

**EFFECT OF GOVERNMENT REGULATIONS ON
FACTORS HINDERING FINANCING OF SMALL
SCALE WATER INVESTMENTS IN KENYA**

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**Effect of Government Regulations on Factors Hindering Financing
of Small Scale Water Investments in Kenya**

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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DEDICATION

To my sons Sam and Ibra. It is my hope that this work will inspire you to work smart and follow the same academic journey.

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ABBREVIATIONS AND ACRONYMS

AMOS	Analysis of Moment Structure
ANOVA	Analysis of Variance
CBO	Community Based Organizations
CFA	Confirmatory Factor Analysis
DBSA	Development Bank of South Africa.
DCF	Discounted Cash Flow
DF	Degree of Freedom
FDI	Foreign Direct Investment
IFC	International Finance Corporation
IFIs	International Financial Institutions
IMF	International Monetary Fund
IRR	Internal Rate of Return
MDGs	Millennium Development Goals
MMR	Moderated Multiple Regression
MPT	Modern Portfolio Theory
NGO	Non-Governmental Organizations
NPV	Net Present Value
NRW	Non Revenue Water
NCWSC	Nairobi City Water and Sewerage Company
OECD	Organisation for Economic Co-Operation and Development
O & M	Operation and Maintenance
OLS	Ordinary Least Square
PA	Path Analysis
POT	Pecking Order Theory
PUB	Public Utility Board
RMSEA	Root Mean Square of Approximation
RMSR	Root Mean Square Residual
RoK	Republic of Kenya

R&P	Risk Premium
SEM	Structural Equation Modelling
SPSS	Statistical Package for Social Sciences
SSWPs	Small Scale Water Providers
US	United States
USAID	United State Agency for International Development
UN	United Nation
UNDP	United Nation Development Programme
UNICEF	United Nation Children’s Fund
VIF	Variance Inflation Factor
WASREB	Water Service Regulatory Board
WHO	World Health Organization

DEFINITION OF TERMS

Access to Capital

This is the ability of an investor to raise fund from both domestic and foreign capital market to finance an investment opportunity (Finger & Allouche, 2002). Access to capital is the trends in capital flows both in domestic and foreign markets that facilitate acquisition of fund to those willing to invest in various sectors (Chan, 2002). The study adopted Finger and Allouche's (2002) definition.

Cost Recovery

Cost recovery is the ability of a project to generate sufficient revenue to recover all expenses incurred by an investor in financing a project including capital cost, operational costs, opportunity cost and economic externalities (Tsagarakis, 2005). Cost recovery is the rate at which an investor is able to re-coup back the amount of money spent in financing an investment to meet both fixed and continuous expenses (Clough, 2004). The study adopted Tsagarakis's (2005) definition.

Investment

An investment is the current commitment of one's funds for a period of time in order to derive future payments that will compensate the investor for the time the funds are committed the expected rate of inflation and uncertainty of future payment (Kelly & Wilson, 2004). Investment is the trade-off of present consumption for a higher level of future consumption through acquisition of an asset in the hope that it will maintain or increase its value (Daude & Stein, 2007). The study adopted Kelly and Wilson's (2004) definition.

Perceived Risk

Perceived risk is a function of consequence and uncertainty that is, a person's feeling of subjective uncertainty that he or she could gain or lose from a transaction whenever a project has more than one possible outcome (Cox & Ritche, 2004).

Perceived risk is an uncertainty that an investment will earn its expected rate of return. It's therefore the volatility of return on an investment (Tsagarakis, 2005). The study adopted Tsagarakis's (2005) definition.

Peri-Urban

These are mainly the informal settlement, least wealthy areas on the outskirts of city with the highest concentrations of people who are unconnected to water services. Without water connections, people buy water from private vendors or collect water from sources that have not been purified (Finger & Allouche, 2002).

Return on Investment

This is the rate at which an investment is able to earn returns to compensate an investor for the time the fund is committed on the project, the expected rate of inflation and uncertainty about project viability (Gleick, 2004). Return on investment refers to the income in monetary value generated or wealth created from an asset or item that is purchased with the idea that it will appreciate and be sold at a higher price in future (Schaub, 2008). The study adopted Gleick's (2004) definition.

Safe Drinking Water

Water with microbial, chemical and physical characteristics that meet WHO guidelines or national standards on drinking water quality (WHO, 2010).

ABSTRACT

In Kenya, most water utilities have been publicly owned and managed. These utility firms have thus been getting financial support from the government in form of subsidies in addition to the revenue they generate internally. However there has been low level of investment in peri-urban areas by both public and private players creating an investment opportunity. Nevertheless this opportunity is not taken up by small scale water investors hence water scarcity. Many people in these areas do not have access to basic water. The general objective of the study was to determine the effect of government regulations on factors hindering financing of small scale water investments in Kenya. Specific objective of the study was to determine whether cost recovery, investor's perceived risk, access to capital and return on investments affect financing of small scale water investments in peri-urban areas in Nairobi Kenya. The study adopted cross-sectional survey research design. A two stage sampling technique was used to obtain a sample population of 150 Small Scale Water Service Providers (SSWPs). The study utilized self-administered semi-structured questionnaire and content analysis for collecting data. Structural Equation Modelling (SEM) and Moderated Multiple Regression (MMR) analysis was used to analyse the relationship between predictor variables and financing of small scale water investments. The findings of the study indicated that government regulation moderates the relationship between predictor variables and financing of small scale water investments. It was recommended that cost recovery should be improved, investor's risks should be mitigated and capital should be made available. In order to improve return on investments of small scale water investments, the government should enhance tariff reviews. The results of the study will contribute to greater understanding of various financial constraints that small scale water investors go through in trying to make water accessible to peri-urban population.

CHAPTER ONE

INTRODUCTION

1.0 Introduction of the Study

In this chapter an overview of the background of the study highlighting factors hindering financing of small scale water investments was undertaken. Global overview of water investments, urban water management in Kenya and water provision in Nairobi is discussed. The chapter also highlight the statement of the problem, objectives, research hypotheses, scope, significance and limitations of the study.

1.1 Background of the Study

Funds for investment are provided to the firm by investors who hold various types of claims on the firm's cash flows. The investment decision is essentially how much not to consume in the present in order that more can be consumed in the future (Magni, 2009). The optimal investment decision maximizes the expected satisfaction (expected utility) gained from consumption over the planning horizon of the decision maker. Sound financial management and capital investment decision making are critical to survival and long term success of a firm. Capital budgeting is the process of analyzing investment opportunities in long term assets which are expected to produce benefits for more than one year (Bosch *et al.*, 2007).

Decisions on investment, which take time to mature, have to be based on the returns which that investment will make (Cary, 2008). Unless the project is for social reasons only, if the investment is unprofitable in the long run, it is unwise to invest in it. Often, it is always good to know what the present value of the future investment is, or how long it will take to mature (give returns). Once projects have been identified, management then begins the financial process of determining whether or not the project should be pursued. Discounted Cash Flow (DCF) methods have become the dominant methods for evaluating capital investment projects (Cary, 2008). DCF methods which takes into consideration the time value of money, is

regarded as theoretically correct and includes at least three different discounting models: the payback period, net present value (NPV) and internal rate of return (IRR) (Brigham & Ehrhardt, 2002).

The payback period basically determines how long it takes to pay back the initial investment that is required to undergo a project (Cary, 2008). The payback period is probably best served when dealing with small and simple investment projects. If the business is generating good returns, it is supposed to recoup its investment in a few years. NPV considers the time value of money, because the cash flows are discounted back at the firm's rate of capital (r). This rate is the minimum return a firm must earn on a project to have the firm's market value remain unchanged. If the amount earned on the project exceeds the cost of capital, NPV is positive, so the project adds value and should be accepted. The larger the NPV, the more financial value the project adds to the owner (s) (Brigham & Ehrhardt, 2002).

IRR is essentially the return to be received over the life of an investment. It is calculated as the discount rate at which NPV equals zero. This is the rate that makes the present value of the cash flows equal to the initial investment. Strictly defined, the internal rate of return is the discount rate that occurs when a project is at break even, or when the NPV equals 0. The decision rule is simple: choose the project where the IRR is higher than the cost of financing. The greater the difference between the financing cost and the IRR, the more attractive the project becomes. Each project that uses internal funds has a cost of capital. IRR should thus be compared with the cost of capital. If the rate earned is more than the rate it costs, then the project should be undertaken as it adds to firm's value. The goal with capital budgeting is to select the projects that bring the most value to the firm.

Water is one of the most basic requirements for human existence, yet over a billion people in the world lack access to it (World Health Organization, 2010). Most water utilities have been publicly owned and managed. This utilities have thus been getting financial support from the government inform of subsidies in addition to the revenue they generate internally. However public water utilities in most parts of the world

have been unable to provide universal access to water services due to financial constraints (Daniel & Karina, 2003). The level of investments in water sector by public utility companies worldwide is very low especially in peri-urban areas.

The rise of Small Scale Water Providers (SSWPs) reflects the inability of public and private water utilities to adequately provide for the water needs of city dwellers. In Kenya, millions of people, especially the urban poor, remain underserved or not served at all by public or private water utilities (Karanja 2011). Due to insufficient structures coupled with rapid population growth and urbanization, the gap between demand and supply of water continues to widen (Dharmaratna & Harris, 2010). Increasingly, SSWPs are being acknowledged as important suppliers within the Kenyan water sector. However, financial constraints faced by these SSWPs, hinders their growth and expansion (World Bank, 2011).

Most water utilities report negative incomes as users' fee are set below full cost recovery level (Finger & Alluche, 2002, Burki & Perry, 2008, Steven *et al.*, 2007). Low cost recovery is often regarded as a major contributory factor to the poor sustainability of urban water management in developing countries. It reduces the capacity of responsible utility firm to increase service coverage and on the other hand, an urban supply system cannot survive without a sound financial base and proven methods of cost recovery. Low cost recovery makes economic viability even more difficult (Burki & Perry, 2008).

Expanding the existing water infrastructure has become a nightmare as the risk of investing in most countries is too high (Hall, Lobina & Motte, 2003). Whether funding can be secured from the financial system—and at what costs—will be determined in large part by the risks that investors think the water project entails. Often the level of risk is estimated by looking at the experience investors have had with similar projects in the past. Volatility of water investment makes most investor fear the risks involved (World Bank, 2010). Even if lenders are willing to finance the project, they may charge a high risk premium which pushes up the cost of financing. For some projects to be financed, external group assume part of the credit risks.

Water investments are by their nature capital intensive and yet this capital is not readily available (World Bank, 2010). Private players are not willing to borrow to finance water investments due to the predatory interest rate and high cost of capital (World Bank, 2011). Project's creditworthiness is judged based on availability of assets pledged by the borrower rather than a borrower's expected revenues and cash flows. Lenders are normally cautious and are likely to require collateral that can be taken in the event of default. SSWPs often must satisfy collateral requirements well in excess of 100 percent of the loan amount needed (World Bank, 2011).

Water investments are characterized by low return on investments as governments are unwilling to raise prices of water to market levels (Bond, 2004). The generated revenue is used to pay, first, operating expenses, then maintenance expenses, next, debt service and finally, profit to project owners. Thus water utilities hardly cover the financing gap due to low return on investments (Greg, 2007). World Bank (2010) noted that one way to increase revenue generated by water utilities is to charge water users directly the full costs of water services.

1.1.1 Global Over-View of Urban Water Investments

In many parts of the globe, population growth and urbanization are increasingly becoming challenges to governments. Provision of safe drinking water is among the most critical challenges for achieving sustainable development over the next decade (UNICEF, 2013). According to UNFPA (2012), almost all of the population increase expected during 2000-2030 will be absorbed by the urban areas in the less developed regions thereby contributing to the straining of the limited water resource. Provision of safe drinking water contributes to sustainable improvements in people's lives regarding their health, education and economic situation, eradication of extreme hunger and the empowerment of women (UNICEF, 2013). In the provision of water services, there is need to balance social and economic needs for water (UNICEF, 2013). This makes managing urban water a challenge, especially given that the demands for water are increasing yet the availability of the resource is decreasing mainly due to financial constraints (Hellmuth, 2011).

Water investment needs in United States of America (USA) was about \$ 19 billion per year serving a total of about 242 million people (Steven, Stephan, Robert & Rocky, 2007). State and local governments invested \$14.5 billion in water supply in 2005. This implied an investment gap of \$ 4.5 billion per year. It was estimated in 2003 that \$ 276.8 billion would have to be invested between 2003 and 2023 (Steven *et al.*, 2007). In USA, 42 percent of investments are financed by private sector borrowing, 39 percent by current revenues, 13 percent by government loans, 5 percent by government grants and 1 percent from other sources (Mayer & DeOreo, 2005). Environmental Protection Agency (E.P.A) argues that approximately 74 percent of Americans are served by publicly owned water utilities, 11 percent by private utilities, while 15 percent are served by their own wells and SSWPs. The main challenges facing urban water users in the U.S.A. includes water scarcity, water quality and water affordability (World Water Council, 2007).

Between 1991 and 2005 a total of US\$ 54 billion was invested in China urban water supply (World Bank, 2011). This is equivalent to US\$ 3.7 billion per year. Between years 2006-2010 US\$ 11 billion per year was expected to be invested in the sector (World Bank, 2011). This implied an investment gap of \$ 7.3 billion per year. In China most urban water utilities reported negative net incomes as user fees were set well below cost recovery levels and government subsidies were insufficient to cover the financing gap (WHO, 2010). Most water utilities in China have low labour productivity and are overstaffed. Non-revenue water (NRW) was estimated to be 20 percent on average (Greg, 2007). Urban water utilities were thus not able to break-even. Peri-urban areas were thus neglected hence served by SSWPs (WHO, 2010).

Investment in water supply in Malaysia had been a responsibility of the 13 states of Malaysia (Lee, 2010). Between 2001- 2005, federal government had allocated US\$ 1.1billions for water supply projects. However faced with US\$ 2.2 billion debt by state utilities, the federal government decided to embark on a sector reform (Lee, 2010). Several states of Malaysia including Kuala Lumpur embarked on a policy of private sector participation in water provision committing to invest US\$ 760 million. This was followed by US\$ 2.5 billion investment in 2004. However the result was a

mixed reaction in the sub-sectors as it didn't work as expected (World Bank, 2006). In 2009, Malaysian utilities managed to recover on average, 15 percent of their operating costs (World Bank, 2011). But it has to be kept in mind that operating costs were kept low through various subsidies. The full costs of service provision operating costs plus capital costs were not covered through revenues. According to the International Benchmarking Network for Water Supply and Sanitation Utilities, there are challenges of low efficiency and poor cost recovery due to low tariffs (World Bank, 2010).

Looking across India, substantial heterogeneity in water delivery is noted. Piped water supplies 69 percent of households in large cities, 45 percent in smaller cities and towns and only 9 percent of rural households. The remaining percentages are served by private and SSWPs (Srivastava & Sen, 2007). Between 2007 and 2012 Indian government had planned to invest US\$ 24 billion or US\$ 4.8 billion per year for urban water supply (Srivastava & Sen, 2007). The central government financed 55 percent of the investments, 28 percent was financed by state governments, 8 percent by institutional financing, 8 percent by external agencies and 1.5 percent by the private sector (Brown, Trevor & Matthew, 2011). The volume of investments was expected to double to reach 0.7 percent of GDP by 2012 (Srivastava & Sen, 2010). Government subsidies in India account for 4 percent. About 98 percent of this subsidy is said to come from state rather than central budgets (Srivastava & Sen, 2010).

The state and federal governments in India spend US \$1.1 billion or 0.5 percent of GDP in subsidizing water between 2007 and 2012. Un-accounted for water accounted for 25 percent to 40 percent of water produced by utilities in the main urban areas in India (Srivastava & Sen, 2010). Overstaffing in Chennai and Delhi is as high as 33 per 1000 connections. Under-pricing made most of the utilities to be unable to recover their costs. The average rate of cost recovery in 20 cities in 2007 was 60 percent (Srivastava & Sen, 2010). The main challenges affecting Indian government in water provision include un-accounted water, overstaffing and low cost recovery mainly due to under-pricing of water (Srivastava & Sen, 2010).

Water supply in Singapore is characterized by a number of achievements among them being access to water is universal, affordable, efficient and of high quality (Public Utility Board, 2012). In the financial year 2010, Public Utility Board (PUB) in Singapore undertook investments of US \$ 290 million in its water infrastructure (Public Utility Board, 2012). In the year 2005, PUB issued for the first time a bond, raising US\$ 400 million to finance part of its investment program (Public Utility Board, 2012).

During the financial year 2010, Public Utility Board group received an operating grant of US\$ 185 million to fund its operation (Ivy, 2010). Water tariffs in Singapore are set at a level allowing cost recovery, including capital costs. The tariffs were raised in the late 1990s from US\$ 13 in 1996 to US\$ 30 in 2000. By the year 2012, water tariff included a conservation tax set at 45 percent for domestic consumption above 40 m³ per month. A general service tax of 7 percent is added to the bill. According to Public Utilities Board, industrial water tariffs are set lower at S\$ 0.52 per m³ (Public Utility Board, 2012).

South Africa has made incredible progress in providing water supplies to its people, though managing fee structures has been a challenge. In August 2000, local authorities cut water supplies to people living in informal settlement who were unable to afford new user fees resulting cholera epidemic (Laia *et al.*, 2008). The government admitted that the policy of cost recovery exacerbated the cholera epidemic, forcing households to seek alternative water sources. In the build-up to privatizing water services, South Africa reversed its policy of keeping tariffs low and overlooking non-payment. But this reversal occurred overnight and without concurrent measures to ease the financial burden on the poor people (Laia *et al.*, 2008).

Responsibility for water service provision is shared among the country's 231 municipalities and private companies (ADB, 2008). In 2010, 11 of the 13 water boards (84.6 percent) were financially viable and were able to recover their operation costs in large part through the "equitable share" transfers from national government

(Paulina, 2009). The share of the population with access to an improved source of water supply increased from 83 percent in 1990 to 91 percent in 2010, implying that almost 15 million people gained access during that period (WHO, 2010). Durban was the first South African city to introduce a policy of free basic water in 1998. In July 2001 free basic water became a national policy that included at least 6m³ of water. However the main issues are the high levels of investment subsidies and financial sustainability of service providers (WHO, 2010).

Annual investment needs in water supply in Ghana are estimated at US\$ 150 million (UNDP, 2006). Actual annual investments needs in water in urban areas have been estimated at around US\$ 40 million per year though only US\$17 million per year is invested. External funding accounted for 96 percent of this investment in the sector. Community Water and Sanitation Agency (CWSA) maintain that public water utilities are responsible for providing, distributing and conserving water (CWSA, 2004). Local private companies are in charge of meter installation, customer billing and revenue collection.

Water supply in Ghana faces a number of challenges including very limited access to water, non-continuous water supply, high water losses and low water pressure. Non-revenue water in urban areas stands at approximately 50 percent of the produced water. Illegal connections account to 3,000 out of 15,000 connections. Most of those connected to water supply do not pay their bills (Water Aid, 2011). At the end of the 1990s, the Ghanaian government participated in that poor payment culture (Water Aid, 2011). The year 2010 reported low labour productivity of 7.2 persons per 1,000 connections. Water tariffs in Ghana were too low (US\$ 0.15 per m³) to recover the costs of the service (World Bank, 2010).

Access to water supply in Ethiopia is amongst the lowest in Sub-Saharan Africa and the entire world (WHO, 2010). The government estimated that the actual investment needs are about US\$ 297 million per year for the period 2006-2015 but the actual investments is approximately US\$ 39 million. This shows a very large deficit.

Investments for 2006-2015 are estimated that 12 percent will be funded by the government, 15 percent by communities and 73 percent by donors (WHO, 2010).

Water in Ethiopia is supplied by both utility companies and private operators. Ministry of finance and economic development states that the year 2011-2015 aims at increasing drinking water coverage from 68.5 percent to 98.5 percent (World Bank, 2011). World Health Organization (2010) indicated that only 38 percent of urban population had access to improved water supply. Few service providers recover all operating costs and generate cash surplus (WHO, 2010). Non-revenue water, low labour productivity of 9 persons per 1000 connections and illegal connections are the main issues in Ethiopia (World Bank, 2011).

Due to challenges and investment condition that characterised most public water utilities, many governments explored increased private investment (Maslyukivska & Sohail, 2008). They tried to expand their access to new financial resources, technical and managerial skills (World Bank, 2011). However private players were reluctant (Burki & Perry, 2008). No private company has provided effective water services to label any of the privately provided water service projects a full success (Gleick, 2004). In recent years, cases in Buenos Aires-Argentina, Manila-Philippine, Atlanta-Georgia, Cochabamba-Bolivia, Jarkata-Indonesia, United Kingdom and South Africa, indicate that water privatization in most countries have suffered major losses (Gleick, 2004). This has made peri-urban population to buy water from SSWPs (World Bank, 2011).

1.1.2 Water Management in Kenya

In the 1980s, Kenyan government began experiencing budget constraints. It could not provide universal access to safe water and expand the water supply systems. As a result, the idea of creating local-government owned commercial utilities emerged (RoK, 2002). Water and sewer department with finances that were separate from the municipal budget were established (Wambua, 2013). The approach was formalized through the Companies Act Cap 486 of 1996 which allowed the establishment of

publicly owned, commercially run water and sanitation companies. The current legal framework for the Kenyan water sector is based on the *Water Act No. 8 of 2002* which became effective in March 2003 (RoK, 2002).

The Water Act of 2002 introduced far reaching reforms based on the principles of separation of the management of water resources from the provision of water services, separation of policy making from day to day administration and regulation, decentralization of functions to lower level state organs, involvement of non-government entities in the management of water resources and in the provision of water services (RoK, 2002). In 2004, the Water Services Trust Fund was established to provide financial assistance towards capital investment costs in areas lacking adequate services. The Water Services Trust Fund receives funds from the government of Kenya and from donor agencies and directs them to the 362 poorest locations throughout the country (WASREB, 2010).

The main sources of funding for Kenyan water utilities includes the government funds of 58 percent, internally generated funds amounted to 11 percent and donor contributions that made up 31 percent of the funds available. Of the estimated donor funding for 2009 - 2010, 70 percent was in the form of loans, whereas grants represented 30 percent. Only 58 percent of the grant money committed by donors was actually disbursed in 2009-2010 (RoK, 2010). Investment in the water sector increased five-fold from US\$ 55 million in 2005 to US\$ 300 million in 2009. The government financed 58 percent of this amount with its own resources, 31 percent was financed by external donors and 11 percent was self-financed by water utilities (RoK, 2010).

Water supply services in Kenya are delivered under three main management models which are public, private and SSWPs (WASREB, 2010). Within the public management model the main providers are the local authorities which are mostly municipalities. Recent reports from the civil society conducting rapid assessment for urban towns in Kenya have shown the challenges of providing adequate and reliable water in urban areas are low cost recovery and low access to capital (UNICEF,

2012). Urban water management has also been a great challenge as a result of government intervention through subsidy programmes. This has also led to many local water utilities failing to deliver good service to its residents due to low returns on investments. Water supply in Kenya is thus characterized by low levels of access particularly in urban slums. Although urban water tariffs are high by regional standards of US\$ 0.46 per m³, on average water utilities face the challenges of shortage of funds, low cost recovery and low return on investments (WASREB, 2010, World Bank, 2011).

1.1.3 Water Provision in Nairobi

Water services in Nairobi are provided by the Nairobi City Water and Sewerage Company Ltd (NCWSC) (WASREB, 2010). NCWSC mainly serve the city's CBD and high income residential zones (Wambua 2013). The private sector plays a limited but not negligible role in operating water supply systems in Nairobi. Small service providers are the main providers of water in the low income settlements areas of Nairobi (Wambua 2013). Some of them sell water from tanker trucks, community based organizations or NGOs, individual water kiosks, through jerry cans or push carts. By 2010, there were 1500 registered small service water providers in Nairobi (WASREB, 2010).

Water tariffs approved by WASREB in June 2009 are as follows; between 0 and 10m³: Kes 18.71 per m³ (USD 0.183 per m³), between 11 and 30m³: Kes 28.07 per m³ (USD 0.273 per m³), between 31 and 60m³: Kes 42.89 per m³ (USD 0.418 per m³) (WASREB, 2009). Water kiosks in slums are billed at a lower rate of 10 shillings per m³ (USD 0.098 per m³) (WASREB, 2010). Nevertheless, slum residents end up paying much more. (Exchange rate as on 18th July, 2015)

A 20-litre jerry can of water in a slum typically sells for 2 Kenyan shillings, corresponding to 100 shillings per m³ (US\$ 1). During drought periods, prices in slums may rise to 5 and even 10 Kenyan shillings per 20-litre jerry can corresponding to 250 and 500 Kes per m³ (US\$ 2.50-5.00) (WASREB, 2010). Low

cost recovery, capital inaccessibility and low return on investments are the main constraints hindering expansion of SSWPs investments in Nairobi peri-urban areas (Karanja, 2011, World Bank, 2012).

1.2 Statement of the Problem

Finance is one of the most important aspects of water investment (Burki & Perry, 2008). Most water utilities in Kenya have been publicly owned and managed (RoK, 2010). These utilities have thus been getting financial support from the government in form of subsidies in addition to the revenue they generate internally (Karanja, 2011). Despite this financial support, public water utilities have been unable to provide universal access to basic water. These utilities hardly generate enough revenue for investment which creates business opportunity for private investors (Daniel & Karina, 2003). However the level of water investments by small scale service providers in Nairobi peri-urban area is very low (NCWSC, 2011).

Decisions on water investments are based on project's cost recovery, investor's perceived risks, availability of funds and return on investments among other factors (Cary, 2008). Due to low level of investments in water sector, 71 percent of population that lives in Nairobi's peri-urban areas do not have access to basic water (UN Habitat, 2010). Most women spend a lot of time looking for water, instead of gainful economic activities (Karanja, 2011). Many people among this population suffer from preventable diseases while others die every year due to water related problems (UNDP, 2006). Additionally, economic resources are sapped by the cost of medicine to treat waterborne diseases which takes 12 percent of the country's health budget (WHO, 2010). The social and economic consequences of a lack of clean water also penetrate into realms of education, opportunities for gainful employment, agricultural and industrial development (World Bank, 2010).

In Kenya, studies have been done in regard to water. Water Service Regulatory Board (2010) carried a study to assess accessibility to clean piped water in Nairobi. Mukulu, Oyugi and Mwarania (2011) studied the market drivers for competitive advantage of micro and small piped water enterprises in peri-urban areas of three

Kenyan cities of Nairobi, Mombasa and Kisumu. Karanja (2011) conducted a study on improvement of water provision in Nairobi through control of non revenue water. Muiruri (2003) surveyed factors influencing management and commercialized urban water services in Kenya. Wambua (2013) studied water privatization in Kenya, while World Bank (2004) studied effects of water scarcity in Kenya. It is evident that there is hardly any empirical literature that discusses effect of government regulations on factors hindering financing of small scale water investments in Nairobi Kenya. This study therefore intended to fill this pertinent gap.

1.3 Objectives of the Study

The study was guided by the following objectives;

1.3.1 General Objectives

The overall objective of the study was to determine the effect of government regulations on factors hindering financing of small scale water investments in Kenya.

1.3.2 Specific Objectives

1. To establish whether cost recovery influences financing of small scale water investments in Nairobi peri-urban areas in Kenya
2. To assess the effect of investor's perceived risks on financing of small scale water investments in Nairobi peri-urban areas in Kenya
3. To investigate the impact of access to capital on financing of small scale water investments in Nairobi peri-urban areas in Kenya
4. To find out whether return on investment influences financing of small scale water investments in Nairobi peri-urban areas in Kenya
5. To establish the moderating effect of government regulations on the relationship between predictor variables and financing of small scale water investments in Nairobi peri-urban areas in Kenya.

1.4 Research Hypotheses

The study used the following null hypothesis.

1. **H₀₁**: There is no significant relationship between cost recovery and financing of small scale water investments in Nairobi peri-urban areas in Kenya
2. **H₀₂**: There is no significant relationship between investor's perceived risks and financing of small scale water investments in Nairobi peri-urban areas in Kenya
3. **H₀₃**: There is no significant relationship between access to capital and financing of small scale water investments in Nairobi peri-urban areas in Kenya.
4. **H₀₄**: There is no significant relationship between return on investment and financing of small scale water investments in Nairobi peri-urban areas in Kenya.
5. **H₀₅**: Government regulations have no moderating effect on the relationship between predictor variables and financing of small scale water investments in Nairobi peri-urban areas in Kenya.

1.5 The Scope of the Study

The study covered small scale water service providers in peri-urban areas of Nairobi Kenya. Nairobi peri-urban areas have the highest concentration of people who are unconnected to water and sanitation services (WASREB, 2010). Kasarani, Langata and Dagoreti constituencies constituted the areas of study. These areas have informal settlements characterised by low level of water investment by both public and private players hence water scarcity (NCWSC, 2011). Many people in these areas still do not have access to basic water yet there is little participation of private players (UN HABITAT, 2010). Small scale water service providers are the main providers of water in these low income informal settlements (Wambua, 2013). Accessible population for the study were those who sell water from tanker trucks, community based organizations or NGOs and individual water kiosks.

1.6 Significance of the Study

This study will be of great importance to water utilities firms that are experiencing difficulties in meeting their financial commitments because of insufficient operating revenues and capital financing. Various measures of improving revenue generated by water utilities were addressed. The study will also be of help to the government officers in the ministry of water in evaluating the importance of investments in water, enhance financial access for the general economic growth and for the good health of the citizens. The government will be able to address these issues according to the researcher's recommendations.

Water utilities will benefit since the study addressed the most critical factors pertaining to financing of water investments. This contributes to greater understanding on various challenges that utilities go through in trying to make water accessible to all. The study will also add value to the existing body of knowledge as it will develop a model for an effective fund provision and allocation that will be necessary to meet the Millennium Development Goal for safe water facilities through water investments.

1.7 Study Limitations

A limitation is an aspect of research that may influence the result negatively (Mugenda, 2008). The highly encountered limitation was obtaining information from the selected sample as most investors were not willing to disclose some information which they found confidential. The study overcame this limitation by having an introduction letter from the University to assure them that information provided was to be used for academic purpose only. Another limitation of the study was related to obtaining random sample as some of small scale providers are mobile. To overcome this limitation, ample time was dedicated in obtaining sample and where necessary, well trained research assistants were employed.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, a review of relevant existing literature was undertaken. The main goal was to get updated with the current literature on factors hindering financing of small scale water investments in Nairobi peri-urban areas. The review also gave unbiased and comprehensive view of the research topic.

2.2 Theoretical Literature Review

A theory is a systematic explanation of the relationship among phenomena. Theories provide a generalized explanation to an occurrence. A theory is a reasoned statement or group of statements which are supported by evidence meant to explain a phenomenon. A researcher should therefore be conversant with those theories applicable to his/her area of research (Kombo & Tromp, 2009). Trochim (2006) argue that theoretical framework guides research, determines what variables to measure and what statistical relationships to look for in the context of the problem under study. Thus, the theoretical literature helps the researcher see clearly the variables of the study, provides a general framework for data analysis and helps in selection of applicable research design (Kombo & Tromp, 2009).

2.2.1 Transaction Costs Theory

The transaction costs approach takes the choice of ‘make’ or ‘buy’ within a private firm framework and applies it to government decisions concerning public services delivery. Williamson (1999) argues that transactions have three basic dimensions. 1) Uncertainty on how the transaction develops and its results. 2) The frequency with which transactions are repeated. 3) The relative requirement of long-term investments specifically related to the transaction or sunk costs. Because of these factors, the institutional organization required to establish and to apply the contracts can be very complex.

Theoretical analysis of privatization and contracting out uses the concept of transaction costs in an open sense which includes administrative costs as well as costs from incomplete contracts. In their theoretical analysis on the choice between public and private production, Sappington and Stiglitz (1987) argue that the main factor explaining the choice of production form is a function of the transaction costs and cost recovery derived from the delegation of authority. Cost savings are likely to emerge when transactions costs are not huge. Hence, depending on the characteristics of the concrete service, savings will be more or less likely. Stein (1990) used this approach to classify local government services and assess form of delivery. Transactions costs have been used to explain government choice in the decision to contract out (Hefetz & Warner, 2004).

However, some authors like Osborne and Plastrick (1997) downplay the contracting costs and argue that the costs of bureaucracy are higher. Others find the transactions costs to be a significant factor in explaining decisions to privatize or re-internalize production (Hefetz & Warner, 2004; Kavanagh & Parker, 1999). Cost savings and recovery expectations from this view are dependent on nature of service and local market conditions.

2.2.2 Prospect Theory

Kahneman and Tversky (1979) in their critique of the expected utility theory as a descriptive model of decision making under risk and uncertainty developed an alternative model, which they called prospect theory. Prospect theory states that people's perceptions of gain and loss are skewed. That is, people are more afraid of a loss than they are encouraged by a gain. If people are given a choice of two different prospects, they will pick the one that they think has less chance of ending in a loss, rather than the one that offers the most gains. According to their empirical evidence, Kahneman and Tversky (1979) found out that human beings give more weight to outcomes that are more certain as compared to outcomes that are merely probable. This theory assigns more value to gains and losses as compared to the final asset. The theory divides the choice process into two faces. The first face involves framing

by which mental accounts are created and the second phase involves the evaluation of these mental accounts and making a choice (Kahneman and Tversky, 1979).

According to Wood (1996), investors are able to frame situations creating a feeling of a possible loss or gain, which would yield pain or pleasure. Lebaron (1999) observes that, prospect of losses is more distressful to a human being than they are pleased by equivalent gains. Tversky (1990) noted that, people exhibit risk seeking rather than risk adverse behaviour when faced with higher chances of loss. The most studied concepts of prospect theory include; Regret aversion, Loss aversion and mental accounting. All these are states of mind that can influence the decision making process of a human mind. Pious (1993) notes that regret refers to people's emotional reaction to making a mistake. Statman (1999) argued that errors in judgments affect investors making them grief or sorrowful.

Loss aversion recognizes that the mental penalty associated with a loss is greater than the mental reward from a similar size gain (Shiller 2000). Loss aversion may encourage investor-herding behaviour, for example, to invest in respected companies as these carry implicit insurance against regret (Koenig 1999). Lehenkari and Perttunen (2004) found that both positive and negative historical returns significantly reinforce the negative association between the selling propensity of investors and capital losses, suggesting that investors are risk averse. Odean (1998b) argues that loss aversion may be a common feature of investor behaviour, but it generally produces bad decision-making and directly affects investor wealth.

2.2.3 Credit Market Theory

This theory asserts that if collateral and other pertinent restrictions remain given, then it is only the lending rate that determines the amount of credit to be dispensed by the financial sector. Increase in demand for credit and fixed supply of the same will make interest rate rise. It is thus believed that the higher the failure risks of the borrower, the higher the interest premium (Ewert, 2000). The credit market theory argues that the risk free interest rate is determined by interplay of two forces, the demand for and supply of credit. A significant fraction of credit transactions in

underdeveloped countries still takes place in the informal sector, in spite of serious government efforts to channel credit directly via its own banks, or by regulating commercial banks. This is largely because the poor lack sufficient assets to put up as collateral—a usual pre-requisite for borrowing from financial institutions (Piketty, 1997). Some of the lenders demand collaterals and other requirements thus locking out potential borrowers. Collaterals in lending contracts are based on moral hazard and adverse selection that leads to credit rationing (Stieglitz & Weiss 1981).

From this theory collateral and maybe other lending requirements are seen to be hindering the ability of an entrepreneur to access funds thus resulting to credit rationing and low investments. Credit is essential in poor economies in a variety of ways. It is required to finance working capital and investment in fixed assets in order to accumulate saving (Stiglitz & Weiss, 1981). It is an important instrument for smoothing consumption, in a context where incomes typically experience large seasonal fluctuations. Availability of credit reduces reluctance to adopt technologies. The credit market thus affects output, investment, technology choices and inequality (Jaffee & Russell, 1976).

2.2.4 Frictional Theory of Profits

According to this theory there exists a normal rate of profit which is a return on capital that must be paid to the owners of capital as a reward for saving and investment of their funds rather than to consume all their income or hoard them (Stigler, 1982). The term investment refers to transactions that increase the magnitude of real aggregate wealth in the economy. The theory has been used to explain why and how individuals make decisions when investing, saving and even borrowing money. Schmidt (2010) explains that it is important to understand the investment decision of investors, what motivates them, even before considering the selection criterion and ability.

According to the theory, profits exist for some time because of frictional factors which prevent an instantaneous adjustment of the system to the new conditions (Friedman, 1992). When profits are made by firms more firms will enter the industry

until all profits are driven down to zero (that is, firms will be making only normal return on their capital investment). Economic considerations exert influence on individual's keen to make capital gains or receive any payments from the investment they make. In the investment market, an investor faced with options to invest in will logically choose the investment that guarantees protection of wealth and comparatively provides higher returns in the market (Cole & Shastry, 2009).

Profit motive drives a free-market economy (Hammond, 2006). In general, profits perform useful function of sending signals for changing levels of output of various products and for re-allocation of resources among them (Dreman, 2008). The theory is based on the assumptions that the objective of the firm is to maximize its profits. However critics of the theory assert that the principle of profit maximization assumes that firms are certain about the levels of their maximum returns. But profits are most uncertain for they accrue from the difference between the receipt of revenues and incurring of costs in the future. It is therefore not possible for firms to maximize their profits under conditions of uncertainty (Stigler, 1982).

2.2.5 Public Interest Theory of Regulation

The public interest theory of regulation was the theory that was used to guide the study. According to the theory, government regulation is justified by the pursuit of the public interest (Armstrong, 2003). It thus suggests that regulation arises from the need to protect and maximize social welfare. Public interest theory assumes that rational and dis-interested expert regulators exist and that they actually are the best means to identify and ensure the common goals of society (Vicker and Yarrow, 1991). The theory is based on two main assumptions. 1) Areas are prone to fail if left alone and 2) Regulation is costless. Thus market imperfection justifies regulation which has no cost (Armstrong, 2003).

The objective of regulation is to achieve certain public desired results by rectifying situations of market failure which make areas operate inefficiently or inequitably (Posner, 1974). The most relevant market failures in water utilities arise in relation to natural monopolies, externalities, public good characteristics, pollution and

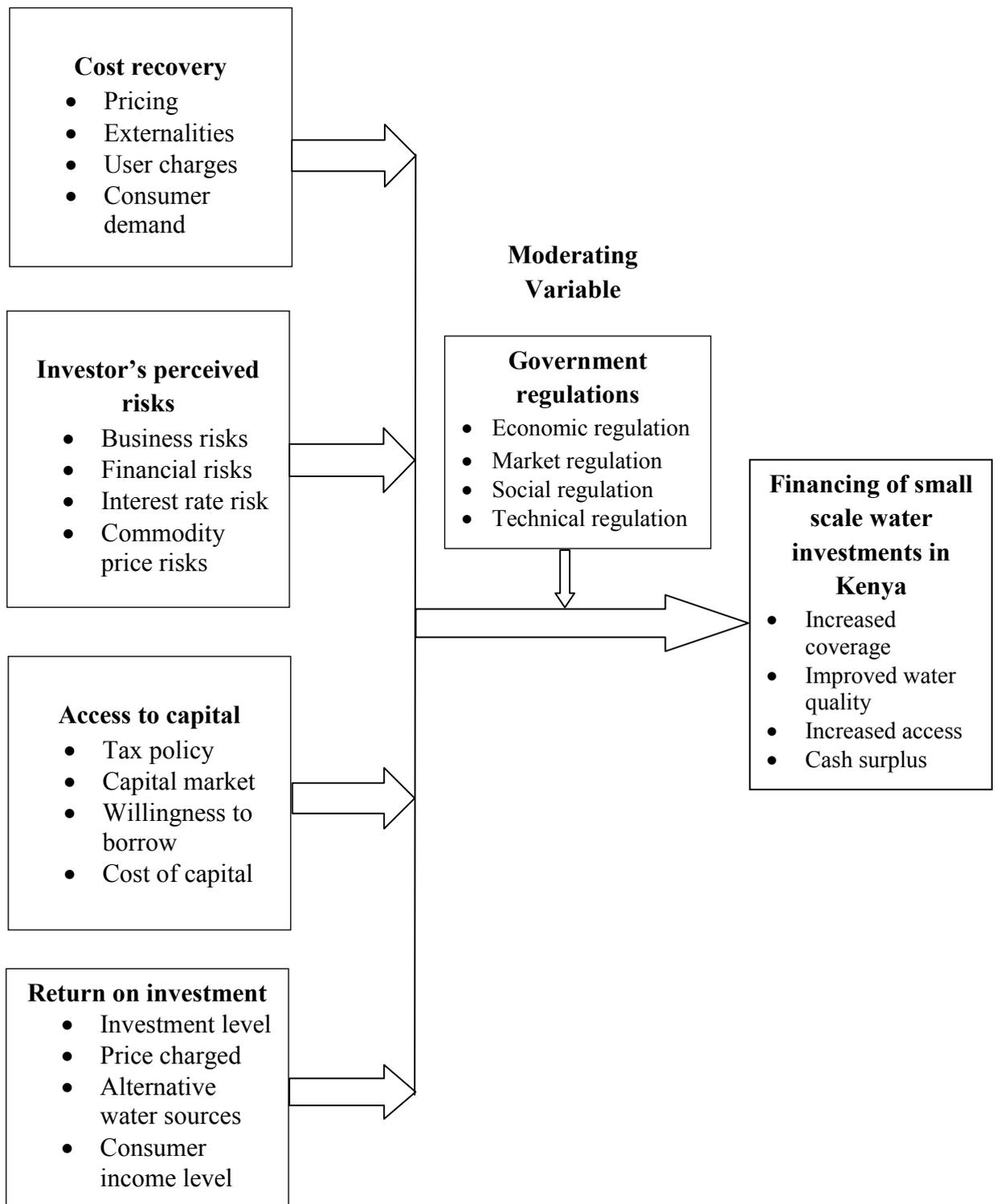
asymmetry of information in the market (Newbery, 2002). However this theory has been criticised. Some authors argue that public interest is difficult to define and to be written down into specific policies (Posner, 1974).

There are no complete informed and rational decisions. Critics to the theory say that it is preferable to rely on the market to solve market imperfections, than on government intervention (Stigler, 1971). The creation and operation of regulatory agencies is meant to transfer economic resources to private interests in return for votes or campaign contributions to politicians. There exist political justifications for regulation (Shirley *et al.*, 2000.) The central actors in the government service delivery process would seek to maximize their personal utility and interests. Politicians and bureaucrats manage these services with the objective of extracting material gains and political power (Spiller & Tommasi, 2005).

2.3 Conceptual Framework

A conceptual framework is a set of broad ideas and principles taken from relevant fields of inquiry and used to structure a subsequent presentation (Reichel & Ramey, 1987). It is a diagrammatical representation that shows the relationship between dependent and independent variables (Young, 2009). Mugenda (2008) defines conceptual framework as a concise description of the phenomenon under study by a graphical or visual description of the major variables of the study. It consists of both independent and dependent variables, with the independent variables presumed to occasion or cause changes in dependent variables (Mugenda, 2008).

The study seeks to explain the dependent variables (Kothari, 2004). The independent variables in this thesis were Cost recovery, Investor's perceived risks, Access to capital and Return on investment. Government regulations was the moderating variables while financing of small scale water investments in Nairobi peri-urban areas in Kenya was the dependent variable.



Independent Variables

Dependent Variable

Fig 2.1: Conceptual Framework for Factor Hindering Financing of Water

2.3.1 Cost Recovery

UNDP (2003) state that cost is the major limiting factor of access to clean water. High costs, low efficiency and unreliability are the characteristics of many utilities in developing countries like Kenya mainly rural and sub-urban areas. The financing cost of water utilities exceeds the capacities of the public sector utilities (Hymer, 2009). The cost to replace the deteriorating water infrastructure in industrialised countries may be as high as \$ 200 billion a year. The type of cost, pricing, consumer demand, external conditions and charging user directly are vital issue for the full cost recovery (Dinar & Subramanian, 2007).

Determination of the optimal price is difficult because of the absence of competitive areas in water supply (Alarerts, 2008). Step tariffs encourage water efficiency use, as the marginal price of water increases from the first to subsequent blocks (Alarerts, 2009). Affordability is the social aspect of water service provision that is most clearly and closely linked to pricing policies. Affordability of water services may not be distributed equally across income groups. A lower income household will inevitably pay a higher proportion of their income for water services than a higher income household does (Haq, 2006) and thus it is important to consider the social and economic value of water. Major development agencies such as the World Bank support the economic concept of willingness to pay for water for full cost recovery (Becker, 2009).

In theory, a water pricing system where charges are equal to the marginal costs of providing the water services will allocate resources more efficiently. Dinar and Subramanian (2007) argued that a proper pricing mechanism could improve water allocation and conservation but in practice, deviations from the pricing principle of marginal cost are common. Seppala and Katko (2003) estimated the welfare gains from reforming water prices and founds that the prices charged to residential consumers are only a third of the estimated marginal cost for water supply. Water pricing should reflect the full costs of supply including environmental and resource costs (Seppala & Katko, 2003).

Finger and Allouche, (2002) maintain that external factors affecting investment cost of water services include geographical and hydrological features – climate, water resources (surface or ground), the level of economic and social development, the size of settlement to be serviced, the quality of raw water, gradient from the source, the status of existing infrastructure, economic externalities and services (Finger & Allouche, 2002).

Charging water users directly to recover the costs for water service encourage a decrease in water use and facilitate the private provision of water services (World Bank, 2004). World Bank (2004) argues that charging customers the full cost for service delivery is necessary but unrealistic, because many people cannot afford to pay the full cost of water services. Their preferred method is cross-subsidization, which means charging the wealthy more than cost and the poor less than cost for water services instead of using public funds. Camdessus (2003) promote a long-term target of full cost recovery, but argue that the process needs to happen slowly and citizens need to see improvement in services in order to be willing to increase payment for water services. All developing countries should be encouraged to implement direct water usage fees, which later may enable the private provision of water services. Cost recovery can also be implemented by public water utilities to promote the efficient use of water (Kikeri & Kolo, 2005).

People's demand for services is shown in prices. As demand increases people's willingness to pay more also increase and this consequently improves the service delivery of a water utility. The excess price paid over and above the prices that justify the true value of a product may be indicators of consumers demand for product or service (Tse, 2001). Service demand is explained in terms of natural market failure due to economic conditions like inflation, tax and interest rates. These elements influence the relevant prices of factors of production which in turn have an effect on demand for services. Demand for water is affected by price charged, quality of water, consumer's income and alternative water sources (Argyre, 2006).

2.3.2 Perceived Risks

Liekweg and Weber (2000) state that risk and economic activity are inseparable. Investments involve a trade-off between risks and return. Every business decision and entrepreneurial act is connected with risk. This applies also to water provision enterprises. Hermann (2006) argue that in a real business environment with market imperfections, investors need to manage those risks in order to secure their business continuity and create additional value by avoiding or reducing transaction costs and cost of financial distress or bankruptcy. Risk is uncertainty that an investment will earn its expected rate of return. Water business activities are uncertain regarding their outcome and this uncertainty implies risks to the profit of the firm (Raffie, Kambiz, Rangesan, Narayanan, Thomas, David & John, 2007).

Cox and Ritche (2004) define perceived risk as a function of consequences and uncertainty that is, the person's feeling of subjective uncertainty that he or she could gain or lose from the transaction. Uncertainty and risk are present whenever a project has more than one possible outcome (Li, 2006). The risk analysis programme will reduce the probability that an event will occur and which event will have temporary or long term impacts on the water management (Green, 2003). Some of the key risk factors during the different stages of a project are likely to include cost over-runs, high tariffs, interest rate fluctuations, changes in regulation and losses caused by external force (Hermann, 2006). Sensitivity analysis assesses risks by identifying the variables that most influence the net benefits of the project and quantifying the extent of their influence (Bel & Anton, 2006).

Eichhorn (2004) asserts that risks can be of different forms; Business risk, Financial risks, Interest rate risk, and Liquidity risk among others. Business risk is the uncertainty of income flows caused by the nature of a firm's business. Hermann (2006) argue that the less certain the income flows of the firm, the less certain the income flows to the investor. Investor will demand a higher risk premium that is based on the uncertainty caused by the basic business of the firm. If water investment experience unstable sales and earnings growth over time it would have high business

risk and is not able to earn a profit for the year. The result is a partly or whole consumption of equity in the period and loss of solvency (Hermann, 2006).

Borner (2006) defines financial risk as uncertainty introduced by the method by which the firm finances its investments. If a firm borrows money to finance investments, it must pay fixed financing charges (in the form of interest to creditors) prior to providing income to the common stockholders, so the uncertainty of returns to the equity investor increases. This increase in uncertainty because of fixed-cost financing is called financial risk or financial leverage and causes an increase in the stock's risk premium (Borner, 2006).

Interest rate risk is based on changes in interest rates and can be observed in different forms. The first form refers to changes in interest rates in connection with variable loans and short-term financing. A rise in the interest rate leads to higher interest payments for the variable rate loan and more expensive follow-up financing (Dhanini *et al.*, 2007). This decreases the company's earnings and can in worst case it is lead to financial distress. The more debt especially short-term and variable rate debt a business has, the more vulnerable it is to changes in the interest rate (Dhanini *et al.*, 2007). Demand sensitivity caused by interest rate changes can also be regarded as part of the interest rate risk (Dhanini *et al.*, 2007).

Commodity price risk is the risk of market price volatility. Water fluctuations can cause much higher (or also lower) procurement costs than anticipated and decrease or increase the profit margin of the firm. In worst case the company makes a loss with the production (Carlo, 2008). There exist alternative sources of water that can be used creating a commodity risk to an investor. In particular, increased water prices and other related regulations are a key outcome of recent policy changes in the water sector. Such policy pressure condition water consumers to regard water as increasingly costly and unreliable and so motivate them to minimise the amount of water that they consume (Cousins, 1999). A project is considered to be bankable in the private sector if it is financially viable and sufficiently robust to survive a downside risk scenario without the financiers losing their money. If either of these

requirements is not met, private finance will not be forthcoming and the project will have to be developed using public funding (Cousins, 1999).

2.3.3 Access to Capital

There are many determinants of capital flows to emerging areas. Both global trends in capital flows and country-specific characteristics that reflect domestic fundamentals and investment opportunities are important determinants of capital availability (Kalemli & Volosovych, 2008). Low-quality institutions are the main impediment to capital flows and portfolio investments. Daude and Stein (2007) argue that government stability as well as law and order seem to exert a particularly strong impact on water investment decisions. Government instability and poor-quality laws, regulations and policies, especially those imposing on economic conditions are major deterrents to water investments.

Developing nations tend to have difficulty raising money to finance water investment (World Bank, 2010). These governments have few alternatives to capital areas. Their treasuries are stretched and insufficient to finance major water projects (World Bank, 2004). Large portions of their economies are unregulated and untaxed 'grey areas' or 'informal sectors'. Developing nations therefore have few options for raising new revenues (World Bank, 2004). The lowest-income countries have the fewest loan options (World Bank, 2004). Funds provided for investment come from variety of sources including bank loans or mixed systems. An efficient credit market will support competition between different types of lending (Burki & Perry, 2008).

Finger and Allouche (2002) state the poor neither trust their governments nor have liquid capital to invest due to their low income. The very poor around the world have at least \$ 9.3 trillion in illiquid 'dead capital' in real estate for which they do not have formal title but nevertheless 'own' in practice. Burki and Perry (2008) argue that developing new financial products or providing guarantees will not help if private investors and water utilities are unwilling or unable to borrow mainly due to prevailing economic environment. Investor's willingness to borrow is affected by tax rate, inflation and interest rates (Burki & Perry, 2008).

From the private or SSWPs perspective, borrowing may be an option if citizens demand better services and if they are able and willing to pay for them. Removing barriers on the demand side is a pre-requisite to developing active and efficient credit systems. Many governments have created Municipal or Urban Development Funds to channel credit to water utilities for investment (Sunman, 2001). In the majority of cases, these funds have been established in cooperation with international organizations like the World Bank, regional development banks or bilateral donors.

Governments with many pressing and competing commitments for budgetary transfers cannot be relied on entirely to financially support water utility operations, let alone capital investments needs requirements (Sunman, 2001). Funding may be available but more often on a sporadic or non-recurring basis (World Bank, 2004). Often, these are rationed to accommodate a number of competing needs across different sectors and purposes. Over the past century, industrialized nations have pioneered a tried-and-tested approach to financing water infrastructure expansion for instance, raising local capital by issuing long-term debt that can be repaid with revenues collected for services provided to new customers (Burki & Perry, 2008).

Unfortunately, the situation in developing nations is very different. The cost of capital is far higher in poor nations because capital is scarce and water infrastructure investments entail significant political risks. With the considerable public financial resources available in the water sector and the high cost of capital, the size of the market for a loan linked product is likely to be limited over the medium term (Burki & Perry, 2008). Thus, public funds are not sufficient to build the infrastructure required to effectively meet the demand for water services (Finger & Allouche, 2002). The town authorities and the private operators have failed to extend piped water to parts of the town due to lack of funds (Burki & Perry, 2008). A view is gaining ground amongst lenders, donor agencies and other observers that there is a low level of investment in the sector and as a result little demands for finance other than for grants or “soft” loans. This is as a result of high cost of capital (World Bank, 2004).

2.3.4 Return on Investment

Despite the United Nations declaring 1980s as International Decade for Clean Water and Sanitation and the increased funding for water development by IFIs and national governments, there are many intractable problems of financing water infrastructure globally (Gleick, 2002). This is mainly where water infrastructures are financed by public utility companies (Gleick, 2002). Water utilities find it difficult to generate sufficient internal revenues to ensure basic financial sustainability (Gleick, 2002). Gleick (2002) state that the major benefit of private sector involvement in water provision is the transformation of old public water companies that are non-performing into more dynamic businesses. Involvement of private partners has helped to rationalize water companies by increasing efficiency, decreasing the unit cost of services and generating more revenue.

World Bank (2004) advocate that in order to facilitate the transition from public to private water service provision and to increase revenue generated, one pre-conditions need to be met that is, charging water users directly in order to recover the full costs of service provision (instead of subsidizing delivery through general public taxes). World Bank (2004) states that involvement of private partners in project ownership separate the policy-makers from water service providers and makes providers more responsive to clients. This would lead to increased focus on customers, improved customer relations, improved quality of water and increased revenue for the business (Maslyukivska & Sohail, 2003).

Most countries have recently begun considering privatization of their water utilities (Gleick, 2002). However water services have been publicly run because private companies were not interested in owning or managing water utilities that generate low returns (Gleick, 2002). There is little or no profit to be made due to low water prices as governments are unwilling to raise prices to market levels (Bond, 2004, World Bank, 2004). For private companies, it is in their best interest to run the water services with minimal cost to produce the best return possible, even if it means installing poor quality machinery, postponing necessary expansion in service areas or

avoiding system upgrades. The huge investments required for increasing service distribution result in a marked lack of incentive for private companies to invest in the least wealthy areas because they are unprofitable (Gleick, 2002). The result is that private investment is not going where it is needed most that is, to those without access to clean water or invest in the least wealthy areas because they are unprofitable (Finger & Allouche, 2002).

Low income users cannot pay the full costs for the service required for the company to maximize its returns. Ability and willingness of a household to pay for water depends of many factors among them being the household income and quality of service delivered by the service provider. However in Kenya due to the poor service delivery by most water utilities across the country, water shortages were prevalent and this led to many residents to reside to unsafe water source (UNICEF, 2009). Return on water describes the real cost of production and the revenue which should be earned from its sale. This should be considered in the provision of water. In the City of Nairobi in Kenya, reclaimed water is always sold at a below cost price but accounts for a very small proportion (between 2-4%) of the whole production cost (Binnie *et al*, 2003).

2.3.5 Regulations of the Urban Water Sector

Urban water systems (UWS) are essential for life and health as well as for economic development (Green, 2003). For this reason, decisions about the urban water sector (UWS) are undoubtedly political in nature, yet they are also eminently economic. Traditionally, the urban water services were characterised by local monopolies where the in-cumbent was local authority-owned (UNDP, 2006). This can be explained by safety, health, economic and technological reasons related to the sector's specificities. However, in spite of this, the urban water sector has undergone important reforms in the past decade triggered by the search for efficiencies by underinvestment and by new environmental problems (UNDP, 2006). These reforms have created a new environment for urban water management and regulation. The main factors of change that have influenced the reform in the UWS can be separated

into economic, market, social and technical regulations.

Economic regulations imply that the water and water facilities and services, must be affordable for all. The direct and indirect costs and charges associated with securing water must be affordable and must not compromise or threaten the realization of other human rights (Ndaw, 2005). To ensure that water is affordable, states parties adopt the necessary measures that include use of a range of appropriate low cost techniques and technologies, appropriate pricing policies such as free or low cost water and income supplements. The direct and indirect costs and charges associated with securing water must be affordable and must not compromise or threaten the realization of other human rights (McIntosh, 2003). In general, the water service is affordable when not more than 2% of the average family income needs be spent on water (Misiunas, 2005). The major instruments of economic regulation are price and access regulation.

Market regulation concerns specific aspects of operating in the market. Firstly, it is about defining tariffs taking into consideration environmental, social and economic concerns. This is one of the main areas of regulatory intervention in the urban water sector (Green, 2003). Secondly, there is the need to foster operating efficiency in both technical (e.g., reducing water leakages) and economic terms (e.g., reducing costs) (Garcia *et al.*, 2007). Finally, there is the need to regulate the sustainability of the system that is, to ensure asset service ability over time and the development of the infrastructures. This aspect has been somehow neglected in theory with classical utility regulatory analyses favouring a short rather than a long-term perspective.

Social regulation pertains to consumer and environmental protection (Tremolet, Shukla & Venton, 2004). Accessibility to water service, service quality and price affordability are three important dimensions of consumer protection which are no longer automatically guaranteed in most water utility firms. Service quality regulation refers to defining levels of service that meet consumer needs and can be provided at a financially sustainable and affordable cost and monitoring that such level of service is actually provided (Tremolet *et al.*, 2004). Service quality in this

sector also refers to issues such as the number of hours of water service provision per day and the handling of customer complaints. Consumer protection regulation is most appropriately set and enforced at the national level (Tremolet *et al.*, 2004). Environmental protection refers to the regulation of the scarce resource in terms of extraction and discharge of water resources. It comprises both quantitative and qualitative requirements. It also includes the promotion of the efficient use of water. The most appropriate level for defining and enforcing this type of regulation is the river basin which is an ecologically and not a politically defined entity (Tremolet *et al.*, 2004).

Technical regulation aims at ensuring the integrity of the infrastructure systems. So-called “system’s integrity” is about inter-operability of water infrastructures (Klein, 2005). Externalities and informational asymmetries may create technical problems related to inter-operability and interconnections of water infrastructures. System’s integrity is essential for the overall quality of the service provided. Technical regulation involves regular assessment of the state of the overall infrastructure and requires frequent decisions concerning maintenance, replacement and renewal of unreliable network elements which lacks in most government run water utilities (Klein, 2005).

While local authorities and service providers may see the need to charge cost effective prices, central government may intervene and block such moves. This normally results in water being under-priced and poor urban water management. This creates an enormous investment gap (ADB, 2012). Water rates have three major functions namely, economic, financial and social. Economic function is to ensure that scarce resources are allocated efficiently, the financial function is to see that costs are covered by revenue and social function requires that consumers are provided with their basic needs at a price which they can afford. Unfortunately no policy can satisfy economic, financial and social criteria all together. This is because economic criteria would require different prices at every supply but the disadvantages of a uniform pricing policy are considered to be outweighed by the advantages. Secondly, there is spare capacity, the low rate demanded by the

economic criterion would fail to meet the least ambitious financial criterion. Hence either one criterion must be ignored or a compromise must be achieved.

Many experts seem to agree that poor access to water supply is often a result of poor policies and management practices (Yan, 2013). The economists are more emphatic and specific. They concurs that water has been ill-governed, but argues that the problem above all, is that it has been colossally underpriced. It concludes that in meeting the ambitious water target of halving the proportion of people without access to clean water, money will play a part. But greater reliance on pricing and areas are even more crucial (Yan, 2013). Managing water as an economic good is an important way of achieving efficient and equitable use and of encouraging conservation and protection of water resources.

Economic factors play an increasing role in water management. However, full appreciation of the value of water and more systematic water pricing could substantially improve water management. Prices for water have increased considerably in real terms over the past decade. This has been partially attributed to rising of quality standards for water supply. The allocation of scarce resources namely water, capital and human resources done by government agencies is aimed at satisfying the needs of the community. However the central actors in the government service delivery process would seek to maximize their personal utility and interests. Politicians and bureaucrats will manage these services with the objective of extracting material gains and political power (Thompson *et al.*, 2009).

2.4 Empirical Review

A number of research on water investments have been done internationally and locally. Bel (2006) studied the Spanish to determine whether the form of production that is, public, private or small scale service providers' influences operating cost of the water utility. The result of their study found that the form of production does not influence costs and market concentration creates problems for competition.

Saal and Parker (2000) analyzed whether privatization caused a reduction in production costs in USA cities. They found that the trend increasing costs did not change after privatization. Moreover, they found that it is regulation (price caps) that induced efficiency improvements in the mid-1990s.

OECD (2004) carried a study to compare productivity of public utilities verses private water provision in 30 European Union countries. They confirmed that pure private production is more expensive than municipal provision. Water provision costs can be reduced through economies of scale which can be realized through monopoly production be it private or public. Under municipal provision, public or private production can thus be made less costly.

Parker and Zhang (2006) studied the relationship between form of production and costs in a sample of 76 firms in African countries. They found no significant relationship between production form and costs.

Dijkgraaf and Gradus (2006) carried a study to determine whether privatizing water provision increases the cost of water provision in Holland. The findings of their study revealed that private production is initially associated with cost savings but this effect disappears over time even with government regulatory interventions. These results suggest the importance of regulatory environment from an industrial organization approach.

Mann and Mikesell (2006) studied government owned and privately-owned water firms in USA on the basis of cost and addressed both ownership and regulatory aspects. Their model included operating environmental variables (water supply sources, per capita income and population density of market area) as well as institutional variables (ownership, regulation jurisdiction. They found private investor-owned utilities had higher costs than government-owned utilities.

Whittington, Davis and McClelland (2008) carried out a study to assess household demand for improved water and sanitation services in Uganda. The appraisal showed that around 25 percent of the households purchased all their water from vendors

implying that the households were willing to pay for water services. Results of the study confirmed that most households were willing to pay for full costs of water from public taps and only a few can afford to pay for private connection even when offered at less than full recovery cost.

Navarro (2008) modelled a two stage process – the decision by a municipality to intervene in the market and publicly provide a service and the decision of how to deliver the service either through public or private production. They argued that pure private production would be the most costly due to market failures that prevent taking advantage of economies of density. Competition under pure private production increases overlap and denies the opportunity to realize the advantages of economies of density.

Teeples and David (2007) conducted a study to compare public versus private provision costs in six USA states. Their model gave more attention to operational costs (total output, length of the water network, number of connections served, percentage of surface water, percentage of water bought from other agencies and storage capacity). The study found that costs with private production were lower than with public production.

Goldblatt (2009) examined effective demand for improved water supplies in two informal settlements in Johannesburg South Africa. The main objective of the study was to assess the potential for cost recovery from consumers to raise revenue to improve supply of domestic water services. The study concluded that the amount households were willing to pay was not sufficient to cover capital costs for individual household connection but enough to cover the costs at limited consumption level like public standpipes.

Dijkgraaf and Gradus (2006) carried a study to determine whether private water service providers increased their prices after the Holland's government increased tax. They found that private providers increased their prices after the government implemented the VAT compensation fund to place higher tariffs on public competitors.

Mukulu *et al.*, (2011) studied the market drivers for competitive advantage of micro and small piped water enterprises in peri-urban areas of three Kenyan cities. Their research finding shows that the water needs in peri-urban areas of Kenya are not being met either by conventional approaches such as the expansion of networked public utilities nor through formal large-scale private sector companies.

Jones and Mygind (2010) carried a study to compare efficiency between private and public delivery of water services in UK. They found a private provision being efficient in some periods and no significant difference between private and public delivery and efficiency in other periods.

Banda, Farolfi and Hassan (2007) examined the determinants of water quantity and quality in South Africa. One of their findings was that a higher proportion of households (62 percent) were willing to pay for improved quantity compared to improvements in water quality (41 percent). They assessed factors influencing the probability that a household is willing to pay for both improved quantity and quality. The results of the first step revealed that availability of water, households' access to a tap and water per capita were significant determinants of willingness to pay for water quantity.

Raje *et al.*, (2002) examined household willingness to pay for municipal water in Mumbai India. The objective of the study was to ascertain whether consumers would accept an increase in water charges. The results revealed that majority of people were satisfied with the existing services. Affordability and belief (faith) in the management of the project operations and utilization of funds were found to be the key determinants of willingness to pay more for improved water services.

Ntengwe (2004) carried out a study in Zambia to determine the linkages between awareness of water issues, ability to pay for water and affordability of water services. The findings of this study revealed that the amount that people were willing to pay was less than the full cost of the service and that awareness enhances the potential for full cost recovery. Affordability and water quality increased utility's cost recovery rate.

Muiruri (2003) surveyed factors influencing management and commercialized urban water services in Kenya. The findings of the study shows that the main factors influencing management and commercialization of urban water service includes low revenue realised by public utilities, risk factors, income of the residents and water pricing.

Ashton (2000a, 2000b) analysed potential improvement in efficiency in the former public agencies that were privatized in UK in 1990s. His findings show that technical change and total factor productivity improvement after privatization are very small and the unique relevant change seems to be improvement in the quality of the inputs used in the industry.

Yang, Pattanayak, Jonson, Mansfield, van and Jones (2006) examined factors that influence the demand for alternative water supply in Sri Lanka. Explanatory variables were monthly water bill, volume of water per day, hours of water supply, safety of tap water and different levels for water safety and water sources. The study revealed that consumption charges, volume of water, safety of water, hours of supply were key determinants of the choice of water source. The results show that the poor households are more price-sensitive than the rich.

Yang *et al.*, (2006) examined factors that influence the demand for alternative water supply in Sri Lanka. Explanatory variables were: monthly water bill, volume of water per day, hours of water supply, safety of tap water and different levels for water safety and water sources. The study revealed that consumption charges, volume of water, safety of water, hours of supply were key determinants of the choice of water source which in turn affects investor's returns. The results also show that the poor households are more price-sensitive than the rich.

Choe *et al.*, (2005) examined household demand for surface water and quality improvement in Philippines. The result show that support for demand for surface water and quality improvement plan fails sharply as the monthly fee for water service increases.

2.5 Critique of Existing Literature

Bel and Costas (2006) studied the Spanish to determine whether the form of production that is public, private or small scale service providers influences operating cost of the water utility. The result of their study found that the form of production does not influence costs and market concentration creates problems for competition. However the results of the study contradict other studies that state that private provision increases price charged to consumers. Factors leading to price similarity were not explained.

Saal and Parker (2000) analysed whether privatization caused a reduction in production costs in USA cities. They found that the trend increasing costs did not change after privatization. Moreover, they found that it is regulation (price caps) that induced efficiency improvements in the mid-1990s. Their study didn't clearly explain financing variables that made the cost not to change after privatization.

OECD (2004) carried a study to compare productivity of public utilities verses private water provision in 30 European Union countries. They confirmed that pure private production is more expensive than municipal provision. Water provision costs can be reduced through economies of scale which can be realized through monopoly production be it private or public. Under municipal provision, public or private production can thus be made less costly. The study can be criticised as efficiency and effectiveness brought about by technology development greatly reduces cost of production not necessarily economies of scale. Again the study was done in developed nation and the results may not be replicable in developing countries.

Parker and Zhang (2006) studied the relationship between form of production and costs in a sample of 76 firms in African countries. They found no significant relationship between production form and costs. However the results of the study contradict other studies that state that private provision increases price charged to consumers. Factors leading to price similarity were not explained.

Dijkgraaf and Gradus (2006) carried a study to determine whether privatizing water provision increases the cost of water provision in Holland. The findings of their study revealed that private production is initially associated with cost savings but this effect disappears over time even with government regulatory interventions. However financial factors leading to increase in water monthly fee over time after a period of cost savings were not explained.

Mann and Mikesell (2006) studied government owned and privately-owned water firms in USA on the basis of cost and addressed both ownership and regulatory aspects. Their model included operating environmental variables (water supply sources, per capita income and population density of market area) as well as institutional variables (ownership, regulation jurisdiction. They found private investor-owned utilities had higher costs than government-owned utilities. However their study did not highlight other factors that determines costs like, perceived risks, return on investment and investors characteristics that influence investments in water.

Whittington *et al.*, (2008) carried out a study to assess household demand for improved water and sanitation services in Uganda. The appraisal showed that around 25 percent of the households purchased all their water from vendors implying that the households were willing to pay for water services. Results of the study confirmed that most households were willing to pay for full costs of water from public taps and only a few can afford to pay for private connection even when offered at less than full recovery cost. However the study concentrated on public and private provision of water. Willingness to pay for small scale water service providers was not addressed.

Navarro (2008) modelled a two stage process – the decision by a municipality to intervene in the market and publicly provide a service and the decision of how to deliver the service either through public or private production. They argued that pure private production would be the most costly due to market failures that prevent

taking advantage of economies of density. However challenges facing financing of small scale water service providers were not explained.

Teeples and Glycer's (2007) conducted a study to compare public versus private provision costs in six USA states. Their model gave more attention to operational costs (total output, length of the water network, number of connections served, percentage of surface water, percentage of water bought from other agencies and storage capacity). The study found that costs with private production were lower than with public production. Water financing variables like cost recovery, perceived risks, return on investment, access to finance and political issues were not explained.

Goldblatt (2009) examined effective demand for improved water supplies in two informal settlements in Johannesburg South Africa. The main objective of the study was to assess the potential for cost recovery from consumers to raise revenue to improve supply of domestic water services. The study concluded that the amount paid by the households was not sufficient to cover capital costs for individual household connection. Another research should be conducted to investigate causes of low cost recovery among public water utilities.

Dijkgraaf and Gradus (2006) carried a study to determine whether private water service providers increased their prices after the Holland's government increased tax. They found that private providers increased their prices after the government implemented the VAT compensation fund to place higher tariffs on public competitors. However other financial factors other than tax that lead to increase in water price were not addressed.

Mukulu *et al.*, (2011) studied the market drivers for competitive advantage of micro and small piped water enterprises in peri-urban areas of three Kenyan cities. Their research finding shows that the water needs in peri-urban areas of Kenya are not being met either by conventional approaches such as the expansion of networked public utilities nor through formal large-scale private sector companies. However challenges influencing financing of water investments and hindering expansion of water network by water utilities were unexplained.

Jones and Mygind (2000) carried a study to compare efficiency between private and public delivery of water services in UK. They found a private provision being efficient in some periods, and no significant difference between private and public delivery and efficiency in other periods. This is the same result found by Estache and Rossi (2002) in their analysis comparing the efficiency of 50 public and private firms in 29 countries in Asia and the Pacific region. They found that private sector participation have no significant link with production costs. However reasons for efficiency variation were not addressed. The study didn't explain financial factors that influence production costs like price, tax, interest rate and competition.

Banda *et al.*, (2007) examined the determinants of water quantity and quality in South Africa. One of their findings was that a higher proportion of households (62 percent) were willing to pay for improved quantity compared to improvements in water quality (41percent). They assessed factors influencing the probability that a household is willing to pay for both improved quantity and quality. The results of the first step revealed that availability of water, households' access to a tap and water per capita were significant determinants of willingness to pay for water quantity. However financial factors leading consumer willingness to pay for water services were not addressed.

Raje *et al.*, (2002) examined household willingness to pay for municipal water in Mumbai -India. The objective of the study was to ascertain whether consumers would accept an increase in water charges. The level of satisfaction with current water services was assessed. The results revealed that majority of people were satisfied with the present service. Affordability and belief (faith) in the management of the project operations and utilization of funds were found to be the key determinants of willingness to pay more for improved water services. However the study concentrated on municipal water provision hence a study need to be carried out on small scale service providers.

Ntengwe (2004) carried out a study in Zambia to determine the linkages between awareness of water issues, ability to pay for water, affordability of water services and

cost recovery. The findings of this study revealed that the amount that people were willing to pay was less than the full cost of the service and that awareness enhances the potential for full cost recovery. Affordability and water quality increased utility's cost recovery rate. Other factors that influence cost recovery like water pricing, consumer demand, externalities and users charge were not explained hence need for an elaborate study.

Muiruri (2003) surveyed factors influencing management and commercialized urban water services in Kenya. The findings of the study shows that the main factors influencing management and commercialization of urban water service includes low revenue realised by public utilities, risk factors, income of the residents and water pricing. Another study should be conducted to investigate multiplicative effects of commercialization mainly in peri-urban areas.

Ashton (2000a, 2000b) analysed potential improvement in efficiency in the former public agencies that were privatized in UK in 1990s. His findings show that technical change and total factor productivity improvement after privatization are very small and the unique relevant change seems to be improvement in the quality of the inputs used in the industry. However the study didn't clearly explain financing variables that led to productivity improvement in efficiency.

Yang *et al.*, (2006) examined factors that influence the demand for alternative water supply in Sri Lanka. Explanatory variables were: monthly water bill, volume of water per day, hours of water supply, safety of tap water and different levels for water safety and water sources. The study revealed that consumption charges, volume of water, safety of water, hours of supply were key determinants of the choice of water source. The results also show that the poor households are more price-sensitive than the rich which in turn affects investor's returns.. However the study didn't explain factor that may lead to availability of alternative sources like cost recovery, perceived risks, capital availability, return on investment and investor's characteristics

Choe *et al.*, (2005) examined household demand for surface water and quality improvement in Philippines. The result show that support for demand for surface water and quality improvement plan fails sharply as the monthly fee for water service increases. However financial factors leading to increase in water monthly fee were not explained.

2.6 Summary

Theoretical analysis of private provision of water explains that the choice of water provision is a function of transactional costs and cost recovery (Sappington & Stiglitz, 1987). Transactional costs have been used to explain the government choice of the decision to contract out (Hefetz, Amir & Mildred, 2004). Some authors downplay the contracting costs and argue the costs of bureaucracy are higher (Osborne & Plastrick, 2007). Others find the costs to be significant factors in explaining decisions to invest (Hefetz & Warner, 2004).

Risk is viewed as an expectation of loss. Investments with low returns attract few or no investor (Kahneman & Tversky, 2002). Investors tend to put more weight on verbal characteristics than numerical ones. Moreover, the translation of verbal risk expressions into numerical form has shown high variability and context dependence. Different individuals may see the same risk situation in quite different ways (Kahneman & Tversky, 2002).

According to credit market theory, the lending rate determines the amount of credit to be dispensed by the financial sector. Increase in demand for credit makes interest rate to rise (Ewert, 2000). The theory argues that the risk free interest rate is determined by forces of demand and supply of credit. Lenders demand collaterals and other requirements thus locking out potential borrowers (Stieglitz & Weiss 1981). From this theory collateral is seen to be hindering the ability of an entrepreneur to access funds for investments.

Hart and Moore (2000) argue that asset ownership gives the owner control, bargaining power and the right to obtain benefits/returns from an investment. Private

producers therefore have incentives to innovate in return maximization (Guttman, 2000). However, cost reduction can be achieved by reducing the quality of the service.

2.7 Research Gaps

From the foregoing review of relevant literature, it is evident that research in the area of financing of water investment has been done but not in a comprehensive approach. All the literature reviewed indicates that previous studies only concentrated on a few investment variables. Ashton (2000a, 2000b), Saal and Parker (2000), OECD (2004), Bel and Costas (2006), Dijkgraaf and Gradus (2006a, 2006b), Mann and Mikesell (2006) and Teeple and Glycer's (2007) studied the relationship between form of water production and costs.

Jones and Mygind (2000) carried a study to compare efficiency between private and public delivery of water services. Raje *et al.*, (2002) examined household willingness to pay for municipal water. Muiruri (2003) surveyed factors influencing management and commercialized urban water services in Kenya. Ntengwe (2004) carried out a study in Zambia to determine the linkages between awareness of water issues, ability to pay for water, affordability of water services and cost recovery. Yang *et al.*, (2006) examined factors that influence the demand for alternative water supply.

Whittington *et al.* (2008) carried out a study to assess household demand for improved water and sanitation services. Mukulu *et al.*, (2011) studied the market drivers for competitive advantage of micro and small piped water enterprises in peri-urban areas of three Kenyan cities. Karanja (2011) conducted a study on improvement of water provision in Nairobi through control of non revenue water.

From survey of relevant literature, it was found that there are no studies specific to Kenya peri-urban areas on effect of government regulations on factors hindering financing of small scale water investment in peri-urban areas in Kenya. This study was therefore conducted in order to fill these pertinent gaps in literature by studying

the variables that influence financing small scale water investments in Kenya peri-urban areas. This study covered additional important variables that were omitted by previous studies like investors perceived risks, access to capital, return on investment and government regulations. This made the study more comprehensive.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, procedures and strategies that were used in the study are described. The research philosophy, research design, population and sampling frame, sampling techniques and sample size, data collection instruments, pilot study, measurements of variables, data processing and analysis, data presentation as well as preliminary studies are discussed.

3.2 Research Philosophy

Philosophy is defined as the general beliefs, concepts and attitudes of an individual or a group (Mertens, 2010). The philosophical method is based on one's ability to make sound and reasoned arguments (Baronett, 2008). Ancient philosophers established two main types of reasoning to test the validity of their observations and to construct rational arguments, that is phenomenological philosophy or constructivism and positivism philosophy (Cooper & Schindler, 2008; Mertens, 2010). This type of reasoning provides framework for the kind of logical analysis that drives scientific research and discovery (Baronett, 2008).

Constructivist epistemology is a branch in philosophy of science maintaining that natural science consists of mental constructs that are constructed with the aim of explaining sensory experience or measurements of natural world. According to constructivist epistemology, scientific knowledge is constructed by the scientific community, seeking to measure and construct models of the natural world. Phenomenological philosophy or constructivism is concerned with how individuals make sense of the world around them and how in a particular philosopher should bracket out pre-conceptions in his grasp of the world (Bryman, 2012).

Constructivism is based on experiential learning through real life experience to construct and conditionalize knowledge. It is problem based adaptive learning that integrates new knowledge with existing knowledge and allows for creation of

original work or innovative procedures. The study aims at describing the lived experience. It focuses on experience one goes through. However experience is not observable by an external observer. Constructivist epistemology offers an explanation of how human beings construct knowledge from information generated by previous experiences. However constructivism epistemology is subjective. According to constructivism, scientific knowledge is constructed through real life experience. It therefore lacks objectivism of natural science. This implies that knowledge generated is not measurable and cannot be tested to allow statistical justification of the conclusion.

Positivism is an epistemological position or approach that advocates the application of the methods of the natural sciences to the study of social reality and beyond (Bryman, 2012). The basic affirmation of positivism is that all knowledge regards matters of fact are based on the “positive” data of experience. Positivism states that knowledge is obtained using scientific methods which are objective and measurable. Positivism is based on four basic principles (Saunders *et al.*, 2007). The first principle is that of phenomenalism. This implies that only phenomena that are observable and measurable are regarded as knowledge. The second principle is deductivism. This implies that the purpose of the theory is to generate hypothesis that can be tested and allow explanation of laws to be assessed. The third principle is inductivism which states that knowledge is arrived at through gathering of facts that provides basis for laws. The fourth principle is objectivism. This implies that knowledge must be conducted in a way that is based on positive information gained from observable experience and only analytical statements are allowed are known to be true through reason alone (Cooper & Schindler, 2011). Based on the four basic principles of positivism, the study adopted positivism philosophy. This philosophy is based on theories that are used to generate hypothesis that are tested to give statistical justification of conclusions from the empirically testable hypothesis (McMillan & Schumacher, 2010).

3.3 Research Design

Cooper and Schindler (2008) describe research design as a statement of essential element of a study and constitute the blue-print for the collection, measurement and analysis of data. It is a logical and systematic plan prepared for directing a research study. Polit and Beck (2003) describe a research design as the overall plan for obtaining answers to the questions being studied and for handling some of the difficulties encountered during the research process. Kothari (2004) states that a research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. Orodho (2003) define research design as a framework for collection and analysis of data that is suited for research questions.

There are several research designs used in social studies. However, the study used cross-sectional survey research design. It is one of the most widely used non-experimental research designs across disciplines to collect large amounts of survey data from a representative sample of individuals sampled from the target population (Cooper & Schindler, 2011). Crewell (2003) observe that cross-sectional survey research design is used when data are collected to describe persons, organizations setting or phenomena.

A survey is useful when a study wants to collect data on phenomena that cannot be directly observed, such as opinions of the respondents. A cross-sectional study design is used when the purpose of the study is descriptive, often in the form of a survey (Crewell, 2003). Orodho and Kombo (2002) asserts that the central feature of survey is that it allows the collection of a large amount of data from a sizeable population in a highly economical way and gives the researcher control over the research process.

3.4 Population

Sekaran (2009) and Hyndman (2008) defines target population as the entire group of people or 'things' that the researcher wishes to investigate. Zikmund *et al.*, (2010)

defines population as all items in any field of inquiry also known as the 'universe'. Polit and Beck (2003) refer to population as the aggregate or totality of those conforming to a set of specifications. On the other hand, Castillo (2009) defines target population as the entire group of individuals or objects to which researchers are interested in generalizing the conclusions.

The target population for this study was 12,000 water service providers in Kenya including public utilities, private and SSWPs (RoK, 2010). Accessible population is that part of target population which the study can particularly reach to select a representative sample (Mugenda, 2011). There are 1500 registered SSWPs in Nairobi (WASREB, 2010). The accessible population for this study was thus the 1500 registered SSWPs in Nairobi. A sampling frame describes the list of all population units from which the sample was selected (Cooper and Schindler, 2011). It is a physical representation of the accessible population and comprises all the units that are potential members of the sample (Kothari, 2004). The sampling frame for this study was the list of all registered SSWPs in Nairobi (RoK, 2011).

3.5 Sampling Technique and Sample Size

Kombo and Tromp (2009) describe a sample as a collection of units chosen from the universe to represent it. It is therefore important to determine an appropriate sample size (Orodho & Kombo, 2002). A two stage sampling technique was used. Purposive sampling and simple random sampling technique were used in the first and second stage respectively. Purposive sampling involves a deliberate selection of particular units of the universe (Miller & Yang, 2008). It enables the researcher to select specific subjects that provides the most extensive information about the phenomenon being studied (Kombo & Tromp, 2009).

There are seventeen constituencies in Nairobi County. Purposive sampling technique was therefore used to identify three constituencies from where small scale water service provider for inclusion in the study was drawn (Kombo & Tromp, 2009). Langata, Kasarani and Dagoreti constituencies were thus selected for the study. These constituencies were chosen as they are characterised by low level of water

investment by both public and private players hence water scarcity (NCWSC, 2011). Many people in these areas still do not have access to basic water yet there is little participation of private players (UN HABITAT, 2010).

Cohen, Manion and Morrison (2000) agree that 10 percent of the accessible population is large enough to allow for reliable data analysis and testing of significance. Accessible population for this study was 1500 registered small scale water providers in Nairobi (WASREB, 2010). Therefore a proportionate sample size of 150 small scale water service providers was selected. Simple random sampling technique was used to identify 50 small scale water providers from each constituency for inclusion in the study. Sampling technique and sample size details are presented in Table 3.1.

Table 3.1 Sampling Technique and Sample Size

Constituency	Frequency	Percentage
Dagoreti	50	33.33
Kasarani	50	33.33
Langata	50	33.33
Total	150	100

3.6 Data Collecting Instruments

Creswell (2003) defines data collection as a mean by which information is obtained from selected subjects of investigation. Primary data were collected from owners of small scale water service providers in Nairobi using self-administered semi-structured questionnaire (Benchhofer & Paterson, 2008). This technique involves interviewer meeting the respondents physically and asking questions face to face as either the respondents or the interviewer fills in the questionnaire. Self-administered questionnaire has a higher response rate (Benchhofer & Paterson, 2008).

Self-administered questionnaire was the main research instrument of collecting primary data (Eriksson & Kovalainen, 2008). Schwab (2005) defines questionnaire

as measuring instruments that ask individuals to answer a set of questions. Dawson (2009) describe questionnaire as a list of questions that assist the researcher in gathering the intended information. A five Likert scale questionnaire was used. A likert scale is a psychometric scale commonly involved in research that employs questionnaires (Burns *et al.*, 2008). It is the most widely used approach to scaling responses in survey research. When responding to a likert questionnaire item, respondents specify their level of agreement or disagreement on a symmetric agree-disagree scale for a series of statements. Thus, the range captures the intensity of their feelings for a given item (Norman, 2010). The questionnaire was open and closed ended (Dawson, 2002). Questionnaires were used because of their low cost even when the universe is large, results can be more dependable and reliable and is free from bias of the interviewer (Kothari, 2004).

The secondary data was obtained from various finance journals, internet, published financial articles and finance text books (Cooper & Schindler, 2011). Secondary research involves the use of data gathered in a previous study to test new hypotheses or explore new relationships (Polit & Beck, 2003). Castillo (2009) describes secondary data as data that is already available i.e. data that has been analysed and documented by someone else. Secondary data was used to complements information from the primary data (Zikmund, *et al.*, 2010).

3.7 Pilot Testing

A pilot test was done before embarking on actual data collection activity (Eriksson and Kovalainen, 2008). Kombo and Tromp (2009) describe a pilot test as a replica and rehearsal of the main survey. Dawson (2002) states that pilot testing assists researchers to see if the questionnaire will obtain the required results. Polit and Beck (2003) describes a pilot study as a small scale version or trial run done in preparation for a major study. Creswell (2003) and Cooper and Schilder (2011) agree that the respondents used in pilot test should constitute 1 percent of the sample used in data collection. The proportionate sample size of 150 respondents was used for the study. Therefore 15 questionnaires were administered in pilot testing to test the degree of

accuracy of the instrument used to collect data in locations in which the pilot survey took place. The purpose of a pilot test is to enable validity and reliability of research instruments to be determined (Cooper & Schilder, 2011).

3.7.1 Validity Test

Validity is the degree at which data collecting instrument measures what it was supposed to measure (Cooper & Schilder, 2011). Zikmund *et al.*, (2010) describes validity as the accuracy of data collecting instruments. It helped in determining whether the respondents understood the direction and instruction on questionnaires (Cooper & Schilder, 2011). The study used content validity to test the accuracy of data collecting instruments. A judgment procedure of assessing whether a tool is likely to provide contents valid data is to request opinion of expert in a particular field to review it and give suggestions on content improvement (Mugenda, 2008). Opinion of three experts was sought to review data collecting instruments. This helped to improve the questionnaires before proceeding to the field for final data collection in locations in which the pilot survey took place. Results of their responses were analyzed to establish the percentage of representation.

Content validity formular suggested by Amin (2005) was used. This formular is as follows;

Content validity = Number of judges declaring item valid/number of items (3.1)

The results indicated that validity test yielded an average index score of 85 percent. This implies that the instruments were valid.

3.7.2 Reliability Results

Reliability test was conducted as a test of whether data collecting instrument yielded the same result on repeated trials. A statistical coefficient - Cronbach's alpha (α) was used as a measure of internal reliability (Cronbach, 1971). The SPSS for windows reliability program was used to determine the reliability of research instruments. Cronbach's alpha reliability coefficient ranges between 0 and 1. Reliability

coefficient of 0 implies that there is no internal reliability while 1 indicated perfect internal reliability. The recommended value of 0.7 was used as a cut-off of reliability (Sekaran, 2009). A total of 15 questionnaires were used in the test for reliability of the pilot study instruments. The result shows that all the 15 questionnaires gave Cronbach's alpha coefficients of between 0.727 to 0.864. The threshold value of 0.7 was met and thus the pilot study instruments were said to be reliable.

Cronbach's alpha is a generalization of a coefficient introduced by Kuder and Richardson in 1937 (Mugenda, 2011).

The Kuder-Richardson (KR_{20}) is based on the following formula;

$$KR_{20} = \frac{(K) (S^2 - \sum s^2)}{(S^2) (K-1)} \dots\dots\dots (3.2)$$

Where: KR_{20} is the reliability coefficient of internal consistency

K is the number of items used to measure the concept

S^2 is the Variance of all scores and

s^2 is the Variance of individual items

3.8 Factor Analysis

Factor analysis was used to reduce the number of variables by combining two or more variables into a single factor and to identify groups of inter-related variables to see how they were related to each other (Zikmund *et al.*, 2010). Both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were employed to understand shared variance of measured variables that were believed to be attributable to a factor or latent construct (Thompson, 2004). EFA was used at the early stages of research in order to identify the variables that cluster together (Bordens & Abbot, 2014). The goal of EFA was to identify factors based on data and to maximize the amount of variance explained (Suhr, 2006). EFA is used when one

has a large set of variables that are to be described in simpler terms and have no *a priori* ideas about which variables will cluster together (Tabachnick & Fidell, 2013).

Principal Component Analysis (PCA) which is a descriptive variable reduction statistical technique was used in factor extraction. The goal of PCA was to extract maximum variance from the data set with each component (Tabachnick & Fidell, 2013). Principal Component Analysis orthogonal rotation, Varimax methods were used to extract quality constructs for each of the independent variable (Zikmund *et al.*, 2010). Rotations can be orthogonal or oblique (allowing the factors to correlate). Varimax rotation which is an orthogonal rotation was used in factor extraction. Varimax solution yielded results which made it easy to identify each variable with a single factor (Zikmund *et al.*, 2010). Rotation serves to make the output more understandable by seeking the so-called "simple structure", a pattern of loadings where items load most strongly on one factor and much more weakly on the other factors (Zikmund *et al.*, 2010).

The factor loadings, also called component loadings in PCA which is the correlation coefficients between the cases (rows) and factors (columns) was used to indicate the percent of variance in the indicator variable explained by the factor. Tabachnick and Fidell (2007) indicate that a loading factor of 0.32 is a good for minimum loading of an item. However Hair, *et al.*, (2010) guideline for practical significance indicates that a factor loading of ± 0.3 means the item is of minimal significance, ± 0.4 indicates it is more important and ± 0.5 indicates the factor is significant. The study therefore used a threshold factor loading of ± 0.4 .

Confirmatory factor analysis (CFA) was used to test the hypothesis that the items used in measuring each objective were associated with specific factors (Zikmund *et al.*, 2010). CFA evaluates a priori hypotheses and is largely driven by theory. CFA analyses require the researcher to hypothesize in advance, the number of factors whether or not these factors are correlated and which items load onto and reflect which factors (Thompson, 2004). CFA was used for evaluation of relationships between observed variables and unobserved variables that accounts for the

correlation among observed variables (Zikmund *et al.*, 2010). Hypothesized models were tested against actual data and the analysis used to demonstrate loadings of observed variables on the latent variables (factors) as well as the correlation between the latent variables (Zikmund *et al.*, 2010).

3.9 Measurement of Variables

Various indicators were used in measuring of study variables. Measurement of variables was done for independent, dependent and for moderating variable.

3.9.1 Measurement of Independent Variables

The study used four independent variables that is cost recovery, perceived risks, access to capital and return on investment. Cost recovery was measured by evaluating respondent's opinions on water pricing, the influence of external conditions, consumer income levels and user's charges, that is, who should meet the cost of financing water infrastructures. These indicators are vital for the recovery of full cost (Argyre, 2006). Perceived risks were measured by identifying the types of risk(s) that mainly influences investors operations since every business decision is connected to risk (Stroeder, 2008). The indicators used include business risks, financial risks, interest rate risks and commodity price risk.

Access to capital was measured by determining the effects of tax policies in investments in water, capital market, investor's willingness to borrow and the cost of borrowing capital under the prevailing market conditions as this are major deterrent to investment (Stein, 2007). Return on investments is a financial ratio which allows an observer to make some determination of the organization financial performance relative to the firm's asset. Private companies are interested to run water services with minimal cost to produce the best return possible (Daley & Farley, 2004). This was measured by determining investment level, price charged to water users, alternative water sources and consumer income levels.

3.9.2 Measurement of Dependent Variable

The dependent variable for the study was financing of water investment in Kenya. The effects of financing were measured by determining the increased coverage, improved water quality, increased access to water and investor's cash surplus. These indicators were vital in determining performance of water utility (Gleick, 2002). The indicators were analysed in order to determine the effects of independent variable on the dependent variable (Ngechu, 2004).

3.9.3 Measurement of Moderating Variable

The study used government regulations as the moderating variable. Government regulations were measured by identifying the main factors of change that have influenced the reform in the urban water systems. These factors include economic, market, social and technical regulations. Economic regulations were measured by determining whether the government defines water prices and access regulation (Finger & Allouche, 2002). Market regulations were measured by determining whether the government defines water tariffs and operating efficiency in both technical and economic terms (Garcia *et al.*, 2007).

Social regulations were measured by determining whether the government protect consumer by ensuring accessibility to water services, service quality and price affordability. Environmental protection refers to regulation of scarce water resources and promotion of efficient water uses. (Tremolet, Shukla & Venton, 2004). Technical regulations were measured by determining whether the government carry out maintenance, replacement and renewal of unreliable network elements (Klein, 2005).

3.10 Data Processing and Analysis

The data that were obtained from the questionnaires were both qualitative and quantitative. Before processing the responses, every filled questionnaire was tallied for every response per question. The responses were first edited, coded and cleaned for analysis. Qualitative data were analysed using descriptive statistics. Descriptive

statistic including the mean, mode and median, variance and standard deviation were used (Mugenda, 2011). These tools were used to describe and determine the respondent's degree of agreement or disagreement with various statements under each variable (Mugenda, 2011). SPSS was used to conduct descriptive data analysis of each variable and the same was presented in form of percentages, tables and graphs. Quantitative approach involved collecting numerical data through counting of attributes or quantities. The counts were used to report the findings as numbers.

After descriptive statistics for all variables were run, data analysis was further conducted using SEM where two phase process consisting of confirmatory measurement model and structural model were used (Bryne, 2006). The first phase involved estimation of the measurement model which assesses the relationship between the observable variables and the theoretical constructs they represent (Bryne, 2006). However prior to CFA, exploratory factor analysis (EFA) that involved computation of factor loading matrix, communality and principle component analysis (PCA) was conducted. To assess the factorability of items, two indicators were examined (Kaiser Meyer-Olkin measure of sampling adequacy and Barletts Test of Sphericity (Pallant, 2010). These tests were generated by SPSS and helped to assess the factorability of data or suitability of data for structure detection (Pallant, 2010). Kaiser-Meyer-Olkin (KMO) test was used to assess sampling adequacy. Bartlett test of sphericity was performed to assess the appropriateness of using factor analysis (Hair *et al.*, 2013).

The confirmatory factor analysis was conducted in order to assess the extent to which the observed data fits the pre-specified theoretically driven model (Hair *et al.*, 2011). CFA was conducted on each construct. CFA was used to shows the extent to which the observed variables (indicators) represented the underlying latent construct (Hair *et al.*, 2010, Hooper *et al.*, 2008). This was done to assess whether proposed variable indicators had significant factor loadings. This was conducted to ensure that the most appropriate model was selected for analysis (Hooper *et al.*, 2008).

There were four criteria that were used to validate the model fit. These were convergent validity, discriminant validity, construct reliability and construct validity (Hair *et al.*, 2011). Different fit statistical tests were used to determine whether the model provided adequate fit for the data. The fit indices were used to assess whether overall models were acceptable and if acceptable researcher establish whether specific paths were significant (Hu & Bentler, 1999). The most basic test, chi-square goodness of fit test was used (Hair *et al.*, 2010). In order to ascertain that the model provided adequate fit for the data, the study also considered absolute fit indices and incremental fit indices (Hair *et al.*, 2010).

The second phase was the specification of the structural model and evaluation of the relationships proposed and testing of hypothesis (Bryne, 2006). Structural equation modeling was used to test the hypothesized relationship and to fit the structural model. SEM assumes linear relationships or unidirectional causal relationships between the research indicators and latent variables, as well as between latent variables (Bryne, 2006). Path diagrams (models) were used to specify patterns of directional and non-directional relationships among observed variables. This was conducted by use of Analysis of Moment Structures (AMOS) software (Byrne, 2006). The software was also used to assess the model's fit, computes results and develops a visual/graphical output (Bhattacharyya, 2007).

In statistics, path analysis is used to describe the directed dependencies among a set of variables. This includes models equivalent to any form of multiple regression analysis, factor analysis, canonical correlation analysis, discriminant analysis, as well as more general families of models in the multivariate analysis of variance and covariance analyses (MANOVA, ANOVA, ANCOVA) (Dodge, 2003). Prior to SEM, exploratory factor analysis was conducted to ensure that factor loadings for indicators to be used were more than 0.4 and that variable indicators converged on one common construct.

Regression weights were used to test the contribution of each indicator to their relevant constructs (convergent validity). Regression weights were also used to

ε = Error term (Disturbance factors)

Equation 2: Involved forming MMR by creating new set of score for the two predictor x and z and modifying it as a third term in the equation as follows;

OLS Equation $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \dots\dots\dots (3.5)$

MMR Equation $Y = \beta_0 + \beta_1 X_1 Z + \beta_2 X_2 Z + \beta_3 X_3 Z + \beta_4 X_4 Z + \varepsilon \dots\dots (3.6)$

- Where;
- Y = Financing of water investment
 - β_0 = Is the constant or coefficient of intercept
 - X_1 = Cost recovery
 - X_2 = Investor’s perceived risks
 - X_3 = Access to capital
 - X_4 = Return on investment
 - $\beta_1 \dots \beta_4$ = The corresponding coefficients for the respective independent variables
 - Z = Corresponding coefficients for the moderating variable
 - ε = Error term (Disturbance factors) which represents residual or values that are not captured within the regression model.

3.11 Preliminary Tests

It is not enough to estimate a model. It must be subjected to preliminary tests to establish its validity and to enable one to draw conclusion. Prior to data analysis, a number of assumptions were tested. This included outlier, normality, linearity, homoscedasticity, multicollinearity, independence of residuals, common method bias and correlation among study variables. When these assumptions are violated, the study results are likely to give biased estimates of the parameters (Saunders, Lewis & Thornhill, 2007).

An outlier is any observation that is long away from the general pattern of distribution of variables (Crewell, 2003). In a specific regression case of regression model, outliers are observations that are long away from the fitted line (Crewell,

2003). Outliers might increase as the sample size increase. Presence of outliers was detected by use of Mahalanobis d-square test. Detected outliers were dropped after which reasonable boxplots were used to show that variables were normally distributed before analysis.

The test for normality of dependent variable was conducted (Mugenda, 2011). Kolmogorov-Sminov and Shapiro-Wilk test for normality were used to detect all departures from normality (Shapiro & Wilk, 1965). The test rejects the hypothesis of normality when the p-value is less than or equal to 0.05 (Sharpiro & Wilk, 1965). These were used to detect departure from normality for each variable of interest (Mugenda, 2011). Normal Q-Q plot and a histogram were used to give a visualized distribution of random variables.

Linearity means that the amount of change or rate of change between scores on two sets of variables is constant for the entire range of scores for the variables (Bai and Perron, 2008). It is therefore the consistent slope of change that represents the relationship between an independent variable and a dependent variable (Granger & Tera, 2007). Problem of linearity was fixed by removing outliers (Bai & Perron, 2008). The study assumed linearity of the variables because outliers had been dropped.

Levene statistic was used to test the null hypothesis for the homogeneity of variance that the variance of the dependent variable is equal across groups defined by the independent variable that is, the variance is homogeneous. This was meant to determine the distribution of the dependent variable for the groups defined by the independent variable. Similarly Breusch-Pagan and Koenker test statistics was used to test for heterosedasticity.

Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated (Porter & Gujarat, 2009). It arises when there is a linear relationship among two or more independent variables in a single equation model (Gujarat & Porter, 2009). Multicollinearity makes the coefficient estimates to change erratically in response to small changes in

the model or the data. Multicollinearity increases the standard errors of the coefficients (Gujarat and Porter, 2009). It makes some variables statistically insignificant while they should be statistically significant. Detection Tolerance and Variance Inflation Factor (VIF) method was used to test for multicollinearity. Multicollinearity is reflected by lower tolerance values and higher VIF values (Hair *et al.*, 2013).

The independence of residuals was tested using Durbin–Watson statistic. Durbin–Watson statistic is a test statistic used to detect the presence of autocorrelation in the residuals or prediction errors from a regression analysis (Gujarat & Porter, 2009). Durbin-Watson statistic was used to tests the null hypothesis that the errors are serially uncorrelated. The value of Durbin-Watson statistic always lies between 0 and 4 and 1.5-2.5 for the acceptable range with a p-value of less than 0.05 (Gujarat & Porter, 2009).

Common method bias is a bias in a dataset due to something external to the measures that may have influenced the response given (Podsakoff, MacKenzie, Lee & Podsakoff, 2009). Collecting data using a single (common) method may introduce systematic response bias that will either inflate or deflate responses as majority of the variance can be explained by a single factor (Podsakoff *et al.*, 2009).

Correlation among independent variables and dependent variables was tested and illustrated by the multiple correlation matrix on appendix vii. Correlation was used to explore the relationship among group of variables and in turn helped to test for multicollinearity (Pallant, 2010). Absence of multicollinearity allowed the study to utilize all the independent variables (Farndale *et al.*, 2010).

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the research findings and results of the study. The purpose of this study was to determine moderating effect of government regulations on the relationship between explanatory variables and financing of small scale water investments in Nairobi Kenya. The study used cost recovery, investors' perceived risks, access to capital and return on investment as the independent variables, government regulations as the moderating variable and financing of small scale water investments as the dependent variable. Data analysis was conducted for each of the specific objective by use of descriptive statistics, structural equation modelling (SEM) and moderated multiple regression (MMR) analysis.

4.2 Response Rate

Response rate equals the number of people with whom semi-structured questionnaires were properly completed divided by the total number of people in the entire sample (Fowler, 2004). From each of the three constituencies, 50 SSWPs were selected. The study thus administered 150 semi-structured questionnaires for data collection. However, 147 questionnaires were properly filled and returned. This represented 98 percent overall successful response rate.

The 98 percent response rate was attributed to the use of self-administered questionnaire. Respondents were also assured of confidentiality of the information provided. Babbie (1990) suggested that a response rate of 50% is adequate 60% is good and 70% and above very good for analysis. Chen (1996) argued that the larger the response rate, the smaller the non-response error. This implies that 98 percent response rate was very appropriate for data analysis. The results of response rate are presented in Table 4.1.

Table 4.1 Response Rate

Constituency	Sample size	Returned	Percent (%)
Dagoreti	50	49	98
Kasarani	50	48	96
Langata	50	50	100
Total	150	147	98

4.3 Demographic Information

This section present demographic information of the respondents involved in water selling business in Nairobi peri-urban areas in Kenya.

4.3.1 Gender of the Respondents

The study sought to establish the gender of the respondents involved in water selling business in Nairobi peri-urban areas as some forms of business are dominated by a particular gender. Figure 4.1 shows the gender of the respondents. From the findings of the study majority (56%) of the respondents were male while few (44%) were female. The findings are in line with those of Mann and Mikesell (2006) who carried a study to compare government owned and privately owned water provision firms on the basis of costs. They found that majority of privately owned water firms are financed and operated by men. This implies that most small scale water businesses in Nairobi peri-urban areas are operated by male. These results may be attributed to the strong male domineering culture in Kenya where men as seen as the financier and controller of most businesses (Karanja, 2011).

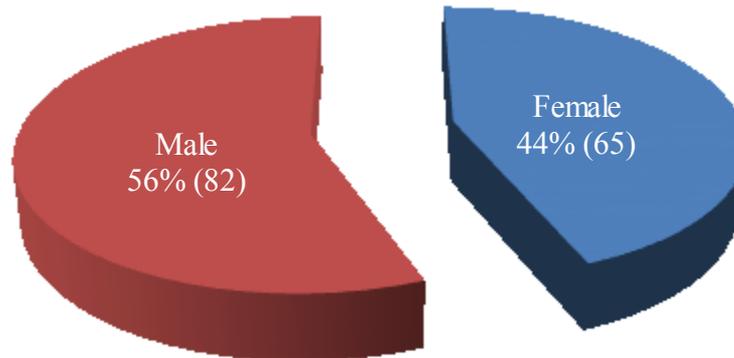


Figure 4.1: Genders of the Respondents

4.3.2 Level of Education

Respondent's education level was categorised into six sub-groups; No education, Primary, Secondary, Tertiary, University and others. The study found that majority (56%) of the respondents had studied up to secondary school. Few (18%) of the respondents had primary school education while those with tertiary education level accounted for 10%. A small proportion (9%) of the respondents had attained university education level. Few (6%) of the respondent had no education thus illiterate. This shows that majority (75%) of the respondents had post primary education level. These results are shown in Table 4.2. The finding agrees with those of World water council (2005) that studied small scale water service providers and found that most water providers in developing countries attained secondary education levels. This implies that majority of small scale water service providers' attained secondary education. Education levels may limit opportunities for gainful employment to individual due to limited training thus may engage in small businesses (Yang *et al.*, 2006).

Table 4.2 Education Level of the Respondents

Education Level	Frequency	Percentage
No education	9	6
Primary	27	18
Secondary	83	56
Tertiary	15	10
University	13	9
Total	147	100

4.3.3 Age of the Respondents

Table 4.3 shows the age of the respondents involved in water selling businesses in Nairobi peri-urban areas. Age of respondents was grouped into six sub-categories that is, below 20 years, 21-29 years, 30-39 years, 40-49 years, 50-59 years and 60 years and above. The findings of the study are as indicated in Table 4.3. The Table shows that majority (34%) of the respondents were between 30-39 years. Few (25%) of the respondents among small scale water service providers in Nairobi peri-urban areas were between 40-49 years old. A small proportion (20%) of the respondents was between 21-29 years. Respondents who were below 20 years accounted for 10% while those with 50-59 years accounted for 7%. A small proportion (4%) of the respondents was above 60 years of age. The findings are in line with those of Njoroge (2006) who found that most small scale entrepreneurs in Kenya are middle aged between 30-40 years. Bass (2005) argues that age bring in experience, responsibility and skills. This finding implies that majority of small scale water service providers are between the ages of 30 to 49 years. This age group is usually energetic, very active, is experienced, responsible and has skills (Teeples & Glyers, 2007).

Table 4.3 Ages of the Respondents

Age	Frequency	Percentage
Below 20 years	15	10
21-29 years	29	20
30-39 years	50	34
40-49 years	37	25
50-59 years	11	7
60 years and above	5	3
Total	147	100

4.3.4 Constituencies of the Respondent

The study was conducted among small scale water service providers in peri-urban areas of Nairobi city in Kenya. Dagoreti, Kasarani and Langata constituencies constituted the areas of study. The results of the study show that majority (34%) of the respondents were drawn from Langata constituency. Few (33%) were drawn from Dagoreti constituency while a proportion of 33% were drawn from Kasarani constituency. The selection of these areas of study was in line with NCWSC (2011) that stated that these constituencies are characterised by low level of water investment by both public and private players hence water scarcity. This implies that the selected areas were ideal for the study. Many people in these areas do not have access to basic water yet there is little participation of private players (UN HABITAT, 2010).

Table 4.4 Constituencies of the Respondent

Constituency	Frequency	Percentage
Dagoreti	49	33
Kasarani	48	33
Langata	50	34
Total	147	100

4.3.5 Length of Service of the Respondent.

Figure 4.2 indicates the period that the respondents had operated water selling business. It was established that majority (50%) of the respondents had been in water business for between 6-10 years. Few (35%) of the respondents had been in water selling business for a period below 5 years while a small proportion (15%) had operated water selling business for period over 10 years. The findings are in line with those Karanja (2011) who carried a study to compare financial stability of small scale water service providers in relation to their operation periods. The study found that majority of small scale water firms collapse before their tenth birth day. This implies that the period that the respondents had operated water selling business would show the financial stability of their business. On the other hand the period of business operation is usually in line with experience, responsibility and skills of the business person (Karanja, 2011).

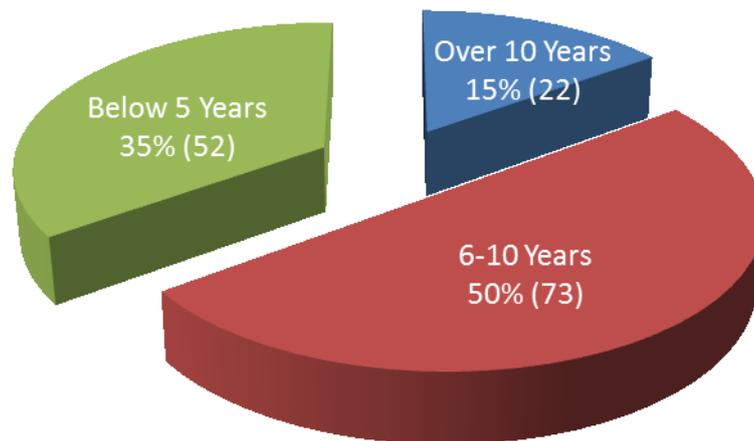


Figure 4.2: Length of Service of the respondent.

4.3.6 Training in Financial Management

Table 4.5 shows the results in regard to training in financial management. Results of the study shows that majority (53%) of the respondents did not have formal training in financial management while few (47%) had received training in financial management while The finding concurs with those of World Bank (2004) in the study on small scale water service providers in developing countries. The study found that most small scale water service providers had no formal training in financial management. This finding implies that training in financial management is lacking among small scale water service providers which may contribute to poor financing of water investments in peri-urban areas in Kenya. Training in financial management equips business people with financial management skills necessary for running the business (Muiruri, 2003).

Table 4.5 Training in Financial Management

Trained	Frequency	Percentage
Yes	69	47
No	78	53
Total	147	100

4.3.7 Business Ownership

The study sought to establish the form of business ownership. Table 4.6 indicates that sole proprietorship constituted the majority (65%) of the respondents. Few (21%) of the respondent's among small scale water service providers operated partnership businesses. A small proportion (14%) of the respondents operated family businesses. These findings are in agreement with those of Mann and Mikesell (2006) who found that most small scale water firms are operated as sole proprietor businesses. Form of business ownership determines the amount of capital available for investment. This implies that most small scale water service providers are operated as sole proprietorship businesses which may pose as a challenge in financing of water investments due to shortage of capital (Bel, 2006).

Table 4.6 Form of Business Ownership

Business ownership	Frequency	Percentage
Family business	21	14
Sole proprietorship	96	65
Partnership	30	21
Total	147	100

4.3.8 Main Challenges in Water Service Delivery in Nairobi Peri-Urban Areas

The main challenges affecting sustainability of water service delivery in Nairobi peri-urban areas are shown in Figure 4.3. The figure shows that majority (44%) of the respondents cited limited access to capital as the main challenge. This was followed by high operational risk (30%). A small proportion (15%) of the respondents cited cost recovery while few (11%) of the respondents cited low return on investment as their main challenge. The result concurs with those of Sunman (2001) who found that limited access to capital and high operational risks are the main challenges affecting sustainability of water service delivery in developing countries. This implies that challenges affecting sustainability of water service delivery in Nairobi peri-urban areas are in line with challenges affecting other developing countries (World Bank, 2011).

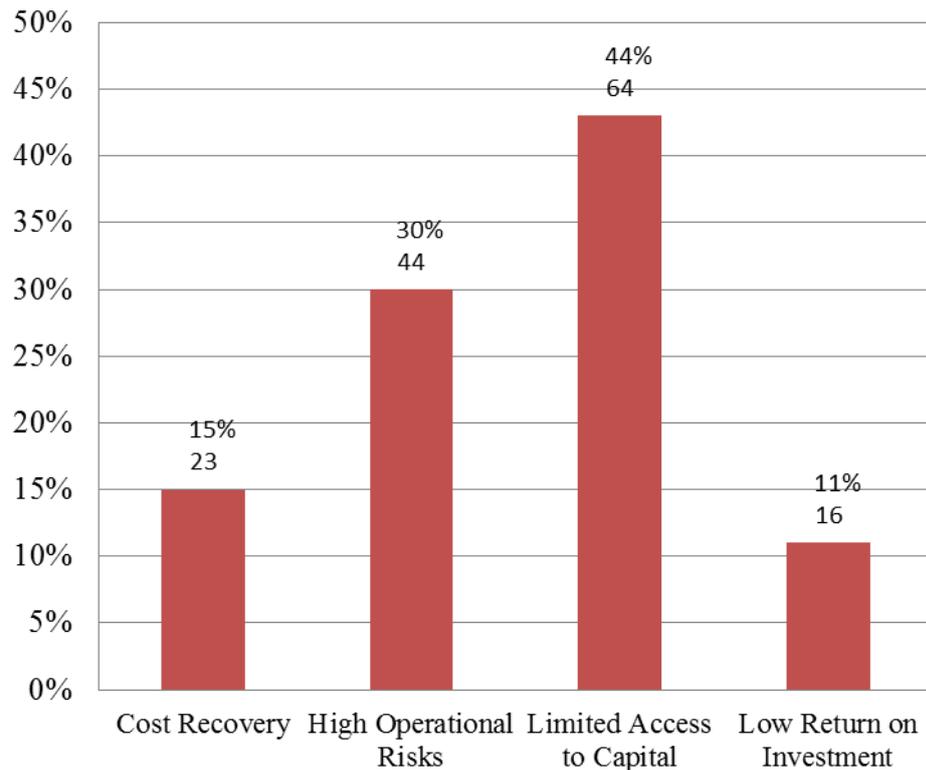


Figure 4.3: Main Challenges in Water Service Delivery

4.3.9 Sources of Capital Used By Small Scale Water Service Providers

The study sought to establish the main sources of capital used to finance water investment among small scale water service providers in Nairobi peri-urban areas. Table 4.7 indicate that majority (33%) of the respondents financed their businesses using owner’s savings/equity. This was followed by those who borrowed from ‘chamas’ (29%) to finance their businesses. A lesser proportion (24%) of respondents borrowed capital from bank while few (13%) got their capital from mixed systems. The results are in line with those of Gleick (2002) who carried a study on financing of water and water systems. The study found that the main source of capital for small scale water service providers is owner’s equity and soft loans mainly from informal groups. Source of capital determines the cost of finance. This implies that the two main sources of capital used by small scale water service providers in Nairobi peri-urban areas to finance their investments are owners savings/equity and borrowing from ‘Chamas’. These two sources have the least cost

of finance compares with other sources of fund used in financing of water investments (World Bank, 2011).

Table 4.7 Sources of Capital Used By Small Scale Water Service Providers

Sources of Capital	Frequency	Percentage
Owners savings	49	33
Borrowing from ‘Chama’	43	29
Bank Loan	36	24
Mixed System	19	13
Total	147	100

4.3.10 Factors that Influenced the Respondent to Enter into Water Selling Business.

Figure 4.4 shows the factors that influenced the respondent to enter into water selling business. The figure shows that majority (59%) of the respondents entered into water selling business due to unemployment. Few (34%) started water selling business as a result of water shortage in their area of operation which was a business opportunity. A small proportion (7%) of the respondents cited succession as a factor. The results are in agreement with those of Maslyukivska and Sohil (2003) who carried a study on private sector participation in water sector in East and Central Africa region. The study found that high unemployment rate in developing countries makes people to engage in small scale businesses. The main factors that influenced the respondent to enter into water selling business may largely determine individual commitment to the firm with the aim of achieving business objectives. This finding implies that unemployment in peri-urban areas of Nairobi city is the main factor that influenced majority of the respondent to enter into water selling business. This could be attributed to high unemployment rate in peri-urban areas of Nairobi city (Njoroge, 2008). This may lead to lack of individual commitment as those involved in water selling businesses may keep on looking for ‘better’ job opportunities elsewhere (Jones & Mygind, 2010).

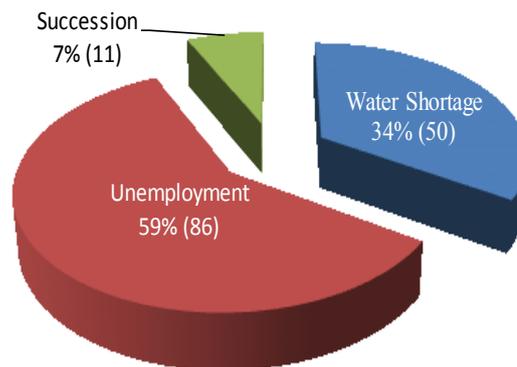


Figure 4.4: Factors that Influenced the Respondent to Enter into Water Selling Business

4.3.11 Cost Incurred Most By Small Scale Water Service Providers

The costs that small scale water service provider's incurred most were sought. Table 4.8 shows that majority (41%) of the respondent incurred rent as their main cost. Capital cost accounted for 29% of the respondents. A lesser proportion (19%) of the respondents indicated routine maintenance cost while few (11%) cited wages and salaries. The findings are in agreement with those of Goldblatt (2009) who found that operating cost including cost of paying rent negatively affect the operations of small scale water service providers in developing countries. Seppala and Katko (2003) studied water utility costs and found that water utilities incurs enormous fixed costs which has constrained achieving of 100 percent coverage. This result implies that the main cost incurred by most of the small scale water service providers is cost of paying rent as well as cost of capital. The high operation cost is thus a challenge that limits financing and expansion of water services in peri-urban areas of Kenya as this leads to low rate of return on an investment (Karanja, 2011).

Table 4.8 Costs Incurred Most by Small Scale Water Service Providers

Cost Incurred Most	Frequency	Percentage
Wages and salaries	16	11
Rent	61	41
Routine maintenance	28	19
Capital costs	42	29
Total	147	100

4.3.12 Ability to Re-Coup Capital Invested

The study sought to know whether respondents among small scale water service provider were able to re-coup the amount of capital invested in their businesses and if yes, after how long. Figure 4.5 shows that majority (56%) were able to re-coup their capital while few (44%) had not re-couped the capital they had invested in their businesses. This implies that most investors had re-couped the capital they had invested in their water selling businesses. Re-coup period determines profitability of the business an indication that water selling business has higher return hence profitable (World Bank, 2011).

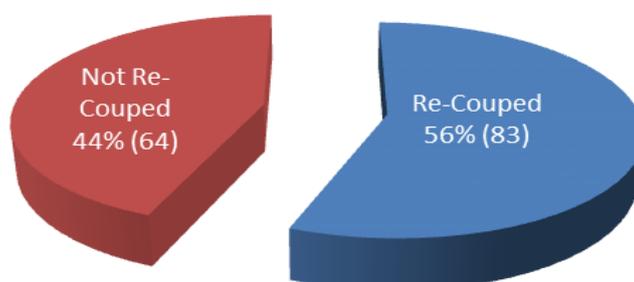


Figure 4.5: Ability to Re-coup Capital Invested

From the findings of the study as shown in Figure 4.6, most small scale water service providers were able to re-coup their capital. Majority (70%) of the respondents re-couped their capital in a period of between 2-5 years. A few (13%) were able to re-coup their capital in a period of between 0-1 year. A lesser proportion (11%) of the respondents took 6-10 years to re-coup their capital while few (6%) took over 10 years to re-coup their capital. This finding shows that most investors took between 2-5 years to re-coup their capital. This findings are in line with those of McDonald (2008) who carried out a study in Uganda to assess ability of young water utilities to re-coup back their capital. The results showed that only around 25% of the young water utilities were able to re-coup their capital in the first two years. This implies that it takes more than two years for water providers to re-coup their capital after which they can start to generate profits. The low return on investment where cash inflow is very low is often an obstacle to water investments as this do not match the long-term financing need of water projects (Kalemli & Volosovych, 2008).

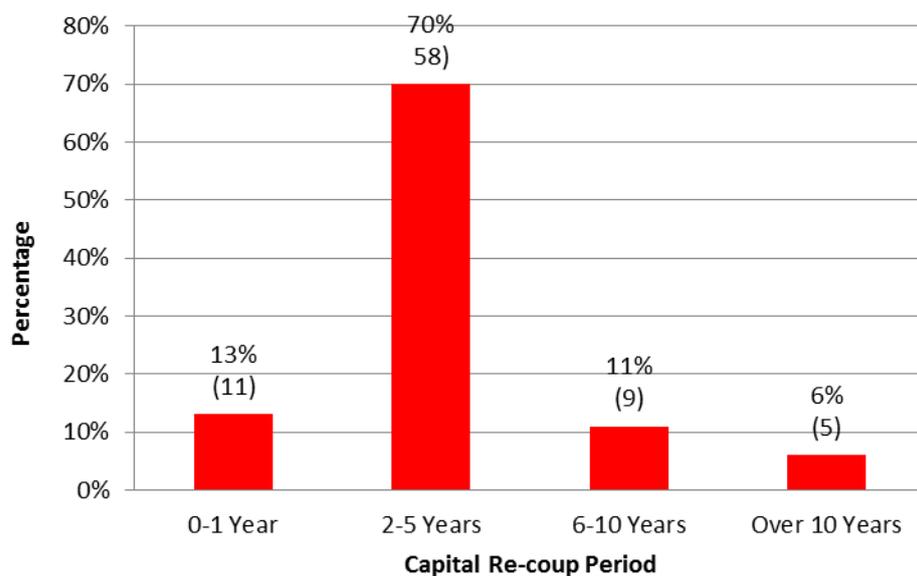


Figure 4.6: Capital Re-coup Period

4.3.13 Uncertainty Faced By Small Scale Water Investors in Peri-Urban Areas

Table 4.9 presents the results of uncertainties which small scale water investors in peri-urban areas face which are hindrances to their operations. From the finding of the study, majority (46%) of the respondents cited uncertainty on changes of interest rate on loans. This was followed by income uncertainty (26%). A lesser proportion (17%) indicated default risk while few (11%) cited liquidity risk as the main uncertainty facing them. The results of the study concurs with those of Li (2006) and Green (2003) who found that water investments are mainly affected by uncertainties including high interest rates and changes in economic and market regulations which lead to losses to the investors. The results thus implies that most water service providers fear changes of interest rate on loans they borrow from financial institution which may negatively affect their financing decisions. These uncertainties are hindrances to their operations and may inhibit financing of water investments in peri-urban areas (Raffie *et al.*, 2007).

Table 4.9 Uncertainty Faced By SSWPs in Peri-Urban Areas

Uncertainty	Frequency	Percentage
Income uncertainty	38	26
Liquidity risk	16	11
Change of interest rates	68	46
Default risk	25	17
Total	147	100

4.3.14 Ability to Get Funds From Financial Institutions

The respondents were asked whether they ever needed funds from financial institution and whether they got or did not get the needed funds due to some reasons. Figure 4.7 shows that majority (63%) of the respondents had applied for funds but were declined while few (37%) had applied for funds and got the needed funds. The main reason cited where fund was not approved was that small scale water service providers had no tangible collateral which would act as security for loans borrowed.

These findings are in line with those of Kalemli and Volosovych (2008) who found that low quality financial institutions and lack of collateral among borrowers are the main impediments to capital flow and portfolio investments. Availability of fund determines the amount of capital for investment. This implies that capital market has not been ready to avail the needed fund for water investments particularly those with no collateral to attach in order to get loans from financial institutions. Capital in-availability is thus a major hindrance to financing of water investments (Burki & Perry, 2008).

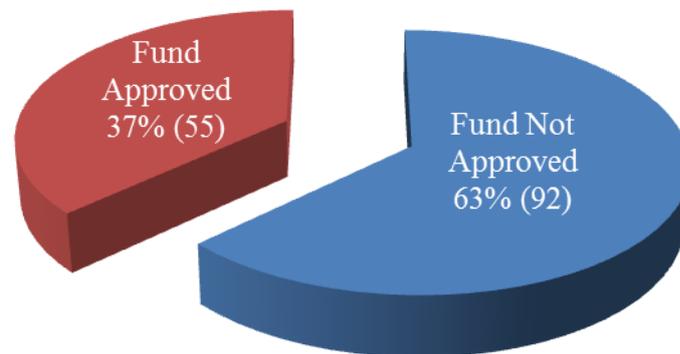


Figure 4.7: Ability to Get the Needed Funds from Financial Institutions.

4.4 Descriptive Factor Variables

This section shows a summary of descriptive factor variables of the study. The study used Cost recovery, Investor's perceived risk, Access to capital, Return on investment as the independent variables, Government regulations as moderating variable and financing of small scale water investments as dependent variable.

Table 4.10 Descriptive Factor Variables

Item	Description	Construct/Informative and Reflective
CR1	Pricing of water: The price charged to consumers for water services greatly affect that amount of revenue generated to finance water investment.	Cost Recovery
CR2	Externalities: (external conditions) External conditions like tax, interest rate, government policy has greatly affected financing of water investments.	Cost Recovery
CR3	User charges: It's better to Charge the water users directly the full cost of water service in order to generate sufficient revenue to recover investments costs	Cost Recovery
CR4	Consumer income levels: The level of consumer's income in peri-urban areas affects the rate of cost recovery to sustain the high cost of investments in water.	Cost Recovery
PR1	Business risk: There is high certainty of the amount of income generated from water selling business hence high business risk.	Perceived Risks
PR2	Financial risks: Water investments highly depend on borrowed capital to finance its operations rather than owner's equity hence has high financial risk.	Perceived Risks
PR3	Interest rate risk: Financing of water investments is usually affected by changes of interest rate on loans. These investments thus have high interest rate risk.	Perceived Risks

PR4	Commodity price risk: Prices of water keeps on changing which affects the profit margins of water businesses hence commodity price risk.	Perceived Risks
AC1	Tax policies: Tax imposed on small scale water investment is too high to generate enough profit which can be ploughed back as capital.	Access to Capital
AC2	Capital market: The ability to raise capital to finance water investments is highly determined by how developed our domestic capital market is.	Access to Capital
AC3	Willingness to borrow: Ability and willingness of investors to borrow money to finance water investments is affected by prevailing economic conditions.	Access to Capital
AC4	Cost of capital: The high cost of borrowing capital from financial institutions affects ability of people to borrow to finance water investments.	Access to Capital
ROI1	Investment level: The return on investment from water selling business in peri-urban areas is affected by the size of the business operates by an investor.	Return on Investment
ROI2	Price charged: The price charged to consumers for water service determines return on investment for the investors.	Return on Investment
ROI3	Alternative water sources: The many alternative water sources in Nairobi including boreholes and bottled water has led to competition among service providers affects return on water investments in peri-urban areas.	Return on Investment

ROI4	Consumer income levels: The level of income among the peri-urban population greatly affects the return on investment of water selling businesses.	Return on Investment
GR1	Economic regulations: Government regulations have great influence on access to water and prices charged to water consumers	Government Regulations
GR2	Market regulations: The government defines water tariffs and operation efficiency i.e. reducing leakage and water costs	Government Regulations
GR3	Social regulations: The government is protecting water consumers by ensuring water accessibility, service quality, and price affordability to all water consumers.	Government Regulations
GR4	Technical regulations: The government regularly assess the state of water infrastructures like pipes and reservoirs, maintain and replace unreliable networks	Government Regulations
F1	Increased coverage: The number of water service providers in peri-urban areas has increased over years.	Financing
F2	Improved water quality: The quality of water has improved over years.	Financing
F3	Increased access: Accessibility of water in Nairobi peri-urban areas increased over years.	Financing
F4	Cash surplus: Investor's income from sales of water has increased over years.	Financing

4.5 Correlation of Study Variables

Correlation among independent variables and dependent variables is illustrated by the correlation matrix in Table 4.11. Correlation values that are not close to 1 or -1 is an indication that the factors are sufficiently different measures of separate variables (Farndale, Hope, Haily & Killiher, 2010). It's also an indication that variables are not autocorrelated (Farndale *et al.*, 2010). Absence of autocorrelation allows the study to utilize all the independent variables (Farndale *et al.*, 2010). From the correlation matrix in Table 4.11, there was no correlation among independent variables. On the other hand detection Tolerance and Variance Inflation Factor (VIF) statistics in Table 4.21 shows no presence of multicollinearity (Hair *et al.*, 2010). Absence of multicollinearity allowed the study to utilise all the independent variables (Farndale *et al.*, 2010, Pallant, 2010).

Table 4.11 Correlations of Study Variables

		Cost Recovery	Perceived Risks	Access to Capital	Return on Investment	Financing
Cost Recovery	Pearson Correlation	1	.505**	.306**	-.070	-.034
	Sig. (1-tailed)		.000	.000	.009	.041
	N	147	147	147	147	147
Perceived Risks	Pearson Correlation	.505**	1	.312**	-.268**	-.310**
	Sig. (1-tailed)	.000		.000	.001	.000
	N	147	147	147	147	147
Access to Capital	Pearson Correlation	.306**	.312**	1	-.151*	-.229**
	Sig. (1-tailed)	.000	.000		.034	.003
	N	147	147	147	147	147
Return on Investment	Pearson Correlation	-.070	-.268**	-.151*	1	.343**
	Sig. (1-tailed)	.009	.001	.034		.000
	N	147	147	147	147	147
Financing	Pearson Correlation	-.034	-.310**	-.229**	.343**	1
	Sig. (1-tailed)	.041	.000	.003	.000	
	N	147	147	147	147	147

** . Correlation is significant at the 0.01 level (1-tailed).

* . Correlation is significant at the 0.05 level (1-tailed).

4.6 Descriptive and Qualitative Analysis of Study Variables

This section shows descriptive statistics of the study variables on moderating effect of government regulations on factors hindering financing of small scale water investments in Kenya. The study used Cost recovery, Investor's perceived risk, Access to capital, Return on investment as the independent variables, Government regulations as moderating variable and financing of small scale water investments as dependent variable.

4.6.1 Cost Recovery and Financing of Small Scale Water Investments

The first objective of the study was to establish whether cost recovery influences financing of small scale water investments in peri-urban areas in Nairobi Kenya. The study focused particularly on the following aspects of cost recovery that is, pricing of water, externalities, user charges and consumer demand for water. Descriptive statistics for cost recovery is as given below.

i) Pricing of Water

The study sought to establish whether price charged to water consumers is too low to generate sufficient revenue for full cost recovery. Table 4.12 indicate that majority (42%) of the respondents agreed with the statement that price charged to water consumers is too low to generate sufficient revenue for full cost recovery. Few (16%) strongly agreed with the statement giving a total of 58% of those who agreed with the statement. It was found that 20% disagreed while (13%) strongly disagreed. Thus a total of 33% of the respondents disagreed with the statement. Those who neither agreed nor disagreed with the statement accounted for 8%.

These finding compare well with those of Seppala and Katko (2003) who asserted that the prices charged to residential water consumers are low and covers only a third of the estimated marginal cost for water supply. Burki and Perry (2008), Steven *et al.*, (2007) maintain that water utilities usually report negative incomes as users' fee (prices) are set below full cost recovery level. This implies that although the government is not willing to increase the price charged to water consumers, majority

of small scale water service providers views that the price charged is well below the market price. Price charged to water consumers should thus be raised to market level for full cost recovery (Finger & Allouche, 2002).

ii) Externalities

The respondents were asked to respond to the statement that external conditions like tax, and interest rate affected for full cost recovery. Table 4.12 indicate that majority (50%) agreed with the statement while few (23%) strongly agreed with the statement. Therefore majority (73%) of the respondents agreed with the statement. A small proportion (14%) disagreed with the statement, 9% strongly disagreed while few (4%) neither agreed nor disagreed with the statement. Therefore a total of 23% disagreed with the statement.

These findings are in line with those of Finger and Allouche (2002) who maintain that factors affecting investment of water services are economic conditions and environmental externalities. This implies that growth of water investments in peri-urban areas is greatly affected by external conditions like tax and interest rate. This acts as impediments to for full cost recovery (Clough *et al.*, 2004).

iii) User Charges

Descriptive Table 4.12 presents the results of user charges. The Table indicate that majority (48%) of the respondent agreed with the statement that it is better to charge water user directly the full cost of water service in order to generate sufficient revenue to recover investment costs. Few (12%) strongly agreed with the statement giving a total of 60% of those respondents who agreed with the statement. It was found that 21% disagreed with the statement while (14%) of the respondents strongly disagreed with the statement. This gave a total of 35% of those respondents who disagreed with the statement. It was found that 6% of the respondents neither agreed nor disagreed with the statement.

These results agrees with findings of World Bank (2004) that hold that charging water users directly to recover the costs for water service encourage a decrease in

water use and facilitate the private provision of water services. World Bank (2004) maintained that it is better to charge water users the full cost of water service in order for the firm to recover the full cost of investment. Paw (2003) maintains that private provision of water services is only beneficial to companies if they can charge users the full cost of expanding water infrastructure. This implies that water investors are for the idea of charging the water consumers the full cost of water without government subsidies in order to make water a market commodity. It is therefore better to charge water user directly the full cost of water service in order to generate sufficient revenue for full recovery of investment costs (World Bank, 2004).

iv) Consumer's Demand for water

Descriptive Table 4.12 show that majority (56%) of the respondents disagreed with the statement that the level of consumer's demand for water is too low to sustain the high cost of investments in water in peri-urban areas. A few (15%) strongly disagreed with the statement. A total of (71%) of the respondents therefore disagreed with the statement. The number of respondents who agreed with the statement accounted for 16%. Those who strongly agreed with the statement were 7% while 5% neither agreed nor disagreed. This gave a total of 23% of those who agreed with the statement.

These results disagree with those of Gleick (2002) who asserted that low demand for water among the urban poor results in a marked lack of incentive for private companies to invest in the least wealthy areas because they are unprofitable. This finding implies that the level of consumer's demand for water in peri-urban areas in Kenya is high enough to sustain the high cost of financing water investment. However most private player are not interested to invest in peri-urban areas citing low returns (Argre, 2006).

Table 4.12 Cost Recovery

Cost recovery Statements N = 147	Strongly agree %	Agree %	Neither agree nor disagree %	Disagree %	Strongly Disagree %
1. Pricing of water: The price charged to consumers for water services is too low to generate sufficient revenue to finance water investment.	16	42	8	20	13
2. Externalities (external conditions) External conditions like tax, interest rate, government policy has greatly affected financing of water investments.	23	50	4	14	9
3. User charges: It's better to Charge the water users directly the full cost of water service in order to generate sufficient revenue to recover investments costs.	12	48	6	21	14
4. Consumer demand for water: The level of consumer's demand for water in peri-urban areas is too low to sustain the high cost of investments in water	7	16	5	56	15

4.6.2 Investor's Perceived Risks and Financing of Small Scale Water Investments

The second objective of the study was to assess the impact of investor's perceived risks on financing of small scale water investments in peri-urban areas in Nairobi Kenya. The study focused particularly on the following aspects of investor's perceived risks that is, business risks, financial risks, interest rate risk and commodity price risk. Descriptive statistics for investor's perceived risks is as given below.

i) Business Risks

The findings of the study as presented in Table 4.13 indicates that majority (57%) of the respondents agreed with the statement that there is high uncertainty of the amount of income generated from water selling business hence high business risk. A few (12%) strongly agreed with the statement giving a total of 69% of the respondents who agreed with the statement. It was found that 18% disagreed with the statement while 10% strongly disagreed with the statement. Thus a total of 28% of the respondents disagreed with the statement. Few 3% of the respondents neither agreed nor disagreed with the statement.

The findings are in line with those of Hermann (1996) who asserted that water investment experience unstable sales and earnings growth over time hence have high business risk and has not been able to earn profit for years. The result is a partly or whole consumption of equity in the period and loss of solvency (Hermann, 1996). The findings of descriptive statistics imply that water selling businesses have high uncertainty on the amount of income generated from the businesses hence high business risk. High business risks have played a significant role in inhibiting financing of water investments in peri-urban areas (Hall *et al.*, 2003).

ii) Financial Risks

Table 4.13 indicates that majority (52%) of the respondents agreed with the statement that water investments highly depend on borrowed capital to finance its operations rather than owner's equity hence has high financial risk. Few (8%) strongly agreed with the statement. A total of 60% of the respondents therefore agreed with the statement. A lesser proportion of 21% disagreed with the statement while 14% strongly disagreed with the statement. Thus a total of 35% of the respondents disagreed with the statement. The number of respondents who neither agreed nor disagreed with the statement accounted for 5%.

The findings concur with those of Borner (2006) who observed that most water utilities borrow money to finance their investments. This finding implies that water

investments highly depend on borrowed capital rather than owner's savings/equity to finance their operations. Borrowing money to finance water investments may be an impediment to financing and expansion of water investments due to costs associated with borrowing (Kalemli & Volosovych, 2008).

iii) Interest Rate Risk

The results in Table 4.13 indicate that majority 48% of the respondents disagreed with the statement that financing of water investments is usually affected by changes of interest rate on loans hence have high interest rate risk. The number of respondents who strongly disagreed with the statement accounted for 11%, giving a total of 59% of those who disagreed with the statement. A few 22% agreed with the statement while 14% strongly agreed with the statement. Thus a total of 36% of the respondents agreed with the statement. Those who neither agreed nor disagreed with the statement accounted for 5%.

These results disagree with those of Gleick (2004) who maintained that private players are not willing to borrow to finance water investments due to the predating interest rate, high cost of capital and poor quality laws, regulations and policies. The finding implies that changes of interest rate on borrowed loan do not affect financing of water investments. Economic conditions have minimal effect on availability of capital for investment in water sector (Daude & Stein, 2007).

iv) Commodity Price Risks

Table 4.13 indicates that majority (48%) of the respondents disagreed with the statement that prices of water keeps on changing which affects the profit margins of water businesses hence commodity price risk. The results show that few (12%) strongly disagreed with the statement. Thus majority (60%) of the respondents disagreed with the statement. A lesser proportion of 25% agreed with the statement while 14% strongly agreed with the statement. A total of 39% of the respondents agreed with the statement while 2% neither agreed nor disagreed with the statement.

The findings contradicts with those of Cousins (1999) that asserts that alternative sources of water can be used creating a commodity risk to an investor. However although the nation has a big water catchment area, water keeps on fluctuating which affect water prices (World Bank, 2010). These results implies that prices of water keeps on changing which affects the profit margin of water businesses hence commodity price risk.

Table 4.13 Perceived Risks

Perceived Risks Statements N = 147	Strongly agree %	Agree %	Neither agree or disagree %	Disagree %	Strongly Disagree %
1. Business risk: There is high uncertainty of the amount of income generated from water selling business hence high business risk.	12	57	3	18	10
2. Financial risks: Water investments highly depend on borrowed capital to finance its operations rather than owner's equity hence has high financial risk.	8	52	5	21	14
3. Interest rate risk: Financing of water investments is usually affected by changes of interest rate on loans. These investments thus have high interest rate risk.	14	22	5	48	11
4. Commodity price risk: Prices of water keeps on changing which affects the profit margin of water businesses hence commodity price risk.	14	25	2	48	12

4.6.3 Access to Capital and Financing of Small Scale Water Investments

The third objective of the study was to investigate whether access to capital influences financing of small scale water investments in peri-urban areas in Nairobi Kenya. The study focused particularly on the following aspects of access to capital that is, tax rates, capital market, willingness to borrow and cost of capital. Descriptive statistics for access to capital is as given below.

i) Tax rates

The results of tax rates are presented in Table 4.14. The results indicates that majority (57%) of the respondents agreed with the statement that tax rate imposed on small scale water investment is too high to generate enough profit which can be ploughed back as capital. The results show that few (12%) strongly agreed with the statement. Thus majority (69%) agreed with the statement. A lesser proportion of 21% of the respondents disagreed with the statement while 12% strongly disagreed with the statement. Therefore a total of 33% of the respondent disagreed with the statement while 3% neither agreed nor disagreed with the statement.

These findings are in line with those of World Bank (2011) that asserts that in developing nations, the governments impose high tax rate on businesses. This implies that tax rate imposed on water business is high and affects their profit margins which in turn affect their capital (World Bank, 2011). Access to capital therefore is a challenge in financing of water investments as the national government remains the major source of finance particularly capital investment (World Bank, 2004).

ii) Capital Market

Table 4.14 presents the results of capital market. The study findings show that majority (52%) of the respondents agreed with the statement that Kenyans have difficulties raising money to finance water investments because the domestic capital market is poorly developed. A few (12%) of the respondents strongly agreed with the statement. This gave a total of 64% of the respondents who agreed with the

statement. Respondents who disagreed with the statement accounted for 17%, while 12% strongly disagreed with the statement. Thus, a total of 29% disagreed with the statement while 2% neither agreed nor disagreed with the statement.

These findings are in line with those World Bank (2010) that asserts that developing nations tend to have difficulty raising money to finance their water investments because their domestic capital areas tend to be poorly developed. This implies that majority of small scale water service providers have difficulties in raising money to finance their operations due to poor development of capital market. The government have thus not raised priority of water sector in their national investment strategies in order to make funds available for such investments. This remains an impediment to financing of water sectors (World Bank, 2010).

iii) Willingness to Borrow

Descriptive Table 4.14 indicates that majority (49%) of the respondents agreed with the statement that most people in Kenya are unable or unwilling to borrow money to finance water investments due to the prevailing economic conditions. A few (12%) strongly agreed with the statement. This gave a total of 61% of the respondents who agreed with the statement. A lesser proportion of 19% of the respondents disagreed with the statement while 15% strongly disagreed with the statement. A total of 34% of the respondents disagreed with the statement while 2% neither agreed nor disagreed with the statement.

The findings compare well with those Burki and Perry (2008) who argued that investor's willingness to borrow is affected by tax rate, inflation and interest rates. Burki and Perry (2008) state that developing new financial products or providing guarantees will not help if private investors and water utilities are unwilling or unable to borrow mainly due to prevailing economic environment. This implies that the prevailing economic condition influences investor's willingness to borrow to finance their operations. The harsh economic conditions have negatively affected availability of capital for investment in water sector (Daude & Stein, 2007).

iv) Cost of Capital

Table 4.14 indicate that majority (59%) of the respondents agreed with the statement that the high cost of borrowing capital from financial institutions make many people not to borrow to finance water investments. It was found that 18% strongly agreed with the statement giving a total of 77% of those respondents who agreed with the statement. A few (14%) disagreed with the statement while 6% strongly disagreed with the statement. Therefore a total of 20% of the respondents disagreed with the statement while 3% neither agreed nor disagreed with the statement.

These findings concur with those of Burki and Perry (2008) who stated that the cost of capital is far higher in poor nations because capital is scarce and water infrastructure investments entail significant political risks. These results implies that the high cost of borrowing capital from financial institutions make many people not to borrow to finance water investments leading to low investment in water sector hence water scarcity (Finger & Allouche, 2002).

Table 4.14 Access to Capital

Access to Capital; Statements N =147	Strongly agree %	Agree %	Neither agree or disagree %	Disagree %	Strongly Disagree %
1. Tax rate: Tax rate imposed on small scale water investment is too high to generate enough profit which can be ploughed back as capital	12	57	3	21	12
2. Capital market: Kenyans have difficulties raising money to finance water investments because our domestic capital market is poorly developed.	12	52	2	17	12
3. Willingness to borrow: Most people in Kenya are unable or unwilling to borrow money to finance water investments due to the prevailing economic conditions.	12	49	5	19	15
4. Cost of capital: The high cost of borrowing capital from financial institutions make many people not to borrow to finance water investments.	18	59	3	14	6

4.6.4 Return on Investment and Financing of Small Scale Water Investments

The fourth objective of the study was to find out whether return on investment influences financing of small scale water investments in peri-urban areas in Nairobi Kenya. The study focused particularly on the following aspects of return on investments that is, investment level, price charged on water, alternative water

sources and consumer income levels. Descriptive statistics for return on investment is as given below.

i) Investment Level

The results of return on investments are presented in Table 4.15. The Table shows that majority (56%) of the respondents agreed with the statement that return on investment from water selling business in peri-urban areas is very low as they operate in small scale. A few (11%) of the respondents strongly agreed with the statement. Thus a total of 58% agreed with the statement. A lesser proportion of 19% of the respondents disagreed with the statement while 3% of the respondents strongly disagreed with the statement. Therefore a total of 22% of the respondents disagreed with the statement while 6 of the respondents neither agreed nor disagreed with the statement.

These findings concur with those of World Bank (2004) that states that there is a low level of investment in the water sector and as a result little demands for finance. Gleick (2002) asserts that most water utilities find it difficult to generate sufficient internal revenues to ensure basic financial sustainability owing to their small scale operations. This implies that most small scale water service providers have low return on investments owing to their scale of operation. Low return on investments inhibits financing of water investments (Gleick, 2002).

ii) Price Charged to Water Consumers

Table 4.15 indicate that majority (45%) of the respondents agreed with the statement that price charged to consumers for water service is too low leading to low return on investment for the investors. A few (12%) of the respondents strongly agreed with the statement. Thus a total of 57% of respondents who agreed with the statement. It was found that 15% of the respondents disagreed with the statement. A lesser proportion of 12% of the respondents strongly disagreed with the statement. A total of 27% of the respondents disagreed with the statement while 3% of the respondents neither agreed nor disagreed.

These finding concurs with those of Bond (2004) who maintained that there was little or no profit to be made by small scale water service providers due to low water prices as governments are unwilling to raise prices to market levels. This implies that price charged to water consumer is too low to generate sufficient return to water investors as price charged is far below the market rate. Water users should be charged the market rate in order to recover the full costs of service provision instead of subsidizing delivery through general public taxes to make water utilities generate sufficient return (World Bank, 2004).

iii) Alternative Water Sources

The results of alternative water sources are presented in Table 4.15. The table shows that majority (54%) of the respondents agree with the statement that the many alternative water sources in Nairobi including boreholes and bottled water has led to competition among service providers which have negatively affected return on water investments in peri-urban areas. A few (14%) of the respondents strongly agree with the statement. This gave a total of 68% of those respondents who agreed with the statement. It was found that those who disagreed with the statement accounted for 16% of the respondents while 10% strongly disagreed with the statement. Thus a total of 26% of the respondents disagreed with the statement while 6% neither agreed nor disagreed with the statement.

These findings are in agreement with those of Carlo (2008) who observed that there exist alternative sources of water that can be used creating a commodity risk – water price volatility which may affect investor’s return on investment. This implies that the many alternative water sources in Nairobi including boreholes and bottled water has led to competition among water service providers which have negatively affected their return on investments in peri-urban areas. This has been a challenge to investors who would wish to finance and expand their water businesses. Private provision of water services is only guaranteed where investor’s return on investment is beneficial to companies (Paw, 2003).

iv) Consumer Income Levels

Table 4.15 indicate that majority (61%) of the respondents agreed with the statement that the low level of income among the peri-urban population greatly affects the return on investment of water selling businesses. A few (13%) strongly agreed with the statement. Thus a total of 74% of the respondents agreed with the statement. It was found that 16% of the respondents disagreed with the statement while 7% strongly disagreed with the statement. Thus a total of 23% of the respondents disagreed with the statement while 3 percent (4) neither agreed nor disagreed with the statement.

These findings compare well with those of Hall (2003) who asserted that low income water users cannot pay the full costs for the service required for the company to maximize its returns. This implies that the low level of income among the peri-urban population greatly affects the return on investment of water selling businesses. This makes private players and small scale water service providers to be reluctant in committing their funds in water businesses. Low income levels among urban poor results in a marked lack of incentive for private companies to invest in the least wealthy areas because they are unprofitable (Gleick, 2002).

Table 4.15 Returns on Investment

Return on Investment Statements	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
N = 147	%	%	%	%	%
1. Investment level: The return on investment from water selling business in peri-urban areas is very low as they operate in small scale.	11	56	6	19	3
2. Price charged: The price charged to consumers for water service is too low leading to low return on investment for the investors.	12	45	3	15	12
4. Alternative water sources: The many alternative water sources in Nairobi including boreholes and bottled water has led to competition among service providers which have negatively affected return on water investments in peri-urban areas.	14	54	6	16	10
4. Consumer income levels: The low level of income among the peri-urban population greatly affects the return on investment of water selling businesses.	13	61	3	16	7

4.6.5 Government Regulations and Financing of Water Investments.

The fifth objective of the study was to establish the moderating effect of government regulations on the relationship between independent variables and financing of small

scale water investments in peri-urban areas in Kenya. The study focus particularly on the following aspects of government regulations that is, economic regulations, market regulations, social regulations, and technical regulations. Descriptive statistics for government regulations is as given below.

i) Economic Regulations

The influence of economic regulations on financing of water investments was assessed. Table 4.16 indicate that majority (68%) of the respondents agreed with the statement that the government regulations have great influence on access to water and prices charged to water consumers. A few (12%) of the respondents strongly agreed with the statement. This gave a total of 80% of those who agreed with the statement. It was found that 10% disagreed with the statement while 7% of the respondents strongly disagreed with the statement. Thus a total of 17% of the respondent disagreed with the statement while 3% of the respondents neither agreed nor disagreed.

These findings concur with those of WASREB (2009) that states that in Kenya, water tariffs are approved by water service regulatory board. Cousins (1999) observed that increased water prices and other related government regulations are a key outcome of recent policy changes in the water sector. Finger and Allouche (2002) asserts that economic regulation is about introducing competitive market structures in industries characterised by market failures, regulating the market and guaranteeing the sustainability of the water system. The major instruments of economic regulation are price and access regulations. This implies that the government regulations have great influence on access to water and prices charged to consumers. These are clear indications that the government do influence prices charged to water consumers (Finger & Allouche, 2002).

ii) Market Regulations

Table 4.16 indicate that majority (53%) of the respondents agreed with the statement that the government defines water tariffs and operation efficiency i.e. reducing

leakage and water costs. A few (10%) of the respondents strongly agreed with the statement. A total of 63% of the respondents thus agreed with the statement. It was found that 22% of the respondents disagreed with the statement while 11% strongly disagreed with the statement. Therefore a total of 33% of the respondents disagreed with the statement while 4% of the respondents neither agreed nor disagreed with the statement.

These findings compare well with those of WASREB (2009) that states that in Kenya, water tariffs are approved by water service regulatory board. Garcia *et al.*, (2007) indicated that market regulation is concerned with defining tariffs and fostering operating efficiency in both technical (reducing water leakages) and economic terms (reducing costs). This implies that the government defines water tariff and operation efficiency. Through regulations the government influence the pricing of water. (Green, 2003, Garcia *et al.*, 2007).

iii) Social Regulations

Descriptive Table 4.16 indicate that majority (53%) of the respondents agreed with the statement that the government is protecting water consumers by ensuring water accessibility, service quality, and price affordability to all water consumers. A few (12%) of the respondents strongly agreed with the statement. This gave a total of 65% of those respondents who agreed with the statement. It was found that 18% of the respondents disagreed with the statement while 12% strongly disagreed with the statement. Thus a total of 30% of the respondents disagreed with the statement while 6% neither agreed nor disagreed with the statement.

These findings contradict with those of Tremolet *et al.*, (2004) that asserts that social regulation pertains to consumer and environmental protection. Accessibility to the service, service quality, and price affordability are three important dimensions of consumer protection, which are no longer automatically guaranteed in most water utility firms. Service quality regulation refers to defining levels of service that meet consumer needs. They can be provided at a financially sustainable and affordable cost and monitoring. That level of service is actually provided and is no longer

automatically guaranteed in most water utility firms (Tremolet *et al.*, 2004). This implies that the government is protecting water consumers by ensuring water accessibility, service quality, and price affordability to all water consumers. The government have thus influenced financing and operations of water investments by establishing water regulations and enforcing them in order to protect consumers and the environment (Green, 2003).

iv) Technical Regulations

Table 4.16 indicate that majority (52%) of the respondents agreed with the statement that the government regularly assess the state of water infrastructures like pipes and reservoirs, maintain and replace unreliable networks. A few (12%) of the respondents strongly agreed with the statement giving a total of 64% of those respondents who agreed with the statement. The study results show that 20% of the respondents disagreed with the statement while 13% strongly disagreed with the statement. Thus a total of 33% disagreed with the statement while 3% neither agreed nor disagreed with the statement.

These findings agrees with those of Klein (2005) who stated that technical regulations involves a regular assessment of the state of the overall infrastructure and requires frequent decisions concerning maintenance, replacement, and renewal of unreliable network elements which lack in most government run water utilities. This implies that the government regularly assess the state of water infrastructures like pipes and reservoirs, maintain and replace unreliable networks (Klein, 2005).

Table 4.16 Government Regulations

Government Regulations Statements N = 147		Agree %	Neither agree or disagree %	Disagree %	Strongly Disagree %
1. Economic Regulation:					
Government regulation have great influence on access to water and prices charged to water consumers	12	68	3	10	7
2. Market Regulation: The government defines water tariffs and operation efficiency i.e. reducing leakage and water costs.	10	53	4	22	11
3. Social Regulation: The government is protecting water consumers by ensuring water accessibility, service quality, and price affordability to all water consumers.	12	53	6	18	12
4. Technical Regulation: The government regularly assess the state of water infrastructures like pipes and reservoirs, maintain and replace unreliable networks.	12	52	3	20	13

4.6.6 Financing Small Scale Water Investments in Peri-urban Areas.

The study sought to investigate the opinions of the respondents regarding financing of small scale water investments in peri-urban areas in Nairobi Kenya. The study focused particularly on the following aspects of financing of water investments in

Nairobi peri-urban areas that is, increased coverage, improved water quality, increased access, low water prices and cash surplus. Descriptive statistics is as given below.

i) Increased Coverage

The study sought to establish whether the number of water service providers has increased over time. Table 4.17 indicate that majority (56%) of the respondents disagreed with the statement that the number of water service providers in peri-urban areas has increased over years. A few 10% of the respondents strongly disagreed with the statement. Thus a total of 66% of the respondents disagreed with the statement. It was found that that 16% of the respondents strongly agreed with the statement while 16% agreed with the statement. A total of 32% percent agreed with the statement while 2% neither agreed nor disagreed with the statement.

These findings are in line with those of Gleick (2004) who stated that although the percentage of the world's population who lacked access to clean water dropped from 41 percent to 21 percent by 1990, the urban poor continue to suffer due to water scarcity. World Bank (2004) asserted that 18 percent of the world's population continues to lack access to clean water mainly due to inadequate water investments and financing. This implies that although water shortage is a serious problem in peri-urban areas, little investment is made in water sector by both small scale water service providers and private players. Water sector may provide opportunities for investments. However private firms and small scale water service providers are reluctant to invest in this sector due to the underlying challenges (World Bank, 2004).

ii) Improved Water Quality

The study sought to establish whether the quality of water sold in peri-urban areas has improved over years. Table 4.17 indicate that majority (32%) of the respondent strongly disagreed with the statement that the quality of water sold in peri-urban areas has improved over years. It was found that 30% of the respondents disagreed

with the statement. This gave a total of 62% of those who disagreed with the statement. A few 18% of the respondents agreed with the statement while 9% strongly agreed with the statement. Thus a total of 27% of the respondents agreed with the statement. The results indicate that a few 11% neither agreed nor disagreed with the statement. This findings concurs with those of World Bank (2004) asserted that 18 percent of the world's population continues to lack access to clean water mainly due to inadequate water investments and financing. This implies that the quality of water being sold in peri-urban areas have not improved much over years. (World Bank, 2010).

iii) Increased Access

Descriptive Table 4.17 shows that majority (59%) of the respondent disagreed with the statement that accessibility of water in Nairobi peri-urban areas increased over years. A few 11% of the respondents strongly disagreed with the statement giving a total of 70% of those respondents who disagreed with the statement. A lesser proportion of 13% strongly agreed with the statement while 12% agreed with the statement. Thus a total of 25% of the respondents agreed with the statement while 6 % neither agreed nor disagreed. The finding are in line with those of WASREB (2009) that indicated that water supply in Kenya is characterized by low levels of access particularly in urban slums and in rural areas. This implies that accessibility of water in Nairobi peri-urban areas has not increased over years (WASREB, 2010, World Bank, 2010).

iv) Cash Surplus

Table 4.17 shows that majority (33%) of the respondents agreed with the statement that investor's income from sales of water had increased over years. A few (7%) strongly agreed with the statement. This gave a total of 40% of those who agreed with the statement. It was found that 27% of the respondents disagreed with the statement while 27% strongly disagreed with the statement. Thus a total of 54% of the respondents disagreed with the statement while 6% neither agreed nor disagreed with the statements.

The findings are in line with those of Gleick (2002) who assert that most water utilities find it difficult to generate sufficient internal revenues to ensure basic financial sustainability owing to their small scale operations. This implies that majority of investors had not experienced cash increase from sales of water. There is little or no profit to be made by small scale water service providers due to low water prices as governments are unwilling to raise prices to market levels. (Finger & Alluche, 2002, Burki & Perry, 2008, Steven *et al.*, 2007).

Table 4.17 Financing of Water Investments

N = 147	% Scores					Strongly Disagree
		Strongly agree	Agree	Neutral	Disagree	
1. Increased coverage: The number of water providers in peri- urban areas has increased over years.		16	16	2	56	10
2 Improved water quality: The quality of water improved over years.		9	18	11	30	32
3. Increased access: Accessibility of water in Nairobi peri-urban areas increased over years.		13	12	5	59	11
5. Cash surplus: Investor's income from sales of water increased over years.		7	33	6	27	27

4.7 Test of Assumptions of the Study Variables

The following assumptions of study variables were tested that is, outlier, normality, linearity, homoscedasticity, multicollinearity, independence of residuals and common method bias. When these assumptions are violated, the study results are likely to give biased estimates of the parameters (Saunders *et al.*, 2007).

4.7.1 Results of Outliers

An outlier is any observation that is long away from the general pattern of distribution of variables and long away from the fitted line (Crewell, 2003). Presence of outliers was detected by use of Mahalanobis d-square test. Detected outliers were dropped after which reasonable boxplots were used to show that variables were normally distributed before the analysis as shown in Figure 4.8. The figure shows that all boxplots were symmetrical with no outliers identified (Tabachnick & Fidell, 2007).

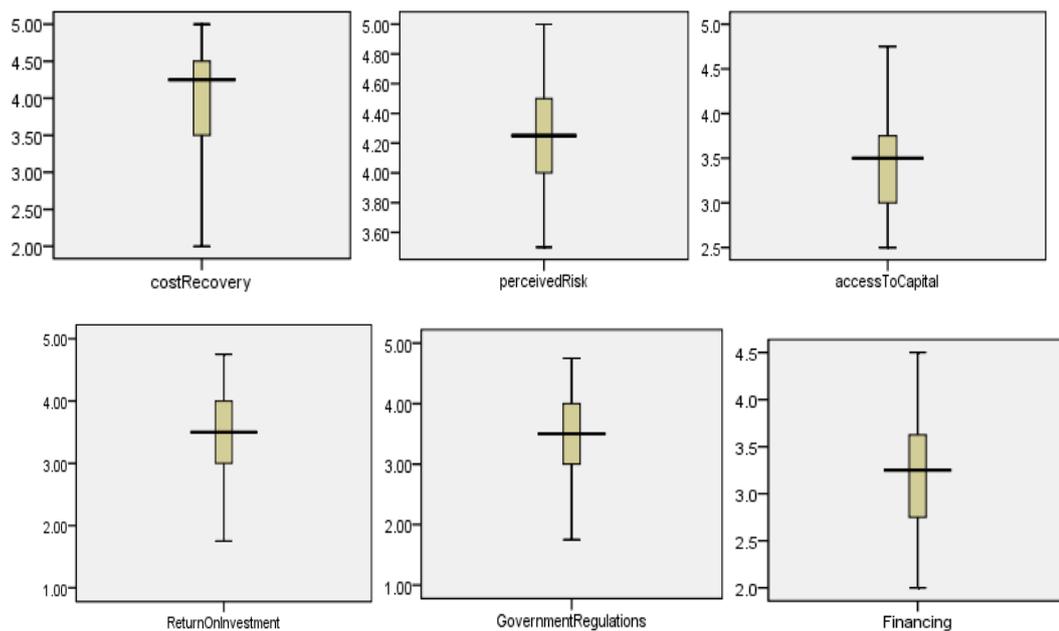


Figure 4.8: Box Plot after Outliers were Dropped.

4.7.2 Normality Test Results of Dependent Variable

To test for the normality of the dependent variable (financing of small scale water investments), Kolmogorov-Smirnova and Shapiro-Wilk tests were conducted. This was fundamental in order to determine appropriate tests to be conducted and make sure that assumptions of a normal distribution were not violated (Math-Statistics-Tutor, 2010). Kolmogorov-Smirnova and Shapiro-Wilk test for normality were used to detect all departures from normality (Math-Statistics-Tutor, 2010). The tests reject the hypothesis of normality when the p-value is greater than or equal to 0.05 (Sharpiro & Wilk, 1965). Table 4.18 shows that the Kolmogorov-Smirnova and Shapiro-Wilk statistics were .041 and .990 respectively. The associated p-value was .200 and .485 for Kolmogorov-Smirnova and Shapiro-Wilk statistics respectively. Since the p-values were greater than the significance level (0.05) (not significant if $p < .05$), this implies that the variables were normally distributed.

Table 4.18 Normality Test Results for Dependent Variable

Factors	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistics	df	Sig	Statistics	df	P-value
Financing of water Investments	.041	133	.200	.990	133	.485

a. Lilliefors Significance Correction

The visualized distribution of random variables of different between expected distribution and the observed distribution of financing of water investment are presented in Figure 4.9 and Figure 4.10. The Figures shows minimal deviation from normality. Thus overall, the distribution appeared normally distributed. On the basis of the computed significant test statistics, for Kolmogorov-Smirnov and Shapiro Wilk tests, normality of dependent variable was maintained. This means that the significance test conducted on the data were fairly accurate (Shlin & Miles, 2010).

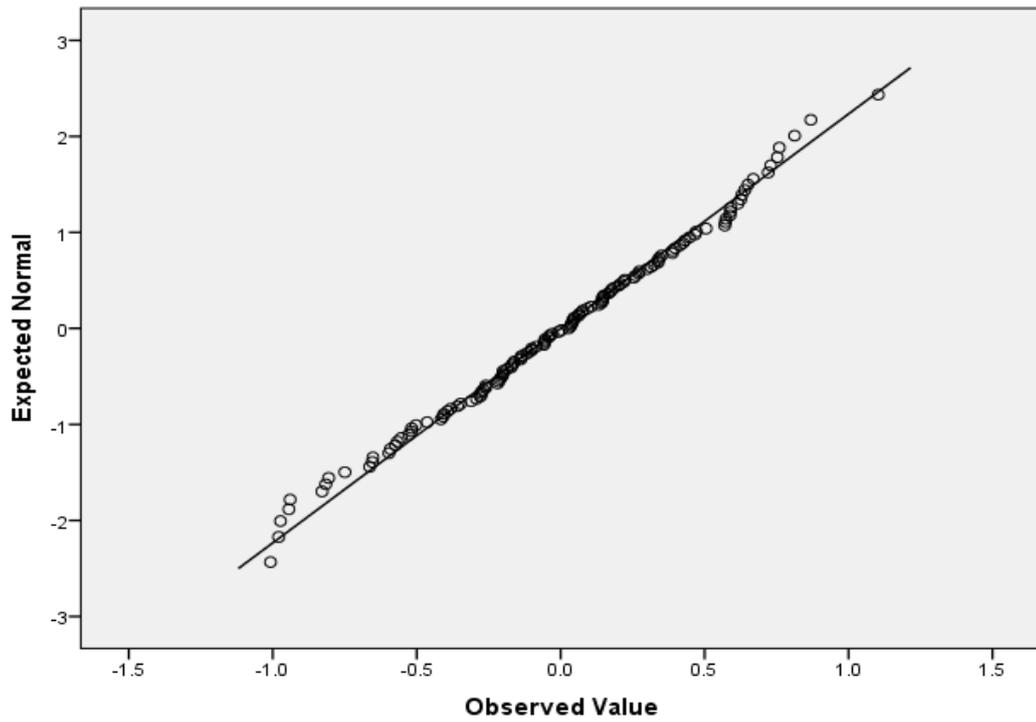


Figure 4.9: Normal Q-Q Plot for Financing of Water Investments

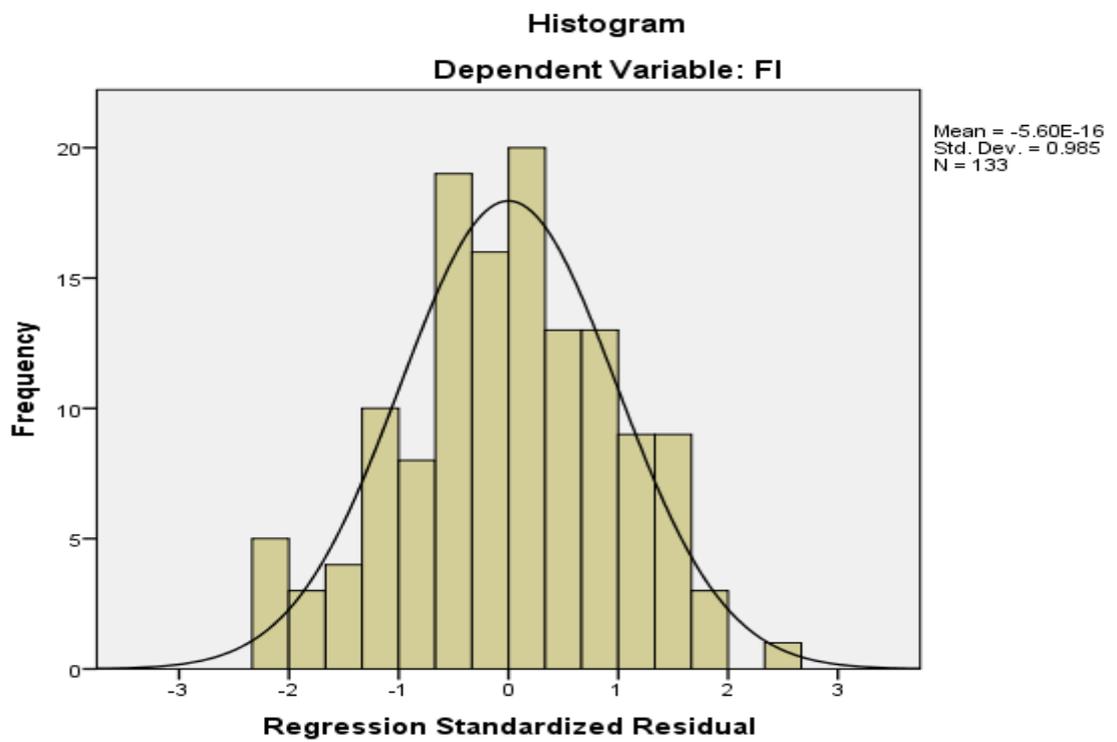


Figure 4.10: Histogram for Financing of Water Investments

4.7.3 Linearity Results

Linearity means that the amount of change or rate of change between scores on two sets of variables is constant for the entire range of scores for the variables (Bai & Perron, 2008). It is therefore the consistent slope of change that represents the relationship between an independent variable and a dependent variable (Granger & Tera, 2007). If a linear model is fitted to data which are nonlinearly related (violations of linearity), predictions are likely to be seriously in error (Hansen, 2009). Problem of linearity is fixed by removing outliers (Hansen, 2009). The study assumed linearity of the variables because outliers had been dropped.

4.7.4 Homoscedasticity of the Residuals of Dependent Variable

Assessment of homoscedasticity of the residuals of financing of water investments was conducted. OLS makes the assumption that the variance of the error term is constant (Homoscedastic) (Greene, 2003). If the error terms do not have constant variance (have differing variance), they are said to be heteroscedastic. Violation of this assumption leads to bias in test statistics and confidence intervals (Greene, 2003). Levene Statistic was used to test the hypothesis for the homogeneity of variance that is, the error variances are all equal or homoscedastic. Table 4.19 shows Levene Statistic of 4.642 with an associated p-value of .000. Since the probability associated with the Levene Statistic is 0.000 which is less than 0.05 level of significance, we fail to reject the hypothesis and conclude that the variance of the dependent variable were homogeneous.

Table 4.19 Test of Homogeneity of Variances

Levene Statistic	df1	df2	P-value
4.642	11	136	.000

Similarly Breusch-Pagan and Koenker test statistics was also used to test the null hypothesis that heteroscedasticity was present. If significant-value is less than 0.05, reject the hypothesis and conclude that variance of independent variable was

homoscedastic (Greene, 2003). Breusch-Pagan test is a large sample test and assumes the residuals to be normally distributed. Table 4.20 shows Breusch-Pagan and Koenker test statistics of 12.757 with an associated p-value of.000. Since the probability associated with the Breusch-Pagan and Koenker test was 0.000 which is less than 0.05 level of significance, we reject the null hypothesis and conclude that the variance of the dependent variable were homogeneous/homoscedastic.

Table 4.20 Breusch-Pagan and Koenker Test for Heteroskedasticity

	SS	df	MS	F	Sig
Model	12.757	4.000	3.189	1.088	.000
Residual	416.364	142.000	2.932	-999.000	-999.000

4.7.5 Multicollinearity Results

To test the correlation between variables, multicollinearity test was conducted. Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated (Gujarat & Porter, 2009). It arises when there is a linear relationship between two or more independent variables in a single equation model (Gujarat and Porter, 2009). In a multiple regression analysis, the estimated regression coefficients fluctuate widely and become less reliable as the degree of correlation between independent variables increases (Kothari, 2004). This result in the sample coefficient being far from the actual population parameter and when the coefficients are tested, the t – statistics becomes small which leads to the inference that there is no linear relationship between the affected independent variables and the dependent variable (Cooper & Schindler, 2011). Multicollinearity also increases the standard errors of the β coefficients, meaning that the β s have relatively higher variability across samples making it difficult to assess the individual importance of a predictor.

Detection Tolerance and Variance Inflation Factor (VIF) method was used to test for multicollinearity (Cooper & Schindler, 2011). O'Brien (2007) suggested that a tolerance value of less than 0.20 and a VIF of 5 or 10 and above indicates a

multicollinearity problem. Multicollinearity is reflected by lower tolerance values and higher VIF values (Hair *et al.*, 2006). Table 4.21 indicates that Variance Inflation Factor (VIF) results for the study variables was less than 5 while Tolerance was greater than 0.2 which shows no multicollinearity between predictor variables.

Table 4.21 Coefficient for Tolerance and Variance Inflation Factor Tests

Variables	Collinearity Statistics	
	Tolerance	VIF
Cost Recovery	.707	1.414
Perceived Risks	.647	1.545
Access to Capital	.862	1.161
Return on Investment	.877	1.140
Mean Tolerance and VIF	.773	1.315

a. Dependent Variables: Financing of Small Scale Water Investments

4.7.6 Independence of Residuals - Durbin–Watson Statistic

Durbin–Watson statistic was used to detect the presence of autocorrelation in the residuals from a regression analysis (Chatterjee *et al.*, 2013). Autocorrelation makes predictors seem significant when they are not. The value of Durbin-Watson statistic lies between 0 and 4 and 1.5-2.5 for the acceptable range. Values of 2 means that there is no autocorrelation in the sample (Verbeek, 2012). Table 4.22 shows Durbin–Watson statistic of 2.048 which is within the acceptable range. This shows that there was no autocorrelation in the sample, hence the residuals were found to have independent errors.

Table 4.22 Durbin–Watson Statistic

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.673 ^a	.453	.436	.45462	2.048

a. Predictors: (Constant), Cost Recovery, Perceived Risks, Access to Capital, Return on investment

b. Dependent Variable: Financing of Small Scale Water Investments

Graphical method of testing independence of residual was also used to visualise the distribution of the residuals. Figure 4.11 shows that residuals were scattered and oscillating around zero showing no pattern of distributed as they are on both positive and negative ends (Verbeek, 2012). This indicated that the residuals were not either positively or negatively auto-correlated hence independent.

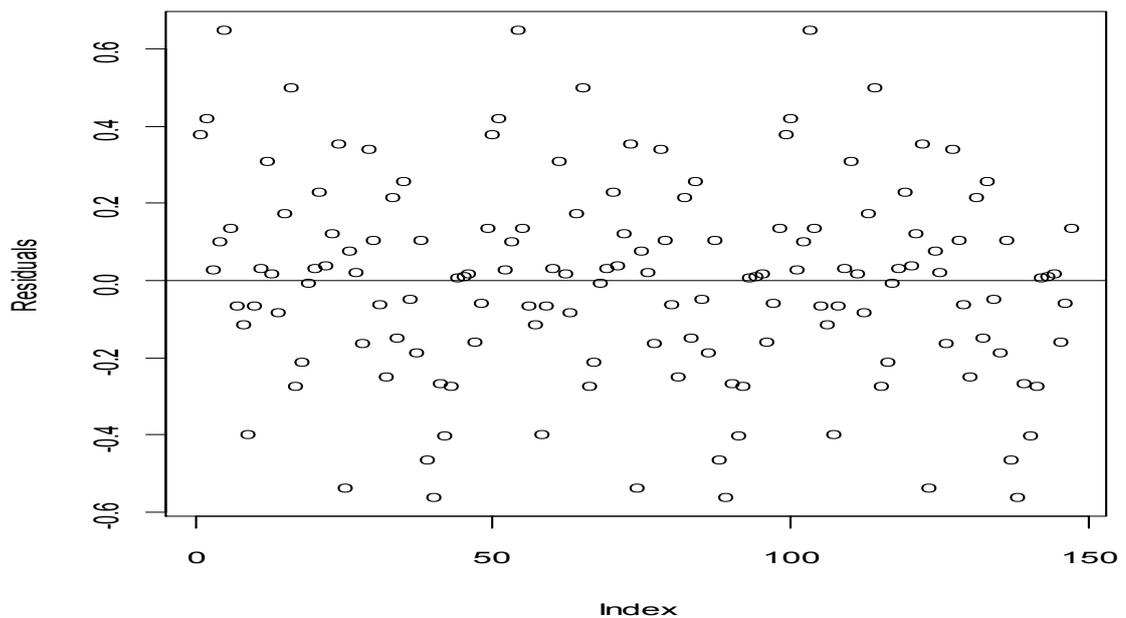


Figure 4.11: Durbin Watson Statistics - Independence of Residual

4.7.7 Common Method Bias

Common Method Bias (CMB) refers to a bias in a dataset due to something external to the measures that may have influenced the response given (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Collecting data using a single (common) method may introduce systematic response bias that will either inflate or deflate responses (Podsakoff *et al.*, 2003). A study that has significant common method bias is one in which a majority of the variance can be explained by a single factor (Podsakoff *et al.*, 2003). To test for a common method bias, a common latent factor (CLF) method was used to capture the common variance among all observed variables in the model. To

do this, a latent factor was added to AMOS CFA model and was then connected to all observed items in the model.

The standardized regression weights from this model were used as a measure of CMB. The results of AMOS software are presented in Figure 4.12. CMB should be less than 20% (0.200) (Podsakoff *et al.*, 2003). In this study, common method bias was $0.28^2 = 0.0780$. This implies that CMB was 7.8% which was much lower than the conventional CMB of 20% (0.2). This indicates that the recommended threshold was met, thus absence of systematic response bias. This evidenced that there were no statistically significant differences at .05 level of significance between responses.

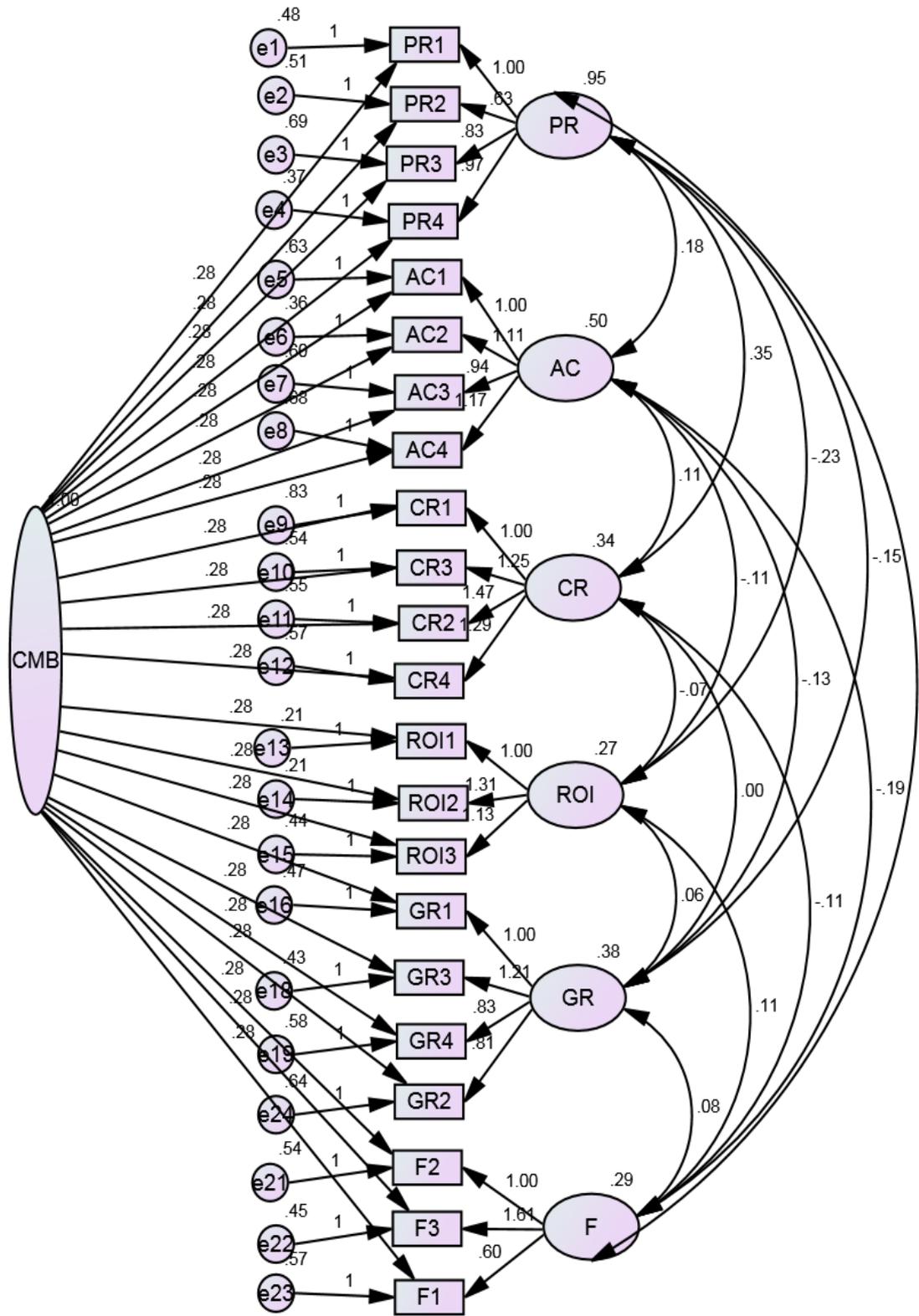


Figure 4.12: Common Method Bias

4.8 Data Analysis and Results of Study Variables

Data analysis was conducted using SEM, where two phase process consisting of confirmatory measurement model and structural model were used. The first phase involved estimation of the measurement model which assesses the relationship between the observable variables and the theoretical constructs they represent. The second phase was the specification of the structural model and evaluation of the relationships proposed and testing of hypothesis (Bryne, 2006).

4.8.1 Confirmatory Measurement Model

The first phase involved confirmatory factor analysis (CFA) that involved evaluation of measurement model on multiple criteria. However prior to CFA, exploratory factor analysis (EFA) that involved computation of factor loading matrix, communality and principle component analysis (PCA) was conducted (Bryne, 2006).

4.8.1.1 Exploratory Factor Analysis

To test whether the items were associated with specific factors, Exploratory Factor Analysis (EFA) was used. EFA was used to identify factors based on data and to maximize the amount of variance explained (Suhr, 2006). EFA is used where the study is being conducted with no pre-conceived theories or expectations (Hair *et al.*, 2013). EFA was conducted in order to understand the structure of the variables before further data analysis. This helped in applying appropriate data analysis techniques to avoid crucial violation of key study assumptions in consequent modelling process (Hair *et al.*, 2013). To assess the factorability of items, two indicators were examined that is, Kaiser Meyer-Olkin measure of sampling adequacy and Barlett's test of Sphericity (Pallant, 2010).

i) Kaiser Meyer-Olkin and Bartlett Test of Sphericity

Kaiser Meyer-Olkin and Bartlett test of Sphericity were generated by SPSS and helped to assess the factorability of data or suitability of data for structure detection (Pallant, 2010). Kaiser-Meyer-Olkin (KMO) test was used to assess sampling

adequacy. The index ranges from 0 to 1 (Tabachnick & Fidell, 2011). For adequate sample, KMO test statistic should be greater than 0.5 (Hair *et al.*, 2013). The world-over accepted index is 0.6 or higher to proceed with factor analysis (Fabrigar, Wegener, MacCallum & Strahan, 1999). Table 4.23 shows KMO statistics of 0.768 which is greater than the convectional probability value of 0.5 and over .60 for a satisfying sample. This implies an acceptable degree of sample adequacy for factor analysis.

On the other hand, Table 4.23 also presents the results of Bartlett’s test of sphericity. Bartlett test of sphericity was performed to assess the appropriateness of using factor analysis (Hair *et al.*, 2013). For factor analysis to be recommended suitable, the Bartlett’s test of sphericity should have p-value of less than 0.05 (Fabrigar *et al.*, 1999). Bartlett’s test of sphericity indicates a chi-square of 1388.137 with an associated p-value of 0.00 which is lower than the convectional probability value of 0.05. It was thus concluded that factor analysis was an appropriate approach for assessing construct validity of the scale.

Table 4.23 Kaiser-Meyer-Olkin and Bartlett’s Test Results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.768
	Approx. Chi-Square	1388.137
Bartlett's Test of Sphericity	df	231
	Sig.	.000

ii) Pattern Loading Matrix

A loading matrix is a matrix of coefficients (weights) for a set of linear equation relating p observed variables with m factors (Carte & Russell, 2003). The rows of the matrix correspond to the observed variables and columns correspond to the factors loadings. The matrix contains the coefficient or loadings used to express the item in terms of the factors. Pattern matrix loadings indices range from 0 to 1.0. 0 means that variables are not involved in a pattern and 1.0 indicates that variables are

almost perfectly related to a factor pattern. Factor loadings should have an average value $\geq .7$ (Byrne, 2006). Table 4.24 shows the loadings and cross loadings for the measurement model and the study coefficients ranging from 0.585 to 0.989 indicating that some of the variables were almost perfectly related to factor pattern (Carte & Russell, 2003).

Table 4.24 Loadings and Cross Loadings for the Measurement Model

	Component					
	1	2	3	4	5	6
PR1	.794					
PR2	.989					
PR3	.765					
PR4	.813					
AC1		.777				
AC2		.924				
AC3		.818				
AC4		.701				
ROI1			.905			
ROI2			.921			
ROI3			.728			
GR1				.787		
GR2				.791		
GR3				.710		
GR4				.743		
CR1					.906	
CR2					.685	
CR3					.841	
CR4					.763	
F1						.923
F3						.585

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 6 iterations.

iii) Communalities

Communality values used to measure the values of each observed variables that could be explained by extracted factors were checked (Field, 2009). Communality value of less than 0.3 indicates that the variables do not fit well with other variables in its component and is undesirable (Pallant, 2010). Small values indicate that variables do not fit well the factor solution and could possibly be dropped from the analysis (Pallant, 2010). Extracted communalities are estimates of variance in each variable accounted for by factors in each factor solution. Extracted communalities values for this study were between 0.583 to 0.794 suggesting satisfactory factorability for all items. This means that the variables fitted well with other variables in their factors (Pallant, 2010). When applying EFA, the results showed a clear factor structure with an acceptable level of cross loadings. These results are presented in Appendix iii.

iv) Principal Component Analysis

Principal Component Analysis using Varimax rotation which is an orthogonal rotation was used in factor extraction (Zikmund *et al.*, 2010). Varimax rotation yielded results which made it easy to identify each variable with a single factor (Zikmund *et al.*, 2010). Tabachnick and Fidell (2007) indicate that loading factor of 0.32 is good for minimum loading of items. However Hair *et al.*, (2010) indicates that a factor loading of ± 0.3 means the item is of minimal significance, ± 0.4 indicates it is more important, and ± 0.5 indicates the factor is significant. The study therefore used a threshold factor loading of ± 0.4 . The fewer the factors explaining more of the variability in the original variables, the better it is in ensuring that there is no redundant information (Hair *et al.*, 2010). The findings of the study indicated that 6 extracted factors in the initial solution had eigenvalues greater than 0.4 which accounted for 69.923% of the variations in the co-variance matrix. This indicates that each item loaded predominantly on 6 factors. The results show that 69.923 % of the variation in the data has been modeled and can be explained by 6 factors. These results are presented in appendix iv.

Appendix iv also shows the variance explained by the extracted factors before rotation. The cumulative variability explained by the six factors in the extracted solution was 69.923% showing no difference from the initial eigenvalues. This means that nothing of the variation explained by the initial eigenvalues was lost to latent factors unique to the original variables and variability that simply cannot be explained by the factor model (Hair *et al.*, 2010).

4.8.1.2 Confirmatory Factor Analysis

The confirmatory factor analysis was conducted in order to assess the extent to which the observed data fitted the pre-specified theoretically driven model (Hair *et al.*, 2010). CFA was conducted on each construct. CFA shows the extent to which the observed variables (indicators) represent an underlying latent construct (Hair *et al.*, 2010, Hooper *et al.*, 2008). This was done to assess whether proposed variable indicators had significant factor loadings. This was conducted to ensure that the most appropriate model was selected for analysis (Hooper *et al.*, 2008). The results of confirmatory factor analysis are presented in Figure 4.13. The Figure show that the factor loading was more than 0.4 for all the hypothesized indicators measuring independent variables except for return on investment that had three indicators. Due to low factor loading, one indicator of return on investment was dropped.

Two hypothesized indicators of financing were also dropped due low factor loadings. Hence, in further analysis the study employed four of the hypothesized indicators of cost recovery, perceived risks, access to capital and three indicators of return on investments. Standardized residual covariance point out the discrepancies between the proposed sample variance and estimated models implied variance. They also indicate whether or not those discrepancies are significant. A significant standardized residual covariance is one with an absolute value greater than 0.3 (Yuan & Zhang, 2011).

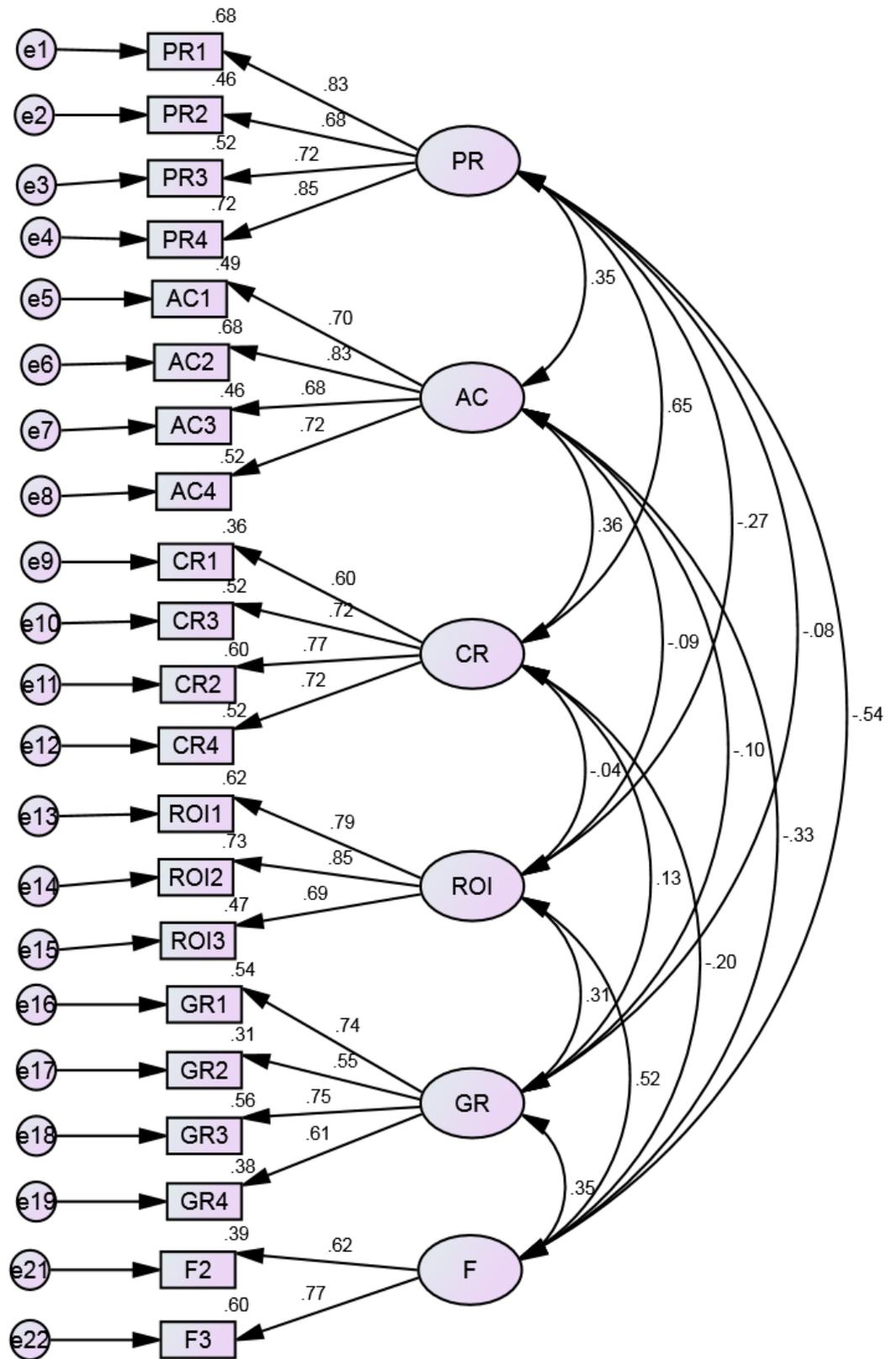


Figure 4.13: Confirmatory Factor Analyses

Before confirmatory structural models were developed, properties of multi-item constructs were analyzed for convergent validity, discriminant validity, construct reliability and construct validity by conducting confirmatory factor analysis (CFA). These four criteria were used to validate the model fit (Hair *et al.*, 2010).

i) Convergent Validity

Convergent validity is used to ensure that measurement items for relevant constructs actually measure that particular construct (Hair *et al.*, 2010). Convergent validity was assessed using the value of standard loadings of the indicators for the underlying construct. The scores are to be statistically significant and above Average Variance Extracted (AVE) of 0.5 (Nunnally, 1978). The measurement model defines how each block of indicators relates to their respective latent variables (Chin, 1998). Confirmatory factor analysis was conducted to assess the convergent validity of the constructs. The CFA results of item loadings are reported in Table 4.25. The items were significantly loaded on the proposed factors with AVE loading higher than 0.5. This indicates that the measurement scales exhibited adequate convergent validity (Hair *et al.*, 2010).

ii) Discriminant validity

Discriminant validity measures the uniqueness of the constructs to each other in the model (Hensler *et al.*, 2009). The average variance extracted (AVE) estimates for each construct with the squared correlations between constructs were used to confirm discriminant validity (Hair *et al.*, 2010). Measures of constructs that theoretically should not be related to each other should be able to discriminate between dissimilar constructs (Hensler *et al.*, 2009). The square root of AVE should be higher than the correlation between pair of constructs (Hair *et al.*, 2010). The AVE values of investor's perceived risks (PR), access to capital (AC), return on investments (ROI), government regulations (GR), cost recovery (CR) and financing were 0.773, 0.731, 0.779, 0.696 0.707 and 0.701 respectively. Their respective AVE met the threshold of 0.5. As indicated in Table 4.25, all the constructs in the model met this criteria indicating that discriminant validity was supported.

Table 4.25 Convergent and Discriminant Test Results

Component	AVE	PR	AC	ROI	GR	CR	F
PR	0.597	0.773					
AC	0.535	.336	0.731				
ROI	0.607	-.331	-.155	0.779			
GR	0.484	-.078	-.081	.213	0.696		
CR	0.500	.427	.289	-.051	.109	0.707	
F	0.491	-.221	-.160	.230	.222	-.027	0.701

iii) Construct Reliability

Construct reliability measures whether the scales used to measure a particular construct provide consistent measurement results (Hensler *et al.*, 2009; Cronbach, 1971). Reliability test was conducted as a test of whether data collecting instrument yielded the same result on repeated trials. A statistical coefficient - Cronbach's alpha (α) was used as a measure of internal reliability (Cronbach, 1971). The SPSS for Windows reliability program was used to determine the reliability of research instruments. The recommended value of 0.7 was used as a cut-off of reliability (Sekaran, 2009). Table 4.26 shows Cronbach's alpha coefficients of between 0.735 to 0.853. The threshold value of 0.7 was met which means that all the variables in the study exhibited construct reliability.

Table 4.26 Overall Cronbach's Alpha Reliability Results

	Cronbach's Alpha if Item Deleted	Overall Cronbach's Alpha
CR1	.776	
CR2	.729	.799
CR3	.740	
CR4	.749	
PR1	.796	
PR2	.835	.853
PR3	.830	
PR4	.789	
AC1	.782	
AC2	.725	.815
AC3	.788	
AC4	.771	
ROI1	.731	
ROI2	.698	.794
ROI3	.722	
ROI4	.809	
GR1	.673	
GR2	.737	.760
GR3	.681	
GR4	.718	
F1	.679	
F2	.594	.735
F3	.614	
F4	.672	

iv) Construct Validity

Validity is the degree at which data collecting instrument measures what it was supposed to measure (Cooper & Schilder, 2011). Zikmund *et al.*, (2010) describes validity as the accuracy of data collecting instruments. It helped in determining whether the respondents understood the direction and instruction on questionnaires (Cooper & Schilder, 2011). The study used content validity to test the accuracy of data collecting instruments. Opinion of three experts was sought to review data collecting instruments. Results of their responses were analyzed to establish the

percentage of representation. Content validity formular suggested by Amin (2005) was used. This formular is as follows;

$$\text{Content validity} = \text{Number of judges declaring item valid/number of items} \dots \dots \text{(4.1)}$$

Table 4.27 shows that validity test yielded an average index score of 85%. This implies that the instruments were valid.

Table 4.27 Construct Validity Results

Rater	No of items	Valid items	Fractions
1	38	32	.8421
2	38	31	.8157
3	38	34	.8947
Average			.8508

v) Chi-square Goodness of Fit Test

Different fit statistical tests were used to determine whether the model provided adequate fit for the data. The fit indices were used to assess whether overall models were acceptable and if acceptable researcher establish whether specific paths were significant (Hu & Bentler, 1999). The most basic test, chi-square goodness of fit test was used. The chi-squared test indicates the difference between observed and expected covariance matrices (Hair *et al.*, 2010). The criterion for acceptance of chi-square index df ratio should ranges between 1.0 to 3.0 (Ullman, 2001). A chi-square p-value less than 0.05 indicate a better fit or smaller difference between expected and observed covariance matrices (Marsh *et al.*, 2011, Hu & Bentler, 1999). Table 4.28 shows a chi statistics of 268.880 with an associated probability value of .000 which is less than 0.05 and CMIN/DF ratio of 1.735 which is within the acceptable range. This indicated that the model fitted the data (Hu & Bentler, 1999).

Table 4.28 Chi-square Test Statistics

Chi-Square	df	CMIN/DF	P-value
268.880	155	1.735	.000

Since the chi-square goodness-of-fit statistics is overly sensitive to sample size, other fit statistics were used to examine the fits (Schumacker & Lomax, 2004). Scholars such as Marsh, Balla and Hau (1996) recommend that individuals utilize a range of fit indices. Other scholars argue that although chi-square goodness of fit test is a traditional measure in assessing overall model fit, it tends to be unreliable when sample size is greater than 200. Thus alternative fit indices could be used as there is no agreement on the best approach for evaluating model fit (Schumacker and Lomax, 2004).

In order to ascertain that the model provided adequate fit for the data, the study also considered the two types of fit statistics commonly used i.e. absolute fit indices and incremental fit indices (Hair *et al.*, 2010). For absolute fit indices the study used root mean square error of approximation (RMSEA), goodness of fit index (GFI) and adjusted goodness of fit index (AGFI) (Hair *et al.*, 2010). For incremental fit indices, Comparative Fit Index was used (Hair *et al.*, 2010). These fit indexes were used to verify that the model was adequate (Browne & Cudeck, 2003).

The Root Mean Square Error of Approximation (RMSEA) is related to the residuals in the model. RMSEA values range from 0 to 1 with a smaller RMSEA value indicating better model fit (Marsh *et al.*, 2011). Good model fit is typically indicated by an RMSEA value of 0.05 or less (Hu & Bentler, 1999), but a value of 0.08 or less is often considered acceptable (Browne & Cudeck, 2003). RMSEA value of less than 0.05 is considered excellent, 0.05 to 0.08 is good while 0.08 to 0.10 is acceptable (Hu & Bentler, 1999). Table 4.29 shows RMSEA results of 0.071 is greater than 0.05, but is less than 0.08 with an associated PCLOSE- value of .010. This shows a good model fit (Hu & Bentler, 1999).

Table 4.29 Root Mean Square Error of Approximation Statistics

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.071	.057	.085	.010
Independence model	.203	.193	.214	.000

Table 4.30 shows the results of goodness of fit index (GFI), adjusted goodness of fit index (AGFI) and Comparative Fit Index (CFI). The goodness of fit index (GFI) is a measure of fit between the hypothesized model and the observed covariance matrix (McDonald & Ho, 2002). The adjusted goodness of fit index (AGFI) corrects the GFI, which is affected by the number of indicators of each latent variable (McDonald & Ho, 2002). The GFI, AGFI and CFI fit indexes range between 0 and 1. However acceptable indexes should be greater or equal to 0.8 (McDonald & Ho, 2002). Table 4.8 shows GFI of .855, AGFI of .804 and CFI index of .901 generally indicating acceptable model fit (Yuan & Hayashi, 2010).

Table 4.30 GFI, AGFI and CFI Model Fit Statistics Results

Model	GFI	AGFI	CFI
Default model	.855	.804	.901
Saturated model	1.000		1.000
Independence model	.414	.352	.000

4.8.2 Confirmatory Structural Models and Hypothesis Testing of Study Variables

Structural Equation Modeling (SEM) was used to test the hypothesized relationship and to fit the structural model in the second phase (Hooper *et al.*, 2008). Prior to SEM, exploratory factor analysis was conducted to ensure that factor loadings for indicators to be used were more than 0.4 and that variable indicators converged on one common construct. In order to assess whether the model provided adequate fit

for the data, the study considered both absolute fit indices and incremental fit indices (Hair *et al.*, 2010). Regression weights were used to test the contribution of each indicator to their relevant constructs (convergent validity). Regression weights were also used to explain the nature of the relationship since all the variables were in the same measurement scale.

Path diagrams (models) were used to specify patterns of directional and non-directional relationships among observed variables (Babin and Svensson, 2012). Path coefficients estimates were used to determine the direction and strength of the factor. This was conducted by use of Analysis of Moment Structures (AMOS) software (Byrne, 2006). Analysis of Moment Structures was used to tests relationships between observed and latent (unobserved) variables to test hypotheses and confirm relationships. The software was also used to assess the model's fit, computes results and develops a visual/graphical output (Bhattacharyya, 2007). T-statistics value (C.R) was used to test whether the models were significant by comparing the model output (t-calc) with the conventional critical value of -1.96 or 1.96 at 0.05 significance level ($p < 0.05$).

4.8.2.1 Influence of Cost Recovery on Financing of Water investments.

The first objective of the study was to determine whether cost recovery influences financing of small scale water investments in Nairobi peri-urban areas in Kenya. Structural models in structural equation modeling (SEM) were applied (Babin & Svensson, 2012). Prior to structural models, exploratory factor analysis was conducted to determine whether cost recovery indicators had significant factor loadings (Zikmund *et al.*, 2010). Factors with loadings of 0.4 and above were considered appropriate (Hair *et al.*, 2010). The results in Table 4.31 show that the factor loadings of all cost recovery indicators ranged from 0.685 to 0.906 suggesting high convergent validity. Hence, in further analysis the study employed the four indicators of cost recovery.

Table 4.31 Factor Loadings for Cost Recovery

Cost Recovery Indicators	Component/Loadings
Pricing of water: The price charged to consumers for water services greatly affect that amount of revenue generated to finance water investment.	.906
Externalities: (external conditions) External conditions like tax, interest rate, government policy has greatly affected financing of water investments.	.685
User charges: It's better to Charge the water users directly the full cost of water service in order to generate sufficient revenue to recover investments costs	.841
Consumer income levels: The level of consumer's income Peri-urban areas affect the rate of cost recovery to sustain cost of investments in water.	.763

Model Fit Tests Results of Cost Recovery

In order to assess whether the model provided adequate fit for the data, the study considered both absolute fit indices and incremental fit indices (Hair *et al.*, 2010). These fit indexes were used to verify that the model was adequate (Browne & Cudeck, 2003). Table 4.32 shows RMSEA of 0.107, GFI of .957, AGFI of .887 and CFI index of .976 generally indicating acceptable model fit (Yuan & Hayashi, 2010).

Table 4.32 Model Fit Statistics Results for Cost Recovery

Model	RMSEA	GFI	AGFI	CFI
Default model	.107	.957	.887	.976
Independence model	.432	.467	.254	0.000

Convergent Validity of Cost Recovery

Regression weights were used to test the contribution of each cost recovery indicators to the construct variable (cost recovery). Regression weights were also used to explain the nature of the relationship since all the variables were in the same measurement scale. Regression weights in Table 4.33 indicate that a unit increase in cost recovery is associated with 1.099 increases in pricing of water (CR1). CR1 is associated with Estimate of 1.099 and C.R of 13.843. Since the C.R (13.843) is greater than 1.96, then there is a significant positive relationship between CR1 and cost recovery. CR2 implies that a unit increase in cost recovery is associated with .586 increases in externality. CR2 is associated with (Estimate = .586, C.R= 7.504) increases in cost recovery. Since the C.R (7.504) is greater than 1.96, then there is a significant positive relationship between CR2 and cost recovery.

A unit increase in cost recovery was associated with 1.034 estimates and a C.R of 12.236 users charges (CR3). Since the C.R (12.236) is greater than 1.96, this implies that there is a significant positive relationship between CR3 and cost recovery. The results in Table 4.33 also show that a unit increase in cost recovery is associated with .998 increases in the consumer demand for water. A unit increase in cost recovery was associated with 0.998 and a C.R of 10.289. This implies that there was a significant positive relationship between CR4 and cost recovery since C.R was greater than 1.96.

Table 4.33 shows that all the regression weights were higher than the acceptable level. The t-calc values (Critical Ratio; C.R) for all the cost recovery indicators were higher than 1.96 (Critical Ratio should be greater than -1.96 or 1.96 at 0.05 significance level ($p < 0.05$)). This implies that all the indicators were significantly related to cost recovery and the results verified the convergent validity of cost recovery construct. Overall the table shows that a unit increase in financing is associated 0.350 increases in cost recovery. Thus when cost recovery increases by 1 unit, financing increases by .350 units. The results shows that there was a significant

positive relationship between cost recovery and financing of water investment (Estimate =.350, C.R = 4.638, p-value = 0.000).

Table 4.33 Regression Weight and CR Values for Cost Recovery

		Estimate	S.E.	C.R.	P-value
F	CR	.350	.076	4.638	.000
CR1	CR	1.099	.079	13.843	.000
CR2	CR	.586	.078	7.504	.000
CR3	CR	1.034	.084	12.236	.000
CR4	CR	.998	.097	10.289	.000

Hypothesis Testing of Cost Recovery

The first objective of the study was to establish whether cost recovery influences financing of small scale water investments in Nairobi peri-urban areas in Kenya.

The hypothesis tested for this objective was;

H₀₁: *There is no significant relationship between cost recovery and financing of small scale water investments in Nairobi Peri-urban areas in Kenya.*

The study also hypothesized that;

H₀₂: *Government regulations do not moderate the relationship between cost recovery and financing of small scale water investments in Nairobi Peri-urban areas in Kenya.*

The study used two structural models. Model 1 represented un-moderated cost recovery while model 2 represented moderated cost recovery. The Structural Equation Modeling (SEM) for the first objective for model 1 is as shown in Figure 4.14. Path coefficients were used to determine the direction and strength of the factor. The figure shows a path coefficient beta value of 0.52 ($\beta = 0.52$). This implies

that for every 1 unit increase in cost recovery, financing of small scale water investments is predicted to increase by 0.52 units.

R^2 was used to show the proportion of variation in dependent variable explained by the SEM model. The figure shows that cost recovery had a coefficient R^2 mean value of .27. The value of R^2 of .27 indicates that 27% of the variations in financing of small scale water investments in peri-urban areas in Kenya can be accounted for by cost recovery scores.

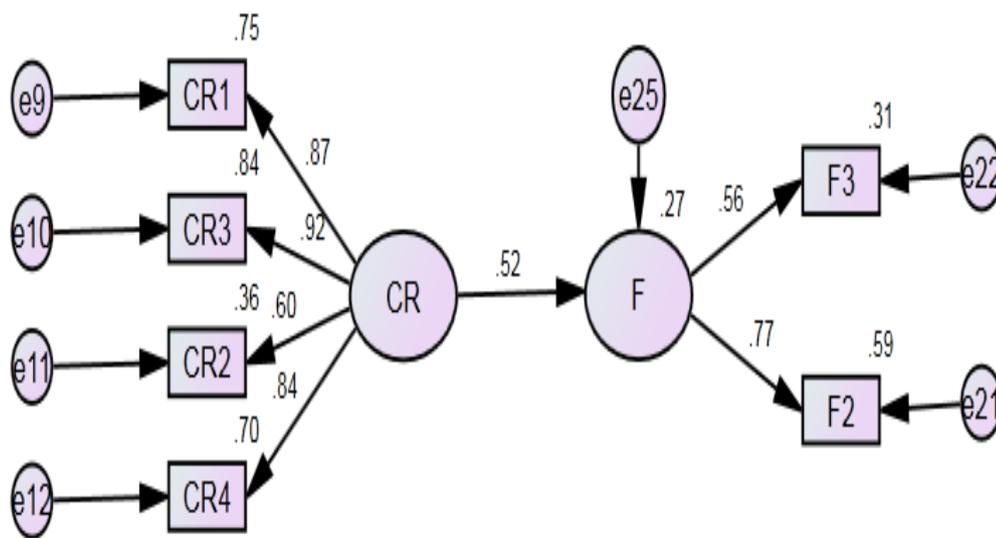


Figure 4.14: Structural Equation Modeling (SEM) for Cost Recovery

T-statistics provided information on the significance of the relationship. T-statistics value (C.R) was used to test whether the relationship between cost recovery and financing of water investment was significant. Critical value should be less than -1.96 or greater than 1.96 at 0.05 significance level. Figure 4.15 shows a t-calc value of 4.638 and a p-value of .000. These results show that there was a significant positive relationship between cost recovery and financing of water investment since the C.R of 4.638 is greater than the conventional critical value of 1.96 at 0.05 significance level ($p < 0.05$).

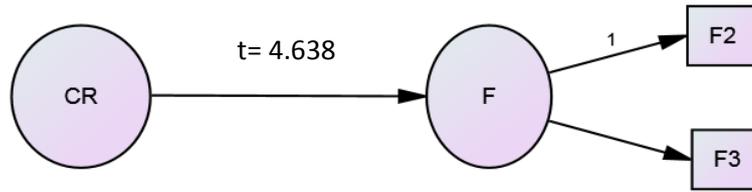


Figure 4.15: T- Statistics for Cost Recovery

The finding of the study reveals that the relationship between cost recovery and financing of water investments in peri-urban areas is positive and significant ($t=4.688$, p -value .000). This implies that an increase in cost recovery leads to an increase in financing of water investments in peri-urban areas. Therefore null hypothesis that there is no significant relationship between cost recovery and financing of small scale water investments in peri-urban areas was rejected at 95 percent significance level. The study therefore fails to reject alternative hypothesis and conclude that cost recovery influences financing of small scale water investments in peri-urban areas. Low cost recovery has therefore played a significant role in inhibiting financing of water investments in peri-urban areas in Kenya.

The findings agree with those Finger and Alluche (2002), Burki and Perry (2008) and Steve *et al.*, (2007) who indicated that water utilities usually report negative income as users' fee is set below full cost recovery level hence low water investments. Hall (2003) argues that low income users cannot pay the full costs for the water service required for the company to maximize its returns which has leads to low investment in water sector. WASREB (2009) maintained that cost recovery takes long and although urban water tariffs are higher by regional standards of US\$ 0.46 per m^3 , on average the level of cost recovery are low among water utilities hence low investments in the sector. Greg (2007) argues that water utilities generate low revenue which cannot cover the financing gap. This has greatly contributed to low level of investments in water sector. The finding of this study contributes to the literature as it point out the relevance of transactional cost theory.

Moderating Effect of Government Regulations on the Relationship between Cost Recovery and Financing of Small Scale Water Investments.

Moderation occur when variable M alters the relationship between the variables X and Y by enhancing or weakening the hypothesized relationship (Sauer and Dick, 2003). In order to determine the function of the moderator, difference in R^2 as recommended by Carte and Russell (2003) was used. The structural equation modeling (SEM) for the first objective for model 2 is as shown in Figure 4.16. Model 2 shows the results after interaction term (cost recovery*government regulations) was introduced in the equation. Path coefficients were used to determine the direction and strength of the factor. The figure shows a path coefficient beta value of 0.51 ($\beta = 0.51$). This implies that for every 1 unit increase in cost recovery, financing of water investments is predicted to increase by 0.51 units.

R^2 was used to show the proportion of variation in dependent variable explained by the SEM model. The results show a coefficient R^2 mean value of .38 which is higher than that of cost recovery of .27. An R^2 of .38 indicate that 38% of the variances in financing of water investments can be accounted for by cost recovery*government regulations scores. Inclusion of interaction term resulted in an R^2 change of 11. An R^2 change of 11 indicates that moderating effect of government regulations explains 11% variances in financing above and beyond the variance explained by cost recovery scores. This shows a significant presence of moderating effect of government regulations on the hypothesized relationship between cost recovery and financing of water investments.

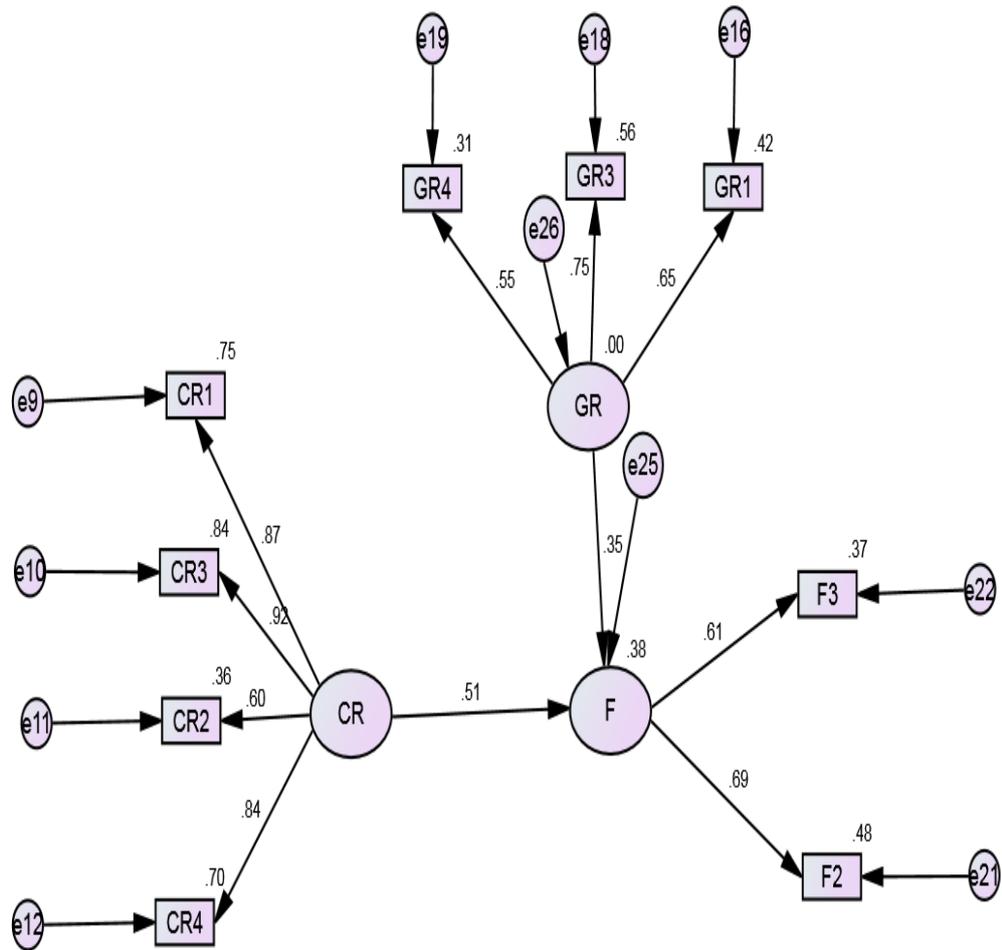


Figure 4.16: Moderated Structural Equation Modeling (SEM) for Cost Recovery

T-statistics provided information on the significance to the relationship. T-statistics value (C.R) was used to test whether the moderating effect of government regulations on the relationship between cost recovery and financing of water investments was significant. Critical value should be less than -1.96 or greater than 1.96 at 0.05 significance level. Model 2 in Table 4.34 shows that Estimate = 0.308, C.R = 4.281, p-value = .000. C.R of 4.281 and p-value of .000 show that there was a significant positive relationship between cost recovery*government regulations and financing of water investment since the C.R of 4.281 is greater than the conventional critical value of 1.96 at 0.05 significance level ($p < 0.05$). Thus null hypothesis that government regulations do not moderates the relationship between cost recovery and

financing of small scale water investments was rejected at 95% significance level and therefore conclude that government regulations moderates the relationship between cost recovery and financing of small scale water investments.

Table 4.34 Moderated Regression Weights for Cost Recovery

		Estimate	S.E.	C.R.	P-value
F	CR	.308	.072	4.281	.000
F	GR	.353	.135	2.609	.009
CR1	CR	1.098	.079	13.868	.000
CR2	CR	.584	.078	7.492	.000
CR4	CR	1.042	.081	12.864	.000
CR4	CR	1.031	.084	12.230	.000

These findings concur with those of WASREB (2009) that states that in Kenya, water prices or tariffs are approved by water service regulatory board. Cousins (1999) observed that increased water prices and other related government regulations are a key outcome of recent policy changes in the water sector. Finger and Allouche (2002) asserts that economic regulation is about introducing competitive market structures in industries characterised by market failures, regulating the market and guaranteeing the sustainability of the water system. The major instruments of economic regulation are price and access regulations. These are clear indications that the government do influence prices charged to water consumers as well as water accessibility (Finger & Allouche, 2002). This implies that the government regulations have great influence on access to water and prices charged to consumers which in return affect cost recovery. This is a clear indication that government regulations moderate the relationship between cost recovery and financing of water investments.

4.8.2.2 Influence of Perceived Risks on Financing of Water Investments.

The second objective of the study was to assess the effects of investor's perceived risks on financing of small scale water investments in Nairobi Peri-urban areas in Kenya. Structural models in structural equation modeling (SEM) were applied (Babin & Svensson, 2012). Prior to structural models, exploratory factor analysis was conducted to determine whether investor's perceived risks indicators had significant factor loadings (Zikmund *et al.*, 2010). Factors with loadings of 0.4 and above were considered appropriate (Hair *et al.*, 2010). The results in Table 4.35 show that the factor loadings of all investor's perceived risks indicators ranged from 0.765 to 0.989 suggesting high convergent validity. Hence, in further analysis the study employed the four hypothesized indicators of investor's perceived risks.

Table 4.35 Factor Loadings for Investor's Perceived Risks.

Indicators	Component/Loadings
Business risk: There is high certainty of the amount of income generated from water selling business hence high business risk.	.794
Financial risks: Water investments highly depend on borrowed capital to finance its operations rather than owner's equity hence has high financial risk.	.989
Interest rate risk: Financing of water investments is usually affected by changes of interest rate on loans. These investments thus have high interest rate risk.	.765
Commodity price risk: Prices of water keeps on changing which affects the profit margin of water businesses	.813

Model Fit Tests Results of Investor's Perceived Risks

In order to assess whether the model provided adequate fit for the data, the study considered both absolute fit indices and incremental fit indices (Hair *et al.*, 2010). These fit indexes were used to verify that the model was adequate (Browne &

Cudeck, 2003). Table 4.36 shows RMSEA of 0.000, GFI of .986, AGFI of .964 and CFI index of 1.000. This shows an excellent model fit (Yuan & Hayashi, 2010).

Table 4.36 Model Fit Statistics Results for Investor’s Perceived Risks

Model	RMSEA	GFI	AGFI	CFI
Default model	.000	.986	.964	1.000
Independence model	.374	.477	.267	0.000

Convergent Validity of Investor’s Perceived Risks

Regression weights were used to test the contribution of each investor’s perceived risk indicators to construct variable (investor’s perceived risk). Regression weights were also used to explain the nature of the relationship since all the variables were in the same measurement scale. Table 4.37 shows that all the regression weights were higher than the acceptable level of -1.96 or 1.96 at 0.05 level of significance. The t-calc values (critical ratio; C.R) for all the investor’s perceived risk indicators were higher than -1.96 or 1.96 (Critical Ratio > -1.96 at 0.05 significance level ($p < 0.05$)). This implies that all the indicators were significantly related to investor’s perceived risk and the results verified the convergent validity of investor’s perceived risk construct. Overall the results shows that relationship between investor’s perceived risk and financing of water investment is negative and significant (Estimate = -.412, C.R = -4.910, p-value = 0.000. This implies that an increase in investor’s perceived risk by 1 unit lead to a decrease in financing by -.412 units.

Table 4.37 Regression Weight and CR Values for Investor’s Perceived Risk

		Estimate	S.E.	C.R.	P-value
F	PR	-.412	.084	-4.910	.000
PR1	PR	.765	.098	7.806	.000
PR2	PR	.656	.084	7.831	.000
PR3	PR	.831	.102	8.168	.000
PR4	PR	.984	.099	9.950	.000

Hypothesis Testing of Investor's Perceived Risks

The second objective of the study was to assess the effects of investor's perceived risks on financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The hypothesis tested for this objective was;

H₀₃: There is no significant relationship between investor's perceived risks and financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The study also hypothesized that;

H₀₄: Government regulations do not moderate the relationship between investor's perceived risks and financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The study used two structural models. Model 1 represented un-moderated investor's perceived risks while model 2 represented moderated investor's perceived risks. The structural Equation Modeling (SEM) for the second objective for model 1 is as shown in figure 4.17. Path coefficients were used to determine the direction and strength of the factor. The figure shows a path coefficient beta value of $-.75$ ($\beta = -.75$). This implies that for every 1 unit increase in investor's perceived risks, financing of water investments is predicted to decrease by $-.75$ units.

R^2 was used to show the proportion of variation in dependent variable explained by the SEM model. The figure also shows that investor's perceived risks had a coefficient R^2 mean of $.56$. The R^2 value of $.56$ indicates that 56% of the variations in financing of water investments in peri-urban areas in Kenya can be accounted for by investor's perceived risks scores.

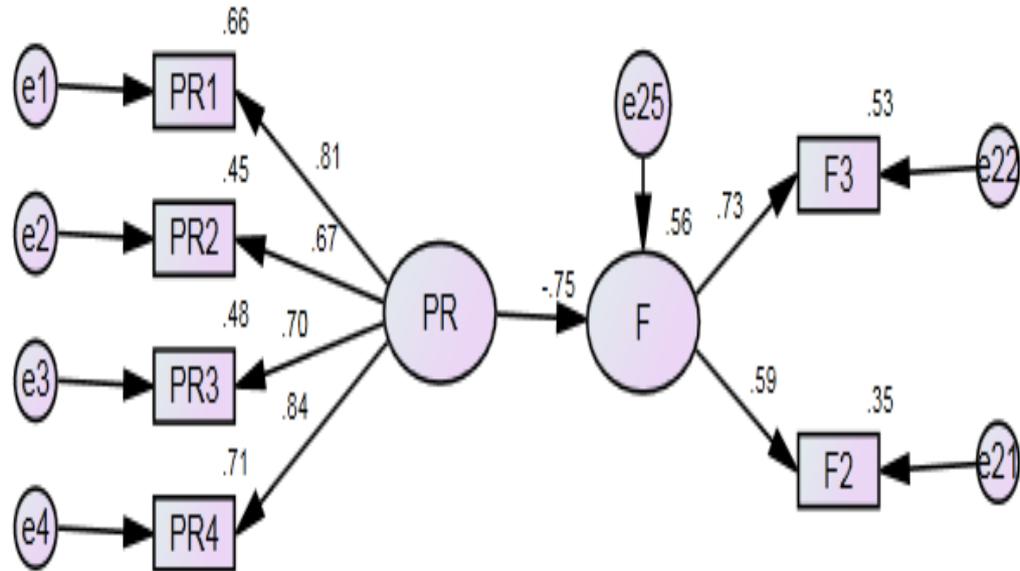


Figure 4.17: Structural Equation Modeling (SEM) for Investor's Perceived Risks

T-statistics provided information on the significance of the relationship. T-statistics value (C.R) was used to test whether the relationship between investor's perceived risks and financing of small scale water investment was significant. Critical value should be less than -1.96 or greater than 1.96 at 0.05 significance level. Figure 4.18 shows a t-calc value of -4.910 (C.R < -1.96). The results show that there was a significant negative relationship between investor's perceived risks and financing of water investment since the C.R of -4.910 is less than the conventional critical value of -1.96 at 0.05 significance level ($p < 0.05$).

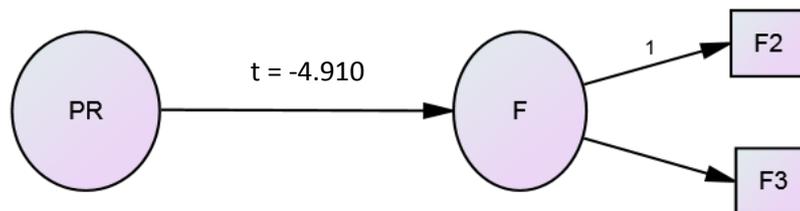


Figure 4.18: T- Statistics for Investor's Perceived Risks

The finding of the study reveals that the relationship between investor's perceived risks and financing of water investments in peri-urban areas is negative and

significant (C.R = -4.910, p-value= .000). This implies that an increase in investor's perceived risks leads to a decrease in financing of water investments in peri-urban areas. Therefore the null hypothesis that there is no significant relationship between investor's perceived risk and financing of small scale water investments in peri-urban areas is rejected at 95 percent significant level. The study therefore fails to reject alternative hypothesis and conclude that investor's perceived risks influences financing of small scale water investments in peri-urban areas. Higher investor's perceived risks have therefore played a significant role in inhibiting financing of water investments in peri-urban areas in Kenya.

The findings agree with those of Hall, Lobina and Motte (2003) which indicate that although there is a lot of liquidity in the financial sector, the risk of investing in most countries is very high. Finger and Alluche (2002), Burki and Perry (2008) maintain that volatility of the investment makes most investor fear the risks involved. Financial failures in the private provision of water services have led several water companies to state that low-income populations are too great of financial risk to invest in (Hall, 2003). The finding of this study contributes to the literature as it point out the relevance of classical decision theory.

Moderating Effect of Government Regulations on the Relationship between Investor's Perceived Risks and Financing of Water Investments.

The structural equation modeling (SEM) for the second objective for model 2 is as shown in figure 4.19. Model 2 shows the results after interaction term (investor's perceived risk*government regulations) was introduced in the equation. Path coefficients were used to determine the direction and strength of the factor. The figure shows a path coefficient beta value of -0.74 ($\beta = -0.74$). This implies that for every 1 unit increase in investor's perceived risks, financing of water investments is predicted to decrease by -.74 units.

R^2 was used to show the proportion of variation in dependent variable explained by the SEM model. The results shows that $R^2 = .67$ which is higher than that of investor's perceived risk of .56. An R^2 coefficient mean value of .67 indicate that

67% of the variances in financing of water investments can be accounted for by investor's perceived risk*government regulations scores. Inclusion of interaction term resulted in an R^2 change of 11. An R^2 change of 11 indicates that moderating effect explains 11% variances in financing above and beyond the variance explained by investor's perceived risk. This shows a significant presence of moderating effect of government regulations on the relationship between investor's perceived risk and financing of water investments.

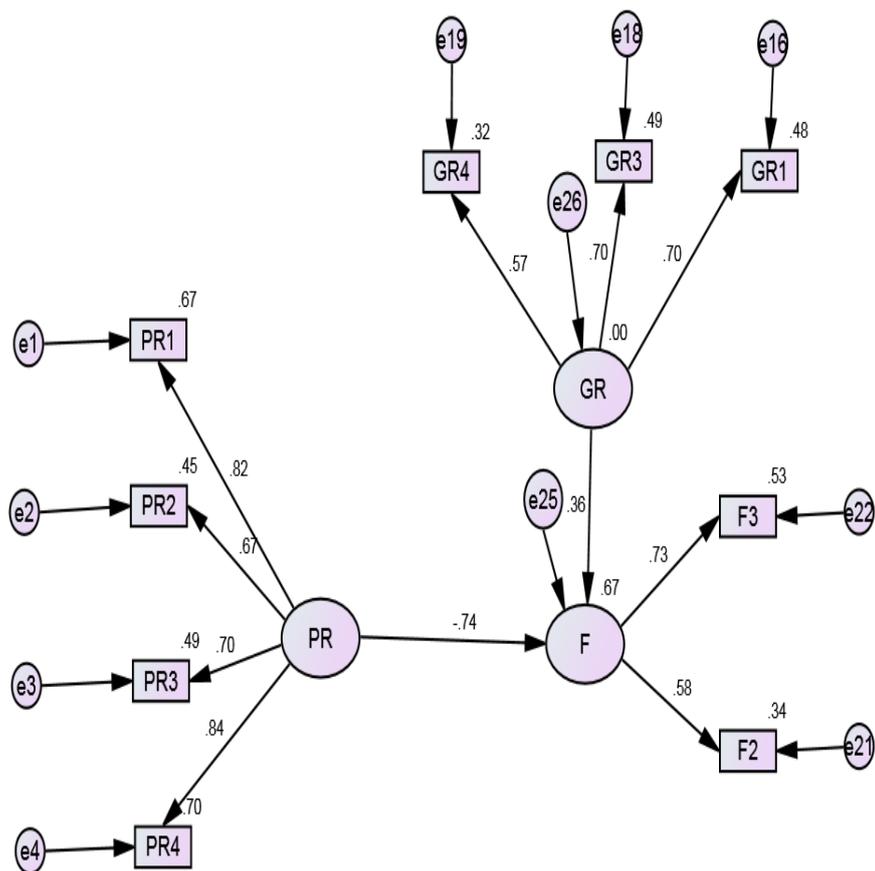


Figure 4.19: Moderated Structural Equation Modeling (SEM) for Investor's Perceived Risks

T-statistics provided information on the significance of the relationship. T-statistics value (C.R) was used to test whether the moderating effect of government regulations on the relationship between investor's perceived risk and financing of

water investments was significant. Critical value should be less than -1.96 or greater than 1.96 at 0.05 significance level. Model 2 in Table 4.38 shows that Estimate = -.393, C.R = -5.015, p-value = .000. C.R of -5.015 and a p-value = .000 show that there was a significant negative relationship between investor's perceived risk and financing of water investment since the C.R of -5.015 is less than the conventional critical value of -1.96 at 0.05 significance level ($p < 0.05$). Thus null hypothesis was rejected at 95% significance level and therefore conclude that government regulations moderates the relationship between investor's perceived risk and financing of small scale water investments in Kenya.

Table 4.38 Moderated Regression Weights for Investor's Perceived Risks

		Estimate	S.E.	C.R.	P-value
F	PR	-.393	.078	-5.015	.000
F1	GR	.286	.101	2.826	.005
PR2	PR	.650	.083	7.824	.000
PR3	PR	.830	.101	8.234	.000
PR4	PR	.973	.098	9.958	.000
GR3	GR	1.079	.223	4.832	.000
GR4	GR	.810	.174	4.659	.000

These results agree with those of Gleick (2004) who maintained that private players are not willing to borrow to finance water investments due to the predating interest rate, high cost of capital and poor quality laws, regulations and policies. The finding implies that changes of interest rate on borrowed loan affect financing of water investments as it changes the risk profile of the investment. The harsh economic conditions have negatively affected availability of capital for investment in water sector (Daude & Stein, 2007). This shows the need for government regulations in order to minimize business, financial, interest rate and foreign exchange risks.

4.8.2.3 Influence of Access to Capital on Financing of Water investments.

The third objective of the study was to investigate the impacts of access to capital on financing of small scale water investments in Nairobi Peri-urban areas in Kenya. Structural models in structural equation modeling (SEM) were applied (Babin & Svensson, 2012). Prior to structural models, exploratory factor analysis was conducted to determine whether access to capital indicators had significant factor loadings (Zikmund *et al.*, 2010). Factors with loadings of 0.4 and above were considered appropriate (Hair *et al.*, 2010). The results in Table 4.39 show that the factor loadings of all access to capital indicators ranged from 0.701 to 0.924 suggesting high convergent validity. Hence, in further analysis the study employed the four indicators of access to capital.

Table 4.39 Factor Loadings for Access to Capital

Indicators	Component/Loadings
Tax rate: Tax imposed on small scale water investment is too high to generate enough profit which can be ploughed back as capital.	.777
Capital market: The ability to raise capital to finance water investments is highly determined by how developed our domestic capital market is.	.924
Willingness to borrow: Ability and willingness of investors to borrow money to finance water investments is affected by prevailing economic conditions.	.818
Cost of capital: The high cost of borrowing capital from financial institutions affects ability of people to borrow to finance water investments.	.701

Goodness of Fit Tests Results of Access to Capital

In order to assess whether the model provided adequate fit for the data, the study considered both absolute fit indices and incremental fit indices (Hair *et al.*, 2010). These fit indexes were used to verify that the model was adequate (Browne & Cudeck, 2003). Table 4.40 shows RMSEA of 0.000, GFI of .985, AGFI of .961 and CFI index of 1.000. This shows an excellent model fit (Yuan & Hayashi, 2010).

4.40 Model Fit Statistics Results for Access to Capital

Model	RMSEA	GFI	AGFI	CFI
Default model	.000	.985	.961	1.000
Independence model	.362	.543	.361	0.000

Convergent Validity of Access to Capital

Regression weights were used to test the contribution of each access to capital indicators to the construct variable (access to capital). Regression weights were also used to explain the nature of the relationship since all the variables were in the same measurement scale. Table 4.41 shows that all the regression weights were higher than the acceptable level at 0.5. The t-calc values (critical ratio; C.R) for all the access to capital indicators were higher than 1.96 (Critical Ratio should be greater than 1.96 at 0.05 significance level ($p < 0.05$)).

This shows that the indicators were significantly related to access to capital and the results verified the convergent validity of access to capital construct. Overall the results shows that relationship between access to capital and financing of water investment is positive and significant (Estimate = .252, C.R = 2.202, p-value = 0.029). This implies that an increase in access to capital by 1 unit lead to an increase in financing by .252 units.

Table 4.41 Regression Weight and CR Values for Access to Capital

		Estimate	S.E.	C.R.	P-value
F	AC	.252	.119	2.202	.029
AC2	AC	1.306	.162	8.074	.000
AC3	AC	1.162	.151	7.713	.000
AC4	AC	1.210	.163	7.428	.000
AC4	AC	1.401	.159	8.811	.014

Hypothesis Testing of Access to Capital

The third objective of the study was to investigate the impacts of access to capital on financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The hypothesis tested for this objective was;

H₀₅: There is no significant relationship between access to capital and financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The study also hypothesized that;

H₀₆: Government regulations do not moderate the relationship between access to capital and financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The study used two structural models. Model 1 represented un-moderated access to capital while model 2 represented moderated access to capital. The structural Equation Modeling (SEM) for the third objective for model 1 is as shown in Figure 4.20. Path coefficients were used to determine the direction and strength of the factor. The figure shows a path coefficient beta value of .26 ($\beta = .26$). This implies that for every 1 unit increase in access to capital, financing of water investments is predicted to increase by .26 units.

R^2 was used to show the proportion of variation in dependent variable explained by the SEM model. The figure shows that access to capital had a coefficient R^2 mean value of .07. The R^2 value of .07 indicates that 7% of the variations in financing of water investments in peri-urban areas in Kenya can be accounted for by access to capital scores.

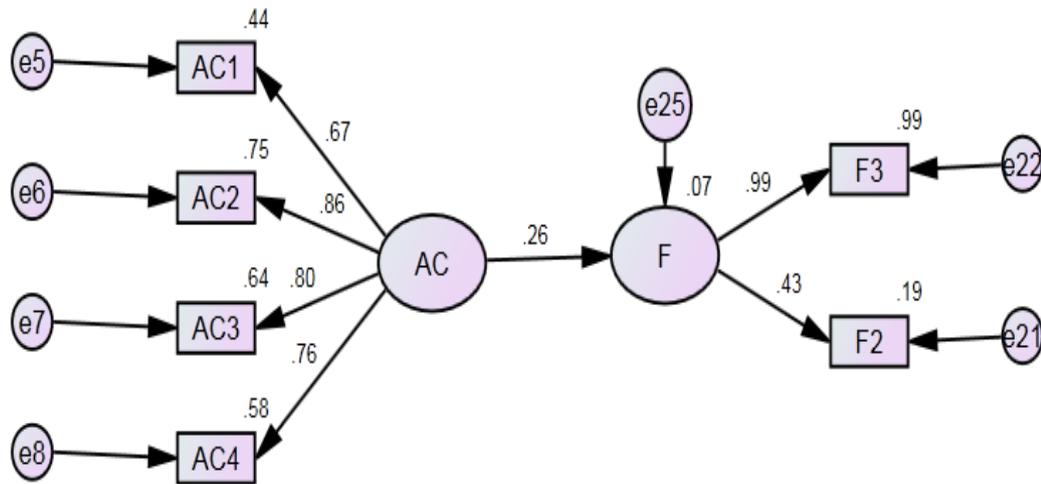


Figure 4.20: Structural Equation Modeling (SEM) for Access to Capital

T-statistics provided information on the significance of the relationship. T-statistics value (C.R) was used to test whether the relationship between access to capital and financing of water investment was significant. Critical value should be less than -1.96 or greater than 1.96 at 0.05 significance level. Figure 4.21 shows a t-calc of 2.202. The results show that there was a significant positive relationship between access to capital and financing of water investment since the C.R of 2.209 is greater than the conventional critical value of 1.96 at 0.05 significance level ($p < 0.05$)

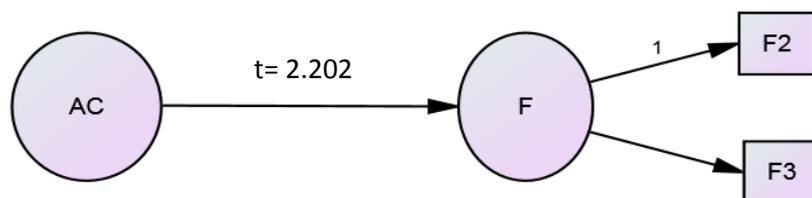


Figure 4.21: T- Statistics for Access to Capital

The finding of the study reveals that the relationship between access to capital and financing of water investments in peri-urban areas is positive and significant ($t=2.202$, p -value .029). Thus an increase in access to capital leads to an increase in financing of water investments in peri-urban areas. Therefore the null hypothesis that there is no significant relationship between access to capital and financing of small scale water investments in peri-urban areas is rejected at 95 percent significant level. The study therefore fails to reject alternative hypothesis and conclude that access to capital influences financing of small scale water investments in peri-urban areas. Capital in-availability has thus played a significant role in inhibiting financing of water investments in peri-urban areas in Kenya.

The findings agree with those of Gleick (2004) that indicated that private players are not willing to borrow to finance water investments due to the predating interest rate, high cost of capital and poor quality laws, regulations and policies. According to World Bank (2004) developing nations tend to have difficulty raising money to finance water investments because their domestic capital areas tend to be poorly developed. Burki and Perry (2008) maintain that the cost of capital is far higher in poor nations because capital is scarce and water infrastructure investments entail significant large amount of capital. According to Finger and Allouche (2002) public funds are not sufficient to build the infrastructure required to effectively meet the demand for water services. The finding of this study contributes to the literature as it point out the relevance of pecking order theory.

Moderating Effect of Government Regulations on the Relationship between Access to Capital and Financing of Water Investments.

The structural equation modeling (SEM) for the third objective for model 2 is as shown in Figure 4.22. Model 2 shows the results after interaction term (access to capital*government regulations) was introduced in the equation. Path coefficients were used to determine the direction and strength of the factor. The figure shows a path coefficient beta value of .28 ($\beta = .28$). This implies that for every 1 unit increase

in access to capital, financing of water investments is predicted to increase by .28 units.

R^2 was used to show the proportion of variation in dependent variable explained by the SEM model. The results shows coefficient R^2 mean value of .21 which is higher than that of access to capital of .07. An R^2 value of .21 indicate that 21% of the variances in financing of water investments can be accounted for by access to capital*government regulations scores. Inclusion of interaction term resulted in an R^2 change of 14. An R^2 change of 14 indicates that moderating effect explains 14% variation in financing above and beyond the variance explained by access to capital. This shows a significant presence of moderating effect of government regulations on the relationship between access to capital and financing of water investments.

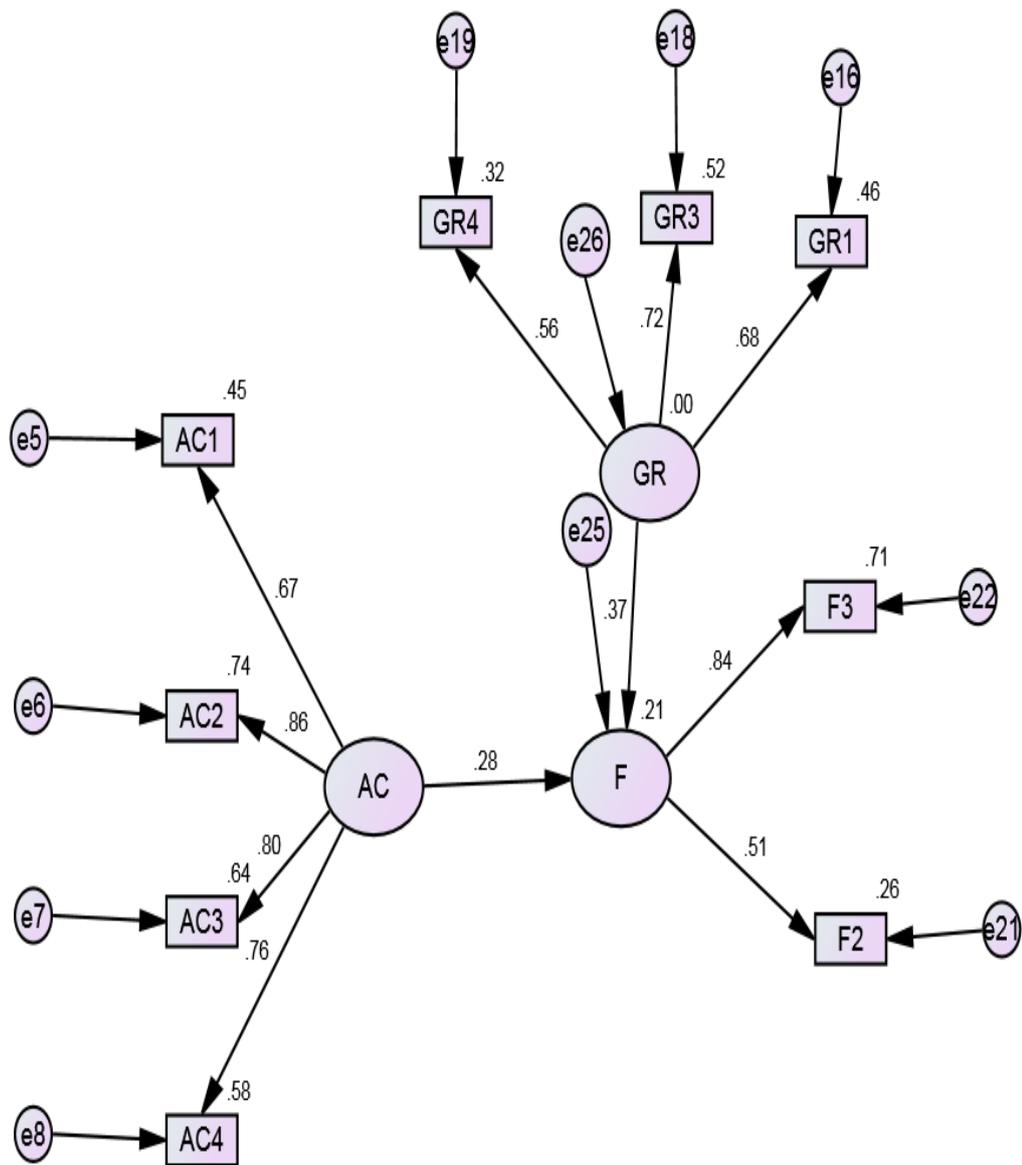


Figure 4.22: Moderated Structural Equation Modeling (SEM) for Access to Capital

T-statistics provided information on the significance of the relationship. T-statistics value (C.R) was used to test whether the moderating effect of government regulations on the relationship between access to capital and financing of water investments was significant. Critical value should be less than -1.96 or greater than 1.96 at 0.05 significance level. Model 2 in Table 4.42 shows that access to capital Estimate = .228, C.R = 2.151, p-value = .031). C.R of 2.151 and a p-value = .031

show that there was a significant positive relationship between access to capital and financing of water investment since the C.R of 2.151 is greater than the conventional critical value of 1.96 at 0.05 significance level ($p < 0.05$). Thus null hypothesis that government regulations do not moderate the relationship between access to capital and financing of small scale water investments in Nairobi peri-urban areas in Kenya was rejected at 95% significance level and therefore conclude that government regulations moderates the relationship between access to capital and financing of small scale water investments in peri-urban areas of Kenya.

Table 4.42 Moderated Regression Weights for Access to Capital

		Estimate	S.E.	C.R.	P-value
F	AC	.228	.106	2.151	.031
F	GR	.264	.127	2.083	.037
AC1	AC	1.000			
AC2	AC	1.300	.161	8.087	.000
AC3	AC	1.158	.150	7.729	.000
AC4	AC	1.208	.162	7.451	.000
GR1	GR	1.000			
GR3	GR	1.130	.236	4.793	.000
GR4	GR	.822	.177	4.644	.000

These findings are in line with those World Bank (2010) that asserts that developing nations tend to have difficulty raising money to finance their water investments because their domestic capital areas tend to be poorly developed. The government have thus not raised priority of water sector in their national investment strategies in order to make funds available for such investments. This remains an impediment to financing of water sectors (World Bank, 2010). This implies that majority of small scale water service providers have difficulties in raising money to finance their operations due to poor development of capital market thus need for government regulations in the financial areas to avail the highly needed capital. Access to capital

is therefore a challenge in financing of water investments as the national government remains the major source of finance particularly capital investment (World Bank, 2004).

4.8.2.4 Influence of Return on Investments on Financing of Water investments.

The fourth objective of the study was to find out whether return on investment influences financing of small scale water investments in Nairobi Peri-urban areas in Kenya. Structural models in structural equation modeling (SEM) were applied (Babin & Svensson, 2012). Prior to structural models, exploratory factor analysis was conducted to determine whether return on investment indicators had significant factor loadings (Zikmund *et al.*, 2010). Factors with loadings of 0.4 and above were considered appropriate (Hair *et al.*, 2010). The results in Table 4.43 show that the factor loadings of return on investment indicators ranged from 0.728 to 0.921 suggesting high convergent validity. In further analysis the study employed three indicators of return on investment.

Table 4.43 Factor Loadings for Return on Investments

Indicators	Component/Loadings
Investment level: The return on investment from water selling business in peri-urban areas is affected by the size of the business operates by an investor.	.905
Price charged: The price charged to consumers for water service determines return on investment for the investors.	.921
Alternative water sources: The many alternative water sources in Nairobi including boreholes and bottled water has lead to competition among service providers affects return on water investments in peri-urban areas	.728

Model Fit Tests Results of Return on Investments

In order to assess whether the model provided adequate fit for the data, the study considered both absolute fit indices and incremental fit indices (Hair *et al.*, 2010). These fit indexes were used to verify that the model was adequate (Browne & Cudeck, 2003). Table 4.44 shows RMSEA of 0.101, GFI of .973, AGFI of .898 and CFI index of .974. This shows an acceptable model fit (Hair *et al.*, 2010).

Table 4.44 Model Fit Statistics Results for Return on Investment

Model	RMSEA	GFI	AGFI	CFI
Default model	.101	.973	.898	.974
Independence model	.397	.541	.312	0.000

Convergent Validity of Return on Investments

Regression weights were used to test the contribution of each return on investment indicators to the construct variable (return on investment). Regression weights were also used to explain the nature of the relationship since all the variables were in the same measurement scale. Table 4.45 shows that all the regression weights were higher than the acceptable level at 0.5. The t-calc values (critical ratio; C.R) for all the return on investment indicators were higher than 1.96 (Critical Ratio > -1.96 or 1.96 at 0.05 significance level ($p < 0.05$)). This implies that the indicators were significantly related to return on investment and the results verified the convergent validity of return on investment construct. Overall the results shows that relationship between return on investment and financing of water investment is positive and significant (Estimate = .778, C.R = 5.238, p-value = 0.000. This implies that an increase in return on investment by 1 unit lead to an increase in financing by .778 units.

Table 4.45 Regression Weight and CR Values for Return on Investment

		Estimate	S.E.	C.R.	P-value
F	ROI	.778	.148	5.238	.000
ROI1	ROI	1.100	.147	7.483	.000
ROI2	ROI	1.263	.146	8.633	.000
ROI3	ROI	1.149	.148	7.769	.000
F2	F	1.205	.238	5.063	.000
F3	F	1.124	.245	4.582	.000

Hypothesis Testing of Return on Investment

The fourth objective of the study was to find out whether return on investment influences financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The hypothesis tested for this objective was;

H₀₇: There is no significant relationship between return on investment and financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The study also hypothesized that;

H₀₈: Government regulations do not moderate the relationship between return on investment and financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The study used two structural models. Model 1 represented un-moderated return on investment while model 2 represented moderated return on investment. The Structural Equation Modeling (SEM) for the fourth objective for model 1 is as shown in Figure 4.23. Path coefficients were used to determine the direction and strength of the factor. The figure shows a path coefficient beta value of .71 ($\beta = .71$). This

implies that for every 1 unit increase in return on investment, financing of water investments is predicted to increase by .71 units.

R^2 was used to show the proportion of variation in dependent variable explained by the SEM model. The figure shows that return on investment had a coefficient R^2 mean value of .51. The R^2 value of .51 indicates that 51% of the variations in financing of water investments in peri-urban areas in Kenya can be accounted for by return on investment scores.

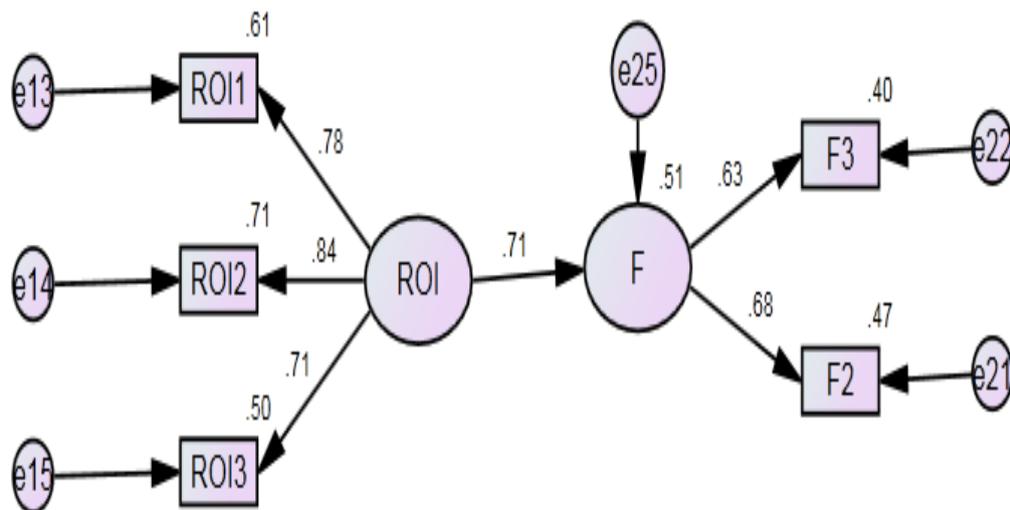


Figure 4.23: Structural Equation Modeling (SEM) for Return on Investments

T-statistics provided information on the significance of the relationship. T-statistics value (C.R) was used to test whether the relationship between return on investment and financing of water investment was significant. Critical value should be less than -1.96 or greater than 1.96 at 0.05 significance level. Figure 4.24 shows a t-calc of 5.238. The results show that there was a significant positive relationship between return on investment and financing of water investment since the C.R of 5.238 is greater than the conventional critical value of 1.96 at 0.05 significance level ($p < 0.05$)

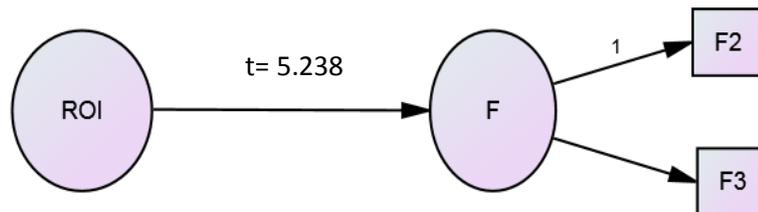


Figure 4.24: T- Statistics for Return on Investments

The finding of the study indicates that the relationship between return on investments and financing of water investments in peri-urban areas is positive and significant ($t= 5.238$, $p\text{-value} = 0.000$). This implies that an increase in return on investments leads to an increase in financing of water investments. Therefore the null hypothesis that there is no significant relationship between returns on investments and financing of small scale water investments in peri-urban areas is rejected at 95 percent significant level. The study therefore fails to reject alternative hypothesis and conclude that return on investments influences financing of water investments in peri-urban areas. Low return on investments has thus played a significant role in inhibiting financing of water investments in peri-urban areas in Kenya.

The findings agree with those Gleick (2002) that indicate that water utilities find it difficult to generate sufficient internal revenues to ensure basic financial sustainability which leads to low investments. Bond (2004) maintain that the rate of return from water investments is little or no profit is made due to low water prices as governments are unwilling to raise water prices to market levels. This leads to low revenue generates from water businesses hence low investments. Hall (2003) state that low income users cannot pay the full costs for the service required for the company to maximize its returns which has led to low water investments. This makes private players and small scale water service providers to be reluctant in committing their funds in water businesses particularly in peri-urban areas (Gleick, 2002). The finding of this study contributes to the literature as it point out the relevance of property right theory.

Moderating Effect of Government Regulations on the Relationship between Return on Investments and Financing of Water Investments.

In order to determine the function of the moderator, difference in R^2 as recommended by Carte and Russell (2003) was used. The structural equation modeling (SEM) for the fourth objective for model 2 is as shown in figure 4.25. Model 2 shows the results after interaction term (return on investment *government regulations) was introduced in the equation. Path coefficients were used to determine the direction and strength of the factor. The figure shows a path coefficient beta value of .68 ($\beta = .68$). This implies that for every 1 unit increase in return on investment, financing of water investments is predicted to increase by .68 units.

R^2 was used to show the proportion of variation in dependent variable explained by the SEM model. The results shows coefficient R^2 mean value of .50 which is lower than that of return on investment of .51. An R^2 of .50 indicate that 50% of the variances in financing of water investments can be accounted for by return on investment*government regulations scores. Inclusion of interaction term resulted in an R^2 change of -.01. An R^2 change of -.01 indicates that moderating effect explains -1% variances in financing below the variance explained by return on investment. This shows a presence of moderating effect of government regulations on the relationship between return on investment and financing of water investments.

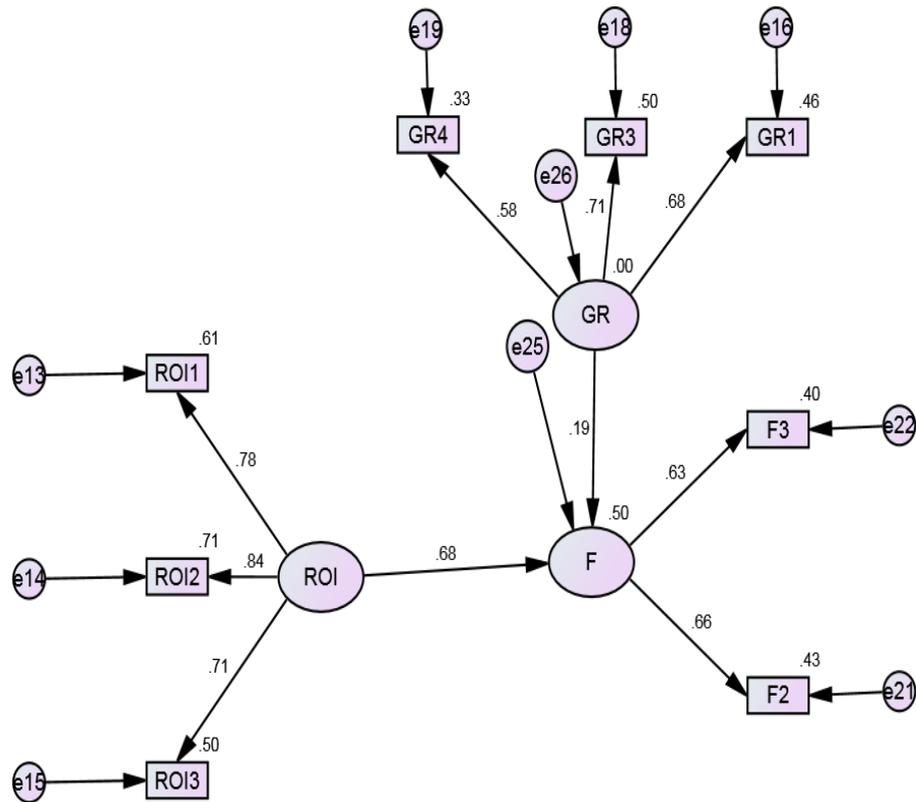


Figure 4.25: Moderated Structural Equation Modeling (SEM) for Return on Investments

T-statistics provided information on the significance of the relationship between variables. T-statistics value (C.R) was used to test whether the moderating effect of government regulations on the relationship between return on investments and financing of water investments was significant. Critical value should be less than -1.96 or greater than 1.96 at 0.05 significance level. Model 2 in Table 4.46 shows that return on investments Estimate = .705, C.R = 4.868, p-value = .000. C.R of 4.868 and a p-value of .000 show that there was a significant positive relationship between return on investments and financing of water investment since the C.R of 4.868 is greater than the conventional critical value of 1.96 at 0.05 significance level ($p < 0.05$). Thus null hypothesis was rejected at 95% significance level and therefore conclude that government regulations moderates the relationship between return on investments and financing of small scale water investments in Kenya.

Table 4.46 Moderated Regression Weights for Return on Investments

		Estimate	S.E.	C.R.	P-value
F	ROI	.705	.145	4.868	.000
F	GR	.177	.113	1.560	.119
ROI1	ROI	1.103	.115	9.591	.000
ROI2	ROI	1.263	.147	8.573	.000
ROI3	ROI	1.143	.148	7.733	.000
GR1	GR	1.170	.119	9.832	.007
GR3	GR	1.125	.245	4.586	.000
GR4	GR	.850	.185	4.604	.000
F2	F	1.030	.132	7.803	.000
F3	F	1.176	.267	4.402	.000

These finding concurs with those of Bond (2004) who maintained that there is little or no profit to be made by small scale water service providers due to low water prices as governments are unwilling to raise prices to market levels. This implies that price charged to water consumer is too low to generate sufficient return to water investors as price charged is far below the market rate. Water users should be charged the market rate in order to recover the full costs of service provision instead of subsidizing delivery through general public taxes to make water utilities generate sufficient return (World Bank, 2004).

4.9 Overall Structural Equation Modelling (SEM) With No Moderator

Structural Equation Modelling (SEM) was conducted to empirically determine the combined effect of cost recovery, perceived risks, access to capital and return on investments on financing of small scale water investments in Nairobi peri-urban areas in Kenya.

Convergent Validity of Study Variables

Regression weights were used to test the combined effect of explanatory variables on financing of small scale water investments. Regression weights were also used to explain the nature of the relationship that is, direction and strength of the factor since all the variables were in the same measurement scale. Table 4.47 shows that all the regression weights (t-calc values or C.R) were higher than the acceptable level of -1.96 or 1.96 at 0.5 significance level. P values for all the variables were less than the conventional p value of 0.05. This implies that all the explanatory variables were significantly related to financing of small scale water investment and thus the results verified the convergent validity of explanatory variable constructs.

Table 4.47 Regression Weight and C.R Values for Explanatory Variables

		Estimate	S.E.	C.R.	P
F	CR	.142	.050	2.829	.005
F	PR	-.305	.065	-4.697	.000
F	AC	.178	.075	2.381	.017
F	ROI	.489	.110	4.443	.000
PR1	PR	1.000			
PR2	PR	.667	.085	7.829	.003
PR3	PR	.830	.104	7.990	.000
PR4	PR	1.001	.102	9.778	.006
AC1	AC	1.000			
AC2	AC	1.300	.162	8.050	.000
AC3	AC	1.161	.151	7.703	.000
AC4	AC	1.217	.163	7.456	.009
CR1	CR	1.000			
CR3	CR	1.097	.081	13.595	.000
CR2	CR	.596	.078	7.624	.000
CR4	CR	1.042	.085	12.237	.000
ROI1	ROI	1.000			
ROI2	ROI	1.259	.148	8.482	.001
ROI3	ROI	1.122	.147	7.648	.000
F2	F	1.000			
F3	F	1.293	.254	5.092	.000

Hypothesis Testing of Overall Model

The fifth objective of the study was to establish the moderating effect of government regulations on the relationship between explanatory variables and financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The hypothesis tested for this objective was;

H₀₉: There is no significant relationship between explanatory variables and financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The study also hypothesized that;

H₀₁₀: Government regulations have no moderating effect on the relationship between explanatory variables and financing of small scale water investments in Nairobi Peri-urban areas in Kenya.

The study used two structural models. Model 1 represented un-moderated overall SEM while model 2 represented moderated overall SEM. The Structural Equation Modeling (SEM) for the fifth objective for model 1 is as shown in Figure 4.26. The figure shows the combined effect of cost recovery, perceived risks, access to capital and return on investments on financing of water investments. Path coefficients were used to determine the direction and strength of the factor. The figure shows path coefficient beta value of $\beta = .30$ cost recovery, $\beta = -.60$ perceived risks, $\beta = .26$ access to capital and $\beta = .57$ return on investment. This implies that for every 1 unit increase in cost recovery, financing of water investments is predicted to increase by .30 units. For every 1 unit increase in investor's perceived risks, financing of water investments is predicted to decrease by -.60 units. For every 1 unit increase in access to capital, financing of water investments is predicted to increase by .26 units and for every 1 unit increase in return on investment, financing of water investments is predicted to increase by .57 units.

R^2 was used to test how well the models fitted the data. R^2 was used to show the proportion of variation in dependent variable explained by the SEM model. Figure 4.30 indicated goodness of fit for the regression between the predictor variables and the outcome variable (financing of water investments). Figure 4.30 Model 1, shows that there was a very strong relationship between independent variables and financing of water investments ($R^2 = .84$). An R^2 value of .84 indicate that 84 % of the

variations in financing of water investments were explained by the SEM model.

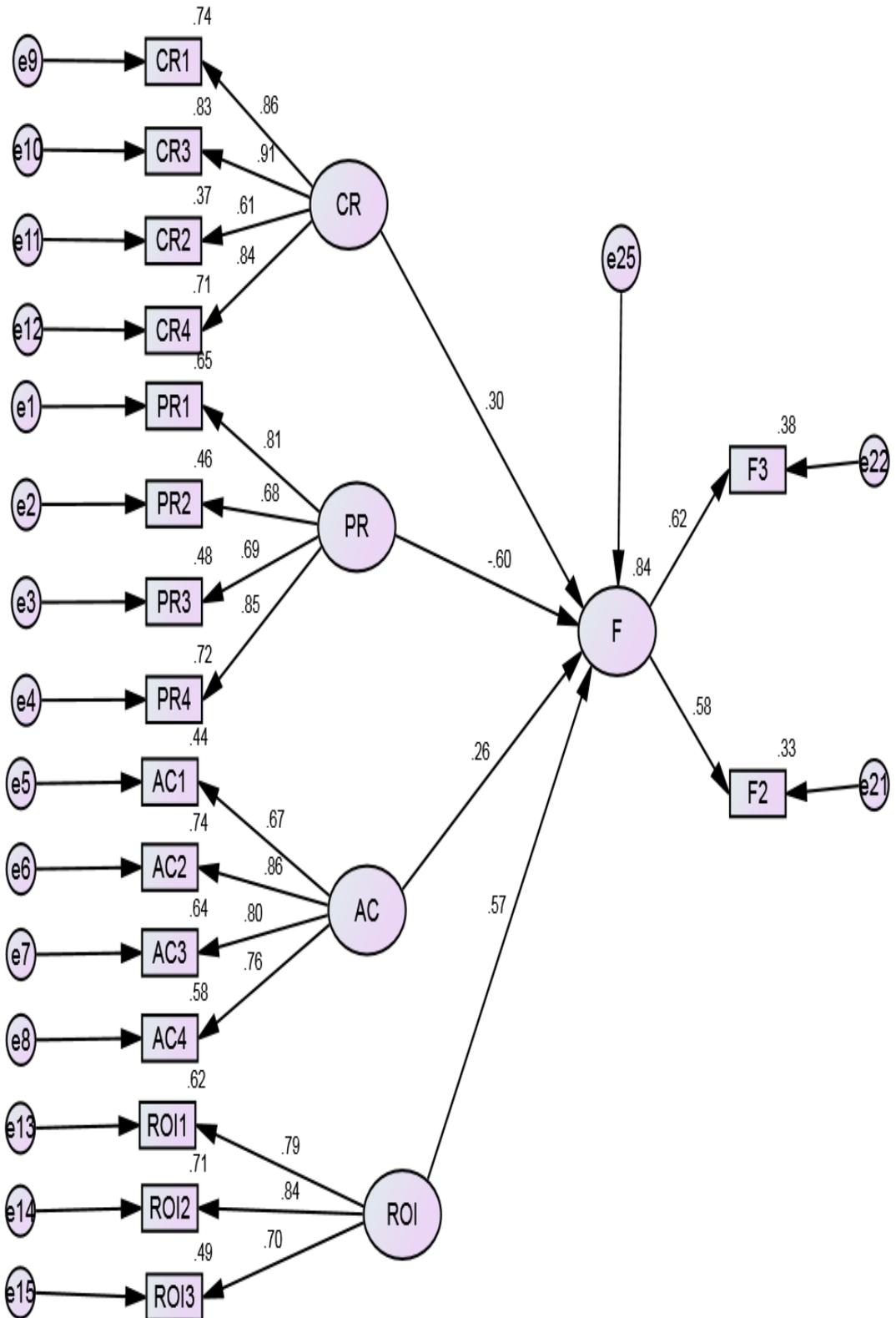


Figure 4.26: Overall Un-moderated Structural Equation Model (SEM)

T-statistics provided information on the significance of the relationship between variables. An overall t-statistics value (C.R) was used to test whether the relationship between explanatory variables and financing of small scale water investments was significant. Critical value should be less than -1.96 or greater than 1.96 at 0.05 significance level ($p < 0.05$). Table 4.48 shows that the t-calc values (critical ratio; C.R) for all the variables were less than -1.96 or greater than 1.96. The p-values for all the explanatory variables were less than 0.05. This means that the relationship between explanatory variables and financing of water investment was significant. Therefore the null hypothesis that there is no significant relationship between explanatory variables and financing of small scale water investments in Nairobi peri-urban areas was rejected at 95 percent significant level. The study therefore fails to reject alternative hypothesis and conclude that there exist a significant relationship between explanatory variables and financing of small scale water investment in peri-urban areas in Kenya.

Table 4.48 Overall T-Statistics Values

D.V	I.Vs	Estimate	S.E.	C.R.	P-value
F	CR	.142	.050	2.829	.005
F	PR	-.305	.065	-4.697	.000
F	AC	.178	.075	2.381	.017
F	ROI	.489	.110	4.443	.000

4.10 Overall Structural Equation Modelling With Moderator

The structural equation modeling (SEM) for the fifth objective for model 2 is as shown in Figure 4.27. Model 2 shows the results after interaction term (government regulations) was introduced in the equation. Path coefficients were used to determine the direction and strength of the factors. The figure shows a path coefficient beta values of $\beta = .29$ cost recovery, $\beta = -.62$ perceived risks, $\beta = .26$ access to capital and $\beta = .52$ return on investment. This means that for every 1 unit increase in cost recovery, financing of water investments is predicted to increase by .29 units. For

every 1 unit increase in investor's perceived risks, financing of water investments is predicted to decrease by -.62 units. For every 1 unit increase in access to capital, financing of water investments is predicted to increase by .26 units and for every 1 unit increase in return on investment, financing of water investments is predicted to increase by .52 units.

R^2 was used to show the proportion of variation in dependent variable explained by the SEM model. The results show a coefficient R^2 mean value of .86 which is higher than that of explanatory variables of .84. Model 2, shows that there was a very strong relationship between independent variables and financing of water investments ($R^2=.86$). Inclusion of interaction term resulted in an R^2 change of .02. An R^2 change of .02 indicates that moderating effect of government regulations explains 2% variances in financing above and beyond the variance explained by explanatory variables scores. This shows a significant presence of moderating effect of government regulations on the relationship between explanatory variables and financing of small scale water investments in Nairobi Kenya.

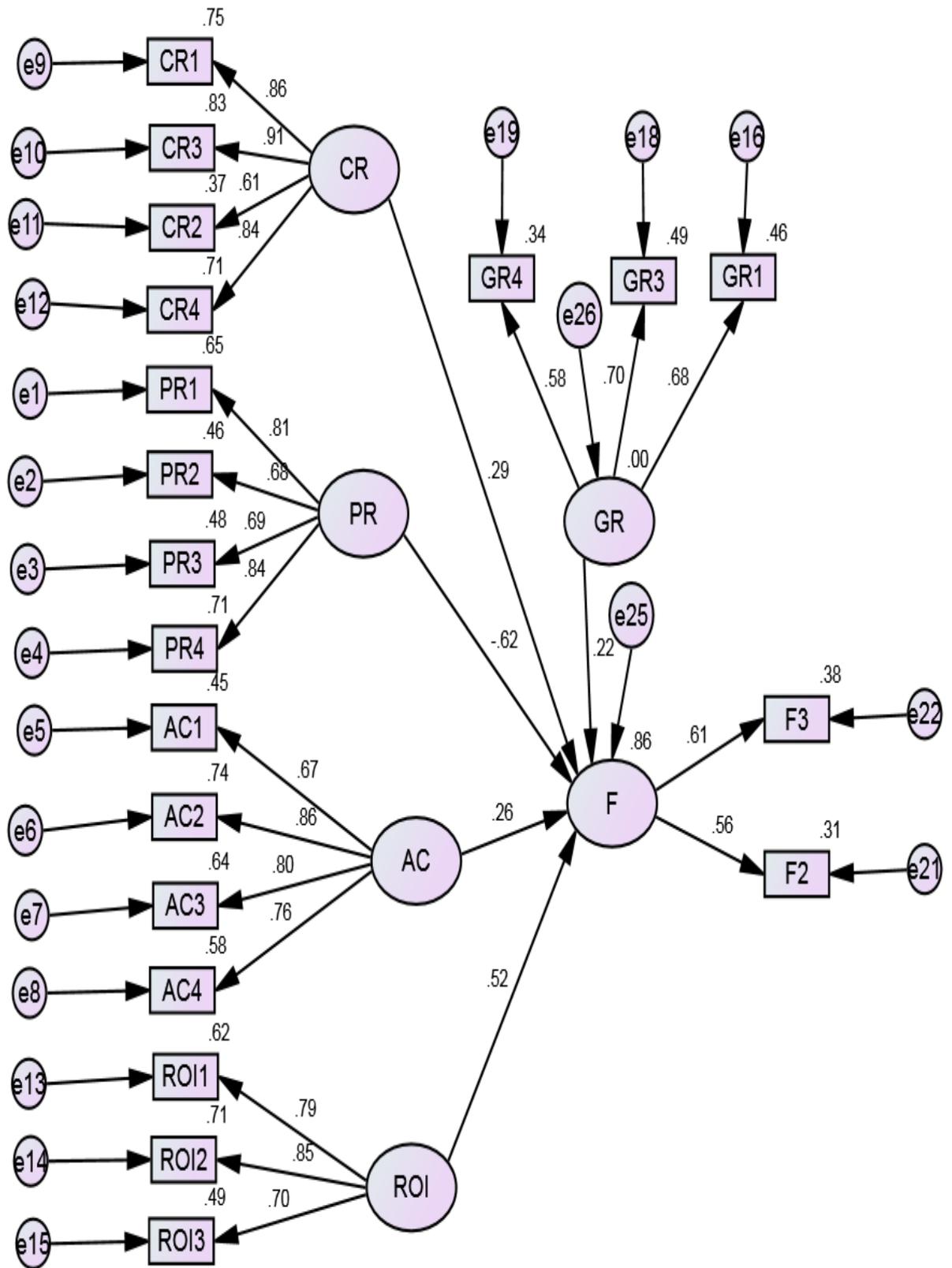


Figure 4.27: Overall Moderated Structural Equation Model (SEM)

An overall t-statistics value (C.R) was used to test whether the moderating effect of government regulations on the relationship between explanatory variables and financing of small scale water investments was significant. Critical value should be less than -1.96 or greater than 1.96 at 0.05 significance level. Table 4.49 shows that the t-calc values (critical ratio; C.R) for all the variables were either less than -1.96 or greater than 1.96. The p-values for all the explanatory variables were less than 0.05. This implies that moderating effect of government regulations on the relationship between explanatory variables and financing of small scale water investments was significant. The null hypotheses that government regulations have no moderating effect on the relationship between explanatory variables and small scale water investments in Nairobi peri-urban areas in Kenya was rejected at 95% level of significance. The study therefore fails to reject alternative hypothesis and conclude government regulations moderate the relationship between explanatory variables and financing of small scale water investments in Nairobi peri-urban areas in Kenya.

Table 4.49 Moderated Regression Weights for Overall SEM

		Estimate	S.E.	C.R.	P-value
F	CR	.134	.049	2.729	.006
F	PR	-.304	.065	-4.708	.000
F	AC	.172	.073	2.346	.019
F	ROI	.432	.105	4.108	.000
PR1	PR	1.000			
PR2	PR	.664	.085	7.830	.000
PR3	PR	.829	.103	8.029	.000
PR4	PR	.995	.102	9.796	.000
AC1	AC	1.000			
AC2	AC	1.299	.161	8.057	.000
AC3	AC	1.160	.150	7.709	.000
AC4	AC	1.216	.163	7.462	.000
CR1	CR	1.000			
CR3	CR	1.097	.081	13.609	.000
CR2	CR	.596	.078	7.616	.000
CR4	CR	1.041	.085	12.234	.000
RO1	ROI	1.000			
RO2	ROI	1.258	.150	8.408	.000
RO3	ROI	1.117	.147	7.611	.000
GR1	GR	1.000			
GR3	GR	1.104	.239	4.628	.000
GR4	GR	.849	.184	4.619	.000
F2	F	1.000			
F3	F	1.323	.265	4.995	.000

These findings concur with those of WASREB (2009) that states that in Kenya, water tariffs are approved by water service regulatory board. Garcia *et al.*, (2007) indicated that market regulation is concerned with defining tariffs and fostering operating efficiency in both technical (reducing water leakages) and economic terms (reducing costs). This implies that the government defines water tariff and operation efficiency. These findings also agrees with Klein (2005) who stated that technical regulations involves a regular assessment of the state of the overall infrastructure and requires frequent decisions concerning maintenance, replacement, and renewal of unreliable network elements. Social regulations pertains to consumer and environmental protection (Tremolet *et al.*, 2004). Accessibility to the service, service quality, and price affordability are three important dimensions of consumer protection. Service quality regulations refers to defining levels of service that meets consumer needs and can be provided at a financially sustainable and affordable cost, and monitoring such level of service. This indicates that the government is protecting water consumers by ensuring water accessibility, service quality, and price affordability. The government have thus influenced financing and operations of water investments by establishing water regulations and enforcing them in order to protect consumers and the environment (Green, 2003). The finding of this study contributes to the literature as it point out the relevance of public interest theory of regulation.

4.11 Overall Significant Test Results for the Study Models

Table 4.50 shows the overall significant test results for the hypothesized research models. The relationships between all explanatory variables were positive and significant except for investor's perceived risks. This was supported by critical values that were less than -1.96 or greater than 1.96 and had associated p-values that were less than the conventional p-value of 0.05 at 95% level of significance.

Table 4.50 Overall Significant Test Results for the Study Models

Dependent Variable	Independent Variables	Estimate	S.E.	C.R.	P-value	Conclusion
F	CR	.134	.049	2.729	.006	Significant
F	PR	-.304	.065	-4.708	.000	Significant
F	AC	.172	.073	2.346	.019	Significant
F	ROI	.432	.105	4.108	.000	Significant

4.12 Summary of Hypothesis Testing Results

After testing the hypothesized research models, all the research null hypotheses were rejected at 95% level of significant. The resultant t-calc statistics values (C.R) for all the variables were either less than -1.96 or greater than 1.96 at 0.05 significance level. The p-values for all the variables were less than 0.05. Hence relationships between all hypothesized variables were significant. Table 4.51 below provides an outline of the hypotheses of the study, their estimates, t-calc statistics and their respective results.

Table 4.51 Summary of Hypothesis Testing Results

Hypothesis	Estimate (Z-Score)	T-statistics (.05 sig level)	Results	Empirical Results
H ₀₁ : There is no significant relationship between cost recovery and financing of water investments in Nairobi Peri-urban areas in Kenya.	350	4.638	Positive and significant (Rejected)	Supported
H ₀₂ : Government regulations have no moderating effect on the relationship between cost recovery and financing of water investments.	.308	4.281	Positive and significant (Rejected)	Supported
H ₀₃ : There is no significant relationship between investor's perceived risks and investments in water in Nairobi Peri-urban areas in Kenya.	-.412	-4.910	Negative and significant (Rejected)	Supported
H ₀₄ : Government regulations have no moderating effect on the relationship between investor's perceived risks and financing of water investments.	-.393	-5.015	Negative and significant (Rejected)	Supported
H ₀₅ : There is no significant relationship between access to capital and financing of water investments in Nairobi Peri-urban areas in Kenya	.252	2.202	Positive and significant (Rejected)	Supported

H ₀₆ :	Government regulations have no moderating effect on the relationship between access to capital and financing of water investments.	.228	2.151	Positive and significant (Rejected)	Supported
H ₀₇ :	There is no significant relationship between return on investment and investments in water in Nairobi Peri-urban areas in Kenya.	.778	5.238	Positive and significant (Rejected)	Supported
H ₀₈ :	Government regulations have no moderating effect on the relationship between return on investments and financing of water investments.	.705	4.638	Positive and significant (Rejected)	Supported
H ₀₉ :	There is no significant relationship between explanatory variables and financing of water investment	.142	2.829	Positive and significant (Rejected)	Supported
H ₀₁₀ :	Government regulations have no moderating effect on the relationship between independent variables and financing of water investments in Nairobi Peri-urban areas in Kenya.	.134	2.729	Positive and significant (Rejected)	Supported

4.13 Defining the Models Using Moderated Multiple Regression Analysis

4.13 (i) Relationship between Cost Recovery and Financing of Small Scale Water Investments in Nairobi Peri-Urban Areas.

Table 4.52 Model 1 shows the relationship between cost recovery and financing of small scale water investments ($R = 0.537$, $R^2 = 0.288$) and $[F(1,131) = 53.037, P = .000]$. R^2 was used to show the proportion of variation in dependent variable explained by the model. The value of R^2 of .288 indicates that 28.8 percent of the variations in financing of small scale water investments in peri-urban areas in Kenya can be accounted for by cost recovery scores.

Model 2 in Table 4.52 shows the results after interaction term (cost recovery*government regulation) was introduced in the equation. The results shows the relationship between cost recovery and financing of small scale water investments ($R = .627$, $R^2 = .393$) and $[F(1,130) = 22.542, P = .000]$. An R^2 of .393 indicate that 39.3 percent of the variation in financing of water investments in peri-urban areas in Kenya can be accounted for by cost recovery* government regulations scores.

Inclusion of interaction term resulted in an R^2 change of 0.105. An R^2 change of 0.105 indicates that moderating effect of government regulations explains 10.5% variances in financing above and beyond the variance explained by cost recovery. This shows a significant presence of moderating effect of government regulations on the relationship between cost recovery and financing of small scale water investments in Nairobi per-urban areas.

Table 4.52 Regression Weights for Cost Recovery

Model	R	R ²	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.537 ^a	.288	.283	.45625	.288	53.037	1	131	.000
2	.627 ^b	.393	.384	.42280	.105	22.542	1	130	.000

a. Predictors: (Constant), CR

b. Predictors: (Constant), Cost Recovery*Government Regulations

In Table 4.53, Model 1 indicate that relationship between cost recovery and financing of water investments in peri-urban areas was positive and significant ($b_1 = 0.286$, $p = .000$; Beta .537). Equation 4.2 shows that for every 1 unit increase in cost recovery, financing small scale water investments is predicted to increase by .286. government regulation was also statistically significant ($P=.000$; Beta .327).

This implies that an increase in effective cost recovery leads to an increase in financing of water investments. Therefore null hypothesis that there is no significant relationship between cost recovery and financing of small scale water investments in peri-urban areas was rejected at 95 percent significance level. The study therefore fails to reject alternative hypothesis and conclude that cost recovery influences financing of small scale water investments in peri-urban areas.

Model 2 in Table 4.53 shows that the moderating effect of government regulations on the relationship between cost recovery and financing of water investments in peri-urban areas was positive and significant ($b_1 = 0.266$, $P\text{-value} = .000$; Beta .498). Equation 4.3 shows that for every 1 unit increase in cost recovery, financing of small scale water investments is predicted to have a difference of 0.266 given that government regulations are held constant. Thus null hypothesis that government regulations do not moderates the relationship between cost recovery and financing of small scale water investments was rejected at 95% significance level. The study

therefore concludes that government regulations moderate the relationship between cost recovery and financing of small scale water investments.

The regression equations for cost recovery were as follows;

OLS Model: Financing of water investments = .927 + .286 Cost Recovery
 (4.2)

MMR Model: Financing of water investments = .172 + .266 Cost Recovery + .321
 Government Regulations
 (4.3)

Table 4.53 Significant Test Results for Cost Recovery

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients		
1	(Constant)	.927	.135		6.858	.000
	CR	.286	.039	.537	7.283	.000
2	(Constant)	.172	.202		.852	.396
	CR	.266	.037	.498	7.234	.000
	GR	.321	.068	.327	4.748	.000

a. Dependent Variable: Small Scale Water Investments

4.13 (ii) Relationship between Investor’s Perceived Risks and Financing of Small Scale Water Investments in Nairobi Peri-Urban Areas.

Table 4.54 Model 1 shows a strong relationship between investor’s perceived risks and financing of small scale water investments ($R = .777$, $R^2 = .603$) and $[F(1,131) = 199.229, P = .000]$. R^2 was used to show the proportion of variation in dependent variable explained by the model. The value of R^2 of .603 indicates that 60.3 percent of the variations in financing of small scale water investments in peri-urban areas in Kenya can be accounted for by investor’s perceived risks scores.

Model 2 in Table 4.54 shows the results after interaction term (investor's perceived risks *government regulation) was introduced in the equation. The results shows that there is a strong relationship between investor's perceived risks and financing of small scale water investments ($R = .841$, $R^2 = .708$) and $[F (1,130) = 46.418, P=.000]$. An R^2 of .708 indicate that 70.8 percent of the variances in financing of water investments in peri-urban areas in Kenya can be accounted for by investor's perceived risks*government regulations scores.

Inclusion of interaction term resulted in an R^2 change of 0.104. An R^2 change of .104 indicates that moderating effect explains 10.4% variances in financing above and beyond the variance explained by investor's perceived risks. This shows a significant presence of moderating effect of government regulations on the relationship between investor's perceived risks and financing of small scale water investments in Nairobi per-urban areas.

Table 4.54 Regression Weights for Investor's Perceived Risks

Model	R	R^2	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.777 ^a	.603	.600	.34060	.603	199.229	1	131	.000
2	.841 ^b	.708	.703	.29350	.104	46.418	1	130	.000

a. Predictors: (Constant), PR

b. Predictors: (Constant), PR*GR

In Table 4.55, Model 1 indicate that relationship between investor's perceived risks and financing of small scale water investments in peri-urban areas is negative and significant ($b_1 = -.453$, $P = .000$; Beta $-.777$). Equation 4.4 shows that for every 1 unit increase in investor's perceived risks, financing is predicted to decrease by $-.453$. Government regulation was also statistically significant ($P = .000$; Beta $.324$). This implies that an increase in investor's perceived risks leads to a decrease in

financing of small scale water investments in peri-urban areas. Therefore the null hypothesis that there is no significant relationship between investor's perceived risk and financing of small scale water investments in peri-urban areas is rejected at 95 percent significant level. The study therefore fails to reject alternative hypothesis and conclude that investor's perceived risks influences financing of small scale water investments in peri-urban areas. Higher investor's perceived risks have therefore played a significant role in inhibiting financing of water investments in peri-urban areas in Kenya.

Model 2 in Table 4.55 shows that the moderating effect of government regulations on the relationship between investor's perceived risks and financing of small scale water investments in peri-urban areas is negative and significant ($b_1 = -0.438$, $P\text{-value} = .000$; $Beta = -.750$). Equation 4.5 shows that for every 1 unit increase in investor's perceived risks, financing of water investments is predicted to decrease by -0.438 given that government regulations are held constant.

This implies that there is a negative relationship between investor's perceived risks and financing of small scale water investments. The higher the investor's perceived risks the low the financing of small scale water investments in peri-urban areas. The study therefore concludes that government regulations moderate the relationship between investor's perceived risk and financing of small scale water investments.

The regression equations for investor's perceived risks were as follows;

OLS Model: Financing of water investments = $3.148 + -.453$ Investor's Perceived Risks..... (4.4)

MMR Model: Financing of water investments = $2.286 + -.438$ Investor's Perceived Risks + $.319$ Government Regulations (4.5)

Table 4.55 Significant Test Results for Investor's Perceived Risks

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients		
1	(Constant)	3.148	.095		33.037	.000
	PR	-.453	.032	-.777	-14.115	.000
2	(Constant)	2.286	.151		15.165	.000
	PR	-.438	.028	-.750	-15.760	.000
	GR	.319	.047	.324	6.813	.000

a. Dependent Variable: Small Scale Water Investments

4.13 (iii) Relationship between Access to Capital and Financing of Small Scale Water Investments in Nairobi Peri-Urban Areas.

Table 4.56 shows the relationship between access to capital and financing of small scale water investments ($R = 0.301$, $R^2 = 0.091$) and $[F(1,131) = 13.067, P=.000]$. R^2 was used to show the proportion of variation in dependent variable explained by the model. The value of R^2 of .091 indicates that 9.1 percent of the variations in financing of small scale water investments in peri-urban areas in Kenya can be accounted for by access to capital scores.

Model 2 in Table 4.56 shows the results after interaction term (access to capital *government regulation) was introduced in the equation. The results shows the relationship between access to capital and financing of small scale water investments ($R = .479$, $R^2 = .229$) and $[F(1,130) = 23.358 P = .000]$. An R^2 of .229 indicate that 22.9 percent of the variances in financing of water investments in peri-urban areas in Kenya can be accounted for by access to capital *government regulations scores.

Inclusion of interaction term resulted in an R^2 change of .138 An R^2 change of .138 indicates that moderating effect explains 13.8% variation in financing above and

beyond the variance explained by access to capital. This shows a significant presence of moderating effect of government regulations on the relationship between access to capital and financing of small scale water investments in Nairobi peri-urban areas.

Table 4.56 Regression Weights for Access to Capital

Model	R	R ²	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.301 ^a	.091	.084	.51567	.091	13.067	1	131	.000
2	.479 ^b	.229	.217	.47660	.138	23.358	1	130	.000

a. Predictor: (Constant), Access to Capital

b. Predictors: (Constant), Access to Capital*Government Regulations

In Table 4.57, Model 1 indicate that relationship between access to capital and financing of small scale water investments in peri-urban areas is positive and significant ($b_1 = 0.238$, $p = .000$; Beta .301). Equation 4.6 shows that for every 1 unit increase in access to capital, financing is predicted to increase by .238. Government regulation was also statistically significant ($p = .000$; Beta .373).

This implies that an increase in access to capital leads to an increase in financing of small scale water investments in peri-urban areas. Therefore the null hypothesis that there is no significant relationship between access to capital and financing of small scale water investments in peri-urban areas is rejected at 95 percent significant level. The study therefore fails to reject alternative hypothesis and conclude that access to capital influences financing of small scale water investments in peri-urban areas.

Model 2 in Table 4.57 shows that the moderating effect of government regulations on the relationship between access to capital and financing of small scale water investments in peri-urban areas is positive and significant ($b_1 = 0.224$, $p\text{-value} = .000$; Beta .283). Equation 4.7 shows that for every 1 unit increase in access to

capital, financing of water investments is predicted to increase by 0.224 given that government regulations are held constant.

Thus null hypothesis that government regulations do not moderate the relationship between access to capital and financing of small scale water investments in Nairobi peri-urban areas in Kenya was rejected at 95% significance level and therefore conclude that government regulations moderates the relationship between access to capital and financing of small scale water investments in peri-urban areas of Kenya.

The regression equations for Access to capital were as follows;

OLS Model: Financing of water investments = 1.318 + .238 Access to Capital
 (4.6)

MMR Model: Financing of water investments = .411 + .224 Access to Capital + .366
 Government Regulations
 (4.7)

Table 4.57 Significant Test Results for Access to Capital

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients		
1	(Constant)	1.318	.159		8.287	.000
	AC	.238	.066	.301	3.615	.000
2	(Constant)	.411	.238		1.726	.087
	AC	.224	.061	.283	3.673	.000
	GR	.366	.076	.373	4.833	.000

a. Dependent Variable: Small Scale Water Investments

4.13 (iv) Relationship between Return on Investment and Financing of Small Scale Water Investments in Nairobi Peri-Urban Areas.

Table 4.58 shows Model 1 shows that there is a strong relationship between return on investments and financing of small scale water investments ($R = 0.712$, $R^2 = 0.506$) and $[F(1,131) = 134.384, p = .000]$. R^2 was used to show the proportion of variation in dependent variable explained by the model. The value of R^2 of .506 indicates that 50.6 percent of the variations in financing of small scale water investments in peri-urban areas in Kenya can be accounted for by return on investments scores.

Model 2 in Table 4.58 shows the results after interaction term (return on investments *government regulation) was introduced in the equation. The results shows that there is a strong relationship between return on investments and financing of small scale water investments ($R = .733$, $R^2 = .538$) and $[F(1,130) = 8.788, P = .000]$. An R^2 of .538 indicate that 53.8 percent of the variances in financing of small scale water investments in peri-urban areas in Kenya can be accounted for by return on investments*government regulations scores.

Inclusion of interaction term resulted in an R^2 change of 0.031 An R^2 change of 0.031 indicates that moderating effect explains 3.1% variation in financing above and beyond the variance explained by return on investments. This shows a significant presence of moderating effect of government regulations on the relationship between return on investments and financing of water investments in Nairobi per-urban areas.

Table 4.58 Regression Weights for Return on Investment

Model	R	R ²	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.712 ^a	.506	.503	.37994	.506	134.384	1	131	.000
2	.733 ^b	.538	.531	.36913	.031	8.788	1	130	.004

a. Predictors: (Constant), Return on Investment

b. Predictors: (Constant), RoI*Government Regulations

In Table 4.59, Model 1 indicate that relationship between return on investments and financing of small scale water investments in peri-urban areas is positive and significant ($b_1 = 0.714$, $p = .000$; Beta .712). Equation 4.8 shows that for every 1 unit increase in return on investments, financing is predicted to increase by .714. Government regulation was also statistically significant ($p = .004$; Beta .186).

This implies that an increase in return on investments leads to an increase in financing of water investments. Therefore the null hypothesis that there is no significant relationship between returns on investments and financing of small scale water investments in peri-urban areas was rejected at 95 percent significant level. The study therefore fails to reject alternative hypothesis and conclude that return on investments influences financing of small scale water investments in peri-urban areas.

Model 2 in Table 4.59 shows that the moderating effect of government regulations on the relationship between return on investments and financing of small scale water investments in peri-urban areas is positive and significant ($b_1 = 0.657$, $p\text{-value} = .000$; Beta .655). Equation 4.9 shows that for every 1 unit increase in return on investments, financing of water investments is predicted to increase by 0.675 given that government regulations are held constant. Thus null hypothesis was thus rejected at 95% significance level. The study therefore concludes that government regulations moderate the relationship between return on investments and financing of small scale water investments in Kenya.

The regression equations for return on investments were as follows;

OLS Model: Financing of water investments = $-.269 + .714$ Return on Investments
 (4.8)

MMR Model: Financing of water investments = $-.566 + .657$ Return on Investments
 $+ .183$ Government Regulations
 (4.9)

Table 4.59 Significant Test Results Return on Investment

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients		
1	(Constant)	-.269	.187		-1.436	.153
	ROI	.714	.062	.712	11.592	.000
2	(Constant)	-.566	.208		-2.725	.007
	ROI	.657	.063	.655	10.451	.000
	GR	.183	.062	.186	2.965	.004

a. Dependent Variable: Small Scale Water Investments

4.14 Moderated Multiple Regression Analysis Results

Moderated multiple regression analysis was conducted to empirically determine whether government regulations moderates the combined effect of cost recovery, perceived risks, access to capital and return on investments on financing of small scale water investments in peri-urban areas in Kenya.

The models used for regression analysis were expressed as follows:

Model₁: OLS Equation: $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon \dots\dots\dots (4.10)$

Model₂: MMR Equation: $Y = \beta_0 + \beta_1X_1Z + \beta_2X_2Z + \beta_3X_3Z + \beta_4X_4Z + \epsilon \dots\dots (4.11)$

- Where;
- Y = Financing of small scale water investment
 - β_0 = Is the constant or coefficient of intercept
 - X_1 = Cost recovery
 - X_2 = Investor’s perceived risks
 - X_3 = Access to capital
 - X_4 = Return on investment
 - $\beta_1\dots \beta_4$ = The corresponding coefficients for the respective independent

variables

Z = Moderating variable

ϵ = Error term (Disturbance factors) which represents residual or values that are not captured within the regression model.

Table 4.60 shows the combined effect of cost recovery, investor's perceived risks, access to capital and return on investments on financing of small scale water investments in peri-urban areas in Kenya. R^2 was used to test how well the models fitted the data. R^2 was used to show the proportion of variation in dependent variable explained by the regression models. Table 4.64 indicated goodness of fit for the regression between the predictor variables and the outcome variable (financing of small scale water investments).

Table 4.60 Model 1 shows a very strong relationship between predictor variables and financing of small scale water investments ($R = 0.919$, $R^2 = 0.845$) and [$F(2,131) = 193.143$, $p = .000$]. The value of R^2 of .845 indicates that 84.5 percent of the variations in financing of water investments in peri-urban areas in Kenya can be accounted for by predictor variables scores.

Table 4.60 Model 2 shows the results after interaction term (government regulation) was introduced in the equation. The results shows a very strong relationship between predictor variables and financing of small scale water investments ($R = .944$, $R^2 = .892$) and [$F(1,129) = 61.526$, $p = .000$]. An R^2 of .892 indicate that 89.2 percent of the variation in financing of small scale water investments can be accounted for by the model after interaction term (government regulations) was introduced.

Inclusion of interaction term resulted in an R^2 change of 0.047. An R^2 change of 0.047 indicates that moderating effect explains 4.7% variances in financing above and beyond the variance explained by financial constraints scores.

Table 4.60 Multiple Regression Weight for Overall Models

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.919 ^a	.845	.840	.2614	.845	193.143	2	131	.000
2	.944 ^b	.892	.888	.2189	.047	61.526	1	129	.000

a. Predictors: (Constant), Cost Recovery, Perceived Risk, Access to Capital, RoI,

b. Predictors: (Constant), Cost Recovery, Perceived Risk, Access to Capital, RoI, Government Regulations

Overall Significant Test Results

Table 4.61 Model 1 and 2 shows the overall significant test results for the hypothesized research models. The relationships between all explanatory variables were positive and significant except for investor's perceived risks. This was supported by p-values that were less than the conventional value of 0.05 at 95% level of significance. This shows a significant presence of moderating effect of government regulations on the relationship between explanatory variables and financing of small scale water investments in Nairobi per-urban areas.

Table 4.61 Significant Test Results for Overall Models

Model		Unstandardized Coefficients		Standardized	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.402	.086		4.661	.000
	CR	.137	.010	.257	13.705	.000
	PR	-.306	.011	-.525	-27.562	.000
	AC	.180	.014	.227	12.831	.000
	ROI	.489	.019	.487	26.285	.000
2	(Constant)	.166	.053		3.128	.002
	CR	.133	.006	.249	22.498	.000
	PR	-.309	.007	-.529	-47.232	.000
	AC	.173	.008	.219	21.035	.000
	ROI	.438	.011	.437	38.435	.000
	GR	.165	.011	.168	15.591	.000

a. Dependent Variable: Small Scale Water Investments

Optimal Models with Moderated Multiple Regression (MMR) Analysis

Table 4.61 above was used to develop the optimal models. The multiple regression equations for financing of small scale water investments were as follows;

OLS Model: Financing of water investments = .402 + 0.137 Cost Recovery
 -.306 Perceived Risks +.180 Access to Capital +0.489 Return on Investments
 (4.12)

MMR Model: Financing of water investments = .166 + 0.133 Cost Recovery - .309
 Perceived Risks +.173 Access to Capital +0.438 Return on
 Investments +0.165 Government Regulations.....(4.13)

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusions and recommendations of the study on moderating effect of government regulations on factors hindering financing of small scale water investments in Kenya. This was arrived at through the scrutiny of the data analysed in chapter four as well as making inferences and deductions from the data. What follows is a summary of the key investors' opinions in relation to financing of small scale water investments in Nairobi peri-urban areas. Also highlighted in this chapter are possible suggestions for further research.

5.2 Summary of Findings

This section presents the summary of the study on moderating effect of government regulations on factors hindering financing of small scale water investments in Nairobi Kenya based on specific objectives.

5.2.1 Cost Recovery

The first objective of the study was to determine whether cost recovery influences financing of small scale water investments in Nairobi peri-urban areas in Kenya. From the results, it was established that financing urban water infrastructure has not been easy. Typically, water investments involve a high capital outlay and long pay-back periods. Cost recovery is usually delayed or never re-couped. Cost recovery is mainly affected by low price charged to water consumers and external conditions like tax and high interest on borrowed capital. These affect full cost recovery. It was unanimously agreed that it is better to charge water users directly the full cost of water services in order to generate sufficient revenue to recover the high investment costs. The low level of consumer income in peri-urban area cannot be able to sustain the high cost of investments in water businesses.

5.2.2 Investor's Perceived Risk

The second objective of the study was to assess the effects of investor's perceived risk on financing of small scale water investments in Nairobi peri-urban areas in Kenya. From the results, it was established that water investments involve greater risks particularly business risk, financial risks and interest rate risks. Business risk entails high uncertainty of the amount of income generated from water selling businesses. Water investments depend on borrowed capital to finance its operations rather than owners equity hence high financial risks. Investments in water are usually affected by changes of interest rate on loans thus have high interest rate risks. Given the complexity and risks associated with water projects, it is not surprising that private sector has been more reluctant to invest in water sector compared with other forms of infrastructure.

5.2.3 Access to Capital

The third objective of the study was to investigate the impact of access to capital on financing of small scale water investments in Nairobi peri-urban areas in Kenya. From the results, it was found that access to capital to finance water investments has been limited. This is mainly due to high taxes imposed on water businesses, harsh economic conditions which make investors to withdraw from borrowing and high cost of borrowing. These factors have negatively affected availability of capital for investments in water sector. Water utilities also tend to have difficulties raising capital because there are few options of raising new capital for water investments.

5.2.4. Return on Investment

The fourth objective of the study was to investigate whether return on investment influences financing of small scale water investments in Nairobi peri-urban areas in Kenya. From the results, it was established that the low rate of return on investments among businesses operated in peri-urban areas have impeded small scale water service providers from increasing investment in the water sector as peri-urban areas are characterised by low income people. The low return on investments is also

attributed to small scale operations where most of water service providers in peri urban areas operate small scale firms thus generating low returns. The prices charged to water consumers are too low as the government is unwilling to raise the water price to market price level. There exist alternative water sources including boreholes and bottled water which has created competition in the market hence low return on investments. Low incomes among water consumers in peri-urban areas greatly affect the return on investments.

5.2.5. Government Regulations

The fifth objective of the study was to establish the moderating effect of government regulations on the relationship between explanatory variables and financing of small scale water investments in Nairobi peri-urban areas in Kenya. From the results, it was established that the monopolistic nature of water sector and its social sensitivity has fostered extensive government intervention that has not always been conducive to financial sustainability.

The present government regulations including economic, market, social and technical regulations influences water service delivery in peri-urban areas in Kenya. Due to these challenges and government influences, water infrastructures are inadequate to meet the high water demand in Kenya. Water scarcity continues to bite city dwellers especially the peri-urban poor population.

5.2.6 Moderating Effects of Government Regulations

The overall objective of the study was to determine the moderating effect of government regulations on factors hindering financing of small scale water investments in Nairobi Kenya. The results revealed that government regulations have moderating effect on the relationship between explanatory variables and financing of small scale water investments in peri-urban areas. Government regulations have therefore played a significant role in influencing financing of small scale water investments in peri-urban areas in Kenya.

5.3 Conclusions

By use of descriptive statistics, parametric analysis and structural equation modelling, the finding indicated that water utilities in peri-urban areas is characterised by low cost recovery. This is attributed the fact that the price charged to consumers for water services is too low to generate sufficient revenue for full cost recovery. External conditions like taxes and high interest rate on borrowed capital greatly affect financing of water investments and cost recovery. The level of consumer's income in peri-urban areas is also too low to sustain the high cost of financing of water investments. It was widely accepted that full cost recovery can be achieved by charging the water user the full cost of water services in order to generate sufficient revenue to recover investment costs.

The findings of the study indicated that the major risks associated with the water investments includes business risk where there is high uncertainty of the amount of income generated from water selling business. Financial risks make water investors to highly depend on borrowed capital to finance their operations rather than owner's equity. Interest rate risks makes financing of water investments to be affected by changes of interest rate on loans. This also makes private and small scale water service providers to be reluctant in committing their funds in water business in Nairobi peri-urban areas.

Small scale water service providers have difficulties raising capital to finance their operations. Investors are unwilling to borrow money to finance water investments due to the prevailing economic conditions and management unwillingness to be subjected to market scrutiny when sourcing money from external sources. The high cost of borrowing capital from financial institutions makes many investors not to borrow to finance water investments.

From the findings of the study, it was established that return on investments from water selling business in peri-urban areas is very low as they operate in small scale. Price charged to consumers for water services is too low while operation costs are high leading to low return in investments for the investors. The many alternative

water sources in Nairobi peri-urban areas including boreholes and bottled water has led to competition among service providers which negatively affect return on investments. The low levels of income among the peri-urban population greatly affect the return on investment of water selling business.

At the most general level, the study found that the government has established policies or regulations and institutional framework to mobilise and allocate resources for the water sector in order to ensure the delivery of water services in an efficient and effective manner. The government regulations thus have an influence on access to water and water prices through economic regulations. Water tariffs and operation efficiency are regulated through market regulations. Water accessibility, service quality and affordability are done through social regulations, while technical regulations helps in assessing the state of water infrastructures like pipes and reservoirs, maintenance and replacing of unreliable networks. From these findings, the study concludes that government regulations influence delivery of water services and financing of water investments in Nairobi peri-urban areas.

From the findings of the study, it can be concluded that the profile of urban water investments is typically characterised by low cost recovery with high threshold costs, high investor's perceived risks relative to other investment projects, low access to capital where borrowing is only available at short maturities that do not match the long-term financing needs of water projects and relatively low rate of return where cash inflow of water utilities is very low. It is true that the water sector may present opportunities for small scale investments but these challenges inhibit financing of small scale water investments in Nairobi peri-urban areas.

Finance is one of the most important functional areas of business and within business firms. It includes decisions related to the acquisition and use of funds for the enterprise. Business finance refers to the fund and monetary support required by an entrepreneur for carrying various activities relating to the business. Business owners and business managers have to have at least a basic understanding of finance even if they outsource certain areas of their financial operations. Within a business, the firm

may invests in services. Provision of water is such an investment. Throughout the world, water resources are coming under serious financial pressure. Most governments are experiencing budget constraints and cannot be able to finance water investments needs. Water utilities generate low revenue which cannot cover the financing gap. They usually report negative incomes as users' fee are set below full cost recovery level. It was established that financing urban water infrastructure has not been easy. Water utilities tend to have difficulties raising capital. The prices charged to water consumers are too low as the government is unwilling to raise the water price to market price level. For this reason private water service providers are reluctant in investing their funds in water business.

5.4. Recommendations of the Study

Better cost recovery from users is vital. In order to increase financial investments in water sector, rapid improvements in cost recovery should be assured. The study suggests an increase in price charged to consumers of water in order to generate sufficient revenue for full cost recovery. However increase of user fees needs to happen slowly and citizens need to see improvement in the quality of water delivery service in order to be willing to increase payment for water services. Willing to increase payment for better water delivery services will lead to full cost recovery. It's also important to empower the urban poor through job creation or availing conducive business environment in order to boost their level of income which would raise their water purchasing power.

From the findings of the study, the major risks associated with the water investments include business risk, financial risks and interest rate risks. Water investors should use owner' equity rather than borrowed capital to finance their operations. The government should formulate policies of stabilizing interest rate on borrowed loans to avoid interest rate risks.

To avail the needed funds in water sector, the government should establish water financing fund and remove barriers on credit access. This fund would enable investors willing to venture into water business to access funds for such investments.

The fund should be in form of subsidised loans to facilitate access to credit for financially weak local authorities and small scale water service providers. The funds have to be strictly monitored to benefit all local governments as well as small scale water investors.

In order to improve return on investments, the government should enhance tariff reviews. The tariffs should be set in a way that is equitable and provides affordable services to the poor. Policies for addressing Non-Revenue Water should be formulated to ensure continuous flow of water. This would enable water utilities to increase their returns which would enhance expansion of small scale water investments.

The share of the population with access to an improved source of water supply can be increased through introduction of a policy of free basic water. This policy was introduced in Durban city in South African in 1998. In July 2001 free basic water became a national policy that included at least 6m³ of water which has made access to basic water to increase from 83 percent in 1990 to 91 percent in 2010. It is essential that the needs of the poor be adequately addressed as part of a sector reform strategy.

5.5 Suggested Areas for Further Research

The study assessed the moderating effect of government regulations on factors hindering financing of small scale water investments in Nairobi peri-urban areas in Kenya. However, other key areas like city central business district, high income residential zones, peri-urban areas of small towns and rural areas were not addresses. This limits generalization of study findings as the results may not be replicable in these other areas. A longitudinal study is thus recommended in order to supplement the findings of this study and provide a better understanding of the challenges in financing of water investments in these other key areas.

Water service delivery in Kenya is done by public water utility firm, private companies and small scale water vendors. The study concentrated on small scale

water vendors. A comparative study should thus be done to compare the operation efficiency and effectiveness between public and private delivery of water services in Kenya. Another study can also be done on non-financial factors that influence supply and delivery of domestic water services in peri-urban areas of Kenya.

REFERENCES

- African Development Bank, (2008). Project completion report. *Third Nairobi Water Supply Project*, 3, 1 - 9.
- Agresti, A. (2002). *Categorical data analysis*. Hoboken: John Wiley and Sons.
- Aguinis, H., & Gottfredson, R. (2010). Best-practice recommendations for estimating interaction effects using moderated multiple regression. *Journal of Organizational Behavior*, 31, 776-786.
- Argyous, G. (2011) *Statistics for research: With guide to SPSS*. New Delhi: Sage publications.
- Argry, N. (2006). Evidence on the role of firm capabilities in vertical integration decisions. *Strategic Management Journal*, 17, 129-150.
- Arrow, J. B. (1965). *Risk and investment analysis*. Oxford: Basil Blackwell.
- Ashton, J. K. (2000a). Cost efficiency in the UK Water and Sewerage Industry. *Applied Economics Letters*, 7(7), 455-458.
- Ashton, J. K. (2000b). Total factor productivity growth and technical change in the water and sewerage industry. *Service Industries Journal*, 20(4), 121-130.
- Asparouhov, T., & Muthén, B. (2009). Exploratory structural equation modeling. *Structural Equation Modeling*, 16, 397-438.
- Babbie, E. (2002). *The practice of social research*. Belmont, BC: Wadsworth.
- Babin, B., & Svensson, G. (2012). Structural equation modelling in social science research. *European Business Review*, 24(4), 320-330.
- Bai, J., & Perron, P. (2008). Estimating and testing linear models with multiple structural changes. *Econometrica*, 66, 47-78.
- Bakker, K. (2003). Archipelagos and networks. Urbanization and water privatization in the south africa. *The Geographical Journal*, 169, 328-341.
- Banda, B. M., Farolfi, S., & Hassan, R. M. (2007). Estimating water demand for domestic use in rural South Africa in absence of price information. *Water Policy Journal*, 9 (5), 513-528.
- Baronett, S. (2008). *Water Logics*. Upper Saddle River, NJ: Pearson Prentice Hall.

- Baumgartner, H., & Hombur, C. (2006). Applications of structural equation modeling in marketing and consumer research: A review. *International Journal of Research in Marketing*, 13, 139-161.
- Bel, Germà. (2006). *Economics and politics of local water privatization*. Madrid: Marcial Pons.
- Bel, G., & Anton, C. (2006). Do public sector reforms get rusty? Local privatization in Spain. *Journal of Policy Reform*, 9(1): 1-24.
- Bhattacharyya, D.K. (2011). *Human resource research methods*. New Delhi. Oxford University Press.
- Browne, M. W., & Cudeck, R. (2009). Single sample cross-validation indices for covariance structures. *Multivariate Behavioral Research*, 24, 445-455.
- Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York: Guilford.
- Borner, K.L. (2006). *Corporate risk management and hedging practice by medium-sized companies in Denmark*. Published master thesis, Aarhus school of business.
- Brett, W., Ted, B., & Andry, O. (2010). Exploratory factor analysis: *Journal of Emergency Primary Health Care*, 8 (3), 12-19.
- Brown, Trevo L., & Potoski, M. (2003). Transaction costs and institutional explanation for government water service production in New York. *Journal of Public Administration Research and Theory*, 13(4), 441-468.
- Bryman, A., & Cramer, D. (1997). *Qualitative data analysis with SPSS for windows*. London: Routledge.
- Bryman, R. (2012). *Social research methods*. (4th Ed.). New York: Oxford University press Inc.
- Byrne, B.M. (2006). *Structural equation modelling with EQS: Basic concepts, applications, and programming*, (2 ed.). Mahwah, New Jersey: USA.
- Byrne, B. M. (2005). *Structural equation modelling with AMOS: basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

- Byrne, B. M. (2004). *Structural equation modeling*. Thousand Oaks, CA: Sage Publications.
- Budescu, Z. C., & Wallsten, D. M. (1985). The social contours of risk. *Journal of Finance*, 1, 41-50.
- Burki, S.J., & G.E. Perry. (2008). *Beyond the Washington consensus: Institutes matter*. Washington D.C: World Bank.
- Camdessus, M. (2003). *Financing water for all. Report of the World panel on financing water infrastructure*. Marseilles: World water council and global water partnership.
- Carlo, P. (2008). Liquidity preference. *The new Palgrave dictionary of economics*, (2nd ed.), 2, 23-37.
- Carlson, N.R., & Heth, C.D. (2009). *Psychology the science of behaviour*. Toronto: Pearson education Canada.
- Carte, T., & Russell, C. (2003). In pursuit of moderation: nine common errors and their solutions. *MIS Quarterly*, 27(3), 479-501.
- Casella, G., & Berger, R. L. (2002). *Statistical inference*. Pacific Grove, CA: Duxberry.
- Castillo, J.J. (2009). Population sampling techniques. Retrieved from *Experiment Resources*: <http://www.experiment-resources.com/population-sampling.html>, retrieved on 10th September 2011.
- Chan, S. (2002). *Liberalism, democracy and development*. New York: Cambridge University Press.
- Chatterjee, Samprit; Simonoff & Jeffrey (2013). *Handbook of regression analysis*. Chichester: John Wiley & Sons.
- Clough, L. (2004). Water privatization principles and practices. *The World's Water 2006-2007*. Washington: Island press.
- Cohen, L., Manion, L., & Morrison, K. (2000). *Research methods in education* (5th ed.). London: Routledge Falmer.
- Conklin, G.M. (2001). Analysis of regression in game theory approach. *Applied Stochastic Models and Data Analysis* 17 (4): 319–330.

- Cooper, D.R., & Schindler, P.S. (2011). *Business research methods*, (11th, ed.). New Delhi: McGraw-Hill Publishing, Co. Ltd.
- Cooper, D.R., & Schindler, P.S. (2008). *Business research methods*, (10th, ed.) New Delhi: McGraw-Hill Publishing, Co. Ltd.
- Cox, C.J., & Ritche, R.P. (2004). Risks of water liberalism. A new methodological approach. *Journal of Finance*, 34(3), 451-463.
- Cousins, P. (2009). Effects of price increase on demand for water in Holland. *International Journal of Water Resources Development*, 2, 27–40.
- Creswell, J. W. (2003). *Research design: qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks: CA: Sage Publications.
- Cronbach, L.J. (1971). *Education Measurement*, (2nd ed), Washington DC: American council of education.
- Cunningham, K. (1967). Orienting dispositions in the perception of risk: an analysis of contemporary worldviews and cultural biases. *Journal of Cross-Cultural Psychology*, 3, 22-61.
- Daniel, A., & Karina, F. (2003). *Privatization of the water and sanitation systems in the Buenos Aires Metropolitan area*. Buenos Aires: Flasco.
- Daude, S., & Stein, F. (2007). Privatization tidal wave. *International Journal of Water Resources Development* 28 (9), 332–345.
- Dawson, C. (2009). *Introduction to research methods: a practical guide for anyone undertaking a research project*. London: Newtec.
- Dhanini, A. G., Jeanne K. J., & Samuel, R. (2007). The Business amplification of risk: *Risk Analysis*, 8(2), 177–187.
- Dijkgraaf, E., & Gradus, R.H.J.M. (2003). Cost savings of contracting out refuse collection. *Empirica*, 30(2), 149-61.
- Dinar, F. B., & Subramanian, L. K. (2007). Relationship between form of water production and production costs in Spain. *International Journal of Water Resources Development*, 33(5), 337–350.
- Donald, R. (2001). *Corporate debt capacity: a study of corporate debt policy and the determination of corporate debt capacity*. Boston: Harvard Graduate School of Business Administration.

- Donaldson, G. (2009). *Strategy for financial mobility*. Boston: Harvard Graduate School of Business Administration.
- Eichhorn, J. Z. (2004). Exposure to financial risk: definition and measurement. *Financial Management Journal*, 14(4), 51-60.
- Einicke, G.A., Falco, G., Dunn, M.T., & Reid, D.C. (2012). Iterative smoother-based variance estimation. *IEEE Signal Processing Letters*, 19 (5), 275–278.
- Environmental Protection Agency. (2010). Public drinking water systems: facts and figures. *Fourth Report to Congress*. EPA 816-R-09-001.
- Euromarket. (2004). Analysis of the European water supply and sanitation areas and its possible evolution. *Final Report for Work Package, 11*, 67-89.
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, 4(3), 272–299.
- Faraway, J. (2002). *Practical regression and ANOVA using R*. Retrieved from www.r-project.org.
- Farrar, D. E., & Glauber, R. R. (2005). Multicollinearity in regression analysis: the problem revisited. *The Review of Economics and Statistics* 49(1), 92-107.
- Ferri, M., & Jones, W. (1979). Determinants of Financial Structure: *A new methodological approach*, *Journal of Finance*, 34(3): 631 644.
- Finger, M., & J. Allouche. (2002). *Water Privatisation: Trans-National Corporations and the re-regulation of the water industry*. New York: Spon Press.
- Fowler, F.J. (2004). *Survey research methods*. New Delhi: Sage Publications.
- Garcia, S., Guerin, L., & Breuil, L. (2007). *Analysis of the European Union explicit and implicit policies and approaches in the water supply and sanitation sector*. London: IWA Publishing.
- Gefen, D., Straub, D.W., & Boudreau, M. (2000). Structural equation modeling and regression: guidelines for research practice. *Communications of the AIS*, 1 (7), 1–78.

- Glaum, Z. L. (2000). Economic exposure and integrated risk management. *Strategic Management Journal*, 5, 497-514.
- Gleick, P. (2002). *The Privatization of water and water systems. The world's water. The Biennial Report on Freshwater Resources*. Washington D.C: Island Press.
- Granger, C. W. J., & Tera, E. T. (2007). *Modelling nonlinear economic relationships*. Oxford: Oxford University Press.
- Green, C. (2003). *Handbook of water economics: principles and practice*. Chichester: John-Willey and Sons.
- Greene, W. H. (2003). *Econometric analysis, (5th ed.)*. New Jersey: Prentice Hall.
- Greg, B. (2007). *Stepping up - improving the performance of china's urban water utilities*. Beijing: African Development Bank.
- Goldblatt, M. (2009). Assessing the Effective Demand for Improved Water Supplies in Informal Settlements: a willingness to pay survey in Vlakfontein and Finetown, Johannesburg. *Geoforum*, 30(1), 27-41.
- Gujarati, D. (2009). *Multicollinearity: What happens if the regressors are correlated? Basic econometrics*, (4th ed.). New Delhi: McGraw-Hill.
- Gujarati, D.N and Porter, D.C. (2009). *Basic econometrics*, (5th ed.). Boston: McGraw-Hill Irwin.
- Hall, D. (2003). *Water multinationals in retreat. public service international research unit*. London: University of Greenwich Business School.
- Hair, F., Joe, G., Tomas, M., Hult, Christian, M., & Marko, S. (2013). *Partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks: Sage.
- Hair, J. F., Black, W. C., Babin. B. J., & Anderson, R. E. (2010). *Multivariate data analysis (5th ed.)*. New Jersey: Pearson Prentice Hall.
- Hair, J. B., Babin, W., Anderson, & Tatham, R. (2006). *Multivariate data analysis*, (6th ed.). New Jersey: Pearson Education
- Hansen, B. E. (2009). Inference in TAR models. *Studies in Nonlinear Dynamics and Econometrics*, 1(2), 1-14.
- Hart, O.D. & Moore, J. (2000). Property rights and the nature of the firm. *Journal of Political Economy*, 98(6), 49-58.

- Hart, O.D., Andrei, S., & Robert W. V. (1997). The proper scope of government: theory and an application to prisons. *Quarterly Journal of Economics*, 112(4), 127-161.
- Harrington, D. (2009). *Confirmatory factor analysis*. New York: Oxford University Press.
- Hefetz, A., & Mildred E. W. (2004). Water privatization and its reverse. Explaining the dynamics of the government contracting process. *Journal of Public Administration Research and Theory*, 14(2), 171-190.
- Hermann, B. (2006). Economic exposure and integrated risk management. *Strategic Management Journal*, 5, 497-514.
- Holland, P.H., & Holyoak, L.J. (2009). *Induction: processes of inference, learning, and discovery*. New York: Cambridge University Press.
- Hosmer, D., & Stanley L. (2000). *Applied logistic regression*, (2nd ed.). New York: Wiley Publishers.
- Hooper, D., Coughlan, J., & Mullen, M.R. (2008). Structural equation modelling: guidelines for determining model fit. *Journal of Business Research Methods*, 6, 53–60.
- Howell, D. C. (2010). *Statistical methods for psychology*, (7th ed.). Belmont, CA; Thomson Wadsworth.
- Hu, L. T., & Bentler, P. M. (1999). Evaluating model fit. Structural equation modeling: concepts, issues, and applications. Thousand Oaks, CA: Sage.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1-55.
- Ivy .O & Bee. L. (2010). Singapore water management policies and practices. *International Journal of Water Resources Development*, 26(1), 65–80.
- Jaffee, D., & Russell, T. (1976). Imperfect information, uncertainty and credit rationing. *Quarterly Journal of Economics*, 90, 651–666.
- Jones, D. C., & Mygind, N. (2010). The Effects of water privatization on productive efficiency: evidence from the Baltic republics. *Annals of Public and Cooperative Economics*, 71(3), 415– 39.

- Kahneman, D., & Tversky, A. (2002). Judgment under uncertainty: heuristics and biases. *Journal of Social Science*, 185, 1124–1131.
- Kalemli, O. & Volosovych, T. (2008). Impediment to capital flows. *Strategic Management Journal*, 5, 497-514.
- Kanywuiro, S.K. (1987). An application of trend analysis to model domestic water consumption patterns for selected residential areas of Nairobi. *Unpublished MBA Project, University of Nairobi*.
- Karanja, J. (2011). Improving water provision in Nairobi through control of non-revenue water. Global water summit 2011. *Global Water Intelligence*, 7, 212–213.
- Kariuki, M., & Schwarz, J. (2005). Small-scale private service providers of water supply and electricity: a review of incidence, structure, pricing and operating characteristics. *World Bank Policy Research Working Paper 3727*.
- Kavanagh, I., & Parker, D. (1999). Managing the contract: a transaction cost analysis of externalisation. *Local Government Studies*, 26(4), 1-22.
- Kelly, I., & Wilson, J. (2004). Water investment needs in New York. *Journal of Economic Development*, 98(6), 1119-1158.
- Kikeri, S., & Kolo, A. (2005). Water privatization trends and recent developments. *World Bank Policy Research Working Papers*, 11, 37- 65.
- Kjellen, M., & McGranahan, G. (2006). *Informal water vendors and the urban poor*. London: International Institute for Environment and Development.
- Klein, M. (2005) *Economic regulation of water companies*. Policy research working papers. Washington D.C: World Bank.
- Kline, R. B. (2010). *Principles and practice of structural equation modeling*. New York: Guilford press.
- Kock, N., & Lynn, G.S. (2012). Lateral collinearity and misleading results in variance-based sem: an illustration and recommendations. *Journal of the Association for Information Systems*, 13(7), 546-580.
- Kogan B. W., & Wallach B. R. (1964). Risk perception and social anthropology. *Critique of Cultural Theory*. *Ethnos*, 68(2), 159-178.

- Kombo, D.K., & Tromp, D.L.A. (2009). *Proposal and thesis writing. An Introduction*. Nairobi: Don Bosco Printing Press.
- Kothari, C.R. (2004). *Research methodology and techniques*, (2nd ed.). New Delhi: New Age Int.
- Kunreuther, L. J. (1976) Theories of risk perception: who fears what and why?" *American Academy of Arts and Sciences*, 119(4), 41–60.
- Le, C. & Lucien, B. (2009). Maximum likelihood. An introduction. *ISI Review* 58 (2), 153–171.
- Liekweg, K., & Weber, D. (2000). Exposure to currency risk: definition and measurement. *Journal of Financial Management*, 13, 31-40.
- Mann, P. C., & John L. M. (2006). Ownership and water system operation. *Water Resources Bulletin*, 12(5), 995-1004.
- Marsh, H. W., Balla, J. R., & Hau, K. T. (1996). *An evaluation of incremental fit indexes: a clarification of mathematical and empirical properties*. New York: Marcoulides.
- Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: the effect of sample size. *Psychological Bulletin*, 103, 391-410.
- Marsh, H. W., & Hau, K. T. (1996). Assessing goodness of fit: is parsimony always desirable? *Journal of Experimental Education*, 64, 364-390.
- Marsh, H.W., Balla, J.R., & McDonald, R.P. (2011). Goodness-of-fit Indexes in confirmatory factor analysis: the effect of sample size. *Psychological Bulletin* 103(3), 391–410.
- Maslyukivska, O., & M. Sohail. (2003). *Private sector participation in the water sector in the Eca region: emerging lessons*. Paris: World Bank.
- Mayer, P.W., & DeOreo, W.B. (2005). *Residential end uses of water*. American water. New York: Works Association Research Foundation.
- McDonald, R. P., & Ho, M. H. R. (2002). Principles and practice in reporting statistical equation analyses. *Psychological Methods*, 7(1), 64-82.
- McNamara, C. (1999). *General guideline for conduction interview*. Minnesota: Renehart and Winston.

- Mertens, D.M (2010). *Research and evaluation in education and psychology. intergrating diversity with quantitative, qualitative and mixed methods*. London: Sage Publishers
- Miller, G. J., & Yang, K. (2008). *Handbook of research methods in public administration*. Newyork: Auerbach Publications.
- Moore, D., & George P. (2003). *Introduction to the practice of statistics*. New York: Freeman & Co.
- Morrison, R. (2005). *The Cambridge handbook of thinking and reasoning*. New York: Cambridge University Press.
- Morton, H. (1993). *The story of psychology*. New York, NY: Bantam
- Mugenda, A.G. (2008). *Social science research. theory and principles*. Nairobi: Act press.
- Mugenda, A.G. (2011). *Social science research; theory and principles*. Nairobi: Act press.
- Mukulu, E., Oyugi, L., & Mwarania, S. (2011) Market drivers for competitive advantage of micro and small piped water enterprises in peri-urban areas of Kenyan cities. *Journal of Human Resource and Entrepreneurship Development*. (3) No 1, 2011.
- Muiruri, P. N. (2003) *Factors influencing management of commercialized urban water services*. An Unpublished MBA Project, University of Nairobi.
- Nachmias, F.C., & Nachmias, D. (1996). *Research methods in social sciences*. London. St Martin press Inc.
- Navarro. (1988). How areas for impure public goods organize: the case of household refuse collection. *Journal of Law, Economics and Organization*, 4(2), 217- 241
- Nairobi City Water and Sewerage Company. (2008). City residents to benefit from alternative water sources initiative. *Nairobi Water News*, 14, 1-2.
- Nairobi City Water and Sewerage Company. (2011). *Customer water supply contract*. Nairobi: Nairobi City Water and Sewerage Company.
- Newbery, D. (2002). Regulating unbundled network utilities. *The Economic and Social Review*, 33, 23-41.

- Ngechu, M. (2004). *Understanding the research process and methods; an introduction to research methods*. Nairobi: Act press.
- Ngumi, P. (2012). Effect of bank innovations on financial performance of commercial banks in Kenya. *Unpublished PhD thesis, Jomo Kenyatta University of Agriculture and Technology*.
- Ntengwe (2004). The impact of consumer awareness of water sector issues on willingness to pay and cost recovery in Zambia. *Physics and Chemistry of the Earth*, 29(2004), 1301–1308.
- Nunnally, J.C. (1978). *Psychometric theory*. (2nd ed). New York, NY: McGraw-Hill.
- O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Journal of Economics and Statistics*, 4(5), 673-684.
- Olsen, R. A. (1998). Behavioral finance and its implication for stock-price volatility. *Financial Analysts Journal*. March/April, 2012: 10-17.
- Organisation for Economic Co-Operation and Development. (2004). *Financing water and environmental infrastructure for all. OECD global forum on sustainable development*. Paris: OECD.
- Osborne, D. & Gaebler, T. (2007). *Reinventing government: how the entrepreneurial spirit is transforming government*. Reading, MA: Addison-Wesley.
- Orodho, A.J., & Kombo, D.K. (2002). *Research Methods*. Nairobi: Kenyatta University, institute of open learning.
- Ouyahia, M.A. (2006). *Public-private partnerships for funding municipal drinking water infrastructure: what are the challenges?* Government of Canada: Policy Research Initiative.
- Pallant, J. (2010). *SPSS survival manual. a step by step guide to data analysis using SPSS*, (4th ed.). New York: Open University Press.
- Parker, B.G., & Zhang, H. (2006) Relationship between form of water production and production costs in Africa. *Journal of Economic Perspectives*, 15(2), 13-20.
- Patricia, C, A. (2006). Urban infrastructure finance from private operators: what have we learned from recent experience? *World Bank Policy Research Working Paper* 4045, November 2006.

- Peters, E. (1996). *Chaos and order in the capital areas*, (2nd Ed.). New York: John Wiley & Sons, Inc.
- Piel, J.V. (1995). *Research methods in business studies*. New York: Dryden press.
- Piketty, T. (1997). The dynamics of the wealth distribution and the interest rate with credit rationing. *Review of Economic Studies*, 64, 173–189.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., & Podsakoff, N.P. (2003). Common method biases in behavioral research. A critical review of the literature and recommended remedies, *Journal of Applied Psychology*, 88(5), 879-90.
- Polit, D., & Beck, C. (2003). *Research principles & methods*, (7th Ed.). Lippincott: Williams & Wilkins.
- Raffie, Kambiz, Rangesan, Narayanan, Thomas R. H., David L., & John M. C. (2007). Cost analysis of water utilities: a goodness-of-fit approach. *Atlantic Economic Journal*, 21(3), 18-29.
- Raje. D.V., Dhobe.P. S., & Deshpande, A.W. (2002). Consumer's willingness to pay more for municipal supplied water. *Ecological Economics*, 42(3), 391-400.
- Republic of Kenya. (2002). *The water act, 2002*. Kenya Gazette Supplement 107 (Acts No. 9). Nairobi: Government Printer.
- Republic of Kenya. (June 2011). *Kenya economic update*, (4th Ed.). 4, Nairobi: World Bank Group.
- Republic of Kenya. (2009). *Government of Kenya sector investment plan*. Nairobi: Government printers.
- Republic of Kenya. (2010). *National water policy*. Nairobi: Government Printers.
- Robert, Z. & Douglas, R. (2009). *Statistics: probability, inference, and decision*. New York: Holt, Rinehart & Winston.
- Saal, David S., & David Parker. (2000). The impact of privatization and regulation on the water and sewerage industry in England and wales: a cost function model. *Managerial and Decision Economics*, 21(6), 253-268.
- Sabri, A. (2013). Modelling a high reliability and validity by using confirmatory factor analysis on five latent construct. *International Research Journal Advanced Engineer and Scientific Technology*, 1(1), 7.
- Samuel, C. (2010). *Econometrics*. New York: McGraw Hill.

- Sappington, M., & Joseph, E. S. (1987). Privatization, information and incentives. *Journal of Policy Analysis and Management*, 6(4), 567-582.
- Sauer-Paul, L., & Dick, A. (2003). Using moderator variables in structural equation Models. *Advances in Consumer Research*, 20, 636-640.
- Saunders, M., Lewis, P., & Thornhill, A. (2007). *Research methods for business students*, (4th Ed.). Harlow: Prentice Hall.
- Schaub, J. D. (2008). Harnessing entrepreneurship in the water sector: expanding water services through independent network operators. *Waterlines*, 27(4), 270–288.
- Schaninger, M. (1976). *Risk and culture: an essay on the selection of technical and environmental dangers*. Berkeley: University of California Press.
- Shapiro, S., & Wilk, M. (1965) Analysis of variance test of normality. *Biometrika*, 52(3), 591-599.
- Schwab, D. (2005). *Research methods for organizational studies*, (2nd ed.). London: Lawrence Erlbaum Associates.
- Schonborn, N. (2010). Financial versus operative hedging of currency risk. *Global Finance Journal*, 14, 1-18
- Sekaran, U.S., & Bougie, R. (2010). *Research methods for business: a skill building approach*, (5th ed.). New York: John Willey and sons publishers.
- Sekaran, U. (2008). *Research methods for business: a skilled building approach*. New York: John Willey and sons Publishers.
- Shefrin, H. (2000). *Beyond greed and fear*. Boston: Harvard Business School Press.
- Shleifer, A. (1998). State versus private water utility ownership. *Journal of Economic Perspectives*, 12(4), 133-150.
- Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling*. New Jersey: Lawrence Erlbaum Associates.
- Seppala, G. V. & Katko, M. K. (2003). Factors influencing cost of water provision. *World Bank Policy Research Working Paper* 4319.
- Sijbers, J. & Dekker, A.J. (2004). Maximum likelihood estimation of signal amplitude and noise variance from data, *51(3)*, 586–594.

- Smith, L. R. & Wilford, H. J. (2005). Management of liquidity risk. *Journal of Finance*, 12, 23–33.
- Srivastava, D.K., & Sen, T.K. (2007). *Government subsidies water in India*. New Delhi: National Institute of Public Finance and Policy.
- Stein, R. M. (2007). *Urban alternatives: public and private areas in the provision of local services*. Pittsburgh, PA: University of Pittsburgh Press.
- Steinberg, J. (2010). *Exploring the dimensionality of large-scale standardized educational assessments using PROC FACTOR*. Paper presented at Northeast SAS Users Group (NESUG), Baltimore, MD.
- Steiger J. H. (2000). Point estimation, hypothesis testing and interval estimation using the RMSEA: *Journal of Economics and Statistics*, 7(3), 149-162.
- Steven, J. B., Stephan J. N., Robert E. P., & Rocky, D. (2007). *urban water management in the united states. Past, present, and future*. San Diego: Spon Press.
- Stigler, G. (1971). The theory of economic regulation. *Journal of Economic and Management Science*, 2, 3-21.
- Stiglitz, J. & Weiss, A. (1981). Credit rationing in markets with imperfect information, *American Economic Review* 71, 393–410
- Stroeder, B.J (2008). Risk, uncertainty and government. *Journal of Financial Management*, 11, 34-42.
- Stone, G. & Winter, F. (2007). *Risk Acceptability*. Virginia: Earthscan.
- Sunman, R. (2001) *Urban water supply. Policy Research Working Papers*. Washington D.C. World Bank.
- Suhr, D. D. (2006). Exploratory or confirmatory factor analysis in *statistics and data analysis?* Retrieved from <http://www2.sas.com/proceedings/sugi31/200-31.pdf>.
- Tabachnick, B. G., & Fidell, L.S. (2007). *Using multivariate statistics*. (5th Ed.). Boston: Pearson Education.
- Tabachnick, B. G., & Fidell, L.S. (2001). *Principal components and factor analysis in using multivariate statistics*. MA: Allyn & Bacon.

- Teeple, R. & David G. (2010). Cost of water delivery systems in Spain: specifications and ownership effects. *Journal of Economics and Statistics*, 69(3), 399-408.
- Thaler, R. E. (1993). *Advances in behavioral finance*. New York, NY: Russell Sage Foundation.
- Tsagarakis, K. P. (2005). Economic risks in the drinking water sector; *international conference on water economics, statistics and finance*. Rethymno: International Water Association.
- Tremolet, S., Shukla, P. & Venton, C. (2004). *Contracting out utility regulatory functions. Final Report for the World Bank*. Environment Resources Management.
- Trochim, V. J. (2006). *Understanding the methods and process*. Thousand Oaks: CA: Sage.
- Tucker, L. R., & Lewis, C. (1973). A Reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38, 1-10.
- Tse, A.C.B. (2001). How much are consumers willing to pay for a higher level of service? a preliminary survey. *Journal of Service Marketing*, 15(1), 11-17.
- Ullman, J. B. (2001). *Structural equation modeling; using multivariate statistics*. MA: Allyn & Bacon.
- United Nation Development Programme. (2006). *Human development report, millennium development goals: a compact among nations to end human poverty. united nations development programme (UNDP)*, New York: Oxford University Press.
- UN-Habitat. (2003). *Water and sanitation in the world's cities. local action for global goals*. London: Earthscan.
- UN-HABITAT. (2010). *State of the World's cities 2010/2011-cities for all. bridging the urban divide*. Nairobi: United Nations Human Settlements Programme.
- Verbeek, M. (2012). *A guide to modern econometrics*, (4th ed.). Chichester: John Wiley & Sons.
- Vickers, J. & Yarrow, G. (1988) *Privatization: an economic analysis*, Cambridge: The MIT Press.

- Water Aid. (2008). *Looking back. The long term impacts of water and sanitation projects*. London: Water Aid Report.
- Wambua, Z. (2013). Water privatisation in Kenya. *Heinrich Boll Foundation*, 2004. Pp. 12-15.
- Water Service Regulatory Board. (2010). *Impact; a performance report of Kenya's water services sub-sector*. Nairobi: Water Services Regulatory Board.
- Whittington, D., Davis, J., McClelland, E. (2008). Implementing a demand-driven approach to community water supply planning in Lugazi Uganda. *Water International*, 23(3), 134-145.
- Williamson. Oliver E. (1999). Public and Private Bureaucracies: A transaction cost economics perspective. *Journal of Law, Economics, and Organization*, 15(1), 306-42.
- World Health Organization. (2003). *The right to water*. Geneva: World Health Organisation.
- World Health Organization. (2007). *The Right to Water. Health and Human Rights Publication Series, no. 3*: Geneva: World Health Organisation.
- World Health Organization. (2010). The right to water. *Health and human rights. Publication Series, no. 1*: Geneva: World Health Organisation.
- World Bank, (2004a). *Water resources sector strategy. Strategic directions for world bank engagement*. Washington D.C: World Bank.
- World Bank, (2004). *World's development indicators*. Washington D.C: World Bank.
- World Bank, (2006). *World Bank Policy Research. Working Paper 4045*, November 2006.
- World Bank, (2010). *World Development Indicators*. Washington, DC: World Bank.
- World Bank, (2011). *World Development Indicators*. Washington, DC: World Bank.
- World Water Council, (2007). *Analysis of the 3rd World water forum*. Marseilles: World Water Council Publication.
- Yang, J., Pattanayak. S.K., Jonson. F.R., Mansfield. C, van den Berg, C., & Jones. K. (2006). Unpackaging demand for water service quality: evidence from co-joint surveys in SriLanka. *World Bank Policy Research Working Paper 3817*.

- Yang, K. & Miller, G. (2008). *Handbook of research methods in public administration*. New York: Taylor and Francis Group.
- Young, N. (2009). *Understanding the research process and methods*. an introduction to research methods. Las Vegas: Act press.
- Yuan, K.-H. & Zhang, Z. (2011). Structural equation modeling diagnostics using R package, *An Interdisciplinary Journal*, 15, 335–351.
- Yuan, K. H., & Hayashi, K. (2010). Fitting data to model: structural equation modeling diagnosis using two scatter plots. *Psychological Methods*, 15, 335–351.
- Zikmund, G.W., Babin, B. J., Carr, C. J. & Griffin, M.(2010). *Business research methods*, (8th ed.). South-Western, Cengage Learning.

Appendix I

LETTER OF INTRODUCTION TO THE RESPONDENT

August, 2013.

Dear Respondent,

RE: REQUEST FOR INFORMATION.

I am a student at JKUAT pursuing PhD in Business Administration – Finance option. I would like to conduct a research on: **Effect of Government Regulations on Factors Hindering Financing of Small Scale Water Investments in Kenya.** This research is a pre-requisite for the course.

Collection of data will involve administration of questionnaires as well as interview. I would kindly request for your cooperation and participation through answering the presented questionnaires either by myself or my research assistants.

Your assistance and corporation will be highly valued.

Yours faithfully,

Kimani E. Maina.

Appendix II

QUESTIONNAIRE

QUESTIONNAIRE FOR: FACTORS HINDERING FINANCING OF WATER INVESTMENTS IN KENYA: SURVEY OF NAIROBI PERI-URBAN AREAS.

QUESTIONNAIRE No:.....

Date...../...../2014

(Information provided will be highly confidential)

BACKGROUND INFORMATION

(Please tick appropriately or fill additional information in the space provided).

1. Gender

Male

Female

2. Education level

No education

Primary

Secondary

Tertiary

University

Others; Specify.....

3. In which age group are you?

Below 20 years 30-39 years 50-59 years

21-29 years 40-49 years 60 years and above.

4. In which constituency do you operate your water business?
- Dagoreti Kasarani Langata
5. How long have you been in water selling business?
- Below 5 years 6-10 years over 10 years
6. Have you ever been trained in financial management?
- Yes
- No
7. Business ownership
- Family business
- Sole proprietorship
- Partnership
8. Which are the main challenges affecting sustainable urban water service delivery?
- Cost recovery
- High operational risk
- Limited access to capital
- Low return from sale of water
9. Which is the most important source of capital for your water business?
- Own savings/equity Bank loan
- Borrowing from 'Chama' Mixed system
10. What influenced you to enter into water selling business?
- Unemployment
- Water shortage in the area
- Succession
- Others; Specify.....

11. Which among the following costs do you incur most?

- Wages and salaries
- Rent
- Routine maintenance
- Capital cost

12. Have you been able to re-coup the amount that you invested in your business?

- Yes
- No

If yes, after how many years?

- 0 – 1 Year
- 2 – 5 years
- 6 – 10 years
- Over 10 years

13. Which is the main type of uncertainty that is experienced by water selling business?

- Uncertainty of the amount of income generated
- Water as a ‘commodity’ is difficult to sell
- Changes of interest rate on loans.
- Default risks

14. Have you ever needed fund from financial institutions and were un-able to get the needed funds for any reason(s)

- Yes
- No

If yes, what was the reason(s)

NAIROBI PERI-URBAN AREAS INFORMATION.

SECTION A: Cost Recovery

This section has statements regarding cost recovery. Kindly respond with the response that matches your opinion. Please tick as appropriate in the boxes using a tick (✓).

Cost Recovery	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
	5	4	3	2	1
1. Pricing of water: The price charged to consumers for water services greatly affect that amount of revenue generated to finance water investment.	[]	[]	[]	[]	[]
2. Externalities (external conditions) External conditions like tax, interest rate, government policy has greatly affected financing of water investments.	[]	[]	[]	[]	[]
3. User charges: It's better to Charge the water users directly the full cost of water service in order to generate sufficient revenue to recover investments costs.	[]	[]	[]	[]	[]
4. Consumer income levels: The level of consumer's income in peri-urban areas affects the rate of cost recovery to sustain the high cost of investments in water.	[]	[]	[]	[]	[]

SECTION B: Perceived Risks

This section has statements regarding perceived risks. Kindly respond with the response that matches your opinion. Please tick as appropriate in the boxes using a tick (✓).

Perceived Risks	Strongly agree	Agree	Neither agree or	Disagree	Strongly Disagree
	5	4	3	2	1
1. Business risk: There is high certainty of the amount of income generated from water selling business hence high business risk.	[]	[]	[]	[]	[]
2. Financial risks: Water investments highly depend on borrowed capital to finance its operations rather than owner's equity hence has high financial risk.	[]	[]	[]	[]	[]
3. Interest rate risk: Financing of water investments is usually affected by changes of interest rate on loans. These investments thus have high interest rate risk.	[]	[]	[]	[]	[]
4. Commodity price risk: Prices of water keeps on changing which affects the profit margins of water businesses hence commodity price risk.	[]	[]	[]	[]	[]

SECTION C: Access to Capital

This section has statements regarding access to capital. Kindly respond with the response that matches your opinion. Please tick as appropriate in the boxes using a tick (✓).

Access To Capital	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
	5	4	3	2	1
1. Tax policies: Tax imposed on small scale water investment is too high to generate enough profit which can be ploughed back as capital.	[]	[]	[]	[]	[]
2. Capital market: The ability to raise capital to finance water investments is highly determined by how developed our domestic capital market is.	[]	[]	[]	[]	[]
1. Willingness to borrow: Ability and willingness of investors to borrow money to finance water investments is affected by prevailing economic conditions.	[]	[]	[]	[]	[]
4. Cost of capital: The high cost of borrowing capital from financial institutions affects ability of people to borrow to finance water investments.	[]	[]	[]	[]	[]

SECTION D: Return on Investment.

This section has statements regarding return on investment. Kindly respond with the response that matches your opinion. Please tick as appropriate in the boxes using a tick (✓).

Return On Investment	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
	5	4	3	2	1
1. Investment level: The return on investment from water selling business in peri-urban areas is affected by the size of the business operates by an investor.	[]	[]	[]	[]	[]
2. Price charged: The price charged to consumers for water service determines return on investment for the investors.	[]	[]	[]	[]	[]
1. Alternative water sources: The many alternative water sources in Nairobi including boreholes and bottled water has lead to competition among service providers affects return on water investments in peri-urban areas.	[]	[]	[]	[]	[]
4. Consumer income levels: The level of income among the peri-urban population greatly affects the return on investment of water selling businesses.	[]	[]	[]	[]	[]

SECTION E: Government Regulations.

This section has statements regarding government regulations. Kindly respond with the response that matches your opinion. Please tick as appropriate in the boxes using a tick (✓).

Government Regulations	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
	5	4	3	2	1
1. Economic Regulation: Government regulation have great influence on access to water and prices charged to water consumers	[]	[]	[]	[]	[]
2. Market Regulation: The government defines water tariffs and operation efficiency i.e. reducing leakage and water costs.	[]	[]	[]	[]	[]
3. Social Regulation₁: The government is protecting water consumers by ensuring water accessibility, service quality, and price affordability to all water consumers.	[]	[]	[]	[]	[]
4. Technical Regulation: The government regularly assess the state of water infrastructures like pipes and reservoirs, maintain and replace unreliable networks.	[]	[]	[]	[]	[]

SECTION F: Financing of Water Investments in Peri-urban Areas.

This section has statements regarding financing of water investments in peri-urban areas. On your own opinion what is your position about the following statements from the time you started operating to date? Kindly respond with the response that matches your opinion. Please tick as appropriate in the boxes using a tick (√).

Financing of water investments in Kenya	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
	5	4	3	2	1
1. Increased coverage: The number of water service providers in peri- urban areas has increased over years.	[]	[]	[]	[]	[]
2. Improved water quality: The quality of water has improved over years.	[]	[]	[]	[]	[]
3. Increased access: Accessibility of water in Nairobi peri-urban areas increased over years.	[]	[]	[]	[]	[]
4. Cash surplus: Investor’s income from sales of water has increased over years.	[]	[]	[]	[]	[]

Appendix III

Communalities

Indicators	Initial	Extraction
CR1	1.000	.747
CR2	1.000	.741
CR3	1.000	.706
PR1	1.000	.748
PR2	1.000	.737
PR3	1.000	.656
PR4	1.000	.754
AC1	1.000	.640
AC2	1.000	.781
AC3	1.000	.653
AC4	1.000	.665
ROI1	1.000	.768
ROI2	1.000	.794
ROI3	1.000	.669
GR1	1.000	.675
GR2	1.000	.584
GR3	1.000	.673
GR4	1.000	.583
F1	1.000	.789
F3	1.000	.623

Extraction Method: Principal Component Analysis.

Appendix IV

Extracted Components

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.792	23.958	23.958	4.792	23.958	23.958
2	3.004	15.019	38.977	3.004	15.019	38.977
3	2.067	10.335	49.312	2.067	10.335	49.312
4	1.696	8.478	57.789	1.696	8.478	57.789
5	1.269	6.345	64.135	1.269	6.345	64.135
6	1.158	5.788	69.923	1.158	5.788	69.923
7	.776	3.881	73.804			
8	.721	3.603	77.407			
9	.587	2.933	80.340			
10	.569	2.844	83.184			
11	.525	2.624	85.809			
12	.434	2.169	87.977			
13	.422	2.111	90.088			
14	.382	1.912	92.000			
15	.343	1.714	93.714			
16	.339	1.694	95.408			
17	.266	1.332	96.740			
18	.249	1.245	97.985			
19	.221	1.106	99.091			
20	.182	.909	100.000			

Appendix V

Correlations Matrix

		Cost Recovery	Perceived Risks	Access to Capital	Return on Investment	Financing
Cost Recovery	Pearson Correlation	1	.505**	.306**	-.070	-.034
	Sig. (1-tailed)		.000	.000	.199	.341
	N	147	147	147	147	147
Perceived Risks	Pearson Correlation	.505**	1	.312**	-.268**	-.310**
	Sig. (1-tailed)	.000		.000	.001	.000
	N	147	147	147	147	147
Access to Capital	Pearson Correlation	.306**	.312**	1	-.151*	-.229**
	Sig. (1-tailed)	.000	.000		.034	.003
	N	147	147	147	147	147
Return on Investment	Pearson Correlation	-.070	-.268**	-.151*	1	.343**
	Sig. (1-tailed)	.199	.001	.034		.000
	N	147	147	147	147	147
Financing	Pearson Correlation	-.034	-.310**	-.229**	.343**	1
	Sig. (1-tailed)	.341	.000	.003	.000	
	N	147	147	147	147	147

** . Correlation is significant at the 0.01 level (1-tailed).

* . Correlation is significant at the 0.05 level (1-tailed).

Appendix VI

Normality of the Observed Variable

Variable	Min	Max	Skew	c.r.	Kurtosis	c.r.
Return on Investment	1.750	4.750	-.237	-1.175	-.372	-.920
Access to Capital	2.500	5.000	.469	2.323	-.099	-.246
Perceived Risk	2.750	5.000	-.766	-3.793	.344	.852
Cost Recovery	2.000	5.000	-.847	-4.194	.469	1.161
Financing	1.250	4.500	-.472	-2.335	.103	.255

Appendix VII

Covariance among Exogenous Variables

Exogenous Variables	Exogenous Variables	Estimate	S.E.	C.R.	P-value
Cost Recovery	Perceived Risk	-.202	.033	-6.169	0.001
Perceived Risk	Access to Capital	-.184	.028	-6.505	0.001
Access To Capital	Return on Investment	.237	.038	6.281	0.001
Cost Recovery	Access to Capital	.204	.036	5.709	0.001
Cost Recovery	Return on Investment	.312	.046	6.774	0.001
Perceived Risk	Return on Investment	-.246	.035	-6.949	0.001

Appendix VIII

Standardized Residual Covariances

	Return on Investment	Access To Capital	Perceived Risk	Cost Recovery	Financing
Return on Investment	.000				
Access to Capital	.000	.000			
Perceived Risk	.000	.000	.000		
Cost Recovery	.000	.000	.000	.000	
Financing	.000	.000	.000	.000	.000
