

MODERATING EFFECT OF GOVERNMENT REGULATIONS ON THE RELATIONSHIP BETWEEN COST RECOVERY AND FINANCING OF WATER INVESTMENTS IN NAIROBI PERI-URBAN MARKETS IN KENYA

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©2015

International Academic Journals

Received: 20th February 2015

Accepted: 24th February 2015

Full Length Research

Available Online at: http://www.iajournals.org/articles/iajef_v1_i4_14_31.pdf

Citation: Kimani, E. M., Mouni, G. G., Wanjau, K. L. & Mung'atu, J. K. (2015). Moderating effect of government regulations on the relationship between cost recovery and financing of water investments in Nairobi peri-urban markets in Kenya. *International Academic Journal of Economics and Finance*, 1 (4), 14-31

ABSTRACT

Over the last 200 years, most water utilities have been publicly owned and managed. For this reason, public utility firms have been getting financial support from the government in form of subsidies in addition to the revenue they generate internally. However these water utilities have not been able to generate sufficient internal revenue to ensure sustainable financial investments. There has been low level of investment in the sector especially in peri-urban markets mainly due to poor cost recovery. The study explored moderating effect of government regulations on the relationship between cost recovery and financing of water investments in Kenya. The study adopted descriptive survey research design. A two stage sampling technique was used to obtain a sample population of 150 small

scale water service providers. The study utilized self-administered questionnaire and content analysis for collecting data. SEM was used to analyse the relationship between cost recovery and financing of water investments. The findings of the study indicated that factors inhibiting cost recovery includes poor water pricing, low users' charge and externalities. The recommended remedies to cost recovery includes cross-subsidization, gradual increase of user fees, and service improvement. The results of the study will be of great importance as it will contribute to greater understanding of various factors that inhibits cost recovery among water utilities and how these factors can be improved.

Key Words: *Cost recovery, Financing, Peri-urban Markets, Safe drinking water*

INTRODUCTION

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 (WHO), 2010]. Scarcity of water is one of the world's leading problems affecting more than 1.1 billion people globally (WHO, 2010). As a result, 33 percent of the world population suffer from preventable diseases, while millions of people die every year due to water related issues (United Nation Development Programme, 2006). Historically, water has been viewed as a public good, not a market commodity (Finger and Allouche, 2002). Over the last 200 years, most water utilities have been publicly owned and managed. However public water utilities in most parts of the world have been unable to provide universal access to water services (Daniel and Karina, 2003).

Public utility companies have high level of indebtedness, and the institutions have poor creditworthiness. Burki and Perry (2008) argue that the current level of investments in water sector by public utility companies worldwide is very low. International Financial Institutions (IFIs) began promoting programs to increase access to clean water in the 1950s. In 1977 United Nations (UN) held the first international conference on freshwater and lack of access to clean drinking water was declared an international crisis (Finger and Allouche, 2002). In response, the United Nations declared the 1980s the "International Decade for Clean Water and Sanitation". Thereafter, IFIs and national governments significantly increased their

funding for water investments. The percentage of the world's population without access to clean water dropped from 41 percent in 1980 to 21 percent by 1990 (Gleick, 2004).

In Kenya, the responsibility for water service provision is in the hands of public utilities, private firm and small water service providers (WASREB, 2009). Water supply in Kenya is characterized by low levels of access, particularly in urban slums and in rural areas. The main sources of funding for Kenyan water institutions includes the government funds of 58%, internally generated funds amounted to 11% and donor contributions that made up 31% of the funds available. The 2009 Impact Report by the RoK estimated that only 37% of Kenyans had access to sufficient and safe drinking water close to their homes at an affordable price (RoK, 2010).

Water services in Nairobi are provided by the Nairobi City Water and Sewerage Company Ltd (NCWSC) (WASREB, 2009). NCWSC mainly serve the city's CBD and high income residential zones (Wambua, 2004). The private sector plays a limited, but not negligible role in operating water supply systems in Nairobi. Small scale service providers are the main providers of water in the low income settlements (peri-urban) areas of Nairobi (WASREB, 2009).

STATEMENT OF THE PROBLEM

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). However the current level of investment in water sector in Nairobi peri-urban markets is very low (NCWSC, 2011). These utilities have not been able to meet their water investment needs due to poor cost recovery (RoK, 2010). As a result, the level of investment in water sector is very low hence water scarcity. Among the Kenya's population that lives in the Nairobi's peri-urban markets, 71% do not have access to basic water (UN Habitat, 2003).

Most women in these areas spend 60% of their time looking for water, time that could have been spent for gainful economic development (Karanja, 2011). Many people among this population suffer from preventable diseases while others die every year due to water related issues (UNDP, 2006). The social and economic consequences of a lack of clean water also penetrate into realms of education, opportunities for gainful employment, agricultural industrial development, regional conflict and productivity (World Bank, 2010).

RESEARCH OBJECTIVE

The objective of the study was to determine moderating effect of government regulations on the relationship between cost recovery and financing of water investments in Kenya.

LITERATURE REVIEW

This study analysed the effect of government regulations on the relationship between cost recovery issues (pricing, externalities, user charges and consumer demand) and financing of water investments in Nairobi peri-urban markets.

Concept of Water Financing

Finance is one of the most important aspects of business management and includes decisions related to the acquisition and use of funds for the enterprise (Burki and Perry, 2008). 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 (Burki and Perry, 2008). Water utilities generate low revenue which cannot cover the financing gap (Greg, 2007). They usually report negative incomes as users' fee are set below full cost recovery level (Finger and Alluche, 2002, Burki and Perry, 2008, Steven et al., 2007). 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

Theoretical Literature Review

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 and 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 and Tromp, 2009).

The transaction costs theory 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 and Warner, 2004). Transactions costs are a significant factor in explaining decisions to privatize or re-internalize production (Hefetz and Warner, 2004, Kavanagh and Parker, 1999). Cost savings and recovery expectations from this view are dependent on nature of service and local market conditions.

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. 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. The key variables in this study were categorized as independent variable, moderator and dependent variable. Mugenda (2008) explains that the independent variables are called predictor variables because they predict the amount of variation that occurs in another variable while dependent variable, also called criterion variable, is a variable that is influenced or changed by another variable. The dependent variable is the variable that the researcher wishes to explain. A moderator variable is a variable that alters the strength of the causal relationship (Frazier, Tix & Barron, 2004).

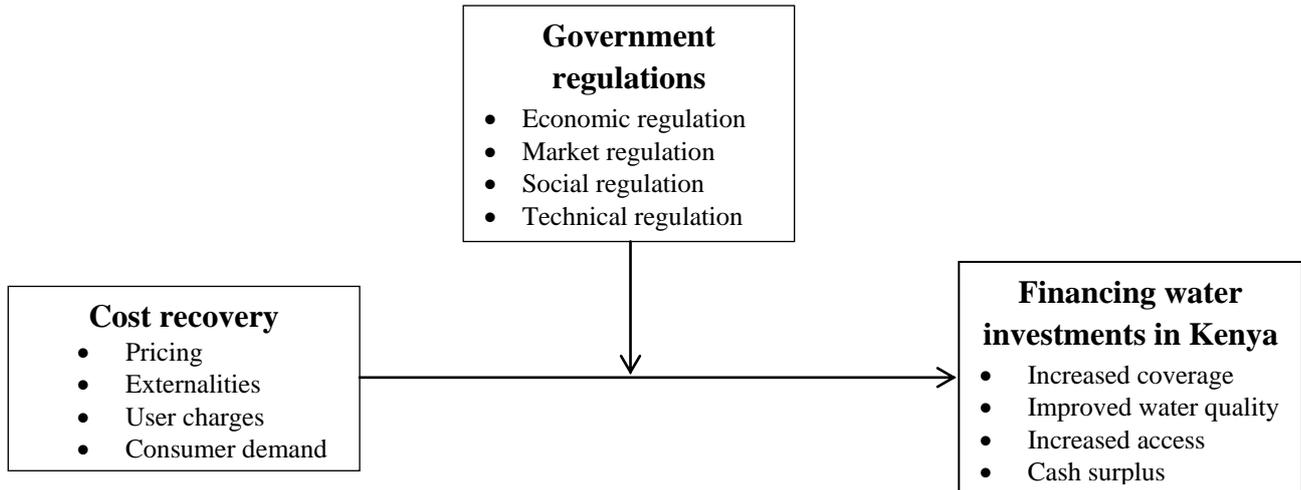


Figure 1: Conceptual Framework

Empirical Studies on Water Financing

The objective of this study was to determine whether cost recovery influences implementing operational framework for financing of water investments in Nairobi Peri-urban markets in Kenya. A number of researches on financing water investments have been done internationally and locally. Ashton (2000a) analysed potential improvement in efficiency in the former public agencies that were privatized in UK in 1990s. Saal and Parker (2000),

OECD (2004), Bel and Costas (2006), Dijkgraaf and Gradus (2006a, 2006b), Mann and Mikesell (2006), and Teeple and Glyer'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. Rajeet 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. Mukuluet 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.

Research Gap

From survey of relevant literature, it was found that there are no studies specific to Kenya peri-urban areas on moderating effect of government regulations on the relationship between cost recovery and financing of water investments in Nairobi peri-urban markets in Kenya. This study was therefore conducted in order to fill these pertinent gap in literature by studying the variables that influence cost recovery among water utilities in Kenyan peri-urban markets. Therefore the study hypothesized that:

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

The study also hypothesized that:

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

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 (Burki and Perry, 2008). 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 (Steven et al., 2007). A number of indicators are used to measure financing of water investments. This indicators includes increased coverage, improved water quality, increased access and cash surplus (Steven et al., 2007).

RESEARCH METHODOLOGY

Research Design

This study was guided by cross-sectional survey. This design helps with hypothesis formulation and testing the analysis of the relationship between variables (Kothari, 2004). The target population for this study was 12,000 water service providers in Kenya including public utilities, private and small scale service providers (RoK, 2010). The accessible population for this study was 1500 registered small scale water service providers in Nairobi. A two stage sampling technique was used; purposive sampling and simple random sampling technique in the first and second stage respectively. 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 and 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).

Study Population

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 respondents was selected. Simple random sampling technique was used to identify 50 small scale water providers from each constituency for inclusion in the study.

Data Collection Procedure

Creswell (2003) and Cooper and Schilder (2011) agree that the respondents used in pilot test should constitute 10percent of the sample used in data collection. 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. Cronbach's Alpha statistic ranged from 0.727 to 0.864 indicating high reliability of data. Mertens (2010) avers that the closer the coefficient is to 1.0, the more reliable the measurements. This study adopted content validity. Opinion of three experts was sought to review data collecting instruments before proceeding to the field for final data collection in locations in which the pilot survey took place. Validity test results yielded an average index score of 85 percent. This implies that the instruments were valid.

Eigen values criterion was used to determine the selection of factor loadings for each component. The larger the eigen value loading, the more important the associated principal component (Graham & Midgley, 2000). In this case, the varimax with Kaiser Normalization sampling adequacy with eigen value greater than 1 were used as the rotation method because the items were uncorrelated. Montgomery, Peck and Vining (2001) recommend that a

minimum factor loading of 0.40 should be used when factor analysis is used to refine construct validity. All items had factor loadings ranging from 0.763 to 0.906.

Data Analysis

Statistical Package for the Social Sciences (SPSS) version 21.0 for Windows 7 and Windows 8 was used for data entry, data cleaning and running the Exploratory Factor Analysis (EFA). Other software applications used were Ms-Excel for Windows 8 for case cleaning, variable screening and as a transit package in that the data from SPSS was saved in Ms-Excel for it to be exported to SPSS. Analysis of Moment Structures (AMOS) version 18, which is essentially analysis of mean and co-variance structures, for Initial EFA, Confirmatory Factor Analysis (CFA), Path Analysis and Structural Equation Modeling (SEM); Smarts' version 2.0 for Path Analysis, SEM with moderation and model diagnostics; STATA version 12.0 for normality testing; R-GUI version 2.10.0 for building plots, for instance box-plots using the Ggplot2 package, and for univariate and multivariate testing of outliers in the dependent variable.

Before processing the responses, every filled questionnaire was tallied for every response per question. The responses were first edited, coded, and cleaned for analysis (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. To ensure that there was no violation of the assumptions, this study tested for outliers, normality, linearity, homoscedasticity, multicollinearity, independence of residuals correlation and common method variance. The results of the tests conformed to the respective thresholds for each test.

Data analysis was further conducted using two phase process consisting of confirmatory measurement model and structural model (Bryne, 2006). The first step 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, communalities and principle component analysis (PCA) was conducted. To assess the factorability of items, Kaiser Meyer-Olin and Barlett's Test of Sphericity tests were conducted (Pallant, 2010). CFA was used to show the extent to which the observed variables (indicators) represented the underlying latent construct (Hair et al. 2010, Hooper et al., 2008). To validate the model fit, convergent validity, discriminant validity, construct reliability, and construct validity were conducted. The most basic test, chi-square goodness of fit test, absolute fit indices and incremental fit indices were used (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 modelling was used to test the hypothesized relationship and to fit the structural model. Regression weights were used to test the contribution of each indicator to their relevant constructs (convergent validity) and also to explain the nature of the relationship since all the variables

were in the same measurement scale. Path coefficients were used to determine the direction and strength of the factor. R² was used to show the proportion of variation in dependent variable explained by the SEM models. 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 (i.e. $p < 0.05$). This made the null hypothesis to be accepted or rejected.

RESEARCH RESULTS

The objective of the study was to determine whether cost recovery influences implementing operational framework for financing of water investments in peri-urban areas in Kenya. The study focused particularly on the following aspects of cost recovery; pricing of water, externalities, user charges and consumer demand for water.

Measurement of Effect Price Charged to Water Consumers on Cost Recovery

The study sought to establish whether price charged to water consumers is too low to generate sufficient revenue for full cost recovery of water investments. The study findings indicated that majority (42%) of the respondents agreed with the statement that price charged to water consumers is too low to generate sufficient revenue to finance water investments. 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%. This implies that price charged to water consumers is too low to generate sufficient revenue for full cost recovery. These findings 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 and Alluche, 2002).

Measurement of Effect of Externalities on Cost Recovery

The respondents were asked to respond to the statement that external conditions like tax, interest rate and government policy has greatly affected cost recovery and financing of water investments. The study findings indicated that majority (50%) agreed with the statement while few (23%) strongly agreed with the statement. Therefore (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. This implies external conditions like tax, interest rate and government policy has greatly affected cost recovery and financing of water investments. These findings are in line with those of Finger and Allouche (2002) who maintain that factors affecting investment of water services include: geographical and

hydrological features-climate, water resources (surface or ground), economic conditions and social development, the size of settlement to be serviced, the quality of raw water, gradient from the source, the status of existing infrastructure and services. This implies that financing of water investments in peri-urban areas is greatly affected by external conditions like tax, interest rate and government policy. This acts as impediments to financing of water investments (Clough et al., 2004).

Measurement of Effect of User Charges on Cost Recovery

The results of user charges indicated 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. This implies 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. These results collaborate 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).

Measurement of Effect of Consumer's Demand for Water on Cost Recovery

The findings of consumer's demand for water shows 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 financing water investments 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. This implies that level of consumer's demand for water is high enough to sustain the high cost of financing water investments in peri-urban areas. 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 markets 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 markets citing low returns (Argre, 2006).

Convergent Validity of Cost Recovery

Regression weights were used to test the contribution of each cost recovery indicators to the construct variable (cost recovery) and also to explain the nature of the relationship since all the variables were in the same measurement scale. Table 1 show that all the regression weights were higher than the conventional level. The t-calc values (Critical Ratio; C.R) for all the cost recovery indicators were higher than 1.96 (Critical Ratio > -1.96 or 1.96 at 0.05 significance level (p<0.05). This implies that all indicators were significantly related to cost recovery and the results verified the convergent validity of cost recovery construct. The results show that there was a significant positive relationship between cost recovery indicators and the construct variable (cost recovery).Relationship between cost recovery was also positive and significant (C.R=4.638, p=0.000).

Table1: Regression Weight and CR Values for Cost Recovery

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

Relationship between Cost Recovery and Financing of Water Investments

The objective of the study was to determine whether cost recovery influences financing of water investments in 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 model 1 is as shown in figure 2.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 water investments is predicted to increase by 0.52 units.R2 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 R2 mean of .27. The value of R2 of .27 indicates that 27% of the variations in financing of water investments in peri-urban markets in Kenya can be accounted for by cost recovery scores.

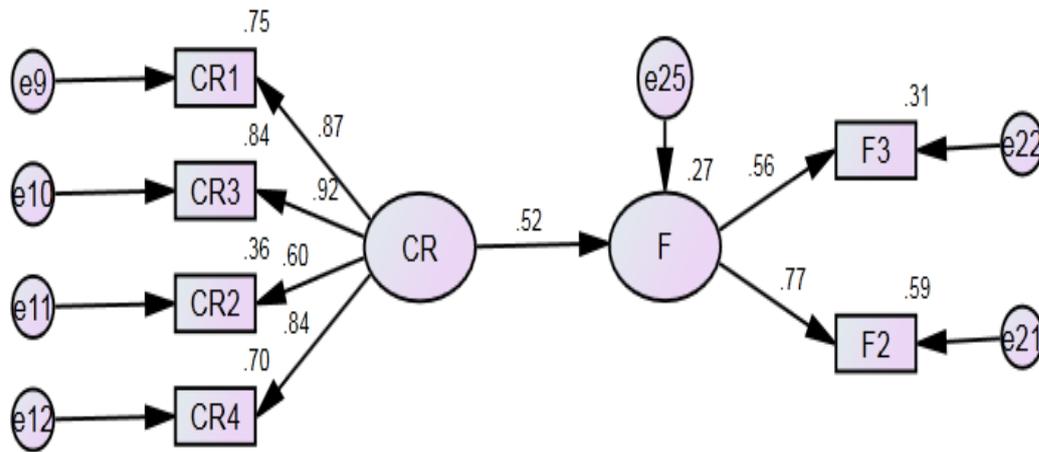


Figure 2: Structural Equation Modeling (SEM) for Cost Recovery

T-statistics provided information on the significance to the relationship. T-statistics value (C.R) was used to test whether the relationship between cost recovery and financing of water investment was significant. Figure 3 shows a t-calc of 4.638. These results show that there was a significant positive relationship between cost recovery and financing of water investment. C.R of 4.638 is greater than the conventional critical value of 1.96 at 0.05 significance level ($p < 0.05$).

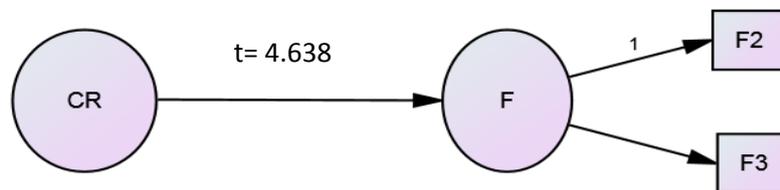


Figure 3: T- Statistics for Cost Recovery

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 markets. Therefore null hypothesis that there is no significant relationship between cost recovery and financing of water investments in peri-urban markets was rejected at 95% significance level. The study therefore fails to reject alternative hypothesis that cost recovery influences financing of water investments in peri-urban markets. Low cost recovery has therefore played a significant role in inhibiting financing of water investments in peri-urban areas in Kenya.

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

Moderation occur when variable M alters the relationship between the variables X and Y, by enhancing or weakening the hypothesized relationship (Sauer & Dick, 2003). In order to determine the function of the moderator, difference in R² as recommended by Carte and Russell (2003) was used. Model 2 shows the results after interaction term (cost

recovery*government regulation) was introduced in the equation. Path coefficients were used to determine the direction and strength of the factor.

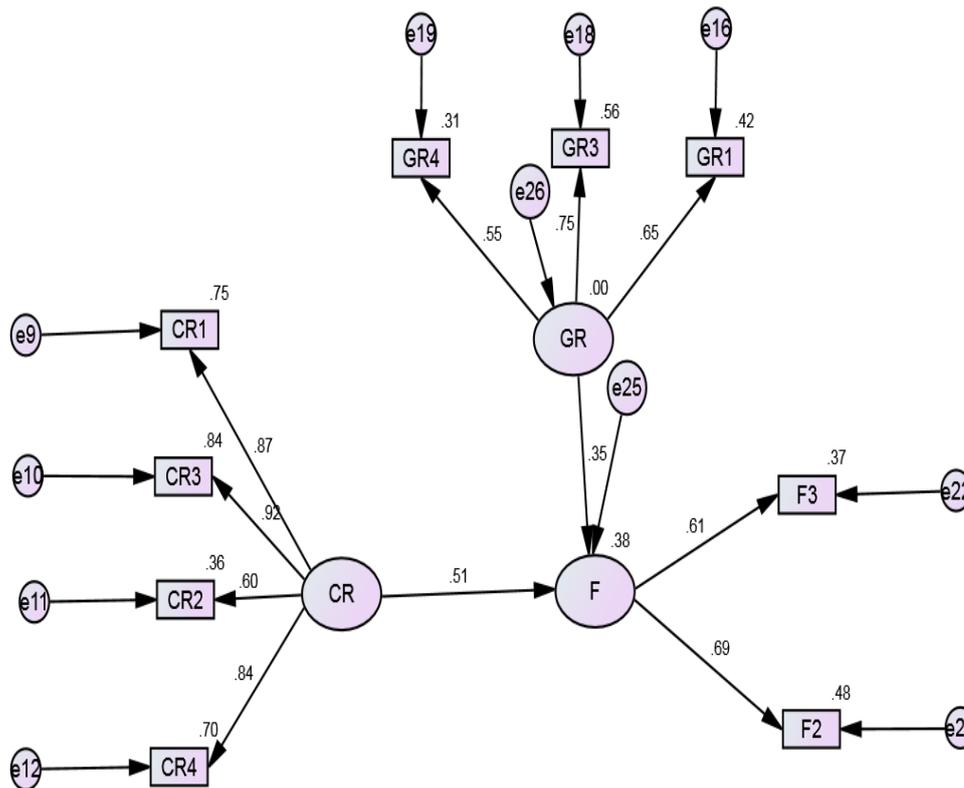


Figure 4: Moderated Structural Equation Modeling (SEM) for Cost Recovery

Figure 4 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. R² was used to show the proportion of variation in dependent variable explained by the SEM model. The results show a coefficient R² mean of .38 which is higher than that of cost recovery of .27. An R² 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 R² change of 11. An R² change of 11 indicates that moderating effect explains 11% 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 hypothesized relationship between cost recovery and financing of water investments.

T-statistics value (C.R) was used to test whether moderating effect of government regulations on the relationship between cost recovery and financing of water investments was significant. Critical value should be greater than -1.96 or 1.96 at 0.05 significance level. Model 2 in Table 2 shows that Estimate = 0.308, C.R =4.281 p-value = .000. C.R of 4.281 and p-value of .000 indicates 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

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

Table 2: Moderated Regression Weights for Cost Recovery

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

The regression coefficients associated with government regulations shows the difference in financing between operations that are highly regulated and those that are lowly regulated. The interpretation for the regression coefficient for interaction term is that there was a .321 difference between the slopes of financing on cost recovery where operations are highly regulated and where operations are lowly regulated. The slope regressing financing on cost recovery is steeper where operations are highly regulated compared to where there is low regulations as shown in figure 5.

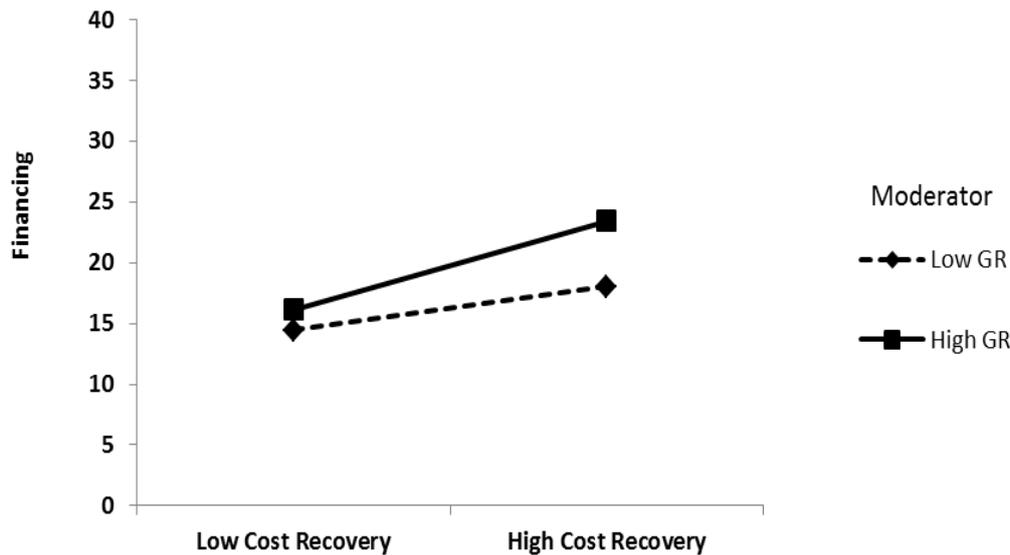


Figure 5: Slope Showing Effects of Government Regulation on Cost Recovery

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 (e.g., reducing water leakages) and economic terms (e.g., 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 regulation 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 regulation refers to defining levels of service that meets consumer needs and can be provided at a financially sustainable and affordable cost, and monitoring that such level of service. This implies 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).

DISCUSSION AND CONCLUSION

By use of descriptive statistics, inferential statistics and structural equation modelling, it was concluded that the profile of urban water investments is typically characterised by low cost recovery which makes investors dis-interested to invest in water business. Water projects tend to be un-attractive for project finance because they fall foul of the high threshold costs that they are typically entailed. They are characterised by poor cost recovery mainly due to low water pricing as the government is unwilling to increase water prices to market level.

Majority of small scale water service provider's views that the price charged to water consumers is well below the market price. Most small scale water investors are for the idea of charging water consumers the full cost of water without government subsidies in order to make water a market commodity. External conditions like tax, interest rate and government policy has greatly affected cost recovery and financing of water investments. The findings of the study further revealed that the level of consumer's income in peri-urban areas is too low to sustain the high cost of financing water investment. It was noted that cost recovery is mainly affected by low water pricing, externalities and low level of consumer's income in peri-urban. There is a positive relationship between cost recovery and financing of water investment. It was further observed that government regulations explain 11% above the variance explained by cost recovery. This is a clear indication that government regulations moderate the relationship between cost recovery and financing of water investments. Government regulations have thus played a significant role in influencing financing of water investments.

From the findings of the study it was found that better cost recovery from users is vital. However, full cost recovery is unlikely to be achieved easily or quickly. Most water utilities have not been able to recover the full cost of water investments. In order to increase financial investments in water sector, rapid improvements in cost recovery should be assured as this determines the financial health of the service providers and their access to finance for investments. The suggested remedies to cost recovery includes cross-subsidization that is, charging the wealthy members of the society more than cost and the poor less than cost for water services instead of using public funds, gradual increase of user fees, and service

improvement in the quality of water delivery service in order to be willing to increase payment for water services for full cost recovery and increased financing of water investments (Camdessus, 2003).

RECOMMENDATIONS

The study assessed the moderating effect of government regulations on challenges hindering implementing operational framework for financing of water investments in Nairobi peri-urban markets in Kenya. However, other key areas like city central business district, high income residential zones, peri-urban markets 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 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.

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