FACTORS INFLUENCING SUSTAINABILITY OF MICRO AND SMALL PIPED WATER ENTERPRISES IN PIPED NETWORKS IN PERI-URBAN AREAS OF KENYAN CITIES

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Factors Influencing Sustainability of Micro and Small Piped Water Enterprises in Piped Networks in Peri-Urban Areas of Kenyan Cities

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DECLARATION

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

Signature……Date…….

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This thesis has been submitted for examination with our approval as university supervisors.

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DEDICATION

This thesis is dedicated to my wife Dr. Jane G. Mputhia, my children Stella Mputhia Wainaina and Anthony M. Wainaina, Cathy N. Mputhia, Carol M. Mputhia, David K. Mputhia and granddaughter Talia Wainaina. Through these beloved ones I cascade this dedication to the generations to come.

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ABBREVIATIONS/ACRONYMS

AWSB	Athi Water Services Board
CA	Competitive Advantage
CWSB	Coast Water Services Board
GIS	Geographic Information System
GPS	Geographic Positioning System
KIPPRA	Kenya Institute of Public Policy Research and Analysis
KIWASCO	Kisumu Water and Sewerage Company
MDGs	Millennium Development Goals
MO	Master Operator
MOWASCO	Mombasa Water and Sewerage Company
NCWSC	Nairobi City Water and Sewerage Company
PPP	Public - Private Partnership
PWU	Public Water Utility
MSPWE	Micro and Small Piped Water Enterprise
MSWE	Micro and Small Water Enterprise
RBT	Resource based theory
SCA	Sustained Competitive Advantage
SPSS	Statistical Package for the Social Sciences
SSPWP	Small scale piped water provider
SWE	Small Water Enterprise
UN	United Nations
UTM	Universal Transverse Mercator

DEFINITION OF TERMS

Aguateros	Small Water Enterprises that invest and manage localized piped water networks in the peri-urban areas of Paraguay (Nickson, 2005).
Entrepreneurial Rent	Rents accrued from risk-taking behaviour or insights into complex and uncertain environments (Dollinger, 2008).
Fully privatized model (FPM)	An enterprise organization model in which the owners of the enterprise are fully responsible for investments in all the water supply infrastructure (Bakker, 2003).
Geographic information system (GIS)	Software that combines features of cartography and databases to overlay reference information in a locality on computer-generated maps (BusinessDictionary.com, 2010).
Geographic positioning system(GPS)	A radio navigation system that allows land, sea, and airborne users to determine their exact location. GPS is used to support a broad range of military, commercial, and consumer applications (The GIS 2 GPS Portal, 2002).

Micro and small piped water enterprises (MSPWE's)	Small scale private operators who have moved to fill the supply gap left by water utilities by operating piped water systems (Asian Development Bank, 2006).
Master operator (MO)	An enterprise to which management of networks, giving connections and extending water supply network has been delegated in a public private partnership between the enterprise and the public water utility (Kisumu Water and Sewerage Company).
Peri-urban area	Include open spaces, that are easy to access from formally built-up urban areas as an extension of the city rather than as an entirely separate area and rural-urban interfaces characterized by strong urban influences (Norström, 2007).
Public – private partnership (PPP)	The combination of a public need with private capability and resources to create a market opportunity through which the public need is met and a profit is made (United Nations Economic and Social Council, 2005).
Quantitizing qualitative data	Converting qualitative data into numerical codes so that it can be analyzed statistically (Saunders *et al*., 2007).

Resource Based Theory	A theory of the firm that provides a rigorous model for analysing the competitive advantage (CA) or sustained competitive advantage (SCA) of a firm, combining internal analysis with external analysis (Jaquier, 2010).
Sustainability	An enterprise is sustainable when the entrepreneur possesses and controls resources that have four attributes:- rare, valuable, imperfectly imitable and non-substitutable that are used to develop competitive or sustained competitive advantage under favourable industry conditions and collects entrepreneurial rents (Dollinger, 2008).
Universal transverse Mercator (UTM)	A map projection system for global mapping dividing the world into 60 zones each of 6 degrees longitude wide, extending from 80 degrees latitude south to 84 degrees latitude North (University of Wisconsin, 2009).

ABSTRACT

The purpose of this study was to investigate the factors that influence sustainability of micro and small piped water enterprises (MSPWE's) in piped networks in peri-urban areas of Kenya's cities. Previous studies had shown that small water enterprises (SWEs) had been created to fill water service delivery gaps in the public water utility networks but none had been undertaken to enable generalization on the factors that influence their sustainability. This study, therefore, aimed at filling the knowledge gap by examining MSPWE's operating in the peri-urban areas of the Kenyan cities- Nairobi, Mombasa and Kisumu. The theoretical framework applied in the study was the resource based theory (RBT). The findings will promote better understanding of prerequisites for the sustainability of MSPWE's operating in peri-urban areas by key actors which in turn could spur interventions to enhance the sustainability of the MSPWE's thereby enabling them enhance their capability to deliver piped water to peri-urban areas.

The study adopted mixed model research design. The target population was 2,742 MSPWE's in piped water networks in peri-urban areas of Kenya's cities occurring in three organizational strata comprising fully privatized models (FPM's) and enterprises operating under public private partnerships (PPP's) as bulk sale PPP's (referred to as Master Operators) or retail PPP's. The sample size comprised 503 MSPWE's selected by stratified random sampling. Data was collected by administering questionnaires to the MSPWE's entrepreneurs and supplemented by interviews of top management in eight key institutions on water services delivery in Kenyan cities and direct observations. Data was subjected to qualitative and

quantitative analysis. A key predictor of sustainability, entrepreneurial pricing strategies, was studied by testing of hypotheses on price competitiveness within MSPWE's categories and with the public water utilities in the same city by chi-squared (χ^2) test and across MSPWE categories within and across cities by analysis of variance (ANOVA).

The study found that the factors postulated to influence sustainability, that is, market drivers for entrepreneurial response, entrepreneurial customer responsiveness, entrepreneurial pricing strategies, regulatory and business organization frameworks as well as interventions for acquisition and improvement of entrepreneurship skills enabled the majority of MSPWE's to acquire and control water and associated infrastructure as a resource that was valuable, rare, imperfectly imitable and non-substitutable and created favourable industry conditions. These factors led to the attainment of the conditions needed to acquire competitive advantage according to the resource based theory. It was therefore concluded that market drivers for entrepreneurial response, entrepreneurial customer responsiveness, entrepreneurial pricing strategies, regulatory and business organization frameworks and interventions for acquisition and improvement of entrepreneurial skills influence the sustainability of MSPWE's. The recommendations made include implementation of interventions to assist growth of MSPWE's by joining forces to become larger service providers, streamlining regulation to ensure market driven MSPWE's while catering for consumer safety, design and implementation of tailor-made interventions for acquisition and improvement of entrepreneurial skills by MSPWE'S and up-scaling them through public private partnerships (PPP's) in water services delivery.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Micro and small water enterprises (MSWEs) are independent small-scale private water providers that supply water to users on demand. They are independent to the extent that they are self-employed entrepreneurs. The small independent operator enters a market freely and takes risks. The rise of these water enterprises in many cities of the developing world reflects the inability of water utilities to adequately provide for the water needs of city dwellers (Asian Development Bank, 2006).

Previous studies (KIPPRA, 2000; Njiru & Albu, 2002) have established that micro and small water enterprises in Kenyan cities and elsewhere in many cities of the developing world have come in to fill service gaps left by public water utilities (PWUs) in peri-urban areas. This is consistent with the expected entrepreneurial behavior of opportunity recognition and implementing action to maximize potential gains on the available opportunities. According to Bakker (2003), this is not unexpected as history has shown that wherever there have been gaps in water service delivery and there have been willing and capable customers to be served, entrepreneurial ventures have sprung up and as a result there has been a diversity of water supply management systems worldwide.

The socio-economic and geo-demographic dynamics of peri-urban areas, precipitated by rural-urban migration, present entrepreneurship opportunities in

provision of piped water supply. Rural to urban migration is a world-wide trend, affecting the lives and livelihoods of increasing numbers of people, with a transition representing the actual meeting of urban and rural activities, conceptualized as the peri-urban interface. In the developing countries, the most substantial proportion of this population settles in the peri-urban interface. The peri-urban interface is where urban-driven economic and social change is most intense, where new industries and housing are established, where migrants from both the city centre and rural areas settle, and where the usual urban infrastructure services are generally non-existent and natural resources are under intense pressure from competing demands. As cities expand, the peri-urban interface also moves outward with housing density and socio-economic activities assuming a strong urban trend (Mattingly & Gregory, 2006). Furthermore open spaces within city boundaries that are easy to access from the built-up urban areas also experience similar geo-demographic and socioeconomic dynamics, resulting in what are commonly referred to as informal settlements, which may also be categorized as peri-urban areas (Norström, 2007)

In general, the peri-urban interface is characterized by strong urban influences and unanticipated fast population growth resulting in, amongst other things, rapid increase in water demand and other services which are not catered for by the city utilities (Norström, 2007). As people enter the peri-urban interface, their livelihood activities change from predominantly rural to substantially urban and opportunities arise to help manage this transition and successfully exploit new opportunities (Mattingly & Gregory, 2006).

1.1.1 Micro and small water enterprises in peri-urban water markets

Overcoming the service problems in peri-urban areas as articulated above must take into account the wide range of variety found in peri-urban areas, not only in geo-demographic variation but also in the type and organization of service providers. Bakker (2003) argues that solving water supply problems in the peri-urban areas of cities in the Global South, the private sector, comprising mainly small scale private mobile water vendors – delivering water to households by jerrycan or tanker – have long been the means by which substantial proportions of the residents of peri-urban areas obtain water. Within urban areas, both corporate and non-corporate organizations are involved in the provision of water supply. Simultaneously, small-scale water supply businesses operate – particularly in peri-urban areas. In contrast the form of private sector participation in the developed Global North, for instance in France and Britain, comprises large private companies that manage municipal and city water supply infrastructure via long-term engagements in form of management contracts, concessions and leases.

McGranahan, *et al.* (2006) articulate that the failure of utilities, either under public sector or large scale private sector management to provide reliable water services in peri-urban areas, presents entrepreneurial possibilities for the appropriate private sector in form of small scale service providers. The MSWEs activity in filling gaps in water services delivery by the water utilities have not been limited to mobile water vendors alone. Inquiries from the public water utilities serving the three Kenyan cities confirm MSWE activity in piped water supply and show that water service delivery gaps left by lack of network coverage and unreliable service levels by water

utilities have created opportunities in some peri-urban areas of Kenyan cities. For example in peri-urban areas such as Nyalenda in Kisumu, Mukuru in Nairobi and Ongata Rongai on the outskirts of Nairobi city and in several areas of Mombasa, MSWEs are involved in delivery of piped water to consumers.

The MSPWE's have also been active in many other cities of the developing world, for instance in Paraguay where small water enterprises, the *Aguateros*, invest and operate small localized water supply networks that serve substantial populations in peri-urban areas where the water utility has been constrained to operate (World Water Council, 2005). The Water Utility serving Can Tho City in Vietnam, has adopted a partnership with local entrepreneurs who provide land and run small localized piped networks to provide potable water in the rapidly urbanizing Mekong Delta, as a result of the expansion of Can Tho City (Spencer, 2007) and the inability of the centralized water utility to reach these areas. There is a similar kind of local system in neighbouring Cambodia's largest city, Phnom Penh (Spencer, 2007).

1.1.2 Sustainability of micro and small water enterprises in peri-urban areas

The involvement of for profit players in the provision of water services has always elicited widespread controversy, with some seeing water as a social good and others seeing it as an economic good. Opponents of the for profit orientation to water services provision argue that governments should not abdicate their social responsibility and secede water provision to the whims of private sector over-profiteers, seeing water as a basic need such that some cultures or religious persuasions may not welcome the sale of water (Ecumenical Council, 2002). Such

perceptive orientations would seem to work against private sector enterprising in the provision of water services.

Proponents of water as an economic good use the reality on the ground to argue that the public sector alone has not generally been able to meet the water services demands, more particularly so in areas of rapid population increases such as the peri-urban areas and informal settlements of cities in the developing World (World Bank, 2005). Nowadays water does not qualify as a public good because it is no longer abundant but scarce, especially in urban areas, where delivering water of good quality to the consumer involves substantial investments in infrastructure. The concept of water as a public good, therefore, is not tenable (K'Akumu, 2006). This argument supports market driven provision of water.

The reality in many cities of Sub-Saharan Africa, including Kenya, is that despite the significant role played by SWEs in providing water services, they face numerous constraints, and are usually not recognized by utilities and policy makers. SWEs often operate within a hostile environment, and this undermines their potential to make a more significant contribution to provision of good quality affordable water services to their customers (Albu & Njiru, 2002). Against this global, regional and national background and with Kenya's National Water Policy upholding water as an 'economic' and adding a 'social' good dimension (Republic of Kenya, 1999), the question arises whether the sustainability of the Micro and Small Piped Water Enterprises operating in piped water networks of peri-urban areas of Kenyan cities can be assured or not.

According to the resource based theory, an enterprise is expected to have acquired competitive or sustained competitive advantage, that is sustainability, when the entrepreneur possesses and controls resources that are valuable, rare, imperfectly imitable (that is, difficult to imitate) and non-substitutable under favourable industry conditions (Dollinger, 2008). On the basis of the resource based theory, therefore, the equivalent of this question is "Does the MSPWE entrepreneur possess and control resources with the four qualities and are the industry conditions favourable or not?" Although previous studies have established that MSWEs in Kenya have come in to fill service gaps left by public utilities (McGranahan, Njiru *et al.*, 2006*)*, no study undertaken so far has provided adequate information to enable generalization on factors influencing the sustainability of MSPWE's in piped water networks in Kenya's peri-urban areas.

1.2 Statement of the Problem

Previous studies show that water utilities in many cities of the developing world have various inadequacies in provision of piped water in peri-urban areas. As a result of this, small water enterprises (SWEs) have sprung up to fill the service delivery gaps in these areas (Njiru & Albu, 2002; Asian Development Bank, 2006; MCGranahan, 2006). A similar situation existed in the peri-urban areas of Kenyan cities (KIPPRA, 2000; Njiru & Albu, 2002). Inquiries with the public water utilities serving the three cities indicated that micro and small piped water enterprises (MSPWE's) were operating businesses either as fully private enterprises or in public private partnerships with the public water utilities. The MSPWE's had emerged as the entrepreneurial vehicles for meeting unfulfilled demands for piped water consistent

with observations by Mattingly and Gregory (2006) that the socio-economic and geo-demographic dynamics of peri-urban areas present opportunities that could be successfully exploited.

As would be expected markets are also influenced by policy and legislative environment (Republic of Kenya, 2005). The water markets in the peri-urban areas in which the MSPWE's operate are predisposed to a policy, legislative and regulatory environment precipitated by the National Water Policy (1999) and the Water Act 2002 which uphold water as an 'economic good' but also add a 'social good' dimension to protect the poor, making it potentially possible to regulate water prices. The question arising is whether or not the MSPWE's could be sustainable under such industry conditions. The market and regulatory scenario facing the MSPWE's implies that there are market drivers for entrepreneurial response. Furthermore it may be expected that policy and legislative environment influence the regulatory and business organization frameworks.

Previous studies (Asian Development Bank, 2006; Nickson, 2005; Spencer 2007) had also shown that SWEs were more customer responsive in comparison to the water utilities in peri-urban areas. Considering that no enterprise can survive for long if it largely fails to attain price competitiveness and meet customer expectations (Desai, 2009; Saleemi, 2009), it would be expected that entrepreneurial customer responsiveness and entrepreneurial pricing strategies influence the sustainability of the MSPWE's. In addition tailor made interventions could be expected to influence sustainability of the MSPWE's in the sense that they could build and enhance the acquisition and improvement of entrepreneurial skills by the MSPWE entrepreneurs

(Namusonge, 1999; Desai, 2009; Drucker, 2007, Rosa & Scott, 1996) as specialized water service providers, in responding to their customers.

From the above discussion it may be postulated that the factors influencing sustainability of MSPWE's include market drivers for entrepreneurial response, entrepreneurial customer responsiveness, entrepreneurial pricing strategies, regulatory frameworks and business organization forms as well as interventions for acquisition and improvement of entrepreneurial skills. There was, however, lack of adequate empirical information to enable generalization on the factors influencing sustainability of the MSPWE's as no adequately representative study had been undertaken on MSPWE's in peri-urban areas of Kenya cities.

A case study on the creation and sustainability of small piped water enterprises in Ongata Rongai town, a satellite town on the peri-urban fringe of Nairobi city, (Mwarania, 2007), highlighted its limitation that being a case study the findings could not be generalized to other towns. The study location was purposively selected, covering only the fully private enterprises prevalent in the town, totally excluding MSPWE's operating under public private partnerships and fully private enterprises in other peri-urban areas of Kenyan cities. The sample picked was therefore not representative of the MSPWE population in peri-urban areas of Kenyan cities. Furthermore it did not give each and every MSPWE (subject of analysis) in the peri-urban areas of Kenyan cities an equal known and non-zero chance of being selected and as such was not a probability sample and was therefore inadequate for making statistical inferences about the population under study (Namusonge, 2010).

Hence there was a gap in knowledge on the factors influencing sustainability of MSPWE's in peri-urban areas of Kenyan Cities. This study aimed to fill this gap in knowledge by examining MSPWE's operating in the peri-urban areas of the three Kenyan cities, Nairobi, Mombasa and Kisumu.

1.3 Objectives

The overall objective of the study was to investigate the factors influencing sustainability of micro and small piped water enterprises (MSPWE's) in piped networks in peri-urban areas of Kenyan cities. The specific objectives of the study were:

1. To investigate the market drivers for entrepreneurial response and their influence on the sustainability of micro and small piped water enterprises in the peri- urban areas of Kenyan cities.
2. To determine the entrepreneurial customer responsiveness to specific customer demands for piped water by the micro and small piped water enterprise in peri-urban areas of Kenyan cities and its influence on the sustainability of these enterprises.
3. To establish the entrepreneurial pricing strategies by the micro and small piped water enterprise in peri-urban areas of Kenyan cities and their influence on the sustainability of the MSPWE's.
4. To determine the regulatory and business organizational frameworks under which the micro and small piped water enterprises in peri-urban areas of Kenyan cities operate and their effect on the sustainability of the MSPWE's.

5. To establish the types of interventions for acquisition and improvement of entrepreneurial skills and their influence on the sustainability of the micro and small piped water enterprise in peri-urban areas of Kenyan cities.
6. To recommend policy, regulatory measures and interventions for acquisition and improvement of entrepreneurial skills to enhance the sustainability of the micro and small piped water enterprises serving peri-urban areas of Kenyan cities.

1.4 Research Questions and Hypotheses

1.4.1 Research questions

1. What were the market drivers for entrepreneurial response and what was their influence on the sustainability of micro and small piped water enterprises in the peri- urban areas of Kenyan cities?
2. What was the entrepreneurial customer responsiveness to specific customer demands for piped water by the micro and small piped water enterprise in peri-urban areas of Kenyan cities and what was its influence on the sustainability of these enterprises?
3. What were the entrepreneurial pricing strategies by the micro and small piped water enterprises in the peri- urban areas of Kenyan cities and how did they influence the sustainability of the MSPWE's?
4. What were the regulatory and business organizational frameworks under which the micro and small piped water enterprises in peri-urban areas of

Kenyan cities operate and what was their effect on the sustainability of the MSPWE's?

5. What were the types of interventions for acquisition and improvement of entrepreneurial skills by the micro and small piped water enterprise in peri-urban areas of Kenyan cities and what was their influence on the sustainability of these enterprises?
6. What policy, regulatory measures and interventions for acquisition and improvement of entrepreneurial skills could be made to enhance the sustainability of the micro and small piped water enterprises serving peri-urban areas of Kenyan cities?

1.4.2 Hypotheses

Hypotheses were formulated and tested to provide statistical verification of the entrepreneurial pricing strategies. This was done by establishing the price competitiveness between (1)MSPWE's in each organization model with the public water utility in each city; (2) amongst MSPWE's in each organizational model in each city and (3) between MSPWE's across organizational models within each city and across cities. The following hypotheses were tested:-

a) Hypotheses on price competitiveness between MSPWE's and the public utility

The competitiveness of the price, P, between each MSPWE organizational model in a particular city with the public utility price, Ppu, was tested using the following hypotheses:-

Null Hypothesis, H_o : The Water price, P<= Ppu;

Alternate Hypothesis, H_1 : The Water price, P> Ppu

The hypotheses were tested using Chi-squared (χ^2) as the test statistic at 5% level of significance.

b) Hypotheses on price competitiveness within MSPWE's in the same organizational model in the same city

If there was price competitiveness between MSPWE's in the same organizational model in a particular city it would be expected that there was no significant variation of the prices P from the mean price $P_{E.}$ The price competitiveness was tested using the following Null and Alternate hypotheses:-

Null Hypothesis, H_o: The Water price, P<= P_E

Alternate Hypothesis, H_1: The Water price, P > P_E

The hypotheses were tested using Chi-squared (χ^2) as the test statistic at 5% level of significance.

c) Price competitiveness across the MSPWE's in the three cities

If there was no significant difference in the price charged by MSPWE's in the different organizational models in the three cities then the mean prices charged, $\mu_{1,}$ $\mu_{2,}$ $\mu_{3, \ldots}\mu_{n,}$ for the different models of MSPWE's within and across the three cities should not be significantly different from each other. The difference in the prices was tested by analysis of variance (ANOVA) on the prices across the different models of MSPWE's using the following Null hypothesis, H_o, and the Alternate hypothesis, $H_{1:}$

Null hypothesis $H_{0:}$ $\mu_1 = \mu_2 = \mu_{3=\ldots} = \mu_n$, that is, there was no difference between the prices charged by different categories of MSPWE's

Alternate hypothesis $H_{1:}$ $\mu_1 \neq \mu_2 \neq \mu_3 \neq \ldots \neq \mu_{n,}$ that is, there was a difference between

the prices charged by different categories of MSPWE's.

1.5 Justification of the Study

1. The study established the factors that influence sustainability of MSPWE's in peri-urban areas. This would be useful in enabling better understanding of prerequisites for the MSPWE survival and sustainability.
2. The better understanding arising from the study findings could in turn spur recognition and interventions directed to enhancing the sustainability and growth of the MSPWE's thereby turning them into reliable partners in sustainable delivery of piped water services in peri-urban areas.
3. The Study provided information that enabled comparison of prices within and across different MSPWE's models on one hand and with public utilities on the other hand and thus determined price competitiveness between the MSPWE's and their prices relative to the prices expected by public water utilities.
4. The Study provided evidence on the existence of Kenyan enterprises that represent the potential and capability of the private sector as a reliable market driven partner in the sustainable delivery of water services.

1.6 Scope of the Study

The study covered all categories of MSPWE's in peri-urban areas of the three Kenyan Cities, Nairobi, Mombasa and Kisumu. This scope was adopted in order to representatively cover the expected heterogeneity arising from the varied MSPWE's business organizational forms (FPM's and PPP's) and differences in socio-economic

and socio-political settings across the cities.

1.7 Limitation of the Study

Although the study findings could be generalized to peri- urban areas of Kenyan cities in which there were several MSPWE's operating within close proximity such that consumers have the flexibility of choosing their service provider within a convenient short radius, this could not be done for areas which did not experience multiple MSPWE's activity in close proximity.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

The literature review mapped and assessed the existing intellectual territory in the area of study and linked the proposed study to the existing body of knowledge. First a critical review of the theoretical frameworks in entrepreneurship is presented. This is followed by identification and presentation of the pertinent independent variables expected to influence sustainability of MSPWE's in peri-urban areas and their relationship with the dependent variable, sustainability, illustrated by a conceptual framework. The literature review, presented thereafter, has specific focus on the respective variables that were expected to influence the sustainability of the MSPWE's, identified gaps that could be filled by the proposed study, as well as the dependent variable- sustainability.

2.2 Theoretical Framework

2.2.1 Introduction

In pursuit of the appropriate theoretical framework to adopt in this study, a critical review of the theories on entrepreneurship was undertaken. First the perspectives and key tenets of the classical theories, widely covered by many authors on entrepreneurship, are presented based on Desai (2009); Saleemi(2009) and Dollinger (2008). This is followed by a critical review of the evolutionary theory development on entrepreneurship and lays the ground upon which the choice of the theoretical

framework used in this study is based. A critical review of the chosen theoretical framework used in the study is then presented and then linked to the conceptual framework that shows the postulated independent variables and the expected relationship with the dependent variable, sustainability.

2.2.2 Classical theories of entrepreneurship

a) Economic theory

In economic theory, entrepreneurship and economic growth take place when the economic conditions are favourable. The firm is seen as an input combiner and organizer. largely dependent upon the economic policy, programmes and economic environment of that country. The theory assumes that inputs are homogenous and can be purchased by all at a given price.

This theory has been criticized by observing that although economists have posed many theoretical interpretations of entrepreneurship, there has been very little empirical research conducted on this phenomenon (Burnett, 2000). According to Montaye (2006), the theory fails to explain entrepreneurship empirically because of the extreme simplifying assumptions in neoclassical economics, in particular perfect competition and static market equilibrium, which assume, in turn, free and perfect information about markets, production processes, and so forth. These assumptions, which reduce the economic process to clocklike mechanics, overlook the need for specialized individuals (entrepreneurs) to perform the discovery, coordination, promotion, and risk-bearing functions that neoclassical economics takes for granted.

Burnett (2000) observes that since few economists can even agree about how to define entrepreneurship, developing the tools to measure it has been especially problematic. Thus, observes Burnett, entrepreneurship arises to make up for a market deficiency but the majority of mainstream economic models assume perfect information and clearly defined production functions. Thus, entrepreneurs typically fall outside of these models.

Dollinger (2008) argues that economic theory assumes that the firm is an input combiner and organizer seen to lean on homogenous inputs that can be purchased by all firms at a given price but this is not the reality. In agreement with Dollinger (2008), Drucker (2007) avers that entrepreneurship is about systematic innovation and strategy that result in resources that are not commonly available in the market and in most cases are only unique to a particular firm. Even imitation, according to Drucker (2007), results in different resources that gives the entrepreneurial firm a competitive advantage.

b) Sociological theory

The sociological theory avers that entrepreneurship is likely to get a boost in a particular social culture. Social sanctions, cultural values, and role expectations are responsible for the emergence of entrepreneurship. Society's values are the most important determinant of the attitudes and role expectations. Individuals are culturally influenced in the perception of opportunity and in turn react differently to that which may or may not, according to prevailing cultural values, be considered to be an opportunity for entrepreneurship behavior.

The main criticism of the sociological theory is that it lays emphasis on the individuals social background and little emphasis on the individuals drive. Desai (2009) observes that based on this theory an entrepreneurship model which may be successful in one culture may not be expected to succeed in another and thus hampering theory development.

Drucker (2007) argues that the foundation of entrepreneurship lies in concept and theory implying that it can be taught to people of different backgrounds and thus break the barriers imposed by culture. Burnett (2000) argues that the supply of entrepreneurship is dependent on both individual level factors and general economic factors and not sociological background or traits as standalone factors. He further argues that not just anyone can be an entrepreneur but, agreeing with Drucker (2007) and McClelland avers that the skills of an entrepreneur can be taught. Thus, policymakers can affect the level of entrepreneurship in their countries by crafting policies that reform the market in order to encourage entrepreneurship both economically and educationally.

c) Psychological/Trait theory

According to the psychological/trait theory, entrepreneurship gets a boost when society has sufficient supply of individuals with necessary psychological characteristics. The psychological characteristics include need for high achievement, a vision or foresight and ability to face opposition. These characteristics are formed during the individual's upbringing which stress on standards of excellence, self reliance and low father dominance but could also be imparted through training.

Dollinger (2008) views the main shortcoming of the trait theory as looking for similarity amongst the entrepreneurs. He argues that if all entrepreneurs had certain similar characteristics or traits, it is not an advantage to any of them. Hence other factors must account for the entrepreneurial behaviour and there must be differentiation in them if competitive advantage is to be acquired. Hence the pursuit should be one of the theory of differences, not commonalities.

Kruger (2004) observes that theories which place weight on personality are difficult to test. No single characteristic or set of characteristics studied so far seem to uniquely and conclusively explain entrepreneurial characteristics. Therefore it seems more appropriate to accept a continuum along which several types of entrepreneurs exist.

Drucker (2007), disputes that personality trait significantly accounts for the supply of entrepreneurship and avers that the foundation of entrepreneurship lies in concept and theory rather than in intuition and as a practice which has a knowledge base it can be taught. Hence entrepreneurial behaviour, rather than personality trait, is more important to enhance entrepreneurship.

d) Schumpeterian innovation theory

Desai (2009) observes that a dynamic theory of entrepreneurship was first advocated by Joseph Schumpeter in 1949. According to Schumpeter, entrepreneurship is the catalyst that disrupts the stationary circular flow of the economy and thereby initiates and sustains the process of development. Innovation occurs when the entrepreneur introduces a new product into the market, introduces a new production method,

opens up a new market, finds out a new source of raw material supply or introduces new organisation in any industry. Innovation is seen as the source of the entrepreneurial rewards with profit as the key indicator, According to Schumpeter, innovation was substantially driven by intuition, the capacity of seeing the essential facts and discarding the unessential even though one can give no account of the principles by which this is done.

This theory has been criticized as mainly applicable to large scale businesses and seems to disregard creative imitation that adapts a product to a niche market in a better way than the original innovation as happens in many developing countries on products innovated in the developed countries, rather than innovate to meet the bulk of market deficiencies (Desai, 2009; Saleemi, 2009). Dollinger (2008), also argues that other forces, other than the entrepreneur as averred by Schumpeter, may present potential shocks to the circular flow and may result in the creative destruction of capital, making it available for redeployment.

Like Schumpeter, Drucker (2007) avers that innovation is the real hub of entrepreneurship but unlike Schumpeter his view is that it is not confined to large scale enterprises and economic institutions but may happen in large or small enterprises, in private or public organizations. Unlike Schumpeter, Drucker's view is that entrepreneurship is the practice which has a knowledge base, the foundation of which lies in concept and theory rather than in intuition.

The neo-Austrian school challenged this theory by arguing that dis-equilibrium, rather than equilibrium, was the likely scenario for entrepreneurship. A typical

entrepreneur, according to various economists of the Austrian school, is the arbitrageur, the person who discovers opportunity at low prices and sells the same items at high prices because of inter-temporal and inter-spatial demands, emphasizing that the entrepreneur is constantly alert to profitable exchange (arbitrage) opportunities and is the first to act when such opportunities appear. This emphasis complements many theories of entrepreneurship (Montaye, 2006). The Austrian school economist Ludwig von Mises argued that entrepreneurship centers on the role of uncertainty and the only source from which an entrepreneur's profits stem is his ability to anticipate better than other people the future demand of consumers. The entrepreneur is a speculator, a person eager to utilize their opinion about the future structure of the market, the market dis-equilibrium as distinct from equilibrium, for business operations promising a profit, the only instruction required is self-understood and does not need to be especially mentioned: “Seek profit".

2.2.3 Evolutionary theory development on entrepreneurship.

Alvarez (2005) avers that the of entrepreneurship continues to struggle with the development of a modern theory of entrepreneurship. Over the years different scholars have posited different characteristics that they believe lead to the supply of entrepreneurship. This struggle has, however, centered on either opportunity recognition or the individual entrepreneur or on economics where the entrepreneur was at best viewed as the fourth factor of production. However because there is a lack of clarity about the theoretical assumptions that entrepreneurship scholars use in their work, assumptions from both individual, opportunity recognition and economics have been used as if they are interchangeable. This lack of theoretical

distinction has hampered theory development in the field of entrepreneurship.

According to Dollinger (2008), a good theory is practical because it enables its user to be efficient. Efficiency for the entrepreneur means recognizing what information is helpful and knowing where it can be obtained and then use the theory to translate the raw information into usable data and process the data into categories and variables and determine how these variables are related, causal relationships and the direction of the relationships. In support of this view, Drucker (2007) avers that the foundation of entrepreneurship lies in concept and theory rather than in intuition.

Aldrich and Martinez (2001) observe that although the propensity to entrepreneurship varies from one society to another, from an individual to another , from one economic situation to another, a universal constant is that no matter how many entrepreneurs emerge, most do not succeed in creating lasting organizations and the list of potential pitfalls associated with starting a new venture appears limitless. They further argued that understanding how and why some entrepreneurs succeed remains a major challenge for the entrepreneurship research community.

In their attempt to specify a theoretical perspective for the study of entrepreneurship, Aldrich and Martinez (2001) pointed out that as intellectually stimulating as it may be to find out what motivates entrepreneurs and how they differ from ordinary mortals, the more critical question is how these individuals manage to create and sustain successful organizations, despite severe obstacles. Furthermore, they highlighted two indispensable elements of entrepreneurship theory and research. First, any theoretical model or research design should integrate the outcomes of

entrepreneurial efforts and the processes that led to those outcomes. Second, understanding entrepreneurial success requires that we consider the social context in which entrepreneurs develop their efforts.

Alvarez (2005), in implied agreement with Aldrich and Martinez (2001), argued that while explanations of entrepreneurship have adopted different theoretical assumptions, most of these concern three central features of entrepreneurial phenomena: the nature of entrepreneurial opportunities, the nature of entrepreneurs as individuals, and the nature of the decision making context within which entrepreneurs operate. Nonetheless, various theoretical traditions in the field have adopted radically different interpretations with respect to these assumptions of entrepreneurial phenomena, therefore arriving at different explanations of these phenomena.

Alvarez (2005) suggested that the nature of entrepreneurs and the nature of the decision making context within which entrepreneurs operate are two sets of assumptions upon which logically consistent theories of entrepreneurship may be constituted. Moreover, these two sets are complementary and can be applied to widely studied entrepreneurial phenomena but none of them alone can comprehensively study the two facets.

Murphy (2011) agrees with Alvarez (2005) and Drucker (2007) and argues that a conceptual foundation leads to classes of theories. In his critique on existing theories of entrepreneurship, Murphy (2011) argues that currently most entrepreneurship theory relies on conceptual foundations from a mix of other areas, which does not

promote a consistent literature that builds on itself. Whereas a wider array of theoretic streams offers a rich outlook on entrepreneurial discovery, a stronger conceptual foundation would promote relatable narratives and implications and help fulfill the area's need for a more integrated framework.

Burnett (2000) argued that a generalized set of entrepreneurship qualities can be developed. In this regard Aldrich and Martinez (2001), identified three elements indispensable to an understanding of entrepreneurial success: process, context, and outcomes. The critique by Aldrich and Martinez (2001) catapulted three important advances that include (a) a shift in theoretical emphasis from the characteristics of entrepreneurs as individuals to the consequences of their actions, (b) a deeper understanding of how entrepreneurs use knowledge, networks, and resources to construct firms, and (c) a more sophisticated taxonomy of environmental forces at different levels of analysis that affect entrepreneurship. From an evolutionary approach, process and context (strategy and environment) interact in a recursive continuous process, driving the fate of entrepreneurial efforts. Thus, integrating context and process into research designs remains a major challenge. Such integration constitutes a necessary step to a more complete evolutionary approach and a better understanding of entrepreneurial success.

By insisting on the inclusion of context, process, and outcomes in theoretical models and research designs, Aldrich and Martinez (2001) argued for the need for an evolutionary approach. Evolutionary theory unites in a single coherent framework a concern for entrepreneurial outcomes and the processes and contexts making them possible, using the basic concepts of variation, adaptation, selection, and retention.

An evolutionary approach studies the creation of new organizational structures (variation), the way in which entrepreneurs modify their organizations and use resources to survive in changing environments (adaptation), the circumstances under which such organizational arrangements lead to success and survival (selection), and the way in which successful arrangements tend to be imitated and perpetuated by other entrepreneurs (retention).

Murphy (2011) therefore articulates a conceptual foundation for entrepreneurial discovery theory, with a shift from unidimensional to multidimensional logic. He argued that the shift promotes a more flexible and distinct conceptualization that extends the current dominant view and increases coordination of entrepreneurial discovery research across disparate theoretic streams. In this regard Murphy observed that the resource based theory (RBT) also extensively referred to as the resource based view (RBV) articulated by Barney (1991) is an evolutionary multidimensional theory in that it views entrepreneurship in terms of individual, the environment and constraints in it, as well as the organization responsible for the entrepreneurial processes and the outcomes of the processes. In other words RBT consolidates into one theory the context, processes and outcomes of entrepreneurship. This theory is reviewed below and its suitability for use in the study critically examined.

2.2.4 Choice of the theoretical framework for the study

On the basis of the above review and the detailed review of the classical theories presented in Section 2.2.2, the economic, sociological and trait theories as well as the Schumpeterian innovation theory were considered largely inadequate to study

factors influencing the sustainability of MSPWE's.

The key criticisms against the economic theory is that it makes unrealistic assumptions about the market and flow of information assuming perfect competition, market equilibrium and perfect flow of information within the market (Montaye, 2006; Burnett, 2000, Dollinger, 2008). It also completely ignores the entrepreneur who is responsible for the discovery of opportunities, creativity to solve customer problems and risk bearing (Montaye, 2006).

The sociological theory and the trait theories are criticized as being uni-dimensional, focusing only on the person of the entrepreneur, and failing to capture the full context in which entrepreneurship thrives, the processes and outcomes (Alvarez, 2005). As Aldrich and Martinez (2001) pointed out, as intellectually stimulating as it may be to find out what motivates entrepreneurs and how they differ from ordinary mortals, the more critical question is how these individuals manage to create and sustain successful organizations.

Dollinger (2008) criticized the trait theory for looking for commonalities amongst entrepreneurs rather than differences for in that case none of the entrepreneurs would have any advantage over another. Instead, avers Dollinger (2008), we should be looking for a theory of differences not commonalities. The sociological theory has also been criticized on the basis that by taking the sociological background of the entrepreneur to be the main driver of entrepreneurial behavior, no theory can be developed for universal application in all cultures (Desai, 2009; Saleemi, 2009).

The Schumpeterian innovation theory has been criticized on the basis that it is

largely applicable to large firms and ignores creative imitation which has been found to be responsive to satisfy specific customer requirements in niche markets (Drucker, 2007). The Austrian school also criticized this theory on the basis that the entrepreneurial driver is profiteering on the basis of speculation and not intuition (Desai, 2009). Drucker (2007) also criticized the theory on the basis that entrepreneurship lies in concept and theory, not intuition.

On the other hand the resource based theory has been assessed as a robust and rigorous line of inquiry that captures entrepreneurship in its multidimensional perspectives- context, processes and outcomes (Murphy, 2011, Jaquier, 2010; Mills, 2010). There are several empirical verifications of the theory, for instance by Caldeira and Ward (2001) on small and medium manufacturing firms in Portugal.

On the basis of this review, the economic, sociological and trait theories as well as the Schumpeterian innovation theory were considered largely inadequate to study factors influencing the sustainability of MSPWE's and the focus was directed to a multi-dimensional theory. The resource based theory, being a multi-dimensional theory that integrates context, processes and outcomes of entrepreneurship in one theory was chosen as the theoretical framework for the study and is given further articulation in the following sections.

2.2.5 Resource Based View (RBV)

Economic theory holds that in the normal course, and in the absence of market imperfections, abnormal economic rents will get competed away by rivals or new entrants to an industry (Executive Fast Track, 2011). This is in agreement with

observation by Powell (2007), that in the market based view (MBV), firms are seen as being homogenous and competition is seen as occurring via positioning in the markets- the strategic challenge for the firm being the identification of attractive markets to compete in. Powell avers that the question not asked in the MBV is whether the market opportunity is one that can be exploited by the firm or not, that is, does the firm have the resources and competencies to compete in the market?

Powell (2007) observed that the view of the firm on the basis of its resources and competencies to compete in the market, or resource based view, was popularized by the works of Edith Penrose (1959), Birger Wernerfelt (1984) and Jay Barney (1991). Edith Penrose contributed to the RBV field as early as 1959, when she argued that a firm is more than an administrative unit; it is also a collection of productive resources the disposal of which between different users and over time is determined by administrative decision. Penrose averred that when we regard the function of the private business firm from this point of view, the size of the firm is best gauged by some measure of the productive resources it employs. Birger Wernerfelt coined the term Resource Based View (RBV) of the firm in 1984.

However most scholars consider Jay Barney (1991) as the father of the modern Resource-Based View of the Firm (RBV) or Resource Based Theory. Barney articulated that RBV emphasizes strategic choice identifying, developing and deploying key resources to maximize returns. Each organization is a collection of unique resources and capabilities that provides the basis for its strategy and the primary source of its returns. Barney (1991), postulated that the competitive advantage or sustained competitive advantage of a firm could be determined on the

basis of whether the resources/resource mix the firm possessed or could acquire had the attributes valuable, rare, inimitable and non-substitutable applied under a strategy that maximized strengths of the firm, optimally utilized the opportunities and mitigated against threats and weaknesses taking into account the internal and external environments.

The main criticism raised against RBV is that it apparently reflects a unique feature, namely, that sustainable competitive advantage is achieved in an environment where competition does not exist. The critics argue that according to the characteristics of the RBV, rival firms may not perform at a level that could be identified as considerable competition for the incumbents of the market, since they do not possess the required resources to perform at a level that creates a threat and competition (Ethiraj, et al., 2005, Chatain, 2010). Citing earlier works, these critics argue that through entry barriers, barriers to imitation, incumbents ensure that rival firms do not reach a level at which they may perform in a similar manner to the former. In other words, the sustainability of the winning edge is determined by the strength of not letting other firms compete at the same level. The moment competition becomes active, competitive advantage becomes ineffective, since two or more firms begin to perform at a superior level, evading the possibility of single-firm dominance; hence, no firm will enjoy a competitive advantage. Further such sustainable competitive advantage could exist only in the world of no competitive imitation.

Mills (2010), in support of RBV, observed that the achievement of any of business objectives is dependent on the firms strengths and weaknesses. Mills averred that the resource-based view of the firm (RBV) is the one approach that concentrates on the

individuality of each firm, the important differences between each firm and its competitors. Kotelnikov (2010) also articulates that RBV of firms is based on the concept of economic rent and the view of the company as a collection of resources and capabilities, highlighting the need for a fit between the internal resources and capabilities of the firm and the external environment in which a firm operates.

Kotelnikov (2010), arguing in support of RBV in a dynamic perspective, avers that in the 21st-century hyper-competitive landscape, a firm is a collection of evolving capabilities that is managed dynamically in pursuit of above-average returns. Thus, differences in firm's performances across time are driven primarily by their unique resources and capabilities. Individual resources may not yield to a competitive advantage but it is through the synergistic combination and integration of sets of resources that competitive advantages are formed. Jaquier(2010), in support of the RBV, asserts that the RBV provides a rigorous model for analysing the competitive advantage (CA) or sustained competitive advantage (SCA) of a firm, combining internal analysis with external analysis.

Murphy **(**2011), on his critique on theoretical framework for entrepreneurship, and advocating multidimensional theoretical frameworks, agrees with Jaquier (2010) and specifically pinpoints that RBV is multidimensional in its representation of entrepreneurship and accounts for a robust line of inquiry that underlies a plurality of distinct streams in the area. Dollinger (2008) argues that the resource based theory is efficient and practical because it focuses on the strengths, assets and capabilities of the entrepreneurs and their ventures. It incorporates market opportunity, industry conditions and competition but it also emphasizes resources, skills and capabilities

(including the skill and capability to learn new skills and capabilities) of the entrepreneurs and the organization.

Desai (2009), articulates a multidimensional conceptual model of entrepreneurship (Figure 2.1) with following dimensions; (1) individual entrepreneur, (2) environment – resources and constraints and; (3) organization .

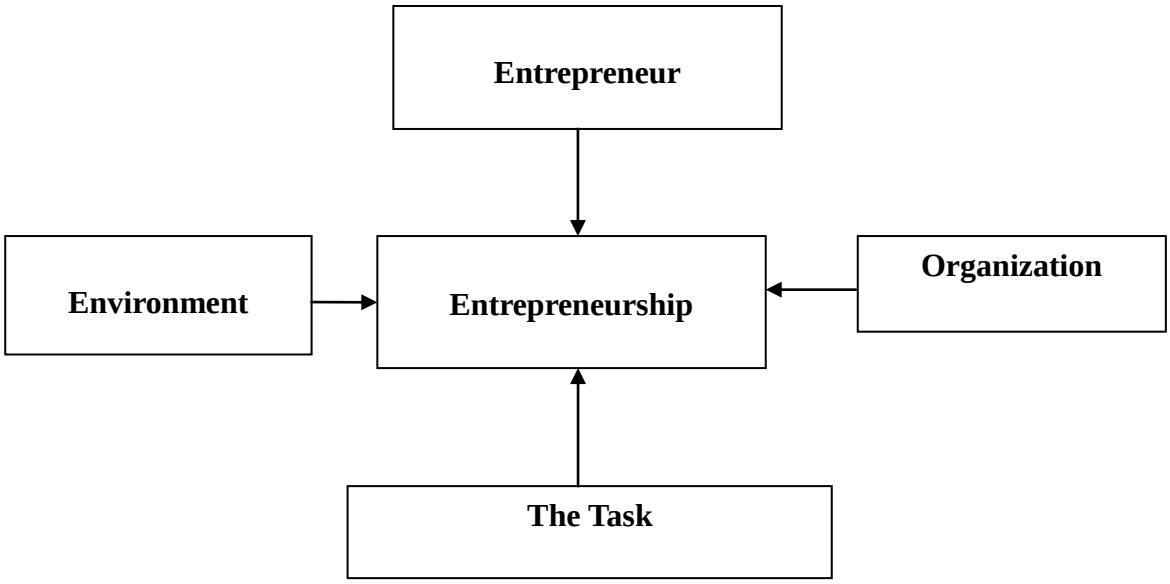

Figure 2.1: Conceptual Model of Entrepreneurship
Source: Desai (2009)

Researcher's View on the criticism on RBT

The criticism leveled against RBV seems to miss the point that competition is a struggle to create differentiation above the competitors or at the very least a struggle for survival by keeping abreast the rest of the competition. Falling behind on this means taking exit sooner or later. Failure to create a differentiation means the enterprise will fall out as soon as its competitors create a differentiation. Creating and sustaining the threshold of the differentiation requires entrepreneurial behavior in

dynamic creativity, not a once in lifetime innovation. In fact this differentiation is the purpose, the logical and realistic struggle and outcome of thriving entrepreneurship and it will be there for as long as there will be entrepreneurial enterprises. What RBV postulates is therefore not inconsistent with entrepreneurship, but rather an affirmation of the entrepreneurial struggle, the motivation for the struggle being desired entrepreneurial outcome, that if a firm can attain sufficient threshold of this differentiation then it will have a competitive advantage and if it can sustain this differentiation it will have sustained competitive advantage. The behavior of the entrepreneurial enterprise to create this differentiation is what Drucker (2007) referred to as purposeful innovation, what Joseph Schumpeter referred to as creative destruction of capital and these are struggles to create a threshold differentiation above competitors; quite consistent with RBV.

In view of the presented analysis, this study adopted the resource based theory as the theoretical framework to study the factors influencing the sustainability of MSPWE's in piped networks in peri-urban areas of Kenyan Cities. The theoretical and conceptual frameworks presented hereafter are derived from the conceptual model of entrepreneurship presented in Figure 2.1 and the MSPWE in peri-urban water markets as deciphered on the basis of RBT.

Application of the RBT to MSPWE's

When the conceptual model for entrepreneurship (Figure 2.1) is specifically applied to MSPWE's it translates to: (1) the individual MSPWE entrepreneur; (2) the Organization (MSPWE - fully privatized or a public private partnership either as retail PPP or MO's who are contracted PPP's); (3) environment, that is the peri-urban

water markets, the prevailing policy, legal and regulatory frameworks. This conceptual model of entrepreneurship as applied to MSPWE's is presented in Figure 2.2.

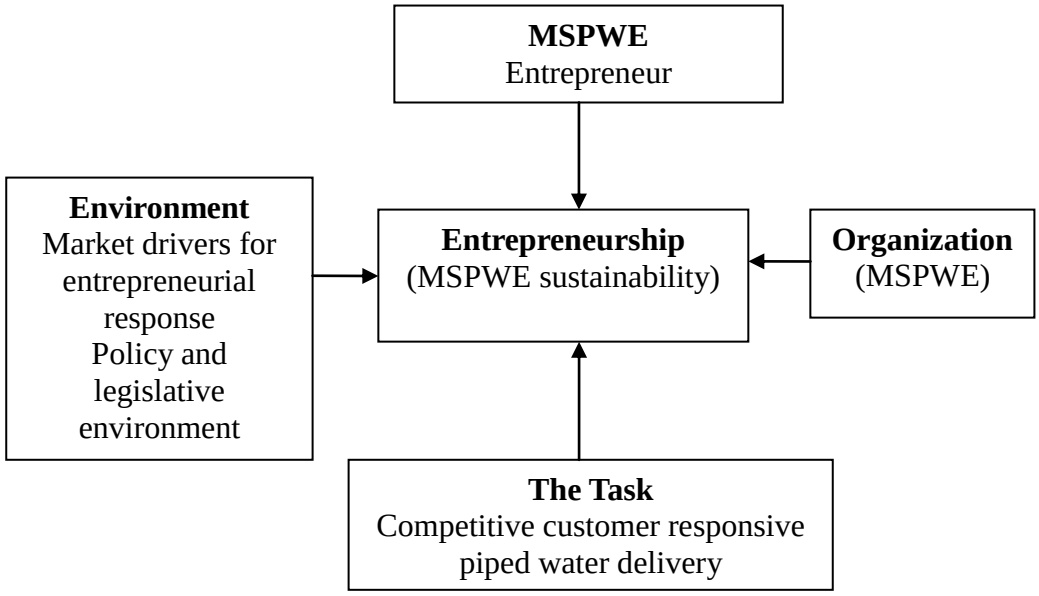

Figure 2.2: Conceptual Model of Entrepreneurship Applied to MSPWE's
Source: Based on Desai (2009)

Citing the earlier works of Barney(1991), Jaquier (2010) articulates a framework for analysis of the CA or SCA of the firm based on RBT. Resource-based analysis of the firm determines which resources and capabilities result in which strengths or weaknesses, what constitutes strengths, weaknesses, opportunities, threats, strategies to be implemented (those that build strengths to exploit opportunities and avoid or mitigate weaknesses). The analysis then determines resources/capabilities with the four attributes valuable, rare, imperfectly imitable and the favorable/unfavorable industry conditions. The CA or SCA of the firm (sustainability) is then predicted on

the basis of RBT. Under RBT framework of analysis the factors influencing the sustainability of MSPWE's in peri-urban areas, that is the resources with the four CA attributes valuable, rare, difficult to imitate, non-substitutable may be assessed. Peri-urban areas are faced by gaps in utility networks and commonly polluted water resources (Spencer, 2007; Bakker 2003; Njiru & Albu, 2002). In this sense water is a valuable and rare resource. Furthermore piped water infrastructure is location specific, usually monopolistically controlled and relatively costly to replicate (K'Akum, 2006; Bakker, 2003). This renders the water resource and its infrastructure to be imperfectly imitable. Finally as a unique natural resource needed to sustain life, industrial and commercial activities, it is non-substitutable. The context, process and outcomes for the MSPWE's on the basis of RBT is illustrated in Figure 2.3.

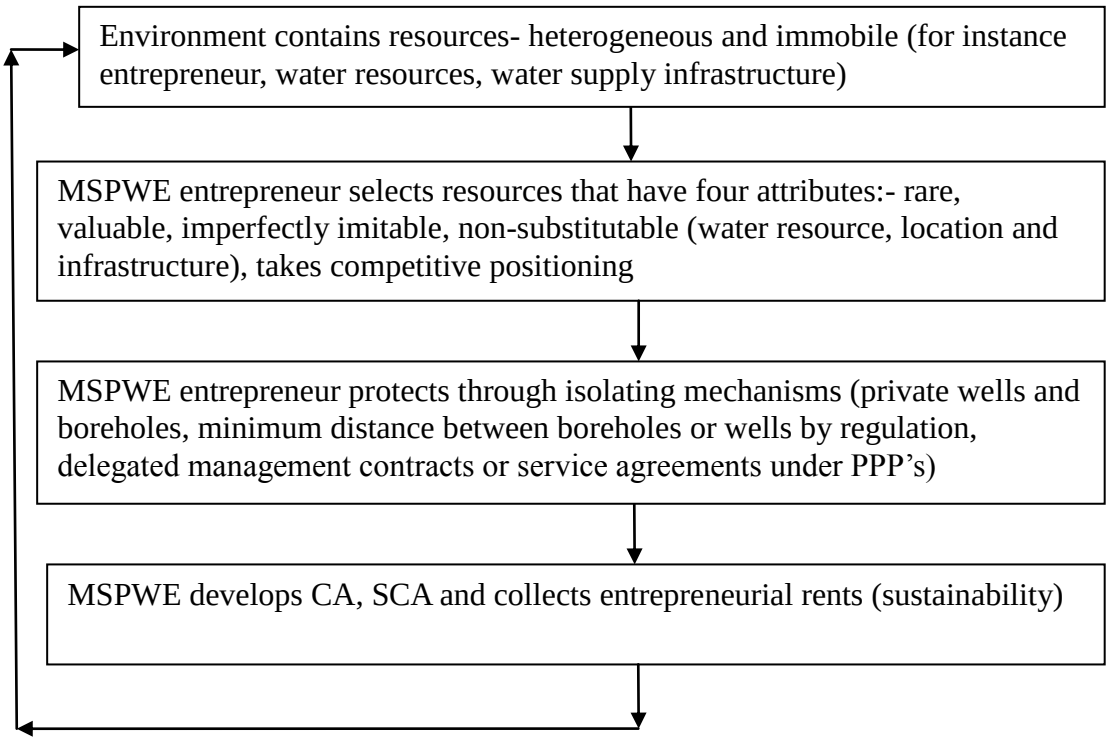

Figure 2.3: Context Process and Outcomes of Entrepreneurship in MSPWE
Source: Based on Dollinger (2008).

Caldeira and Ward (2001), citing several past researchers who had applied RBT, successfully applied the Resource Based Theory (RBT) in their study on the success of adoption of information system/information technology (IS/IT) in manufacturing small and medium enterprises (SME's) in Portugal. The purpose of the study was to consider how RBT could be used to explain success with the adoption of information systems and information technology (1S/IT) in manufacturing SME's. Adoption of IS/IT was predicted to be a distinctive capability that could impart CA to the adopting firms. The analytical model used by Caldeira and Ward (2001) was developed from the RBT framework and is presented in Figure 2.4.

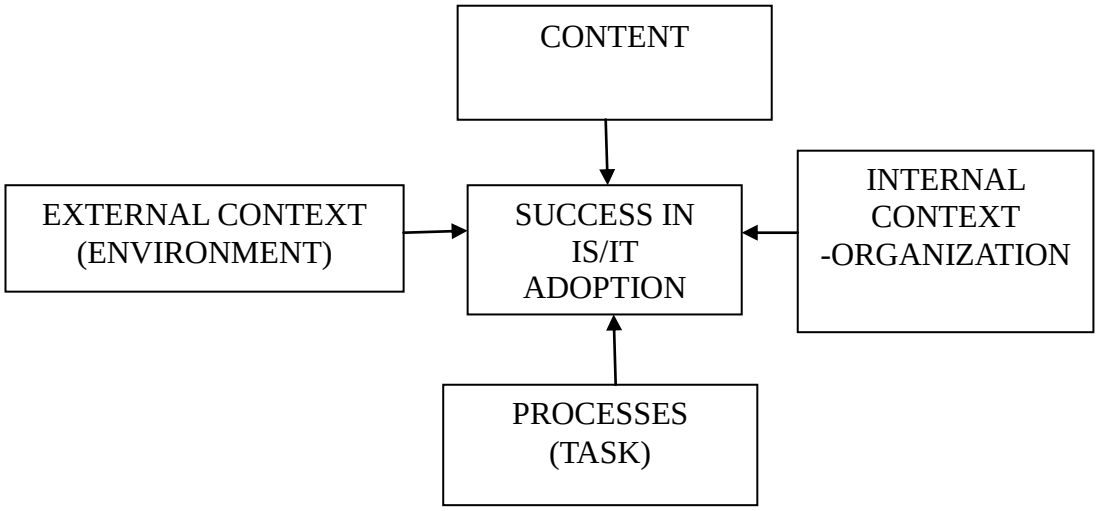

Figure 2.4: Caldeira and Ward (2001) Theoretical/Analytical Framework
Source: Caldeira and Ward (2001)

Comparing the Caldeira and Ward (2001) theoretical framework presented in Figure 2.4 with the conceptual model of entrepreneurship presented in Figure 2.1 would seem to indicate that the individual entrepreneur in Figure 2.1 has been omitted in Figure 2.4. In addition content of IS/IT was shown as a dimension of the

entrepreneurship in the Caldeira and Ward (2001) model (Figure 2.4) but in the conceptual model of entrepreneurship (Figure 2.1) content is not a dimension by itself. However within the discussions and explanation in Caldeira and Ward (2001), it is clear that the owner/chief executive represents the person of the individual entrepreneur and has been aggregated into the organization. In addition content of the IS/IT could also be seen to be embodied in the resource mix of the firm and hence may be included in the internal context, that is organization. In view of these observations, the Caldeira and Ward (2001) conceptual model effectively consolidates to the conceptual model of entrepreneurship presented in Figure 2.1.

The study by Caldeira and Ward (2001) adopted in-depth interviews, targeting twelve SMEs in manufacturing. It applied a semi-structured interview schedule with questions/topics based on the RBT analytical framework as presented below. The data collection was complemented by analysis of documents provided by the SMEs and a short questionnaire to confirm the level of IS/IT perceived in the interviews. The interviewees were the owner/CEO, senior IT person and one or more operational managers. The measurements in the study aimed to determine the resources/capabilities in terms of the attributes valuable, rare, imperfectly imitable and non-substitutable.

Valuable	IS/IT supplied to the core competitive process of the business integrated design and manufacturing and customers trading activities
Rare	Integration and customization of a range of IS/IT products plus CEO vision, appreciation support and commitment to adoption process,

	competent customer persuasion.
Imperfectly imitable	Personal relationships/partnerships with key IS/IT suppliers for mutual long term benefits, acquisition of technology education and training at a cost. Competent image to customers (domestic and external)
Non-Substitutable	Continuous incremental innovation in partnership with IT suppliers to enhance the product/service offer.

The study determined, using RBT as the theoretical framework, that the more successful SMEs had distinctively superior IS/IT resources arising from the development of internal IS/IT skills combined with top management support towards IS/IT adoption. From this Caldeira and Ward explained that the determinant factors in combination caused requisite skill sets to be developed, which in turn caused appropriate organizational processes to come into being, which enabled effective adoption of technology and its successful exploitation in use. The resulting organizational competence enabled IS/IT to provide the basis for distinctively superior capability of the firm. The more successful firms had this distinctive capability while the less successful did not.

From the analysis and conclusions by Caldeira and Ward (2001), it is clear that the distinctive capability was brought about using a strategy that involved a purposeful selection and development of resources and capabilities taking into account the internal and external contexts, combining them to become valuable, rare, difficult to imitate and non-substitutable resources and capabilities in the market (the

environment) in which the firm operated. In view of this distinctive capability it would be predicted on the basis of RBT that the firms that had developed and deployed such capabilities would have acquired competitive advantage relative to those that did not. The Caldeira and Ward (2001) study findings confirmed this and provided further verification of the RBT as a robust multidimensional line of inquiry integrating all dimensions of entrepreneurship, that is context, processes and outcomes in agreement with Dollinger (2008), Jaquier (2010) and Murphy (2011). Furthermore the study demonstrated that RBT was applicable to the study of entrepreneurship in SMEs.

2.3 Conceptual Framework

As explained in the choice of theoretical framework, RBT was used to study the predictors of MSPWE sustainability taking into account the internal and external environments as recommended by Jaquier (2010 and empirically tested by Caldeira and Ward (2001) on SMEs. The conceptual framework presents the postulated factors (the independent variables) and the dependent variable (sustainability) and illustrates the expected relationship between the independent variables and the dependent variable. It also provides the initial framework for analysis on the basis of the expected relationship between the independent variables and the dependent variable. Using the measurements of the independent variables (the postulated factors), sustainability is predicted on the basis of the RBT. The prediction of sustainability is then confirmed/verified by measurement of sustainability.

In the conceptual framework the dependent variable – sustainability, and the

pertinent independent variables expected to influence the sustainability of MSPWE's in piped networks in peri-urban areas of Kenyan cities were identified within the context of resource based theoretical framework. This was done taking into account the internal and external contexts of the MSPWE's in the peri-urban water markets and operating under policy and legislative environment precipitated by the National Water Policy, the Water Act 2002 as well as past work related to the study.

2.3.1 The dependent variable - Sustainability

Profitability is used as an indicator of MSPWE sustainability in this study due to its wide recognition as an entrepreneurial reward and its significance for the survival and growth of the enterprise. The Asian Development Bank (2006) highlighted that profitability is an indicator of sustainability in that small scale private water providers (SSPWPs), sustained and motivated by profits, may be longer lasting and more expansionary than NGOs and other not-for-profit providers. Furthermore profit is a major goal for many businesses and without profitability no business can survive or grow (Saleemi, 2009, Bwisa, 2005; Bwisa, 1998), that is be sustainable.

According to Bwisa (2005), maximizing profits is the ultimate goal for many entrepreneurs. Agreeing with this Desai (2009) observes that throughout history many have attempted to define the entrepreneur and it is significant that the definitions advanced by many of them (Richard Cantillon, 1725; Adam Smith, 1776; Jean Baptise Say, 1803; Frank Knight, 1921; Everret Hessen, 1958; Arthur Cole, 1959) is founded on profit and growth as the purpose, drive and reward for entrepreneurial efforts. Saleemi (2009) articulates 'as food is to human life so is profit to the life of the business'. This means that consistent profitability is a sign and

key indicator of not only a business with life but also healthy business and it in-builds the key entrepreneurial rewards. According to Maslow's motivation theory entrepreneurial rewards are essential to give motivation to the entrepreneur to start and sustain their enterprises and because profitability is needed to sustain these rewards it is a key indicator of enterprise sustainability.

2.3.2 Predictor Variables

a) Market drivers for entrepreneurial response

An entrepreneur offers something of value to the customer aiming to make available what the customer lacks, that is the entrepreneurial response is both market focused and market driven (Drucker, 2007). It would be expected that the sustainability of enterprises in such an environment would depend on the appropriate market drivers for entrepreneurial response by the MSPWE's. With the National Water Policy (Republic of Kenya, 1999) upholding water as an economic good and adding a social good dimension to it, the MSPWE's in the peri-urban areas of Kenyan cities operate within an environment in which the worldwide divergent views of water as an economic good or a social good are at play (World Ecumenical Council, 2002; World Water Council, 2005; K'Akum, 2006). On the basis of this environment it would be expected that there should be specific underlying factors, both market and regulatory in nature, influencing the sustainability of the small piped water enterprises. Accordingly market drivers for entrepreneurial response were postulated as factors influencing the sustainability of MSPWE's

Market drivers for entrepreneurial response were derived as an independent variable

based on the review of literature on the provision of water services in the peri-urban areas. According to Norström (2007), the peri-urban interface is characterized by strong urban influences and unanticipated fast population growth resulting in, amongst other things, rapid increase in water demand and other services which are not catered for by the city utilities. Mattingly and Gregory (2006), acknowledge the business opportunity by articulating that as people enter the peri-urban interface, their livelihood activities change from predominantly rural to predominantly urban and opportunities arise to help manage this transition and successfully exploit new opportunities.

From the context of the peri-urban water markets as specifically relates to water and small water enterprises (SWEs) the main variables include water demands, gaps in utility networks, water resource, control of water supply infrastructure, competition and socio-political support (Asian Development Bank, 2006; Njiru & Albu, 2002; Spencer, 2007). Hence in this study these variables are taken as the operational variables for market drivers for entrepreneurial response.

b) Entrepreneurial customer responsiveness

Business earns profits when it satisfies the needs of its customers (Saleemi, 2009). Previous studies in Asia have shown that customer responsiveness may be expected to influence sustainability as SWEs have proved to be more competitive and customer responsive than large enterprises in serving the residents of the peri-urban areas (Asian Development Bank, 2006).

It has been shown that water utilities service levels are often not tailored to be

customer responsive in terms of quantity purchased, reliability, payment system, convenience demand of customers in peri-urban areas who often are low-income families (Asian Development Bank, 2006) and this may be a source of competitive advantage for MSPWE's. Hence entrepreneurial customer responsiveness to specific customer demands for piped water may be postulated as a factor influencing the sustainability of MSPWE's.

c) Entrepreneurial pricing strategies

Entrepreneurial pricing strategies focuses on the needs and realities of the consumer (Drucker, 2007). The expected MSPWE entrepreneurial behavior is therefore to appropriately exploit the available market opportunities while maintaining price competitiveness, a key sustainability prerequisite of market driven enterprises (World Bank, 2005; Bakker , 2003, United Nations Economic Commission for Africa, 2005). From this viewpoint entrepreneurial pricing strategies is also postulated as a factor influencing the sustainability of MSPWE's.

d) Regulatory and business organization forms

The National Water Policy (Republic of Kenya, 1999) upholds water as an economic good and adds a social good dimension to it, making it potentially possible to regulate the entry and conduct of water business. Hence the MSPWE's in the peri-urban areas of Kenyan cities operate within an environment in which the worldwide divergent views of water as an economic good or a social good are at play (World Ecumenical Council, 2002; World Water Council, 2005; K'Akum, 2006). On the basis of this environment it would be expected that there should be specific

regulatory factors which lay the legal requirements for both entry into the water business and conduct of doing business. In addition, Asian Development Bank (2006) and Njiru and Albu, 2002 also articulated the effect of institutional orientations (which embody regulation and business organization forms such as PPP's) to SWEs. Accordingly regulatory frameworks and business organization forms may be postulated as factors influencing sustainability.

e) Interventions for acquisition and improvement of entrepreneurial skills

According to Drucker (2007), the existing business needs to know how to be entrepreneurial and to innovate otherwise it will not survive unanticipated change and innovation unless it acquires entrepreneurial competence. Interventions for acquisition and improvement of entrepreneurial skills have been recognized to impact on the MSEs on opportunity recognition, survival and growth, preparedness to cope with change, skills and attitudes of the enterprise human resource, and improve the entrepreneurial performance (Republic of Kenya, 2005; Namusonge in Mullei & Bokea, 1999; Rosa and Scott, 1996). Hence interventions for acquisition and improvement of entrepreneurial skills may be postulated as a factor influencing sustainability. The conceptual framework is presented in Figure 2.5.

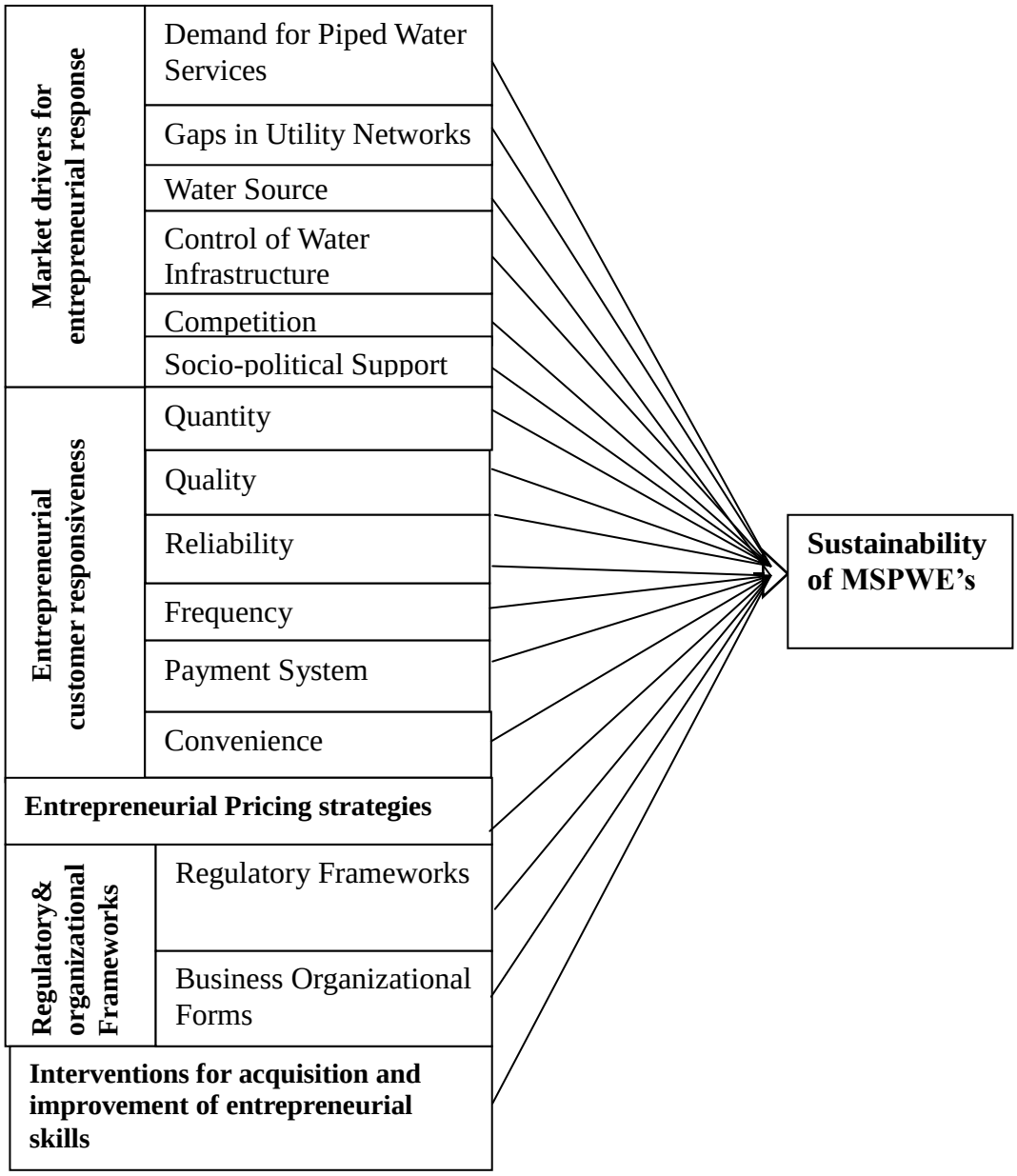

Figure 2.5: Conceptual Framework of Factors Influencing Sustainability of MSPWE's

2.4 Market Drivers for Entrepreneurial Response

The enterprise is influenced by the market environment in which it operates (Republic of Kenya, 2005; Desai 2009). According to Dollinger (2008), the environment poses both opportunities and threats and is characterized by change, uncertainty and complexity and entrepreneurs must continually monitor events and trends and make adjustments to their organizations and strategies. An entrepreneur offers something of value to the customer aiming to make available what the customer lacks, that is the entrepreneurial response is both market focused and market driven (Drucker, 2007). It would be expected that the sustainability of enterprises in such an environment would depend on the appropriate market drivers for entrepreneurial response by the MSPWE's.

Many water utilities in many cities of the developing world have been unable to adequately provide for the water and sanitation needs of city dwellers particularly peri-urban areas (Asian Development Bank, 2006; Bakker, 2003; Njiru & Albu, 2002). This inability to provide a basic service has created the environment driving the rise of MSWEs (Asian Development Bank, 2006; Njiru & Albu, 2002). From the context of the peri-urban water markets as specifically relates to water and small water enterprises (SWEs), the main variables include water demands, gaps in utility networks, water resource, control of water supply infrastructure, competition and socio-political support (Asian Development Bank, 2006; Njiru & Albu, 2002; Spencer, 2007). Hence the above factors may be taken as the operational variables of market drivers for entrepreneurial response. Each of the operational variables is elaborated and analyzed below.

2.4.1 Demand for piped water services

The demand for piped water services in peri-urban areas is explained by various authors. Mattingly and Gregory (2006) articulate that rural to urban migration is a world-wide trend that introduces a transition representing the actual meeting of urban and rural activities in an interface conceptualized as the peri-urban interface. This interface is characterized by geo-demographic and socio-economic dynamics that impact on the population size, population distribution and density. Norström (2007) observes that this is where urban-driven economic and social change is most intense and where the usual urban infrastructure services are generally non-existent and natural resources are under intense pressure from competing demands. The geo-demographic and socio-economic dynamics in peri-urban areas comes with peculiar problems of water service delivery in particular as upheld by the United Nations Economic Commission for Africa (2005) which recognized that in most cities of the developing world the urban population is rising much faster than the rate at which infrastructure services are being extended.

It has been established that as people enter the peri-urban interface, their livelihood activities change from predominantly rural to substantially urban and opportunities arise to help manage this transition and successfully exploit new opportunities (Mattingly and Gregory, 2006). According to the United Nations Habitat (2006), the trend towards more urbanized societies and the growing number of people living in large cities, particularly peri-urban areas in developing countries which receive most of the rural-urban migrant populations, have very large implications for freshwater use. Amongst the competing water uses, water demands from city enterprises and

consumers have become increasingly important. Furthermore population densities and customer mix are important parameters affecting demand for water services (Ouyahia, 2006).

Water is uniquely needed to sustain life and maintenance of sound hygiene. According to Spencer (2007), piped household water has become a valued resource in peri-urban areas, not just because of changes in consumption patterns, but also because residents have noticed that traditional river, canal and groundwater sources have become more polluted with rapid urban development. Thus, demand for piped water is increasing, thereby posing significant new challenges to public water utilities particularly in peri-urban areas. As a factor that directly reflects customer needs, demand for piped water services was expected to be a critical pillar of sustainability because it is the condition in the market that attracts and promises Profitable exploitation to the entrepreneur and sustain MSPWE's because without this demand the MSPWE's would not be in business. There was however lack of adequate information on the specific drivers of demand for piped water services in the peri-urban areas of Kenyan cities. This study sought to fill this gap in relation to the sustainability of MSPWE's.

2.4.2 Gaps in utility networks

Previous studies show that one of the principle drivers of entrepreneurial activity in piped water networks in peri-urban areas are gaps or inadequate service level by the city water utilities. Bakker (2003) observes that as cities have grown, urban services have not kept pace and that an increasing proportion of those lacking potable water live in urban areas, particularly more so in peri-urban areas. She adds that even those

with access to networked services may have problems with low quality and reliability. She argues that expanding the public water utility network poses distinct technical and financial difficulties so that in most cities, a networked water supply system exists but covers only a proportion of the city, usually part or all of the most affluent neighbourhoods.

Bakker (2003) observes that small water enterprises come in to fill the water services delivery gaps left by public utilities. Thus small privately operated piped networks are in operation in many cities of the developing World, for instance *Aguateros* in Paraguay (World Water Council, 2005), Can Tho City in Vietnam (Spencer, 2007), Dhaka, Cebu, Ho Chi Minh City in Asia (Asian Development Bank, 2006) and Ongata Rongai, Kenya (Mwarania, 2007).

These studies show that an entrepreneur develops a water distribution network in an assessed market area, offers neighbors connections based on such factors as connection costs, water price and payment method. The size of networks and the number of their customers vary considerably. The operator takes a predominantly commercial approach, including maximizing market share and achieving a reasonable level of profitability. All this is driven by normal entrepreneurial incentives, that is, return on investment, taking into account assessed market risk, and has particularly strong potential for improving water supply in underserved and disadvantaged urban neighborhoods (Asian Development Bank, 2006).

From the foregoing it was observed that although previous studies had confirmed that lack of utility networks provide entrepreneurial opportunities for MSPWE's,

they did not show what would happen to the MSPWE's if the water utility network was expanded into the areas where the MSPWE's are in business, thereby eliminating the lack of infrastructure that drove the creation of the MSPWE's in the first place. This study sought to establish the influence of gaps in utility network on sustainability of MSPWE's by determining the implications of expanding public utility networks on the MSPWE's and the MSPWE's entrepreneurs preparedness to face change brought about by expanding water utility networks. Faced by this challenge the MSPWE entrepreneur would be expected to cope and manage the change.

2.4.3 Water source

Bakker (2003) articulates that in many networked water supply systems of the cities in the developing world, water may flow intermittently – a few hours per day, or only a few hours per week, water pressure may be low and water quality threatened by infiltration in pipes. These problems of supply are frequently acute in the peri-urban areas and are related to the water source. It can therefore be inferred that water as a resource in the peri-urban area is, according to the resource based theory, a rare, valuable, imperfectly imitable and non-substitutable resource. Hence on the basis of the same theory, as the commodity exchanged in the water markets, the reliability, quality and sustainability of the water source is a factor that may confer a competitive advantage, may be even a sustained competitive advantage to the MSPWE's. If such sources become intermittent, then the businesses also become intermittent and hence cannot be sustainable.

In Ongata Rongai, for instance, Mwarania (2007) established that MSPWE's that sunk boreholes in their own plots enjoyed a competitive advantage over mobile water vendors due to the reliability of the source in terms of sustaining a dependable continuous source of good quality water. However the study covered only this one town and there was lack of adequate information on the sustainability of the water sources from which the MSPWE's in peri-urban areas of Kenyan cities obtain the water they sell. There was therefore need to close such gaps given the critical significance of the water source to MSPWE's sustainability in terms of how dependable the water sources were in terms of quantity yield, water quality, service level and environmental sustainability and the entrepreneurial responses to eliminate/mitigate threats.

2.4.4 Control of water infrastructure

According to the Resource based theory, when a firm possesses and controls resources that are valuable, rare, imperfectly imitable and non-substitutable it can withstand competitive and imitative pressures (Dollinger, 2008)). If an enterprise can protect these resources and maintain these four qualities it will have competitive advantage over the long term, i.e. sustainable. Hence it would be expected that if the MSPWE's can control and protect the water source and the infrastructure used to deliver it in a particular area it will have a competitive advantage in the long term, that is, sustainable. Several reviewers of water infrastructure concur that it is a natural monopoly in that water supply infrastructure assets are location specific and not easy to convert to alternative use and not attractive to replicate because investments are capital intensive and once made are literally sunk costs faced by

various risks that include construction risks that occur with system renovation, regulatory risks which occur with change in regulation and political risks due to political instability and interference and long amortization periods (Bakker 2003; K'Akum, 2006; Ouyahia,2006).

All of the above factors are barriers to the potential entry of multiple players that tend to discourage imitative pressures and thus leaving the substantial control of infrastructure to one location specific player thereby resulting in a tendency towards monopolistic control of water infrastructure. The control of water infrastructure, whether through ownership or by secure partnerships with bulk suppliers in defined localities is expected to provide an isolating mechanism that the MSPWE can use to control the supply and distribution of a valuable resource. According to the Resource based theory, controlling a valuable, rare, imperfectly imitable and non-substitutable resource may confer a competitive or even sustained competitive advantage to the enterprise (Dollinger, 2008). However, there was inadequate information on the nature and extent of control of water infrastructure by MSPWE's in peri-urban areas. This study sought to determine the type of control, if any, MSPWE's in peri-urban areas have on water infrastructure which they depend upon to deliver services and whether or not a monopolistic control of water supply infrastructure is a pre-requisite for their sustainability.

2.4.5 Competition

Bakker (2003) observes that the form of private sector participation in the developed Global North, for instance in France and Britain, comprises large private companies

that manage municipal and city water supply infrastructure via long-term engagements in form of management contracts, concessions and leases. By contrast, in the Global South, the private sector comprising mainly small scale private water vendors have long been the means by which substantial proportions of the residents of peri-urban areas obtain water. However, within the current participation of the private sector the issue of competition remains controversial, whether the enterprises are large or small. Ouyahia (2006) argues that because of conditions of natural monopoly direct competition in the water sector is uncommon and most product competition in water markets takes place between water utilities and un-piped sources, such as vendors and wells, and mostly when piped water is over-priced or of poor quality. The United Nations Commission for Africa (2005) upheld this view by observing that in general, monopolistic nature of the water market structure by public enterprises have led to the absence of competition, resulting in inefficiency and the lack of pricing mechanisms to determine consumer demand and to reflect service costs.

As confirmed by the public water utilities serving the three Kenyan cities, MSPWE's in the peri-urban areas of these cities operate business either as fully privatized enterprises or as public private partnership in small localized networks. The question is whether or not such MSPWE's operate in competitive environments. It has been observed that small water enterprises have proved to be more competitive than public utilities and large enterprises in serving the residents of the peri-urban areas where the majority of the urban poor live (Njiru& Albu, 2002). According to a study by Asian Development Bank (2006), it is argued that although mandated to serve all

zones within the city jurisdiction including peri-urban areas where most of the urban poor live, water utilities service levels are often not tailored to demand and often these utilities do not have the flexibility and the know-how to do business in the informal setting of peri-urban areas.

Moreover, their payment systems are not well adapted to the conditions and constraints of the poor such as irregular income and small consumption capacity. In further analytical comparison of large and small enterprises competitiveness in peri-urban areas, the Asian Development Bank Study argues that international experience shows small scale piped water providers (SSPWPs), in comparison with water utilities, can be more dynamic in filling the gap between supply and demand and have more incentives to grow and expand their services. SSPWPs provide a competitive and appropriate service to households that have no access to utility connection. This is evident in Africa, Asia, and Latin America where SSPWPs serve large urban populations. Profit orientation strengthens SSPWPs. Sustained and motivated by profits, SSPWPs may be longer lasting and more expansionary than cooperatives, NGOs, and other not-for-profit providers (Asian Development Bank, 2006).

However in many instances the small enterprises enter the peri-urban markets because they hardly face competition from the large utility enterprises in these areas. Thus small piped network entrepreneurs in Asian Cities assert that they were attracted to the water markets by the monopoly-like conditions of their new businesses unlike the conditions in the highly competitive construction industry. They added that although they expected to make only modest profits in the water

business, it offered certainty and stability (Asian Development Bank, 2006). In Paraguay small water enterprises, the *Aguateros*, invest and operate small localized water supply networks that serve substantial populations in peri-urban areas where the water utility has been constrained to operate (World Water Council, 2005). The *Aguateros* expand their networks until they encounter another network. Within the area they cover, they tend to be the sole providers of piped water.

There was lack of adequate information on the nature of competition by the MSPWE's in both the fully privatized models and the public utility-small water enterprise partnerships in Kenyan cities peri-urban areas. It was nevertheless observed that the MSPWE's face certain limiting market circumstances that include entry barriers (license to sink boreholes or wells, license to sell water by public water utility, public-private partnerships, public health regulation, minimum regulatory distances between wells) and the spatial fixed and buried nature of piped water infrastructure (Njiru & Albu, 2003; Asian Development Bank, 2006; World Bank, 2005). MSPWE's are thus natural monopolies, albeit on a small scale, within their area of supply. It was therefore expected that enterprises operating piped water infrastructure to supply water in a locality with multiple similar enterprises would dictate prices to some extent within their radius of command but if they raise prices beyond certain levels consumers would be forced to buy from alternative MSPWE's farther away if the price offered is attractively lower taking into account the cost of transport, convenience and access time.

This study aimed at closing the gap in lack of information on the nature of competition, what influences this competition and how such competition or lack of it

influences the sustainability of the MSPWE's in peri-urban areas of Kenyan cities.

2.4.6 Socio-political support

Arguing the case for socio-political support for broad range of water service providers and partnerships, Norström (2007) articulates that with a substantial percentage of their residents living in areas without adequate basic services in peri-urban areas of many cities in the developing world, a holistic concern by the decision makers to marshal all efforts that can contribute positively to providing water to all and to fulfill the Millennium development goal cannot ignore or discourage the role of MSPWE's. However, worldwide, the involvement of for profit players in the provision of water services has always elicited widespread controversy, with some seeing water as a social good and others seeing it as an economic good. Some argue that water would preferably be left in the public hands in order to ensure public interest and governments should not abdicate their social responsibility and secede water provision to the whims of private sector over-profiteers (Budds &McGranahan, 2003).

In this debate proponents of public sector provision also see water as a basic need supported by the argument that water is essential for human life and indeed for all life on earth, placing water in a metaphysical position such that some cultures or religious persuasions may not welcome the sale of water (World Ecumenical Council, 2002). Such perceptive orientations would seem to work against private sector enterprises in the provision of water services and hence present a threat to their sustainability.

On the other hand, proponents of water as an economic good use the reality on the ground to argue that the public sector alone has not generally been able to meet the water services demands, more particularly so in areas of rapid population increases such as the peri-urban areas of cities in the developing World (World Bank, 2005). K'Akum(2006) argues that consumers of water will also make choices depending on its quality and that the phenomena of population growth and spatial distribution and environmental degradation have challenged the concept of public good. He concludes that the concept of water as a public good is not tenable because water is no longer abundant but scarce, especially in urban areas, where delivering water of good quality to the consumer involves investments in infrastructure for abstraction, treatment and delivery.

The concept of water as an economic good was given major international socio-political support through the enactment of the United Nations Dublin Principles of 1992 that recognized water as an economic good, that is, a commodity that should be priced at its cost of provision (including environmental externalities) and its true value to society (United Nations, 1992).The Dublin Principles set an overall global recognition that water is accessed at a price. With this acceptance of the economic value of water, it is observed that water is a commodity that can be accessed at a price. This makes it potentially possible for lack of access to water to be an economic opportunity that could be exploited by entrepreneurs.

As a result of the Dublin Principles, it can be envisaged that wherever public utilities are not able to provide quality water services, there are unmet demands with possibilities of translation into entrepreneurial opportunities. However experience in

many cities of the developing World shows that small water enterprises face many constraints that include administrative, legal, financial, and trading conditions in city water supply markets. Without formal recognition and licensing by local authorities and the city water utility, small networks operate on a commercially precarious footing. Administrative, legal, financial, and trading conditions in city water supply markets frequently disadvantage small water networks and other SSPWPs (Asian Development Bank, 2006). Njiru and Albu (2002) support this view and articulate that the reality in many cities of Sub-Saharan Africa, including Kenya, is that despite the significant role played by SWEs in providing water services, they face numerous constraints, and are usually not recognized by utilities and policy makers. SWEs often operate within a hostile environment, and this undermines their potential to make a more significant contribution to provision of good quality affordable water services to their customers.

Against this global and National background the question of whether or not MSPWE's can be sustainable in an environment with such divergent views arose. There was, however, lack of specific information on socio-political support for MSPWE's operating in peri-urban areas of Kenyan cities. This study aimed to determine the specific socio-political support, if any, for MSPWE's in peri-urban areas of Kenyan cities and establish how such support or lack of it influences sustainability of MSPWE's.

2.5 Entrepreneurial Customer Responsiveness

As cities have grown, urban services have not kept pace and as a result, most

households rely on a mix of water supply strategies ranging from water utility, self provision and neighbourhood water vendor provision (Bakker, 2003). According to Ouyahia(2006), one of the principal reasons why customers go for water services provided by the private sector is consumer dissatisfaction with a public firm's service and observes that few studies examine the effect of privatization on consumers.

An entrepreneur earns profits needed as a motivator and reward for the entrepreneurial struggle, for survival, growth and business longevity by satisfying the needs of its customers (Bwisa, 2005; Saleemi, 2009). MSPWE's, like any other business, must respond to the customer expectations. According to Drucker (2007), the ultimate aim of a business is to create and sustain customers and this is done in four key ways: creating utility, delivering what represents true value to the customer, by adaptation to the customer's social and economic reality and by pricing. Well grounded dimensions of consumer responsiveness combines characteristics such as quantity, quality, reliability, frequency, payment system, convenience and price (Asian Development Bank, 2006; Ouyahia, 2006).

Studies on small water enterprises show that households seek out water supply services from small water enterprises that match price and service level preferences (Asian Development Bank, 2007; Njiru& Albu, 2002). The Asian Development Bank study (2007) shows that small privately operated piped networks fill the gap created by the failure of city water utilities, which theoretically should offer the best fit: except that many PWUs fail in their core business—they do not offer a good quality piped supply, particularly in peri-urban areas and especially to the poor, at any price. Entrepreneurs who own and operate piped networks have proven to be efficient,

effective and responsive. They are efficient in managing their operations. They tend to reach peri-urban areas and low-income families whereas utilities cannot and will not go. The poor and disadvantaged perceive a lower risk in dealing with the private operator's local "line manager" than with the utility's administrator. Small network operators are more sensitive than utilities are to the faint demand signals coming from low-income households. These operators are quick acting entrepreneurs - they quickly apply their own resources to a business opportunity in the peri-urban areas.

Njiru and Albu (2002) support the customer responsiveness of SWEs by arguing that apart from extending water services to settlements that have little prospect of being supplied through conventional distribution systems, SWEs may even be more convenient for poor households – for example in terms of reliability or ability to make daily cash payments - than conventional metered and billed connections. In other words small water enterprises are responsive to the customer expectations with regard to quantity, quality, reliability, frequency, payment system, convenience and price.

There was, however, lack of adequate information on the specific ways in which MSPWE's in the peri-urban areas of Kenyan cities respond to their customers. This study aimed to fill this gap in information by examining the specific ways in which piped water enterprises in the peri-urban areas of Kenyan cities respond to their customers on the key customer responsiveness variables that include: quantity, quality, reliability, frequency, payment system and convenience.

2.6 Entrepreneurial Pricing Strategies

According to Drucker (2007), pricing and Profitable pricing at that is based on a strategic understanding of what the customer really buys. Drucker (2007) asserts that the entrepreneur must understand what gives their customers satisfaction great enough for their money's worth and this must be done profitably. It means pricing is an entrepreneurial strategy structured to the needs and the realities of the customer. MSPWE's, being profit driven, are expected to achieve full cost recovery and a profit margin such that the price, on average, exceeds the input cost by an attractive margin. Bakker (2003) supports this view by arguing that whether through a reworking of infrastructure management goals, or through a redefinition of principles underlying the business of water supply, water ceases to be a service, supplied at subsidized rates to citizens as a right, and is increasingly viewed as a commodity, sold to consumers on a profit-making basis of willingness-to-pay rather than ability-to-pay.

A commercialized system which adopts a 'full cost recovery' pricing policy is preferable because an operator, whether public or private, or a combination of both must generate sufficient revenues from user charges, transfers and subsidies to cover the operation and maintenance costs of water utilities as well as related investment costs (Bakker, 2003; World Bank, 2005; United Nations Economic Commission for Africa (2005).

According to Kenya's National Water Policy (Republic of Kenya, 1999) water is an economic good but adds a social good dimension making it potentially possible to regulate price. MSPWE's in the peri-urban areas including the fully privatized and

public-private partnerships operate in this policy environment. Irrespective of the policy orientation, however, cost recovery and profitability are crucial to MSPWE sustainability as discussed in the preceding paragraphs.

Based on the views of Drucker (2007), it is observed that MSPWE's as natural monopolies, operate in ecological niches, giving the MSPWE a practical monopoly in a small area, making it immune to competition in this small area. The MSPWE would therefore be expected to be informed by its ecological niche status in its pricing strategies. McCloskey (1985) explains that such enterprises operate in monopolistic competition. In monopolistic competition modest changes in the output or price of any single firm will have no perceptible influence on the sales of any other firm and an enterprise could therefore produce and sell more water if it reduces the price. However, there was lack of specific information on the entrepreneurial pricing strategies adopted by MSPWE's in peri-urban areas and the price competitiveness within and across the respective organizational models in the peri-urban areas of Kenyan cities. This study sought to clarify the reality on pricing as a crucial factor influencing enterprise sustainability by assessing the entrepreneurial pricing strategies adopted by the MSPWE's in the peri-urban areas of Kenyan cities.

2.7 Regulatory and Business Organizational Frameworks

Regulatory system selected by government can considerably affect the business environment, and, as a result, determine the competitiveness and ability of private operators to efficiently conduct business (Ouyahia, 2006). The Government of Kenya recognizes and incorporates a policy declaration that an enabling legal and regulatory

environment is imperative if the MSE sector is to create the desired impact and play an effective role as an engine of economic growth, income generation and poverty reduction (Republic of Kenya, 2005). By recognizing water as an economic good and adding a social good dimension, Kenya's National Water Policy (Republic of Kenya, 1999) provides a mixed policy declaration for private sector participation. Ouyahia (2006), argues that to protect consumers and private operators, private participation needs to be preceded by substantial institutional developments in developing countries. Specific policy formulation that favours a win/win approach to private sector participation, particularly on MSPWE's in peri-urban areas is lacking and there is need to examine and make recommendations that lead to the development of such a policy.

Public-Private Partnerships (PPP's) are gaining favour as a way of harnessing the know-how and financial resources of the private sector. According to the United Nations Economic Commission for Africa (2005), governments have been under continuous pressure to consider alternative ways of infrastructure provision. Progressively, government, private sector and civil society organization (CSO) roles have become more clearly defined and public-private partnership (PPP) schemes have become more popular. Public Private Partnerships (PPP's) are seen in this context as an effective means to establish cooperation between public and private actors and to bundle their financial resources, know-how and expertise to meet the challenges facing service provision. While this approach promises several benefits, experience shows that involving private actors in the provision of basic services needs to be carefully planned and monitored if the benefits of such a model are to be

fully realized and the numerous potential drawbacks avoided (United Nations Economic Commission for Africa, 2005).

One of the most challenging aspects facing PPP's remains the need to reconcile two competing aspects: governments need to find ways to fulfill their socioeconomic responsibilities for ensuring services to all citizens, on one hand, while striving to preserve the interests of private investors on the other. However, because of many difficulties related to the cost-recovery levels and priority given to meeting the social objectives, PPP's in most African countries will continue to require public funding in the form of financial allocation or direct subsidies to augment the private sources of funds in all types of partnerships (United Nations Economic Commission for Africa, 2005).

Hence in recognition of the competitive advantage enjoyed by the SWEs in peri-urban areas, there is an emerging trend of deliberate efforts for cooperation between water utilities and SWEs, rather than direct competition in some cities of the developing world to deliver water services in peri-urban areas. Thus in Philippines deliberate efforts to ensure that small piped water networks are no longer the domain of informal entrepreneurs going where utilities will not or cannot go (slums) have been implemented in a number of water utilities with the assistance of Asian Development Bank (Asian Development Bank, 2007). The Asian Development Bank is helping the Manila Water Company Inc. and other utilities to clear the technical hurdles often present in densely populated areas by working closely with the typical local entrepreneur who finances and builds a system within a slum area that mimics the utilities' cost and quality of service, but on a scale that provides affordable, direct

connections to urban poor households (Asian Development Bank, 2007).

In Paraguay small water enterprises, the *Aguateros*, invest and operate small localized water supply networks that serve substantial populations in peri-urban areas where the water utility has been constrained to operate (World Water Council, 2005). The *Aguateros* expand their networks until they encounter another network. Within the area they cover, they tend to be the sole providers of piped water. The experience with *Aguateros* has been so successful that the approach is being replicated in many towns and rural areas of Paraguay with World Bank Assistance (World Water Council, 2005). The Water Utility serving Can Tho City in Vietnam, has adopted a partnership with local entrepreneurs who provide land and run small localized piped networks to provide potable water in the rapidly urbanizing Mekong Delta, as a result of the expansion of Can Tho City (Spencer, 2007) and the inability of the centralized water utility to reach these areas. A similar kind of local system in neighbouring Cambodia's largest city, Phnom Penh, has been termed 'water wholesaling and it seems that this kind of response to an increasing demand for clean household water is destined to become more common in the region (Spencer, 2007).

Using such experiences as the *Aguatero* experience, Nickson (2005) argues that (1) small scale private service providers can contribute to better access to services and ease financial pressures (2) large state or private monopolies are not necessarily the only or best option and (3) public limitations can be overcome by allowing appropriate private sector participation in service delivery. Nickson raises the question whether in fact a large operator (whether public or private) even with the usual exclusive rights to deliver water over the city and its environs, could deliver the

services more efficiently, equitably and with higher coverage over the long term in the peri-urban areas and avers that the World is full of evidence that large utilities in developing countries, whether under public or large private company management, have been grossly unable. There is a strong case, for this reason alone, for tolerance and institutionalized recognition to *Aguateros* and by extension to other small scale service providers elsewhere in the World.

The above review demonstrates noticeable positive global efforts towards PPP's with SWEs in peri-urban areas, in recognition of the competitive advantage they enjoy in these areas. However in Kenya Njiru & Albu (2002) established that at the time their study was conducted, SWEs faced many constraints and a hostile environment. However since this study was undertaken, the water sector in Kenya had undergone massive reforms, amongst them the enactment of the Water Act 2002 that recognizes that private water service providers can be engaged in the provision of water services (Republic of Kenya, 2002). The Act provides room for private sector participation with the Water Service Board as the holder of the license. There was however no study that had been undertaken to determine regulatory and organizational frameworks under the legal and policy environment created by the water act 2002 in relation to MSPWE's and how such frameworks influence the sustainability of MSPWE's in peri-urban areas of Kenyan cities. This study sought to determine, more specifically, how the regulatory authorities and public water utilities in the three Kenyan Cities were endeavouring to establish favourable regulatory frameworks and partnerships in the peri-urban water markets involving MSPWE's and how these influence the sustainability of MSPWE's.

2.8 Interventions for Acquisition and Improvement of Entrepreneurial Skills

Drucker (2007) observes that entrepreneurship is risky because so few of the so called entrepreneurs know what they are doing, lacking in methodology and violating even elementary and well known rules. Desai (2009) points out that even though it is acknowledged that an individual's personal background (family, culture, career) may already have predisposed some entrepreneurial traits, entrepreneurship can be taught to people of all culture. Drucker (2007) avers that entrepreneurship is not a personality trait but a behavior whose foundation lies in concept and theory rather than in intuition and can be taught. According to the Resource based theory, the entrepreneur and the human organization or network that he/she creates can be a source of competitive or even sustained competitive advantage. According to Drucker (2007), the existing business needs to know how to be entrepreneurial and to innovate otherwise it will not survive unanticipated change and innovation unless it acquires entrepreneurial competence.

Interventions for acquisition and improvement of entrepreneurial skills have been recognized to impact on the MSEs on opportunity recognition, survival and growth, preparedness to cope with change, skills and attitudes of the enterprise human resource, and improve the entrepreneurial performance (Republic of Kenya, 2005; Namusonge in Mullei & Bokea, 1999; Rosa and Scott, 1996). In this regard MSPWE's require entrepreneurial, managerial and technical skills for the specialized area of operations in piped networks to be successful. Such skills are vested in the entrepreneur and the human organization and network created. These skills may be improved through interventions tailored for acquisition and improvement of

entrepreneurial skills (Mullei and Bokea, 1999). The expectation is that if business skills are taught, and appropriate advisory and support services are provided, this should have a significant impact in the number of new ventures that are created, survive and prosper. This position is confirmed by Rosa and Scott (1996) who argue that entrepreneurship education is an intervention that can contribute to stimulating entrepreneurial supply and performance. This intervention could be directed to increase the entrepreneurial awareness of people, to persuade them to try out new ventures, and to acquire new skills to help them to succeed in starting and growing businesses.

Namusonge in Mullei and Bokea (1999) explains that to be useful training should be tailored to suit different levels of learning and/ stage of business i.e. pre-startup, startup, business survival, growth and improvement and evaluation of impact. There was, however, lack of adequate information on the types of interventions for acquisition and improvement of entrepreneurial skills on MSPWE's operating in peri-urban areas and the influence of these interventions on the sustainability of the enterprises, more particularly recognizing the specialization required in investing, operating and managing piped water supply networks. This study aimed to fill this gap by establishing the nature of business development interventions and the influence of such interventions on sustainability of MSPWE's in peri-urban areas of Kenyan cities.

2.9 Sustainability

Profitability has been used in this study as the key indicator and operational variable to measure sustainability. This is in consideration of the fact that profitability sustains businesses that survive and grow (Bwisa, 1998; Bwisa 2005; Saleemi, 2009), that is sustainable businesses. Saleemi (2009) articulates that profit is a must outcome of businesses as no business can stay in the market long enough, that is be sustainable, if it does not earn profit asserting that 'as food is to human life so is profit to the life of the business'. In other words profitability is a characteristic, an attribute, that indicates business life and how healthy business is at that; its consistent absence means business stagnation and potential collapse (Saleemi, 2009), that is business cannot be sustainable. This has the implication that consistent profitability is a key indicator of business sustainability.

Bwisa (2005) highlights that maximizing profits is the ultimate goal for many entrepreneurs. In agreement with this view Desai (2009) observes that throughout history many scholars attempting to define the entrepreneur (Richard Cantillon, 1725; Adam Smith, 1776; Jean Baptise Say, 1803; Frank Knight, 1921; Everret Hessen, 1958; Arthur Cole, 1959) recognized profit and growth as the very purpose, drive, reward and motivator for entrepreneurship. The implication of this is that profitability is a major entrepreneurial reward that sparks and sustains the entrepreneur's interest in the business. With consistent lack of this reward, as opposed to consistent profitability, the entrepreneur's interest will diminish; a consequence likely to result in business closure.

Consistent with the above discussion, the Asian Development Bank (2006)

highlighted that profitability is an indicator of sustainability for SWEs in that small scale private water providers (SSPWPs), sustained and motivated by profits, may be longer lasting and more expansionary than NGOs and other not-for-profit providers. From the foregoing discussion, therefore, profitability is a characteristic, an attribute and key indicator of not only a business with life but also healthy business, that is sustainable business. Consistent profitability is therefore a key indicator of enterprise sustainability and may therefore be used as an operational variable to measure sustainability.

2.10 Summary of Literature Review

The literature review mapped and assessed the existing intellectual territory in the area of study and linked the proposed study to the existing body of knowledge. A critical review of theories of entrepreneurship revealed that the classical theories including economic, sociological, psychological/trait theories as well as the Schumpeterian innovation theory were largely inadequate to study the factors influencing the sustainability of MSPWE's. The need for a multidimensional framework that integrates into one coherent framework the context, processes and outcomes of entrepreneurship was critically discussed. This critical review identified the resource based theory as a robust line of inquiry that could be applied to study the factors influencing the sustainability of MSPWE'S in peri-urban areas.

The review justified the postulated independent variables, that is the factors expected to influence sustainability (the dependent variable) of MSPWE's in peri-urban areas of Kenyan cities and explained consistent profitability as an indicator and operational

variable of sustainability that could be used to measure sustainability.

2.11 Summary of Identified Gaps

The literature review revealed that although previous studies had shown that SWEs come in to fill gaps in public utility delivery of piped water to peri-urban areas of Kenyan cities, none was adequate enough in terms of information to enable generalization on the factors influencing sustainability of MSPWE's. The review established that the independent variables expected to influence sustainability of MSPWE's in peri-urban areas include market drivers for entrepreneurial response (demand for piped water services, gaps in public water utility networks, water source, control of water infrastructure, competition, socio-political support), entrepreneurial customer responsiveness, entrepreneurial pricing strategies, regulatory and organizational frameworks as well as interventions for acquisition and improvement of entrepreneurial skills by MSPWE's.

Further, the literature review established that there was lack of adequate information to enable generalization on factors influencing sustainability of MSPWE's in peri-urban areas of Kenyan cities. This study therefore aimed to fill the specific information gaps and generalize on factors influencing sustainability of MSPWE's in the peri-urban areas of Kenyan cities.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

The purpose of this study was to determine the factors that influence the sustainability of micro and small piped water enterprises (MSPWE's) in piped networks in peri-urban areas of cities in Kenya. In this chapter an elaboration of the research design, target population, sampling frame, sample size and sampling technique, the data collection method and instruments and the methods of data analysis are presented.

3.2 Research Design

According to Saunders, *et al.* (2007), research design is the general plan of going about answering the research questions and testing hypotheses. The research was mixed model research. Mixed model research combines both quantitative and qualitative data collection and analysis approaches as opposed to distinct quantitative or qualitative research (Saunders *et al.*, 2007).

The subject of analysis was a micro and small piped water enterprise. The study was designed to collect qualitative and quantitative data from a sample picked from the target population of MSPWE's in the peri-urban areas of Kenyan cities with the aim of describing phenomena on sustainability of MSPWE's and determining the causal relationship between the independent variables and dependent variable as hypothesized in the conceptual framework. It was, therefore, a descriptive and

explanatory mixed model study. According to Saunders, *et al.* (2007), a descriptive study describes phenomena while an explanatory study establishes causal relationship between the identified independent variables and the associated dependent variable. The qualitative aspect of the research is concerned with establishing attributes, features or characteristics that describe a phenomenon (Kothari, 2004), for example the types of regulation applied in the water market, quality, reliability and convenience of a water service. On the other hand a quantitative research is based on the numerical measurements, that is, amounts of characteristics which can be expressed in numbers (Kothari, 2004). It is applicable to the phenomena that can be expressed in terms of quantity, for example water prices, cost of bulk purchase of water, price subsidies, quantity of water sold. Quantities were used to find out the numbers and amounts of some of the variables in the study such as the price of water, cost of bulk water purchases, quantity purchased, quantity sold, profitability as a percentage.

Data was collected using the survey method. All quantitative data was analyzed using quantitative methods while qualitative data was analyzed using qualitative methods, to generate themes and categories relating to sustainability of MSPWE's. In addition the qualitative data collected using questionnaires and observation schedules as well as themes and categories arising out of qualitative analysis of data collected using the interview guide were quantitized and analyzed using statistical methods. According to Saunders, *et al.* (2007), quantitizing qualitative data means converting it into numerical codes so that it can be analyzed statistically. Quantitative data was compiled and analyzed using SPSS and Microsoft Excel.

3.3 Target Population

The target population, consisting of 2,742 MSPWE's, was established by inquiries with the public water utilities in the three cities which indicated that the micro and small piped water enterprises operating piped water networks in the peri-urban areas of Kenyan cities were engaged in the sale of water, either from own sourceworks or from the public utility mains under three business organizational models comprising (1) Three hundred eleven MSPWE's under fully privatized model (FPM) in which the MSPWE invested fully in small localized networks; (2) Six Bulk Water Master Operators under Public-Private Partnerships involving purchase of water in bulk from the public utility and selling it in bulk to retail MSPWE's (3) Two thousand, four hundred twenty five MSPWE's under Public-Private Partnerships involving direct bulk purchase of water from the public utility or from Master Operators involved in a public-private partnership for retailing to consumers. The number of MSPWE's; by organizational type, for each city are presented in the Table 3.1.

3.4 Sampling

The areas from which the sample was taken were where multiple MSPWE's activity was well developed and that could provide adequate sample sizes for the proposed methods of data analysis. The aggregate of the micro and small piped water enterprises in these areas constituted the sampled population as presented in Table 3.1.

Table 3.1: Piped Water Enterprises in Peri-urban Areas of Kenyan Cities

City	Fully Privatized Model (FPM)	PPP's- Master Bulk Water Operators	PPP's- Piped Water Retailer	Grand Total
Nairobi	73		1495	1568
Kisumu	-	6	381	387
Mombasa	238		549	787
Total	311	6	2,425	2,742

Source: Nairobi, Kisumu and Mombasa Water Utilities Registers

As each of the above areas were under the jurisdiction of independent water services boards and public water utilities the sampling frame was established on the basis of inquiries with the water utilities in the three cities. Saunders, *et al* .(2007) support the compilation of the sampling frame by the researcher where no suitable list exists because it is important that the sampling frame is current and accurate.

The study involved undertaking statistical analyses on the sample to enable inferences about the population to be made on the basis of the sample. As the distribution of each of the various population characteristics was not known, a sample size that ensured inferences about the population characteristics could be made on the basis of the sample was taken. Saunders *et al*.(2007), explains that provided samples are not biased, by the law of large numbers, samples of larger size are more likely to be representative of the population from which they are drawn than smaller samples. Statisticians have also proved that the larger the absolute size of a sample, the more closely its distribution will be to the normal distribution and thus the more robust it will be (Namusonge, 2010; Saunders *et al*., 2007). This

relationship, known as the Central Limit Theorem, occurs even if the population from which the sample is drawn is not normally distributed. The Central Limit Theorem provides that when the sample size is at least 30, the approximation to the normal distribution of the sample means is complete and the confidence interval for the population parameter of interest can be determined from the sample mean at a specified level of confidence (Namusonge, 2010; Mason *et al.*, 1999).

However, notwithstanding the above sample size on the basis of the Central Limit Theorem, the selected sample size was also guided by the 5% level of significance at which the formulated hypotheses were to be tested. The level of significance is the statistical standard which is specified for rejecting the null hypothesis (Namusonge, 2010). At this level of significance the level of confidence is 95%. This is the level of confidence normally used for research in social science (Saunders *et al.*, 2007).

Mason *et al.* (1999) explains that the minimum sample size for population of 10,000 and more may be computed by the following formula:

$$n = p(1-p)(z/e)^2 \quad \ldots\ldots(1)$$

Where

n is the minimum sample size required

p is the proportion of the population possessing a particular characteristic under study

z is the z value in the standard normal distribution corresponding to the corresponding level of confidence.

e is the margin of error required.

Mason *et al.* (1999) explain that if an estimate of the proportion that possess the particular characteristic under study is known, whether from a pilot study or any other source, then this may be utilized to compute the sample size. A proportion of 0.5 was used to compute the sample size, which according to Mason *et al* (1999) gives the largest sample size at a given confidence level.

At 95% level of confidence

Z = 1.96

e = 5%

Substituting these in formula (1) above gave a sample size of 384. Saunders *et al*. (2007) explains that this size may be reduced where the population is smaller than 10,000 by application of the formula:

$n' = n/(1 + (n/N))$ ……(2)

Where

n' = The adjusted minimum sample size, n = The minimum sample size as calculated above for a population of 10,0000 and larger was 384, N = The size of the population = 2,742.

Substituting these values in formula (2) above gave the minimum sample size as *n'* = 337.

The proportionate sample sizes for each stratum were computed on the basis of the size of the stratum and the target population. In view of the above explanation concerning the sample size, effort was made to ensure that the sample size for each stratum was the larger value as proportionately computed from formula 2 above or

30, being the minimum sample size as per the Central Limit theorem or the total of the particular stratum for a population size below 30. As the response rate was expected to be lower than 100%, a sample size of at least 50 was selected from each stratum/substratum, assuming a 50- 75% response rate for questionnaires delivered by hand (Saunders *et al.*, 2007), where the number of MSPWE's was 50 or more. Where the number of MSPWE's was below 50, then all the MSPWE's in that particular stratum were picked to constitute the sample size in the stratum.

Taking into account the minimum sample size as per the Central Limit Theorem, the minimum sample size for the selected level of confidence, and a response rate of 75%, the sample size computed was 503 broken down for each stratum as shown in Table 3.2. This sample size comprised 18.3% of the target population which was sufficiently large even for descriptive studies for which the minimum sample size is 10% (Saunders *et al.*, 2007).

Table 3. 2: Selected Sample of Piped Water Enterprises in Peri-urban Areas of Kenyan Cities

City	FPM	PPP's- Master Bulk Water Operators	PPP's- Piped Water Retailers	Total
Nairobi	50		245	295
Kisumu	-	6	62	68
Mombasa	50		90	146
Total	100	6	397	509

Probability sampling was utilized to pick the sample. According to Namusonge (2010), a probability sample is a sample drawn from the population in such a way that every element in the population has a non-zero and a known probability of being chosen. This sampling technique is representative sampling most commonly associated with survey researches (Namusonge, 2010; Mugenda & Mugenda, 2003; Saunders, *et al.,* 2007). As explained above, the sampled population was the MSPWE's located in the peri-urban areas of Kenyan Cities with observable multiple number of MSPWE's operating in piped water networks. The targeted MSPWE's were expected to exhibit heterogeneous characteristics occurring in groups (strata) determined principally by city and business organizational model - the public private partnership comprising master operators on delegated management for water services management in designated zones and direct retailers as well as fully privatized models.

Considering that the population was heterogeneous in that it occurred in different cities and under different organizational models, stratified random sampling technique was adopted to pick a representative sample from the sampling frame. In stratified random sampling the population is divided into the relevant and significant strata based on one or a number of attributes, effectively dividing the population into a number of subsets (Saunders *et al.,* 2007). Nachmias and Nachmias (1996) explain that stratified sampling ensures that the different groups (strata) are adequately represented in the sample and this increases the level of accuracy in estimating population parameters. Stratification enabled each of the MSPWE groupings (strata) in terms of the city and organizational models to be analyzed independently and then

in combination with others in order to bring out the characteristics of any one of the stratum in its own right and also in combination with others.

Each stratum was divided into zones (sub-strata) that were individually more homogenous than the aggregate in the complete stratum. Strata were based on city and organizational model and the sampling areas were peri-urban neighbourhoods identified to have multiple MSPWE's activity. The number of enterprises for each zone in a particular city was established by reference to the public water utility register. A proportionate sample size for each zone was determined on the basis of the total number of enterprises for the particular enterprise organization model in the particular city and the number of enterprises in that zone.

Satellite images of these zones were downloaded from Google Earth and geo-referenced on MapInfo geographic information system (GIS) application platform to produce maps with Universal Transverse Mercator (UTM) grids. A grid of 100m x 100m was created on the resulting maps to produce a series of 100mx100m rectangles for each zone. With the aid of the geo-referenced maps reconnaissance transect walks were made to locate the areas with multiple MSPWE activity more precisely. A hand held geographic position (GPS) set was utilized to capture the UTM coordinates of key points and the coordinates used in preparing location sketches of the sub zones with multiple MSPWE activity on the prepared map with UTM grids.

The sampling space was taken to be the rectangles created by the grids in these zones. These rectangles were given identification numbers and a number equal to the

desired sample size for the particular zone selected by simple random sampling. Simple random sampling, also just called random sampling, is a probability sampling technique that ensures each member of the sampled population has an equal known and nonzero chance of being included in the sample (Namusonge 2010; Nachmias & Nachmias, 1996). Using the UTM grid maps and a hand held GPS the selected rectangles were located on the ground, the number of enterprises operating within each of the selected rectangles counted and the GPs coordinates of the enterprises in the selected rectangles recorded. The number of units of observations picked in any one selected rectangle in a particular zone were determined through proportionate allocation on the basis of the count in the particular rectangle and the total number of MSPWE's in the rectangles selected for the particular zone. The sample size from each rectangle, was picked by simple random sampling.

3.5 Data Collection Methods

Both primary and secondary data were collected. The secondary data was gathered from review of previous studies and water sector publications such as the National Water Policy, the Water Act 2002 and recent study reports from the respective water services boards as well as the public water utilities in each of the three cities under study. Primary data was collected from September to November, 2009 by survey method using three types of survey instruments: (1) a questionnaire administered to the sampled MSPWE's entrepreneurs; (2) an interview guide with a set of open ended questions administered to the chief executives of the Water Services Regulatory Board, the Water Services Trust Fund, three water services boards and three water utilities covering the three cities and (3) the structured observation

schedule for direct observations.

According to Bell (2004), the aim of a survey research is to obtain information which can be analyzed and patterns extracted and comparisons made to enable conclusions and inferences about the population. A survey aims to obtain information from a representative selection from the total population whereby the findings from the sample are used to represent the total population as a whole. The above statistical principle further clarifies that findings based on a sample can correspond closely to those that would be obtained if the whole population were to be studied when sampling ensures proper representation of the total population (Mugenda & Mugenda, 2003; Namusonge 2010). Surveys allow the collection of a large amount of data from a sizeable population in a highly economical way, often obtained by using a questionnaire where the data is standardized, allowing easy comparison (Namusonge, 2010: Saunders, *et al.*,2007).

The three data collection instruments comprising a questionnaire, an interview guide and a structured observation schedule are presented in Appendix I, Appendix II and Appendix III respectively. Use of the three instruments in the study enabled fuller collection of information and triangulation. Nachmias and Nachmias (1996) explain that triangulation is a technique that adopts two or more methods of data collection to minimize the influence of any one particular method of data collection on the research findings. All the questions in the survey instruments sought to obtain the specific information needed to address the research objectives, research questions and hypotheses. The variables were measured in order to answer the research questions. The following matrix (Table 3.3) presents the measurement of variables in

the survey instruments.

Table 3. 3: Measurement of Variables

	Questionnaire Items	Interview Guide Questions	Observation Schedule
Independent Variables			
Market drivers for entrepreneurial response	5-21	1-8	2, 3, 4
Customer Responsiveness	22-28	9	5, 6, 8
Price Competitiveness	23-28, 35	8	5
Regulatory and the organizational frameworks	1-4, 29-32	10-11	6,7
Business development interventions	33-34	12	
Dependent Variable			
Sustainability	23, 35		

The questionnaire is a set of standardized structured questions (Saunders, *et al.*, (2007). On the other hand the interview guide contains open ended questions addressing selected themes or topics of the research for discussions with selected experts. Welman and Kruger (1999) support the interview guide, highlighting that it is a useful instrument that enables collection of in-depth information on specific themes or topics. Open ended questions in the interview guide afford the researcher the opportunity of probing and getting clarifications on vague responses or to ask for elaboration of incomplete answers (Nachmias and Nachmias, 1996). The interview guide was used to collect data for fuller coverage of selected areas of study, for instance regulation and partnerships, from the subjects with relevant knowledge and experience.

A structured observation schedule was used to obtain supplementary information such as reliability of the water supply service, customer preferences and externalities in the operating physical environment. It contained a standardized checklist against which information was filled. According to Welman and Kruger (1999), in direct observation, the survey targets are observed directly as they go about their activities. Nachmias and Nachmias(1996) explain that the main advantage of observation method is its directness as it enables the researcher to study behaviour as it occurs.

The questionnaire was administered to MSPWE's entrepreneurs by the researcher with the help of three research assistants. According to Nachmias and Nachmias (1996), for questionnaires, no clarifications are given or questions reworded and the in order in which questions are asked will be maintained for all respondents to minimize interviewer's bias. In other words the researcher is restricted to the questions, their wording and their order as they appear on the questionnaire with relatively little freedom to deviate from it (Welman & Kruger, 1999). Nachmias and Nachmias (1996) explain that the questionnaire ensures that any variations between responses can be attributed to the actual differences between the respondents and not to variations in the interview and thus reduces the risk that changes in the way questions are worded and the way they are asked might elicit differences in responses.

The questionnaires were delivered by hand by the researcher or his assistants and respondents requested to fill in the questionnaire as the researcher waited or time when the researcher could pick the filled in questionnaire discussed and agreed upon

with the respondents. This approach has a high response rate and by virtue of the researcher's presence accord opportunity to the researcher to collect fuller information through observation and supplementary information from respondents (Namusonge, 2010; Saunders, *et al.* 2007).

The observation schedule was used to collect data in the MSPWE's business setting. To overcome the disadvantage of the skills and experience of the observer, the observations were recorded against a standardized schedule or checklist (Welman & Kruger, 1999). In addition the research assistants were trained on the filling or checking information in the check list. Namusonge (2010) explains that observation method of data collection has the advantage that actual habits or actions of persons may be observed.

Interviews were conducted on the basis of the interview guide with the Chief Executive officers of the Water Services Regulatory Board, the Water Services Boards and Water Utilities under which the three cities fall and the Chief Executive of the Water Services Trust Fund (eight respondents). Saunders, *et al.* (2007) explain that responses proceed on the basis of the respondent's knowledge in the particular topic of the interview. The researcher may choose to vary the order of asking questions between respondents or even skip some questions. The interviews entailed probing, clarifications and elaboration of answers as deemed necessary by the researcher. The interviews on the basis of the interview guide were administered by the researcher himself.

Three research assistants were recruited, one for each of the three cities. They were

trained on how to administer the questionnaires and make direct observations. The questionnaire and the observation schedule were pre-tested with a small group in each of the areas of the survey (about 10% of the sample size) to establish reliability as an instrument of data collection. Minor modifications were made only on the questionnaire. The pre-testing of the questionnaire was done jointly with the researcher and the research assistants.

3.6 Data Analysis

In mixed research, Saunders, *et al.* (2007) explain that either quantitative or qualitative techniques of both data collection and analysis predominate. This research, being mixed model research, involved collection and analysis of both quantitative and qualitative data. Statistical methods were utilized to analyze quantifiable data and also qualitative data to the extent that it could be quantitized. According to Saunders, *et al.* (2007), quantitizing qualitative data means converting it into numerical codes so that it can be analyzed statistically. For this purpose the qualitative data collected using all the instruments was quantitized. Data obtained using open ended questions was subjected to qualitative analysis.

Qualitative analysis seeks to detect themes, categories and patterns that enable general statements to be made on how categories or themes of data are in terms of observed attributes and their relative occurrences and thus leading to conceptualization (Saunders, *et al.*, 2007). Quantitative analysis utilized descriptive and inferential statistics. Descriptive statistics is an analytical tool used in descriptive research to determine and report quantitatively the way things are in the survey sample (Bell, 2004). This type of research attempts to describe such things as type of

regulation, type of water organization models, prices charged. Statistical computations which are often done in descriptive studies are frequencies, percentages, means, modes, medians, standard deviations and variances (Mugenda & Mugenda, 2003). All data obtained using questionnaires; structured observation schedules as well as quantitized qualitative data was analyzed using SPSS software.

As explained in the conceptual framework, RBT was used to study the predictors of MSPWE sustainability taking into account the internal and external environments as recommended by Jaquier (2010 and empirically tested by Caldeira and Ward (2001) on SMEs. The conceptual framework presents the independent variables and the dependent variable (sustainability) and illustrates the expected relationship between the two sets. Using the measurements of the independent variables (the postulated factors), the influence of each of the predictor variables on the sustainability of MSPWE's was assessed on the basis of RBT in terms of whether they enabled the MSPWE possess and control resources with the four attributes: valuable, rare, difficult to imitate and non-substitutable or whether they resulted in establishing favourable industry conditions for the MSPWE's. The prediction of sustainability on the basis of measurements of the independent variables was then confirmed/verified by comparison with measurements of sustainability. Consistent profitability was used as the key indicator and operational variable of MSPWE sustainability.

Inferential statistics was deployed in the analysis involving formulating and testing appropriate hypotheses to sharpen the understanding of the factors influencing entrepreneurial water pricing strategies (Section 3.6.1). Inferences about price competitiveness were made based on the analysis of quantitative and qualitative

responses as well as the test of hypotheses on the competitiveness and variability of the water prices within and across MSPWE models.

3.6.1 Tests of hypotheses on price competitiveness

The purpose of hypothesis testing is to aid researchers in reaching a decision or conclusion about a population (Namusonge, 2010). To study the influence of the entrepreneurial pricing strategies on the sustainability of MSPWE's the following hypotheses were formulated and tested.

Hypotheses on price competitiveness - The price competitiveness within each model and with the public water utility was tested using chi-squared (χ^2) as the test statistic while the price variation across the various models was tested by analysis of variance (ANOVA) at 5% level of significance as follows:-

(a) The competitiveness of the prices, P, charged by MSPWE's in each organizational model in a particular city was compared with the public utility price, Ppu as the expected value in the χ^2 test on the basis of the following hypotheses:-

Null Hypothesis, H_o: The Water price, P<= Ppu;

Alternate Hypothesis, H_1: The Water price, P> Ppu

(b) The Competitiveness of the prices, P, charged by MSPWE's in the same organizational model in the same city was tested by comparison with the mean price, $P_{E,}$ as the expected value in the χ^2 test on the basis of the following hypotheses: :-

Null Hypothesis, H_o: The Water price, P<= P_E

Alternate Hypothesis, H_1: The Water price, P > P_E

(c) The Price competitiveness of the prices μ_1, μ_2, μ_3, ...μ_n, charged by MSPWE's in the different organizational models in the three cities was tested by analysis of variance (ANOVA) using the following Null hypothesis, H_o, and the Alternate hypothesis H_1:

Null hypothesis H_0: $\mu_1 = \mu_2 = \mu_3 = \ldots = \mu_n$.

Alternate hypothesis H_1: $\mu_1 \neq \mu_2 \neq \mu_3 \neq \ldots \neq \mu_n$

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Introduction

In this chapter the data collected in the study is analyzed, discussed and inferences made. The chapter includes the introduction, presentation and discussions on the sample size and response rate, results and discussions. The target population comprised 2,742 MSPWE's occurring in three types of business organizational models- the fully privatized model (FPM), where enterprises invest fully in their own sources and the infrastructure needed to deliver water to the consumer outlets (found in Mombasa and Nairobi), the retail public private partnerships (PPP's) found in all the three cities, simply referred to as PPP's in this study and master operators (MO's) found in Kisumu only. The MO's are private enterprises in a public private partnership with the public water utility, whereby the water utility delegates responsibility to manage, give connections and extend network in a defined zone in a peri-urban area to the private enterprise.

4.2 Population, Sample Size and Response Rate

The target population comprised 2,742 MSPWE's occurring in the three types of business organizational models described above. The questionnaire was administered to a sample comprising 503 MSPWE's selected by stratified random sampling. The sample size and the responses are presented in Table 4.1. The response rate varied from a high of 91.4% to a minimum of 78% across the MSPWE organizational models in the three cities with an overall response rate of 88.9%. This was a good

response rate according to Saunders *et al*. (2007) who observes that for hand delivered questionnaires a response rate of 50-75% is normal.

Table 4.1: Response Rate

City	MSPWE Model	Organizational	Sample Size	Response Counts	Response Rate, %
Nairobi	PPP		245	224	91.4
	FPM		50	47	94
Mombasa	PPP		90	73	81.1
	FPM		50	39	78
Kisumu	PPP		62	58	93.5
	MO		6	6	100
	Total		503	447	88.9

4.3 Enterprise Characteristics

The study determined that MSPWE's had been in operation for varied periods (Figures 4.1-4.3). In Mombasa the mean age for FPM's was 2.8 years while that for PPP's was 5.4years and 33% of the FPM's were more than three years old with the majority of 67% of the FPM's less than three years old suggesting they had cropped up mostly in response to the water shortage in the city over recent years. Mombasa city had 61% of PPP's more than three years old and the remaining 39% less than three years old.

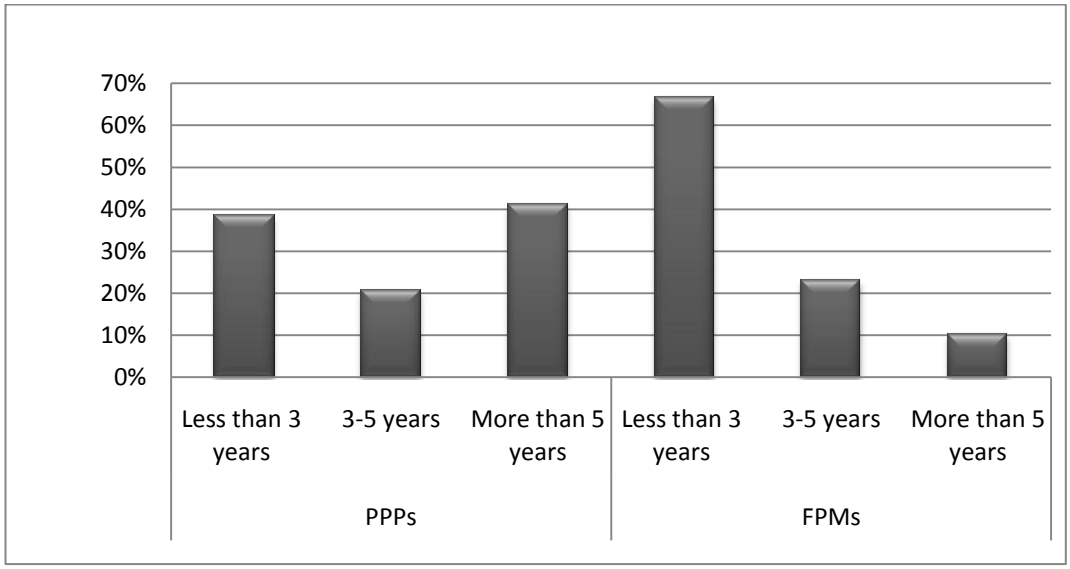

Figure 4-1: Age of Enterprise- Mombasa

Kisumu had the youngest enterprises, with the majority of MO's and PPP's having celebrated their third birthdays in the year of the study with a mean age of 4.2 years for PPP's while that of MO's was three years. Five out of the six MO's (83.3%) were just three years old having come into operation in 2006.

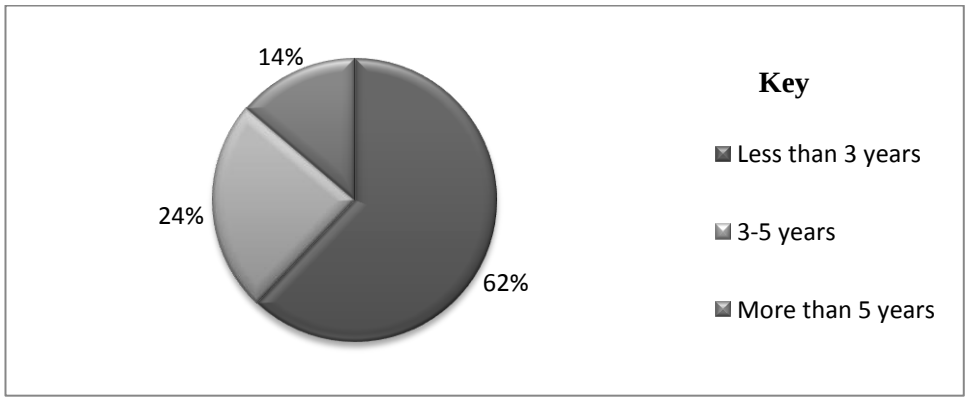

Figure 4-2: Age of Enterprises- Kisumu PPP's

In Nairobi the mean age for FPM's was 5.8 years while that for PPP's was 5.0years, a majority of about 75% FPM's and 70% PPP's were over three years old, with 50% of

FPM's and 48% of PPP's over five years old.

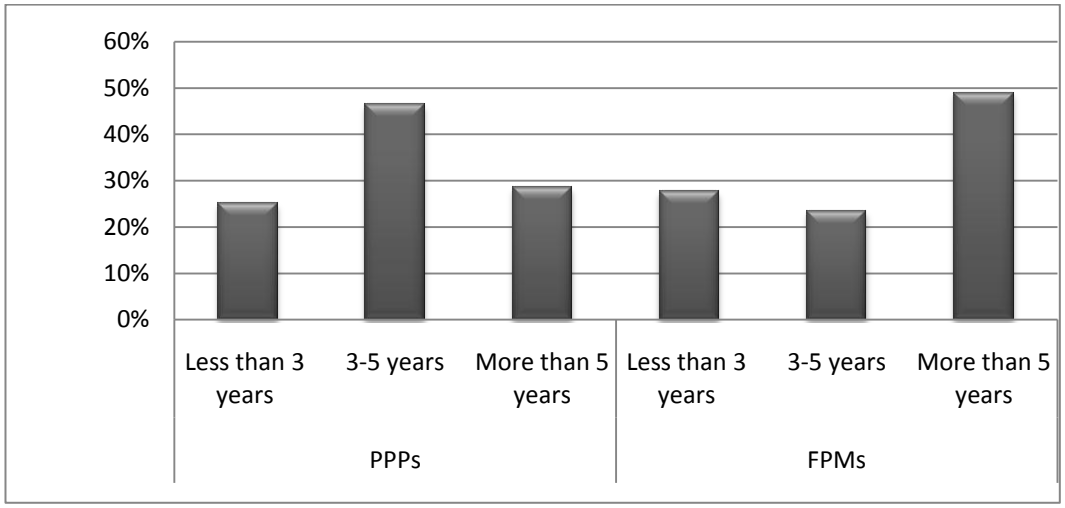

Figure 4-3: Age of Enterprise- Nairobi

Discussions with the water utility for Mombasa indicated that there was an upsurge of FPM's in Mombasa over the last few years because of the biting water shortage in the utility supply in the last 3-5 years. The FPM's, utilizing private wells and boreholes had clearly come into the peri-urban water market to exploit the opportunity created by the inability of the utility to satisfy the demand of the residents in the peri-urban areas. The inadequacy of the utility water supply in the same period also explains why there was no upsurge of PPP's in Mombasa in that period because the utility network from which PPP's source their water had little to give and hence increment in the FPM's. In Kisumu there was also an upsurge of PPP's in the same period, but interestingly due to an opposite occurrence in the utility water mains. The entry of MSPWE's into the Kisumu city peri-urban water market coincided with the tremendous improvement in the utility water supply over 3

years ago. With this improvement MO's got into business in Nyalenda where utility networks were missing and the population density was high, increasing the utility network outreach into the peri-urban neighbourhood but with inadequate density to meet the convenience of the majority of the residents and also giving connections to retail MSPWE's and individuals with metered connections. However many residents found payment of the required deposit to get a connection and monthly bills unaffordable. As a result many entrepreneurs saw and exploited the opportunity created by increased water supply and the consumer economic circumstances and preferences by providing water reliably and at a payment system convenient to the consumers who were more comfortable with small daily expenditures to meet their daily water needs than facing a monthly bill. In Nairobi NCWSC indicated that there was also an upsurge of PPP's with the completion of the Nairobi City Water and Sewerage Bulk Metering Project in Mukuru in 2003.

The results indicated that majority of the enterprises operating under PPP's, except the master operators (MO's) in Kisumu were largely one-outlet water selling outfits. Figure 4.4 shows the number of outlets for Mombasa, indicating that the majority of PPP's and FPM's consistently operated one outlet over a five year period. The proportion of enterprises operating more than one outlet was on a decreasing trend for both PPP's and FPM's, declining from about 35% to 20% for PPP's over a five year period. The same trend was replicated for FPM's showing a decline from about 40% to slightly under 20% over a five year period.

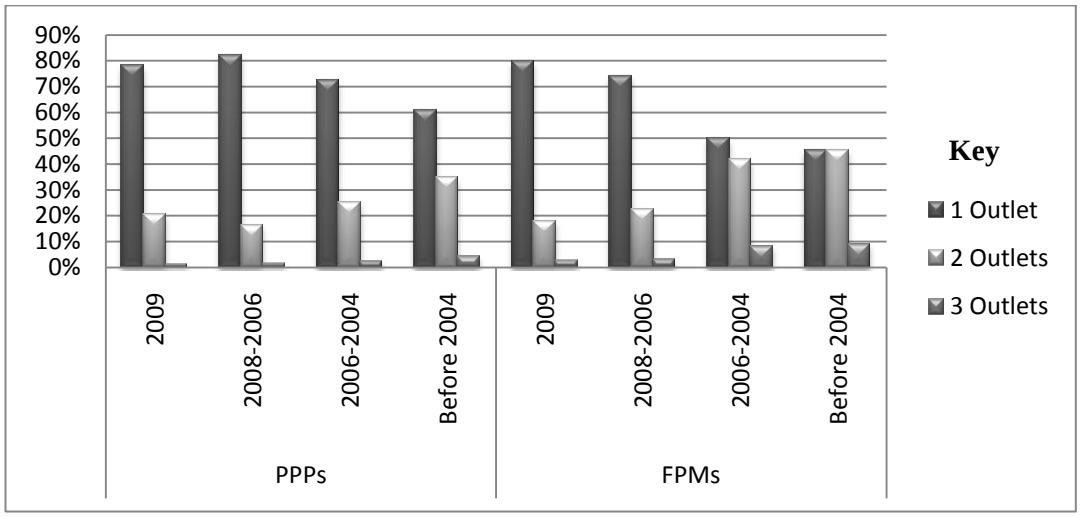

Figure 4-4: Number of water selling points Mombasa

MO's in Kisumu operated multiple outlets consistent with the nature of their business. Four out of 6 MO's equivalent to 67% of the MO population operated 29-50 outlets, one MO operated 78 outlets. The highest number of water outlets operated was 148 outlets under the management of one MO (Figure 4.5).

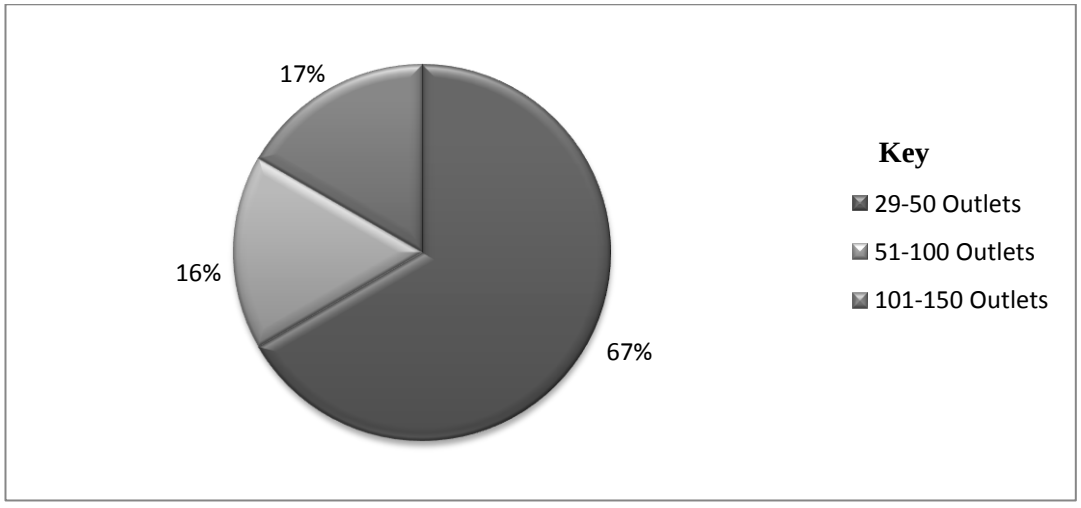

Figure 4-5: Number of Water Outlets- Kisumu-MO's

In Kisumu the proportion of retail PPP's operating just one outlet remained high over a five year period, ranging from about 90%, three to five years ago to just under 80% in 2009 with the proportion operating two outlets increasing from about 10% to about 20% over the last three 3 year period, indicating a slight increase in the number of PPP's operating more than one outlet. This could be attributed to the overall improved water supply in the city in the same period as explained by Kisumu Water and Sewerage Company (KIWASCO).

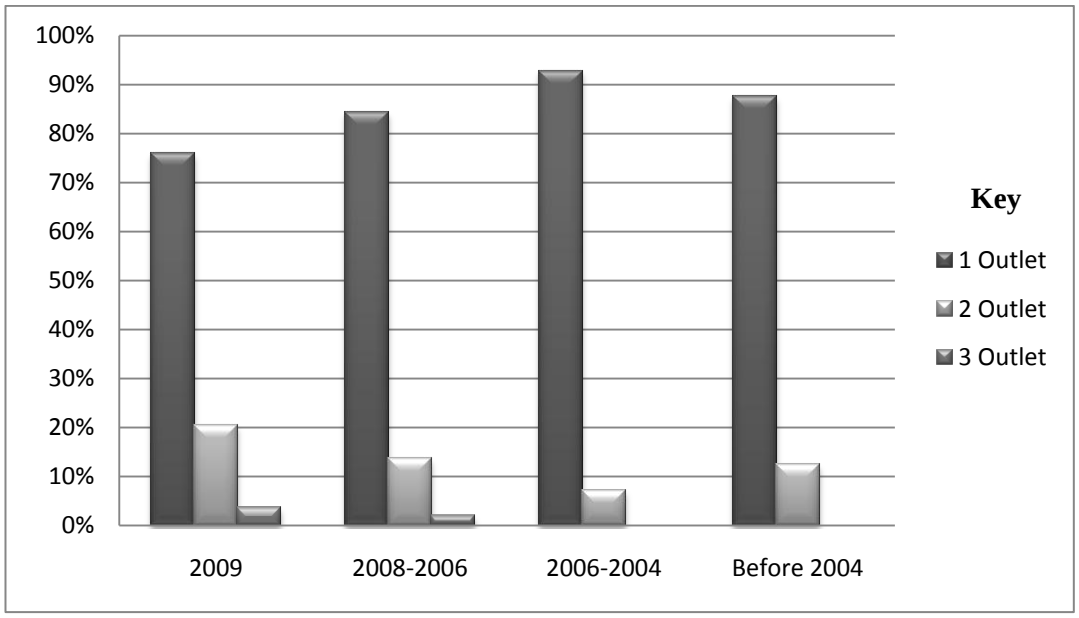

Figure 4-6: Number of water selling points – Retail PPP's, Kisumu

The study established that about 40% of the FPM's in Nairobi operated more than one outlet while the remaining 60% operated one outlet. This had been the trend within the lifespans of the enterprises with the highest number of selling points being 400. Slightly over 37% in this category had more than 4 selling points (Figure4.7). The majority of enterprises operating under PPP's in Nairobi, a significant proportion of about 60% operated one selling point in the last five years and the highest number

of selling points in this category was 4. The proportion of one outlet PPP's increased from 50% to 60% over a five year period, showing more horizontal growth than vertical growth in terms of the size of business.

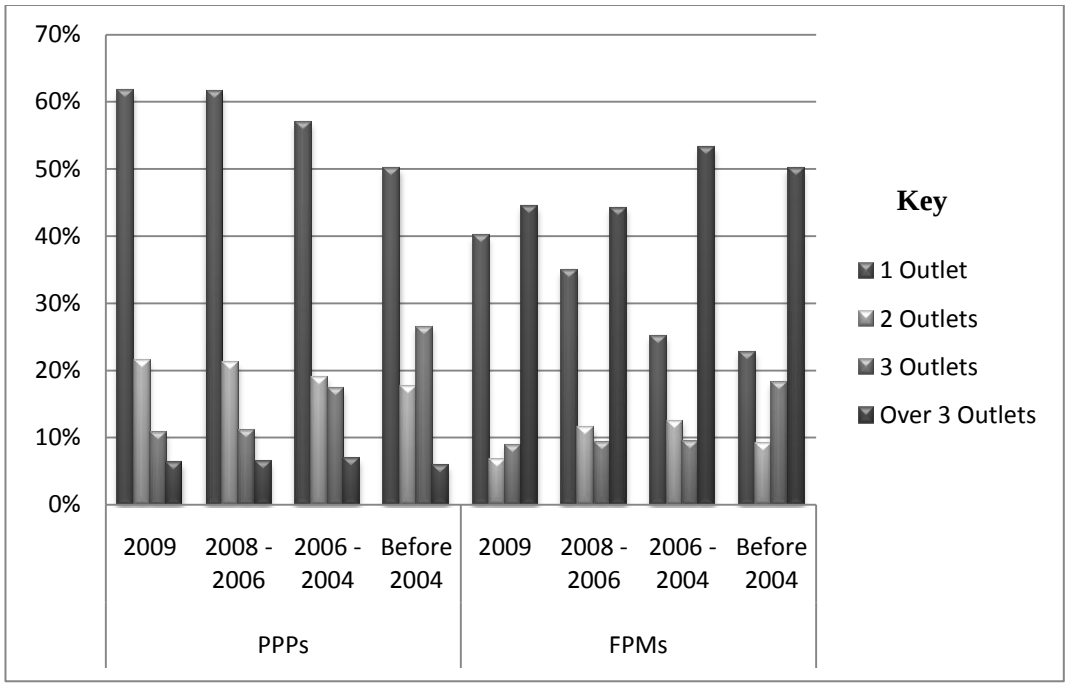

Figure 4-7: Number of water selling points Nairobi

Most of the enterprises had one employee and this scenario remained through the years. About 65% of Mombasa PPP's, on average, had one employee over a five year period with the remaining 35% employing 2 persons with the proportion with one employee increasing from about 55% to slightly over 70% over a five year period (Figure 4.8).

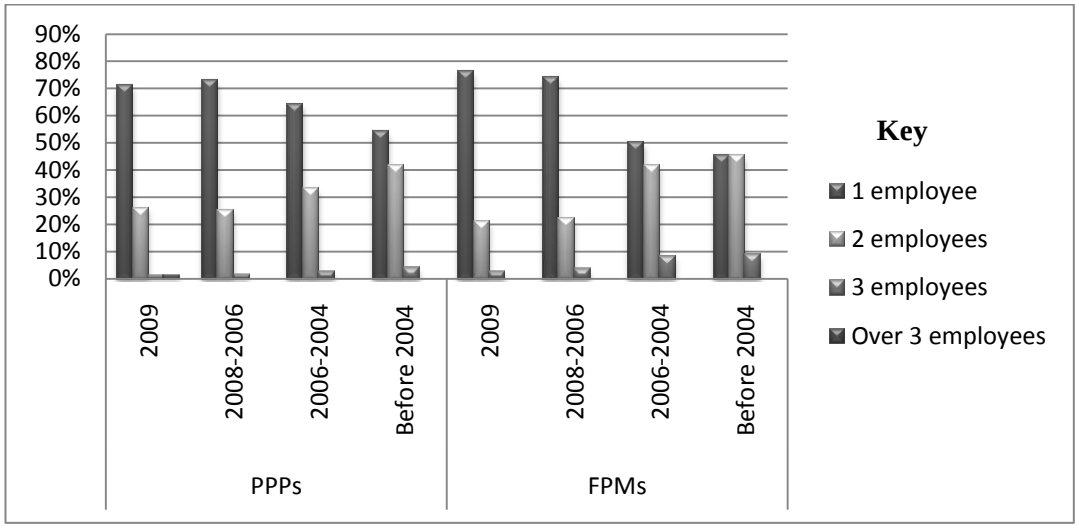

Figure 4-8: Number of Employees- MSPWE's in Mombasa

On average 60% of FPM's in Mombasa had one employee while about 30% had two employees over a five year period and the remaining 10% with three employees. On average the proportion of enterprises with more than one employee dropped from about 40% to about 20% over a five year period (Figure4.8). The drop in proportion of FPM's with one employee could be attributed to the upsurge in the number of one employee MSPWE's in the last three years due to the biting water shortage in the city utility network and not necessarily a decrease in the actual numbers of employees in the respective MSPWE's. However it is observed that the water scarcity in the utility networks, presented an opportunity for the growth of FPM's, but instead of vertical growth there was an increase in the number of one outlet and one employee FPM's, indicating more horizontal growth than vertical growth.

In Kisumu about 80% of the retail PPP's had one employee in the last three years. As can be seen from Figure 4.9 there was a slight increase from 10% to 20% in over a

five year period in the proportion of PPP's employing two to three persons, showing that the improved water source for the PPP's arising from the improving water situation in the city utility system resulted more in the increase in the number of MSPWE's but not the number of employees. This indicated more of horizontal growth than vertical growth.

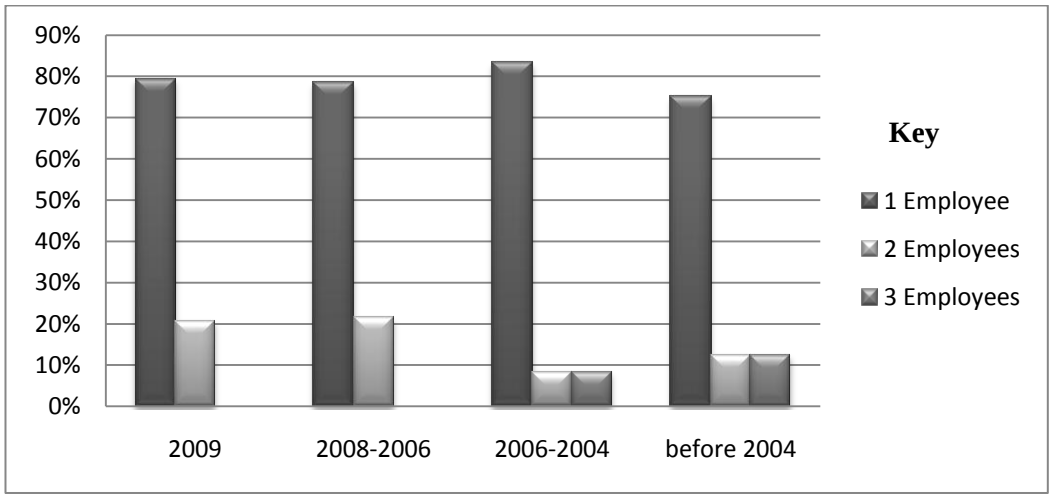

Figure 4-9: Number of Employees- PPP's, Kisumu

For Nairobi the avearge proportion of PPP's with one employee was about 65% over a five year period. The proportion employing one person increased from about 50% to 70% over a five year period. On average about 30-40% of FPM's had one employee over a five year period. An equal proportion had 2 employees over the same period. Less than 20% had more than 2 employees on average in the same period (Figure 4.10).

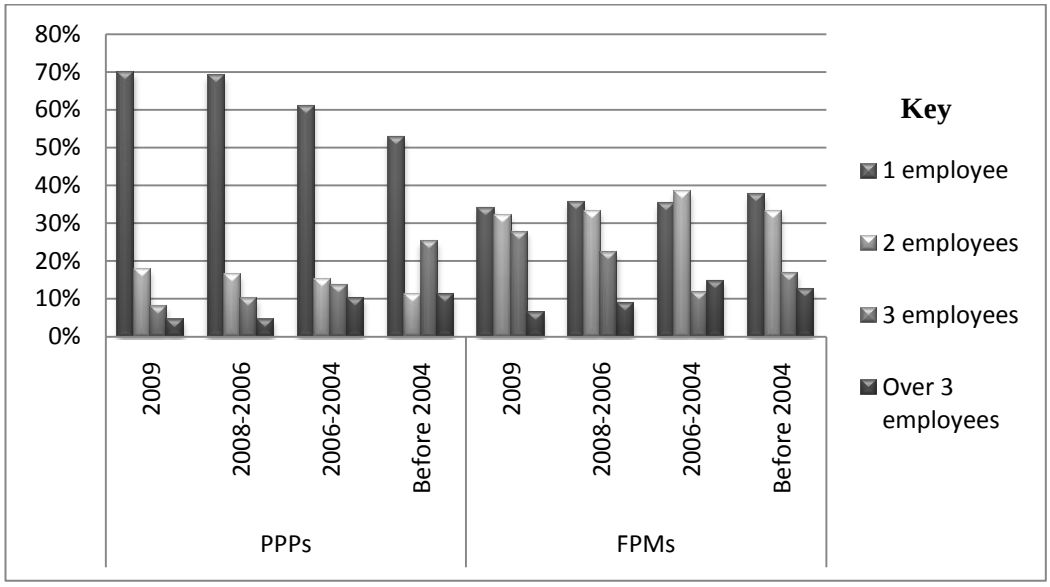

Figure 4-10: Number of Employees in MSPWE's- Nairobi

The enterprise details discussed demonstrate that there has been a lot of horizontal growth in the MSPWE subsector as attested by the upsurge of the enterprises whenever a significant industry condition changed, for instance water improvement in Nyalenda, Kisumu, 3-5years ago and Mukuru, Nairobi, six years ago accounted for the emergence of the majority of PPP enterprises in these cities as verified by the mean age of the enterprises. In Mombasa the biting shortage experienced in the city 3-5 years ago accounted for the majority of FPM's in business in Mombasa. Despite the increase in the number of enterprises, there was little evidence of vertical growth. Those MSPWE's that showed vertical growth were a small proportion of the total.

4.4 Market Drivers for Entrepreneurial Response

The study sought to determine the specific market drivers for entrepreneurial response by the MSPWE's in the peri-urban areas of Kenyan cities and how these

drivers influenced the sustainability of micro and small piped water enterprises. This was against a background lacking in adequate specific information on these drivers and their influence on the sustainability of the MSPWE's. The market drivers for entrepreneurial response studied included demand for piped water services, gaps in utility networks, water sources, control of water infrastructure, competition and socio-political support prevalent in the market as illustrated in the conceptual framework. The study established how these drivers influence sustainability as elaborated in sections 4.4.1- 4.4.6.

4.4.1 Demand for piped water services

The study sought to determine the specific drivers of demand for piped water services in the peri-urban areas of Kenyan cities, because water demand, as a factor that is customer driven was a critical pillar of sustaining MSPWE's without which the MSPWE's would not be in business. This was against a background in which there was lack of adequate information on the specific drivers of demand for piped water services in the peri-urban areas of Kenyan cities.

The results consistently established that MSPWE's were responding to a high water scarcity situation in highly populated peri-urban areas. Table 4.2 shows the scarcity as assessed by the MSPWE's in their markets. The study determined that over a five year period MSPWE's had assessed their markets as faced by high water scarcity.

In Mombasa 60% to 85% of PPP's had assessed their market as faced by high water scarcity between 2004 and 2009, a situation closely reflecting the water scarcity situation facing the water utility as revealed by MOWASCO, the water utility for

Mombasa. In the same period 70-80% of FPM's in Mombasa had also assessed the water scarcity as high. In Kisumu, over the same period, 70-100% of the PPP's, 62-87.5% of PPP's and 80-100% FPM'S in Nairobi had made a similar assessment. The high scarcity of water in the peri-urban areas meant that water, a valuable and imperfectly imitable resource needed to sustain life, was a rare resource to the population in these areas. Figures 4.11-4.13 show the water scarcity rating by the MSPWE's by city/model.

Table 4.2: Water Scarcity rating

Water Scarcity Rating (% of MSPWE's)

	Mombasa					Kisumu				Nairobi			
	Water scarcity rating	2009	2006-2008	2003-2006	Before 2003	2009	2006-2008	2003-2006	Before 2003	2009	2006-2008	2003-2006	Before 2003
PPP's	High	84.9	69.2	57.1	58.3	69	70	83.3	100	87.5	81.3	71.9	61.5
	Low	13.7	24.6	31.4	25	29.3	30	16.7	0	12.5	12.2	17.5	15.4
	none	1.4	6.2	11.4	16.7	1.7	0	0	0	0	6.5	10.5	23.1
	Total	100	100	100	100	100	100	100	100	100	100	100	100
FPM's	High	76.9	81.5	69.2	80					100	95.7	94.1	80.8
	Low	10.3	7.4	7.7	0					0	0	2.9	11.5
	none	12.8	11.1	23.1	20					0	4.4	2.9	7.7
	Total	100	100	100	100					100	100	100	100
MO's	High					50	80						
	Low					16.7	0						
	none					33.3	20						
	Total					100	100						

In Mombasa MSPWE's had assessed the water scarcity in the areas they targeted as high and this scarcity was on an increasing trend over the years, rising from slightly under 60% to about 80% for PPP's and remaining more or less constant at an average of 70% for FPM's over a five year period (Figure4.11). In-depth interviews with representatives of the water utilities confirmed the high water scarcity situation in the areas served by the MSPWE's in the three cities. MOWASCO, the public water utility for Mombasa, indicated Mombasa city and the outlying regions had been struggling with a yawning gap between demand and supply for fresh water due to inadequacy of sources coupled with high losses in the old infrastructure. As a result the Utility capacity to meet demand for water in the city was highly curtailed, meeting only about 40% of the demand according to its assessments and thus necessitating institution of a rationing program. This also left the remaining 60% of the water demand to be met by other service providers such as MSPWE's.

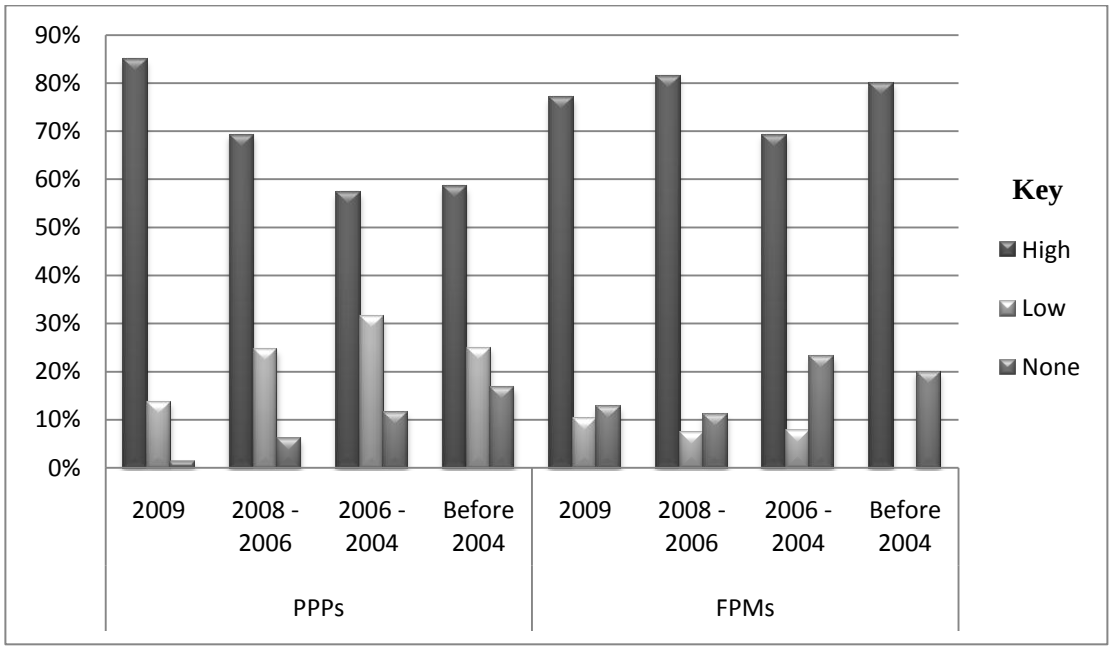

Figure 4-11: Assessment of Water Scarcity in Mombasa-PPP's and FPM's

According to KIWASCO, Kisumu city was faced by an acute shortage of water prior to improving the water utility infrastructure in the previous three years. Prior to this MSPWE's that sourced water from the utility were operating in an environment of acute water shortage but with the improvement of the water infrastructure Kisumu City had started experiencing an increasingly improving water supply situation since three years ago. However, the utility had not penetrated the interior of the peri-urban neighborhoods, leaving these areas faced by high water scarcity. KIWASCO also reported that with the improving water supply in its mains there had been a corresponding increase in the number of enterprises that emerged to cater for the demand precipitated by the water scarcity in the peri-urban areas.

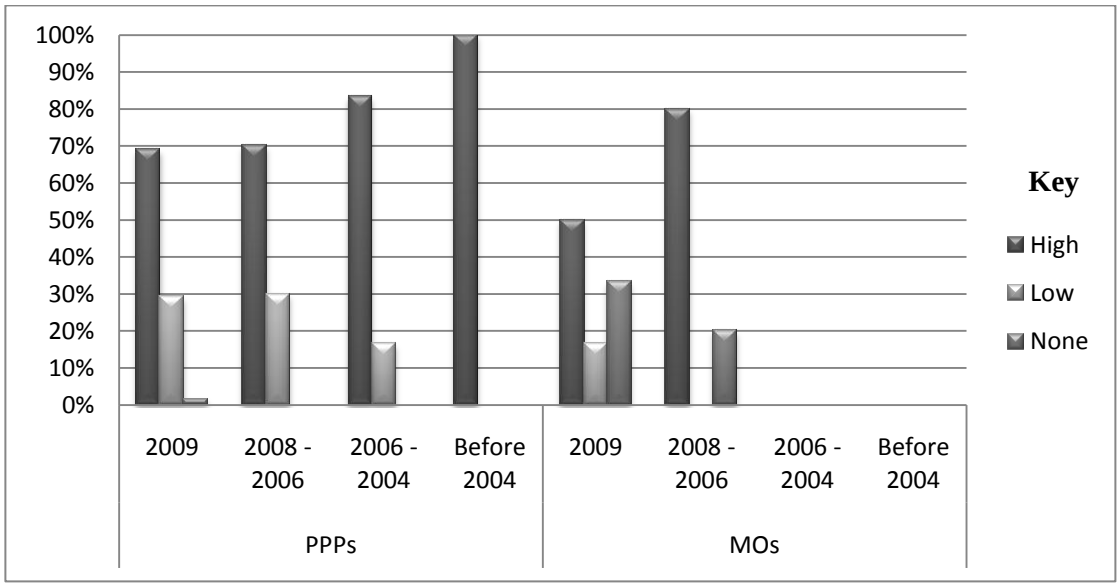

Figure 4-12: Assessment of Water Scarcity in Kisumu - PPP's and MO's

The study results indicated that for the MSPWE's entrepreneurs in Nairobi, areas targeted by the PPP's had shown an increasing trend in scarcity with the proportion of PPP's assessing it as high rising from about 60% to close to 90% over a five year period. A relatively much smaller proportion of FPM's, on the hand assessed water scarcity in the areas they served as high. In the absence of the FPM's, however, these areas would be faced by severe scarcity because of the absence of the water utility only that the FPM's were providing the water services and thus already established a market niche.

According to NCWSC the scenario for Nairobi closely reflected the one for Mombasa, with water scarcity having been on the rise in the city as a result of lack of utility supply to peri-urban areas. Absence of the public water utility in these areas resulted in water scarce areas that presented opportunities to MSPWE's. However whereas FPM's could

continue marshalling possession and control of the water resource even when the same was scarce with the water utility, PPP's depended entirely on the water utility. Although they were serving water-scarce areas due to lack of utility network, poor supply in the utility network meant poor supply to the PPP's. For Nairobi, it emerged that quantity supply to PPP's was not sufficient due to inadequate water supply from the NCWSC and the deficiency of infrastructure.

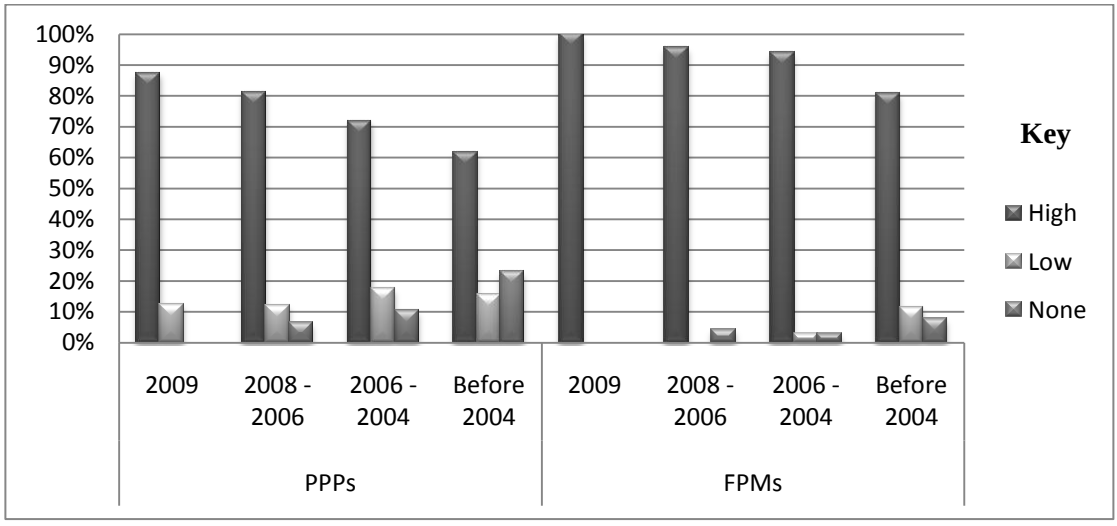

Figure 4-13: Assessment of Water Scarcity in Nairobi, PPP's and FPM's

The study results show that 100% of MSPWE's operating as FPM's rated the scarcity in the market environment they targeted to serve as high. Across the years, water scarcity had been on the rise amongst those allied to utility while privately owned ones indicated a drop in scarcity over the years. This could be explained by the fact that the FPM's water sources; mainly boreholes/wells were sources independent of the utility supply and utilized to mitigate against lack of utility supply. Scarcity of piped water in the peri-

urban areas was indicated by a combination of factors that included few/non-existing water sources, gaps in areas not covered by the utility and areas served poorly by the utility (Table 4.3).

A combination of the factors discussed above accounted for the market response by over 90% of the MSPWE's in the peri-urban areas across the cities. Low number of existing piped water sources in the areas in which the MSPWE's were operating accounted for demand for piped water from 90-100% of PPP's and rose from 40 % to 80% over the last five years for FPM's in Mombasa city and at least 70% for Kisumu piped water retailers in the same period and 100% master operators (MO's). In Nairobi both PPP's and FPM's were responding to the combination of low number of existing piped water sources, areas not served by the water utility and areas served poorly by the water utility.

Table 4.3: MSPWE Reasons for scarcity of Piped Water Services

		Proportion of MSPWE's														
		Mombasa					Kisumu					Nairobi				
		2009	2008	2006	2004	Before 2004	2009	2008	2006	2004	Before 2004	2009	2008	2006	2004	Before 2004
PPP'S	Few/None existing piped water sources	89	87.9	89.1	100	100	70.8	69.9	68.8	68.6	70.6	42.9	42.6	55.6	37.5	42.9
	Gaps in areas not covered by the utility	9.6	7.6	4.4	0	0	22.1	25.2	25	25.5	26.5	53.6	55.3	27.8	25	28.6
	Poor supply by public utility	1.4	4.6	6.5	0	0	7.1	4.9	6.3	5.9	2.9	3.6	2.1	16.7	37.5	28.6
	Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
FPM's	Few/None existing piped water sources	79.5	72.4	57.1	45.5	40						23.9	22.7	22.9	37.9	39.1
	Gaps in areas not covered by the utility	7.7	10.3	14.3	18.2	60						41.3	40.9	42.9	34.5	30.4
	Poor supply by the public utility	12.8	17.2	28.6	36.4	0						34.8	36.4	34.3	27.6	30.4
	Total (%)	100	100	100	100	100						100	100	100	100	100

According to MOWASCO and the asset holding company CWSB, demand in Mombasa city peri-urban areas was characterized by an acute shortage of water; high populations and dense low quality housing. There was also lack of proper planning that acts an obstacle in obtaining way leaves for laying infrastructure and therefore this leaves gaps that these enterprises come in to fill. Incomes were unpredictable so households may not be able to pay for an accumulated bill at the end of the month and sometimes tenancy conditions do not allow them to make alterations like having individual connections.

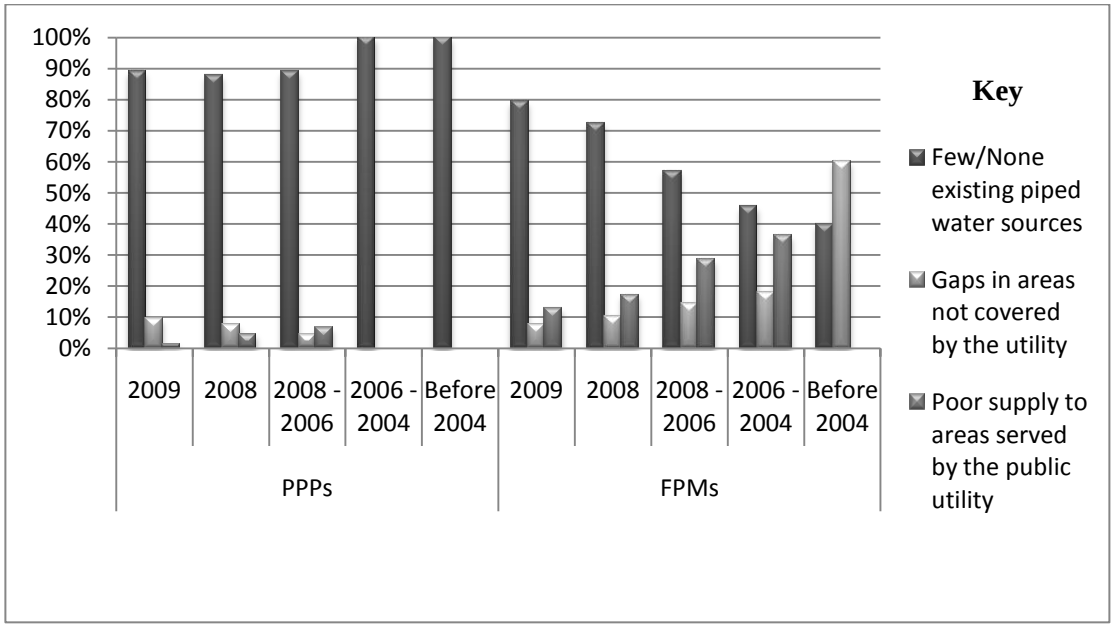

Figure 4-14: Reasons for Demand for Piped Water Services- Mombasa

Similarly in Kisumu the city water utility was of the view that demand was characterized by unplanned low class housing where infrastructure was not present necessitating someone to fill in the gaps. For Kisumu in recent years, the biggest driver

of demand for piped water for all the periods in question was the low number of existing piped water sources (Figure 4.15).

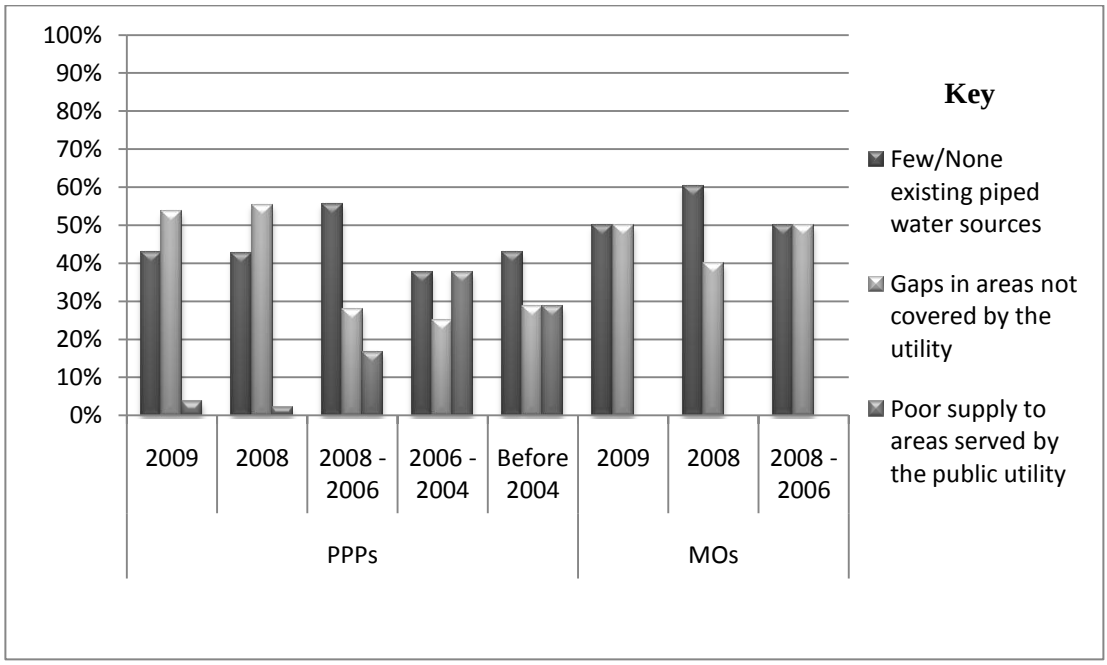

Figure 4-15: Reasons for Demand for Piped Water Services-Kisumu

Nairobi City Water and Sewerage company echoed a similar view to MOWASCO and KIWASCO that demand was characterized by unplanned low class housing where infrastructure was not present necessitating someone to fill in the gaps (Figure 4.16).

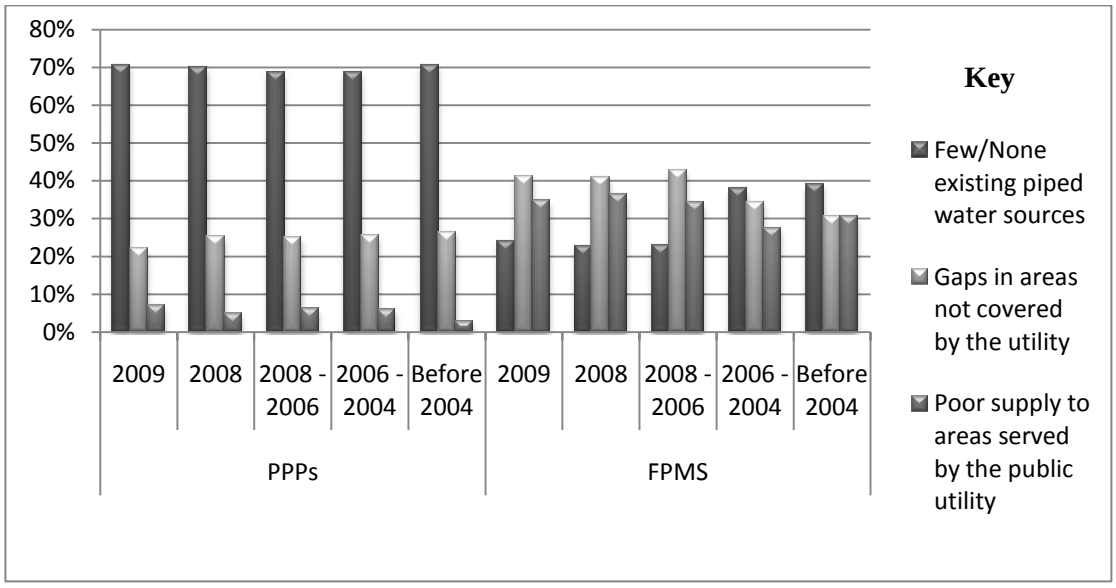

Figure 4-16: Reasons for demand for piped water services Nairobi

Responses from the MSPWE's, interviews with the water utilities in the three cities, examination of satellite images and direct observations (Table 4.4) indicated that the peri-urban areas, where the MSPWE's were active, are characterized by high density housing and high population resident in these areas. Direct observations and interviews with the water utilities established that other than for the presence of MSPWE's the water utilities were either totally absent or had not penetrated the areas targeted by MSPWE's. This created a water scarcity setting in high density population areas, thereby creating favourable industry conditions for those enterprises that possessed and controlled water as the rare and valuable resource that it was in the peri-urban areas.

Table 4.4: Direct Observations- Indicators of Demand

			Strong %	Fair %	Weak %
Mombasa	PPP's	High Density Housing	80.6	16.7	2.8
		Frequent customers to water points operated by enterprise	50.7	42	7.3
		Many connections managed by the enterprise	85.7	14.3	0
	FPM's	High Density Housing	92.1	7.9	0
		Frequent customers to water points operated by enterprise	61.1	38.9	0
		Many connections managed by the enterprise	100	0	0
Kisumu	PPP's	High Density Housing	38.5	48.1	13.5
		Frequent customers to water points operated by enterprise	15.4	63.5	21.2
		Many connections managed by the enterprise	18.5	55.6	25.9
	MO	High Density Housing	100	0	0
		Frequent customers to water points operated by enterprise	0	0	0
		Many connections managed by the enterprise	100	0	0
Nairobi	PPP's	High Density Housing	91.7	7.3	0.9
		Frequent customers to water points operated by enterprise	50.9	34.9	14.2
		Many connections managed by the enterprise	54.2	12.5	33.3
	FPM's	High Density Housing	31.8	56.8	11.4
		Frequent customers to water points operated by enterprise	65.1	30.2	4.7
		Many connections managed by the enterprise	51.9	33.3	14.8

The study findings on demand were in agreement with Mattingly and Gregory (2006) articulating that peri-urban areas are characterized by geo-demographic and socio-economic dynamics that impact on the population size, population distribution and density. Norström (2007) also upheld this view articulating that the peri-urban areas are where urban-driven economic and social change is most intense and where the usual urban infrastructure services are generally non-existent and natural resources are under intense pressure from competing demands. The United Nations Economic Commission

for Africa (2005) also explained that the geo-demographic and socio-economic dynamics in peri-urban areas comes with peculiar problems of water service delivery particularly due to the fact that in the cities of the developing world the urban population is rising much faster than the rate at which infrastructure services are being extended. Ouyahia (2006) highlights a similar view in that amongst the competing water uses, water demands from city enterprises and consumers have become increasingly important and emphasizes that high population densities and customer mix are important parameters affecting demand for water services.

The study established that MSPWE's had scanned the water market environment in the targeted peri-urban areas and assessed them as faced by high water scarcity. It determined that the majority of MSPWE's had acquired possession of the water resource and the infrastructure to make the water available to consumers in an entrepreneurial response to a market demand created by two key drivers – water scarcity and high density population. According to the Resource based theory, an enterprise can acquire sustained competitive advantage and collect entrepreneurial rents if it possesses and controls a valuable and rare resource in favorable industry conditions. This study determined that scarcity of water in peri-urban areas meant that a valuable resource was rare in areas of high population density and hence demand for it. It also determined that in the three cities MSPWE's in peri-urban areas possessed and controlled water as a rare and valuable resource and were clearly exploiting the water scarcity in the areas not covered by the public water utility.

Hence the MSPWE's having marshaled possession and control of water under these industry conditions, could be expected, on the basis of the resource based theory, to have acquired a competitive advantage and collect entrepreneurial rents, which as discussed later in this chapter was the case. This would be expected to continue to be so until or if the possession and control was lost to the competition.

The study determined that the sustainability of PPP's, being dependent on the water utility for their water source, was threatened by the water scarcity facing the utility and hence possession and control of the valuable and scarce commodity needed for a sustained competitive advantage depended on its availability in the water utility mains. This was very well illustrated by the Kisumu situation where, when the utility supply was reliably available in the mains close to Nyalenda, a peri-urban area in Kisumu, MSPWE's emerged, got connected to the utility mains and extended the mains into the interior of the peri-urban area. On the other hand unmet demand for piped water as a result of the absence of the water utility in a peri-urban area remote from the water utility mains emerged as the source of competitive advantage for FPM's, these ones emerging where the utility supply was not close and depending on own developed sources to deliver water to consumers.

The Nairobi, Mombasa and Kisumu situations indicated that where enterprises depended on the water utility for supply of water, under PPP's, water scarcity in the utility mains from which the PPP's sourced their water worked against sustained competitive advantage as they lacked possession and control of the water resource, depending and

remaining vulnerable to fluctuations in the public utility nearest mains. On the other hand, scarcity of utility water in areas served by FPM's worked in favor of FPM's since they possessed and controlled a reliable and sustainable water source as shown by FPM's in Mombasa and Nairobi. FPM's had established themselves in Mombasa and Nairobi as enterprises selling water from own systems independent from any variations in the water utility supply. According to the water utilities in the cities and as confirmed by observation these systems included boreholes and shallow wells equipped with pumps and delivering to water storage tanks from which water was reticulated to consumers connected through individual meters or to water selling points comprising stand pipes and water kiosks where the residents and mobile water vendors bought water for domestic use and for resale respectively.

The study results established that PPP's were not strongly present in areas served poorly by the public water utility mains. This was not surprising as PPP's, dependent on the water utility for the water they sold, could not be expected to provide services superior to those of the very utility they relied on for the service they would provide. PPP's depended on existence of water utility mains close enough for them to afford modest investments in infrastructures over short distances, their business opportunity being penetrating peri-urban areas.

4.4.2 Gaps in water utility infrastructure

The study sought to determine how gaps in the utility network influenced sustainability of the MSPWE's in the peri-urban areas of Kenyan cities by establishing the

implications of expanding public utility networks on the MSPWE's and the MSPWE's preparedness to face change brought about by expanding water utility networks. This was done against a background in which there was lack of information on how expansion of the public water utility infrastructure into the peri-urban areas covered by the MSPWE's would influence the sustainability of the enterprises as there was no previous study that covered these aspects in the peri-urban areas of the Kenyan cities.

The study established that a significant proportion of PPP's viewed the possibility of water utility network expansion as a threat, 58.6% for Kisumu and 54.5% for Nairobi but only 30% for Mombasa (Table 4.5).

Table 4.5: Perception of Threat Poised by Expansion of Water Utility Network

	Is the possibility of public utility expansion a threat to your business?	Mombasa Count	%	Kisumu Count		Nairobi Count	%
PPP's	Yes	22	30.14	34	58.6	122	54.5
	No	47	64.4	24	41.4	102	45.5
	Do not know	4	5.5	0	0	0	0
	Total	73	100	58	100	224	100
FPM's	Yes	9	23.1			16	34.8
	No	26	66.7			30	65.2
	Do not know	4	10.3			0	0
	Total	39	100			46	100
MO's	Yes			4	66.7		
	No			2	33.3		
	Do not know			0	0		
	Total			6	100		

For Mombasa a majority of 64% of PPP's (Figure 4.17) did not feel threatened by an expanding utility network and this could be attributed to the positive and supportive approach adopted by MOWASCO where the water utility allocates the MSPWE's

exclusive rights to sell utility piped water in a defined area that ensures business viability. An overwhelming majority of FPM's on the other hand did not feel threatened, as only 23% for Mombasa and 35% for Nairobi felt threatened by an expanding water utility network.

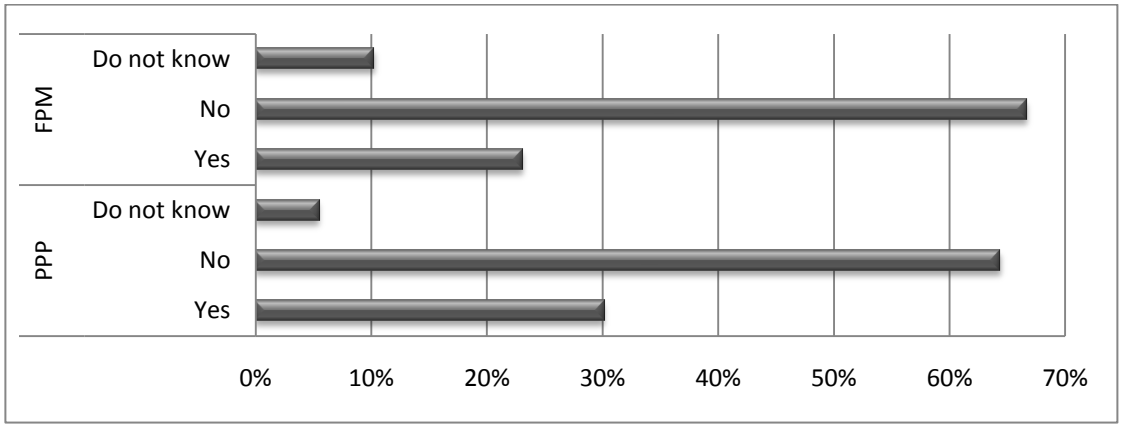

Figure 4-17: Perception of Threats from Network Expansion- Mombasa

In Kisumu a majority of MO's (66.7%), felt threatened by an expanding utility network as this would actually overrun their business zones, with the water utility providing network and catering for multiple connections, the very service in the same area provided by the MO's. About 60% of the retail PPP's in Kisumu also felt threatened by an expanding utility network (Figure 4.18).

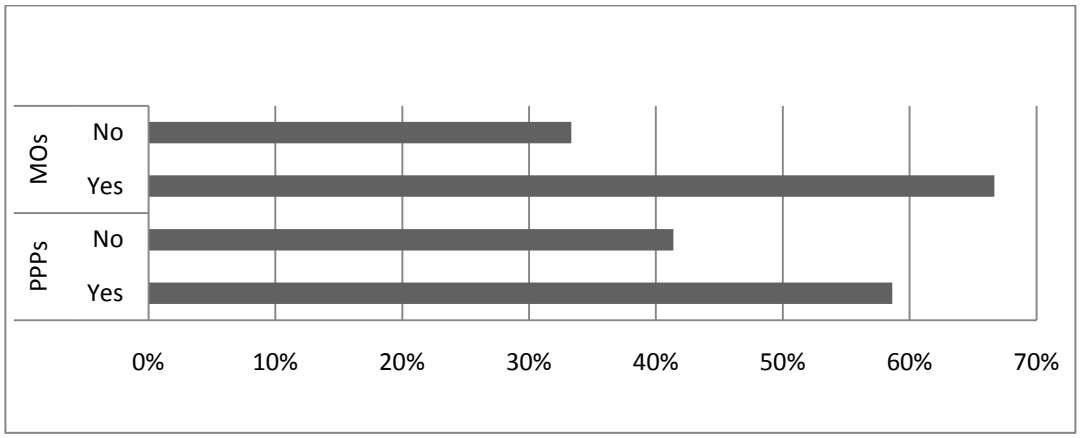

Figure 4-18: Perception of Threats from Network Expansion- Kisumu

In Nairobi the majority of PPP's, about 55% felt threatened by an expanding utility network. FPM's did not show much fear of the threats by an expanding utility network, with about 65% indicating that they did not feel threatened (Figure 4.19).

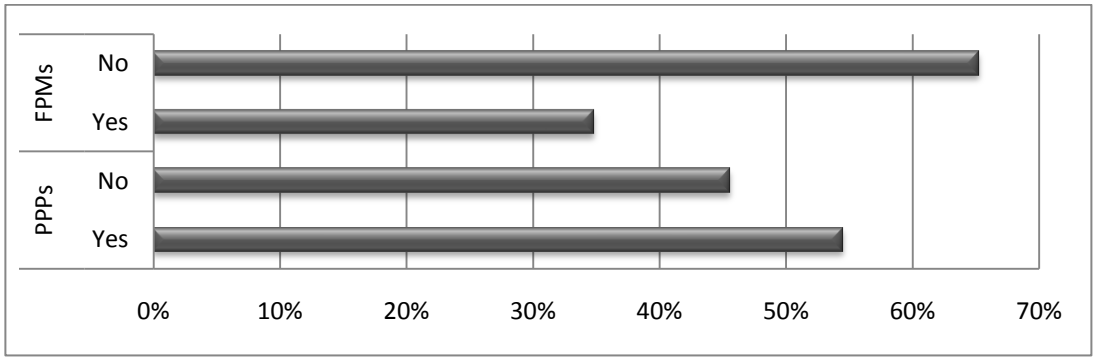

Figure 4-19: Perception of Threats from Network Expansion - Nairobi

The perception of threat posed by an expanding water utility network may have been founded on the grounds that MSPWE's were operating in areas where the water utility

network was absent, even in localized zones such as informal settlements. Water utility network expansion into these areas meant that the utility would take water closer to the consumers and hence not only narrow the water utility service delivery gap that the MSPWE's were exploiting but also compete with the MSPWE's on the customers. However interviews with the water utilities revealed that it was not easy for water utilities to expand networks into these areas due to lack of physical and urban development planning.

The water utilities explained that they anticipate, as part of their mandate and responsibility, to put in more effort to deliver water as close as possible to consumers in peri-urban areas but the lack of planning in these areas meant that there would always be areas where the water utility would not lay networks and as such there would be gaps that MSPWE's remained best placed to cater for. On their part the water utilities would Endeavour to improve the reliability of supply but would leave market forces to rule the water markets in these areas as far as possible, for instance in Kisumu (Nyalenda) and Nairobi(Mukuru), where the entry of MSPWE's into the water business was market driven. Hence despite the fears of expanding water utility networks by MSPWE's there was ample evidence that expanding utility networks do not have to drive MSPWE's out of business. On the contrary, as long as market forces were left to rein, MSPWE's could only be assured of a more reliable supply which they could utilize to their advantage as testified by the Kisumu (Nyalenda) and Nairobi (Mukuru) experiences.

The above observation is supported by the MSPWE responses which indicated that in all

the cities few enterprises had gone out of business as a result of network expansion into the areas of MSPWE business operation. Responses on closing business or relocating to other areas as a result of water utility expansion were significantly low for Mombasa and Nairobi standing at 16% of PPP's and 10% for FPM's for Mombasa and 6.25% of PPP's and none of FPM's for Nairobi (Table 4.6). For Kisumu 58.6% of PPP's indicated that they had closed/relocated business but in-depth interviews with the water utility for Kisumu revealed that MSPWE's may not have closed business as such but only relocated to more lucrative locations following the improvement of the water utility network in the previous three years. The water utility explained that there was more of an upsurge of retail MSPWE's after the improvement of the water supply than any going out of business in the previous three years. This was collaborated by the MSPWE responses on the years in business which indicated that 62% of the MSPWE's for retail PPP's in Kisumu were 1-3years old (Figure 4.2) which meant they entered business in the same period in which there was tremendous improvement in the water utility supply improvement.

Table 4.6: Business Closing/Relocation Due to Water Utility Network Expansion

Enterprise Model		Mombasa		Kisumu		Nairobi	
		Count	%	Count	%	Count	%
PPP's	Yes	12	16.4	34	58.6	14	6.3
	No	61	83.6	24	41.4	210	93.8
	Total	73	100	58	100	224	100
FPM's	Yes	4	10.3			0	0
	No	35	89.7			46	100
	Total	39	100			46	100
MO's	Yes	0	0				
	No	6	100				
	Total	6	100				

The response of MSPWE's to an expanding water utility network was an indicator of the entrepreneur's preparedness to cope with significant change in the market environment. The MSPWE's responses were sought on how they would respond if the water utility network expanded into their area of business operation (Table 4.7). The study determined that only a minority of MSPWE's, 12.3% , 19.3% and 39.3% of PPP's for Mombasa, Kisumu and Nairobi respectively would close business. For FPM's only 26% and none for Nairobi would close business. As opposed to closing business a majority of MSPWE's would adapt to the change by adopting other strategies in order to stay in business. These strategies included, amongst others, preparedness to compete with the water utility, 53.4% of PPP's and 41% of FPM's in Mombasa, 33.3% of PPP's and 50% of MO's in Kisumu, 23.2% of PPP's for Nairobi and 71.7% of FPM's for Nairobi, 53% for Mombasa and 33% for Kisumu.

Proportions consisting of 25%, 29% and 31% of PPP's for Mombasa, Kisumu and Nairobi respectively would either relocate business or negotiate a partnership with the water utility. A small minority, 6.9%, 17.5% and 6.3% of PPP's in Mombasa, Kisumu and Nairobi indicated they were not worried because of existing partnerships/agreements with public utility, meaning the majority of PPP's were not in PPP's that would secure their business interests adequately.

The study established that the majority of MSPWE's did not anticipate to close business if faced by an expanding utility network ; 87.73% , 80.7% and 60.7% of PPP's for Mombasa, Kisumu and Nairobi respectively and 74% and 100% of FPM's for Mombasa and Nairobi respectively but instead showed preparedness to adapt to change encompassing relocating business, negotiating partnership with the water utility and competing with the water utility (Table 4.7). This may be explained by the fact there would still be many consumers who would not afford individual connections and these would continue to consume the services of MSPWE water retailers, a common occurrence driving MSPWE business in peri-urban areas according to all the water utilities and the fact that an expanding water utility network was more likely to be in favour of MSPWE's to extend their businesses into new areas in response to the outward movement of the peri-urban zone.

Table 4.7: MSPWE's Reaction to Expanding Utility Network

	MSPWE Response to Expanding utility network	Mombasa		Kisumu		Nairobi	
		Count	%	Count	%	Count	%
PPP's	Stop business altogether	9	12.3	11	19.3	88	39.3
	Close business in existing area and move to a new area without public utility network	9	12.3	4	7	18	8
	Negotiate a partnership with the public water utility	11	15.1	13	22.8	52	23.2
	Not worried because of existing partnership/agreement with public utility	5	6.9	10	17.5	14	6.3
	Would compete with the public water utility	39	53.4	19	33.3	52	23.2
	Total	73	100	57	100	224	100
FPM's	Stop business altogether	10	25.6				
	Close business in existing area and move to a new area without public utility network	6	15.4			3	6.5
	Negotiate a partnership with the public water utility	7	18			10	21.7
	Would compete with the public water utility	16	41			33	71.7
	Not worried because of existing agreement with public utility	0	0			0	0
	Total	39	100			46	100
MO's	Stop business altogether			0	0		
	Close business in existing area and move to a new area without public utility network			0	0		
	Negotiate a partnership with the public water utility			0	0		
	Would compete with the public water utility			3	50		
	Not worried because of existing agreement with public utility			3	50		
	Total			6	100		

There were mixed scenarios of views of the water utilities across the cities on the implications of the expansion of the networks. The water utilities in Mombasa and Kisumu expected that MSPWE's would operate as PPP's rather than FPM's if and when the utility networks expand into the areas served by MSPWE's following closely on the current arrangements between the water utility and MSPWE's in the PPP arrangements. The water utilities in these cities explained that they would actually encourage these MSPWE's to reorganize as PPP's.

In Nairobi, however, it was felt that when water networks expand into the peri-urban areas now commanded by the MSPWE's the absence of or the limitation of access to infrastructure that created room for enterprises to thrive would go down and the enterprises would die out as their customers would turn to the improved water supply situation by the water utility. However the study results show the contrary. For instance in 2 out of the three cities, Kisumu and Nairobi itself, the water utility network expansion in unplanned peri-urban areas did in fact act as a market driver pulling more MSPWE's into business than driving them out. The study results indicated that in Kisumu and Mombasa the public water utility recognized the role played by MSPWE's in their networks rather than a nuisance and as a result there was an enormous increase in the number of MSPWE's entering business when the water utility expanded and improved its water supply in Kisumu.

According to MOWASCO and KIWASCO, the utilities were already in public private partnerships with MSPWE's within their piped networks. Kisumu had even expanded

network and delegated it to master operators who in turn sold water in bulk to retailing MSPWE's. Mombasa recognized the MSPWE's under PPP's and went a step further to define minimum zones for MSPWE's to ensure viable and potentially profitable zones for MSPWE business. Both categories of MSPWE's, i.e. PPP's and FPM's, were recognized as playing a favourable role in the delivery of water services by MOWASCO and Coast Water Services Board. Thus Coast Water Services Board, under whose jurisdiction MOWASCO falls intended to incorporate MSPWE's under PPP's in a planned network expansion in the peri-urban neighbourhoods thereby reducing the length of pipelines the MSPWE's would invest in and maintain. The Utility conceded that this would of course threaten MSPWE'S operating as FPM's but they would be easier to integrate as PPP's, if they were willing to reorganize as such, for better quality water delivery, particularly to those consumers who would not afford their own connections. FPM's would be affected especially when consumer concerns for water quality come into play.

Even in Nairobi, where the MSPWE's were viewed as opportunists that would be weeded out of business when the infrastructure was expanded, there was evidence that the MSPWE business scenario changed significantly with the expanding and improving water utility supply. NCWSC expected MSPWE's to wither out of business when the utility provided water close enough to consumers in peri-urban areas. Indeed this was what the water utility for Nairobi expected when it installed the Mukuru Meter Chamber Project in 2003. Before this project, Mukuru was captive to cartels operating water

illegally tapped from the city mains. With the metering project, several meters were installed in strategically located meter chambers in the water utility mains at the periphery of Mukuru. Consumers were expected to make connections and obtain water at concessionary rates. Those interested in getting connections had to pay a deposit, lay the pipelines from the meter chamber to their premises and pay bills monthly. They were also free to sell water if they so wished. However, as it turned out, consumers in most cases remained resident of particular areas for very short periods and hence did not find it in their interest or could not afford the required deposit for connection, monthly bills and laying the pipeworks from the bulk meter chambers to their houses. MSPWE's recognized this as an opportunity, applied for the connections and license to sell water, installed own networks to deliver piped water to fixed vending points close to the consumer residences such that each MSPWE had a radius of command, albeit a small one. The MSPWE's then retailed piped water obtained from the water utility at concessionary rates at these fixed points to consumers who paid cash on delivery. NCWSC institutionally embraced this scenario by giving a connection, a license to sell water and providing water at concessionary rates to the retail MSPWE's.

In all the three cities under study, there was consensus from the city water utilities that peri-urban areas had been neglected on water infrastructure amongst other infrastructures in these areas. Characterized by non-existent/inadequate planning these areas were left out of the formal utility infrastructure planning and development as the utilities base their planning and infrastructure development on clearly laid out physical and urban development plans. It was the lack of utility network that MSPWE's exploited

for business as discussed in the previous section and in agreement with previous studies (Njiru&Albu, 2002; Asian Development Bank, 2006; Spencer, 2007). Expansion of water utility network was expected to eliminate the very gaps in the water utility coverage upon which MSPWE's depended for their continuity in business, that is, sustainability. By providing piped water to areas previously not served by the water utility, it would be expected that water would no longer be a rare commodity in the areas thriving with MSPWE's business. Hence as per the Resource based theory the competitive advantage enjoyed by the MSPWE's before the expansion would be expected to end and their sustainability threatened forcing the MSPWE's either completely out of business unless the MSPWE adopted entrepreneurial strategies to adapt to the changes in the market environment brought about by the expansion of the utility network.

However the results indicated that the majority of MSPWE's did not anticipate to close business if faced by an expanding utility network; 87.73%, 80.7% and 60.7% of PPP's for Mombasa, Kisumu and Nairobi respectively and 74% and 100% of FPM's for Mombasa and Nairobi respectively but instead were prepared to adapt to change encompassing relocating business, negotiating partnership with the water utility and competing with the water utility (Table 4.7). This may be explained by the fact an expanding water utility network was more likely to be in favour of MSPWE's as an improved source of water from which they could serve the many consumers who would not afford individual connections or find the monthly billing convenient to their economic circumstances and these would continue to consume the services of MSPWE

water retailers, a common occurrence driving MSPWE business in peri-urban areas according to all the water utilities. Furthermore, as attested in the in-depth interviews, improved water supply in a peri-urban area has been witnessed to favour an outward movement of the peri-urban zone in a way commonly beyond the control of the utility and the local authorities and thus expanding the MSPWE water market instead of eliminating it.

4.4.3 Water Source

On this market driver, the study sought to determine how dependable the water sources from which MSPWE's obtained the water they sold in terms of quantity yield, water quality, service level and environmental sustainability and establish what alternative measures, if any, the enterprises had if their water sources were threaten ed. This was in recognition of the fact that if such sources were threatened, then the MSPWE's may lose their competitive advantage and become unsustainable according to the Resource based theory. In other words the study aimed to determine whether the MSPWE's possessed and controlled water, a rare, valuable and imperfectly imitable resource, which according to the Resource based theory should be a source of competitive or sustained competitive advantage, and in the event that it was threatened whether they were prepared for the change.

The study established that the water sources for MSPWE's could be grouped into two categories - water from utility under PPP's and own developed borehole/wells under FPM's (Table 4.8). The results indicated that the public water utility remained the

dominant water source for PPP's for all the cities. For FPM's the dominant water source was own developed sources although there were few FPM's that had obtained water for resale from the water utility, this being only a small proportion, the highest being 12.5% which had in fact dropped to 0% over the last five years (Table 4.8). Since PPP's depended on the water utility for the supply of water for resale, any fluctuations and lack of reliability in the utility networks would impact on the PPP's in the same way. Hence FPM's possessed and controlled the water resource, a valuable and rare resource in peri-urban areas but PPP's relied entirely on the water utility for access to it. Even if PPP's could control possession of the water resource by obtaining a protection mechanism for access to water from the public utility, their possession of it would still be prone to fluctuations in the public water utility service level.

Table 4.8: MSPWE Water Sources

		Mombasa 2009	2008	2006	2004	Before 2004	Kisumu 2009	2008	2006	2004	Before 2004	Nairobi 2009	2008	2006	2004	Before 2004
PPP's	Own Source	0	0	0	0	0										
	Bulk purchase from MO operator	0	0	0	0	0	72.4	74.5	65.5	0	0					
	From Public utility	100	100	100	100	100	27.6	25.5	34.5	100	100	94.4	97.1	97.8	100	100
	From a private individual	0	0	0	0	0						5.6	2.9	2.3	0	0
	Total	100	100	100	100	100	100	100	100	100	100					
FPM's	Own Developed Borehole	97.4	90	87.5	100	100						100	90.7	91.9	93.1	92.3
	From Public utility	0	6.7	12.5	0	0						0	7	5.4	6.9	7.7
	From a private individual	2.6	3.3	0	0	0						0	2.3	2.7	0	0
	Total	100	100	100	0	0						100	100	100	100	100
MO	Public utility						100	100	100	0	0					
	Total						100	100	100	0	0					

For Mombasa 100% MSPWE's under PPP's obtained water from the public water utility while 87.5-100% of FPM's obtained it from own developed source over a five year period (Figure 4.20). Interviews with the Water utility for Mombasa indicated that the city had three distinct sources of water namely MOWASCO, shallow wells and boreholes. MOWASCO supply at the moment was not reliable as demand had outstripped supply in Mombasa. As a result the utility supplied water through a rationing program. Privately developed shallow wells and boreholes in Mombasa were the most reliable but according to MOWASCO customers object to the quality of the groundwater as pit latrines are sometimes dug to the water Table level and therefore presenting high probability of contamination.

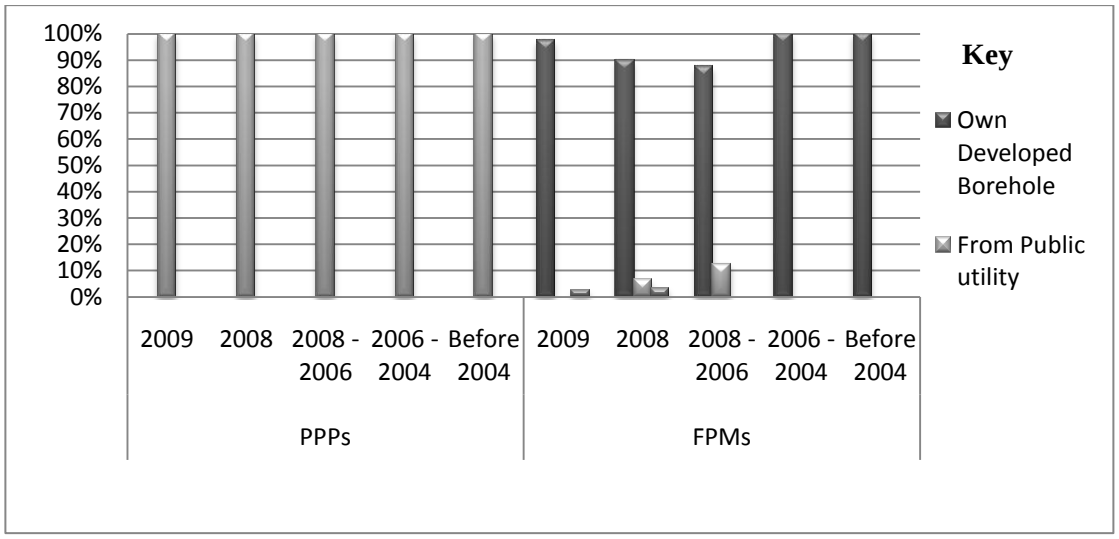

Figure 4-20: Sources of water for sale, Mombasa

For Kisumu, the public water utility remained the dominant source of water directly to MSPWE's operating as PPP's with 100% over 5 years ago decreasing to under 30% in

the last three years. MSPWE's obtaining water from the MO's rose from 66-75% over the last three years (Figure4.21). However MO's act as agents of the water utility with retail PPP's enjoying the same privileges they would if they obtained water directly from the water utility.

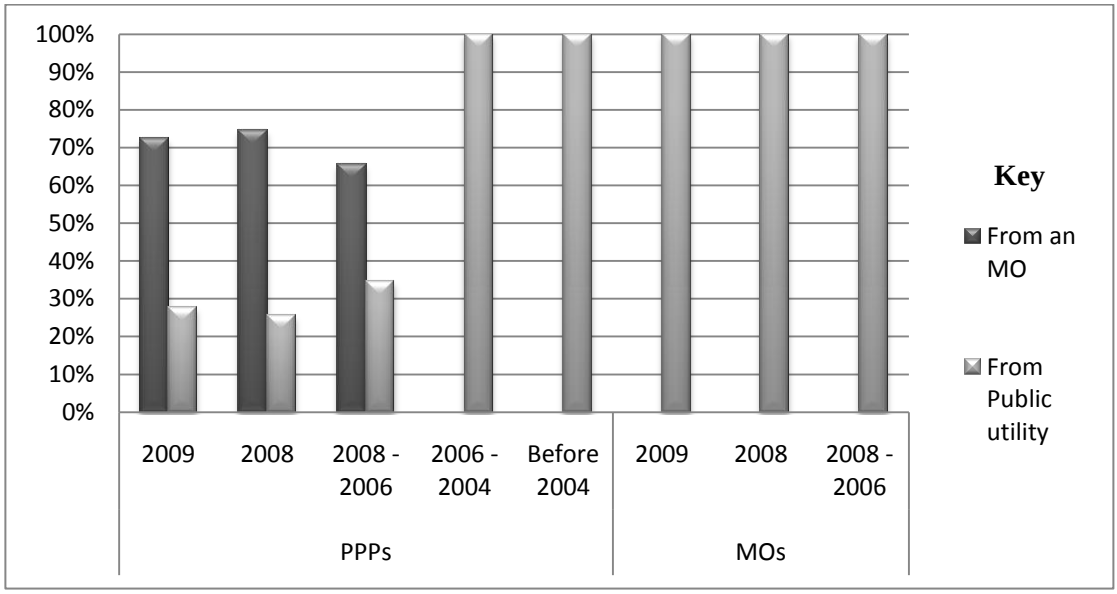

Figure 4-21: Sources of water for sale – PPP's & MO's, Kisumu

In Nairobi the water utility remained the dominant source of water for PPP's declining slightly from 100% five years earlier to about 94.44%, while those PPP's that obtained water from private individuals increased from 0% five years earlier to 5.56% over a five year period., indicating that some MSPWE's under PPP's had resorted to purchasing water from private sources, possibly to mitigate against fluctuations in the water utility supply (Figure4.22).

Although there were few FPM's that had obtained water for resale from the water utility,

this was only a small percentage which dropped from 12.5% to 0% for Mombasa in the last three years and slightly over 7% to 0% for Nairobi over the last five years. Hence FPM's possessed and controlled the water resource, a valuable and rare resource in peri-urban areas but PPP's relied entirely on the water utility for access to it. Even if PPP's could control possession of the water resource by obtaining a protection mechanism for access to water from the public utility, their possession of it would still depend on the its availability from the public utility.

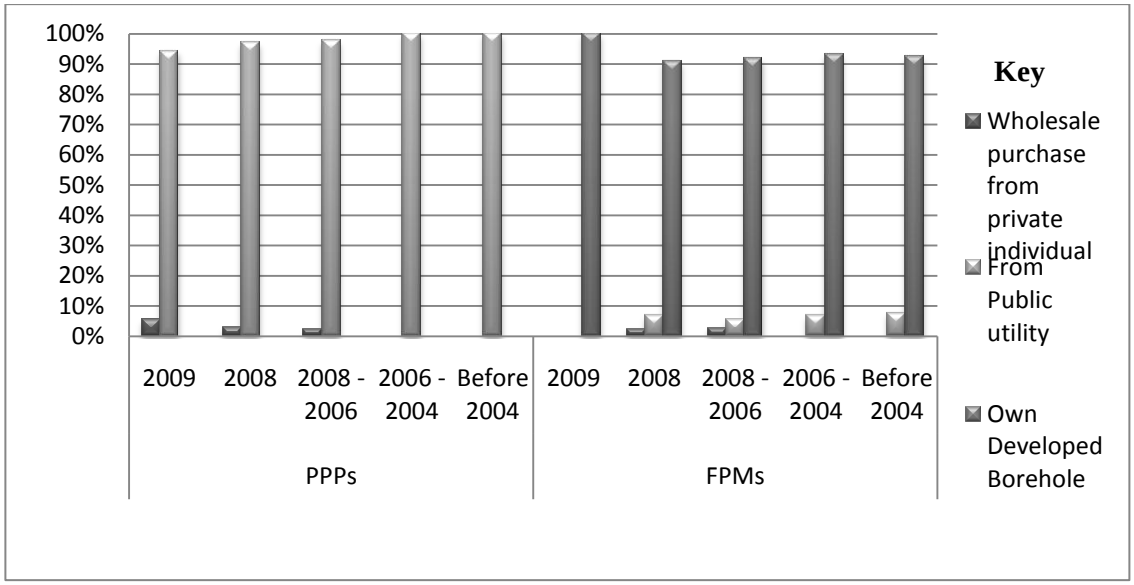

Figure 4-22: Sources of water for sale – PPP's and FPM's, Nairobi

Threats to water source

Table 4.9 summarizes the proportions of MSPWE's facing threats on the water source over the last five years. Although the majority of MSPWE's perceived that they did not face any threats regarding their water sources, there had been a consistent decrease in

those reporting no threats over the last five years, indicating that the threats were actually on the increase except for Kisumu which indicated a marked decrease in threats over the last three years for PPP's. The majority of enterprises indicated that their water sources had been deteriorating in quantity and quality over the last five years. In Mombasa about 50% of the enterprises reported no threats regarding their current water source; however threats have been on the rise as slightly over 70% had no problems with the source over 5 years ago. Figure 4.23 gives an indication of the threats faced by enterprises in Mombasa; highest ranking of them being the drop in quantity amongst 39% of the enterprises in the current situation.

Table 4.9: Threats faced in regard to MSPWE Water Source

	Threats faced in regard to your water source -	Mombasa, 2009	1 - 3 years ago	3 - 5 years ago	More than 5 years ago	Kisumu 2009	1 - 3 years ago	3 - 5 years ago	More than 5 years ago	Nairobi 2009	1 - 3 years ago	3 - 5 years ago	More than 5 years ago
PPP's	None	53.5	61.3	62.9	70	31.5	21.56	21.4	25	21.8	42	41.8	59.7
	Drop in quantity	39.4	30.65	25.71	20	48.2	39.2	50	62.5	39.2	39.6	34.3	29
	Quality Deterioration	4.2	4.8	8.6	5	29.6	33.3	35.7	50	23.9	12.3	16.4	6.5
	Scarcity of alternative	2.8	3.2	2.9	5	31.5	23.5	35.7	62.5	15.2	6.1	7.5	4.9
FPM's	None	30	100	100	100					59.5	65	87.5	92.9
	Drop in quantity	60	0	0	0					23.8	22.5	8.3	0
	Quality Deterioration	0	0	0	0					9.5	5	0	0
	Scarcity of alternative	10	0	0	0					7.1	7.5	4.2	7.1
MO's	None					20	50						
	Drop in quantity					60	33.3						
	Quality Deterioration					0	0						
	Scarcity of alternative					20	16.7						

In Mombasa, among the PPP's, the proportion of those reporting no threats decreased from 70% to 53% over 5 a five year period (Figure4.23). The proportion of those experiencing quantity deterioration increased from 20% to about 40% in the same period with little quality deterioration. FPM's on the other hand reported that they did not experience any deterioration in quality but had experienced a sharp drop in quantity over the last five years, from zero percent to 60% over a five year period. This showed the erratic scenario in the reliability of the water source in Mombasa. Interviews with utility personnel emphasized that the threat of deteriorating quality was more the case with FPM's than with those obtaining water from the utility under PPP's.

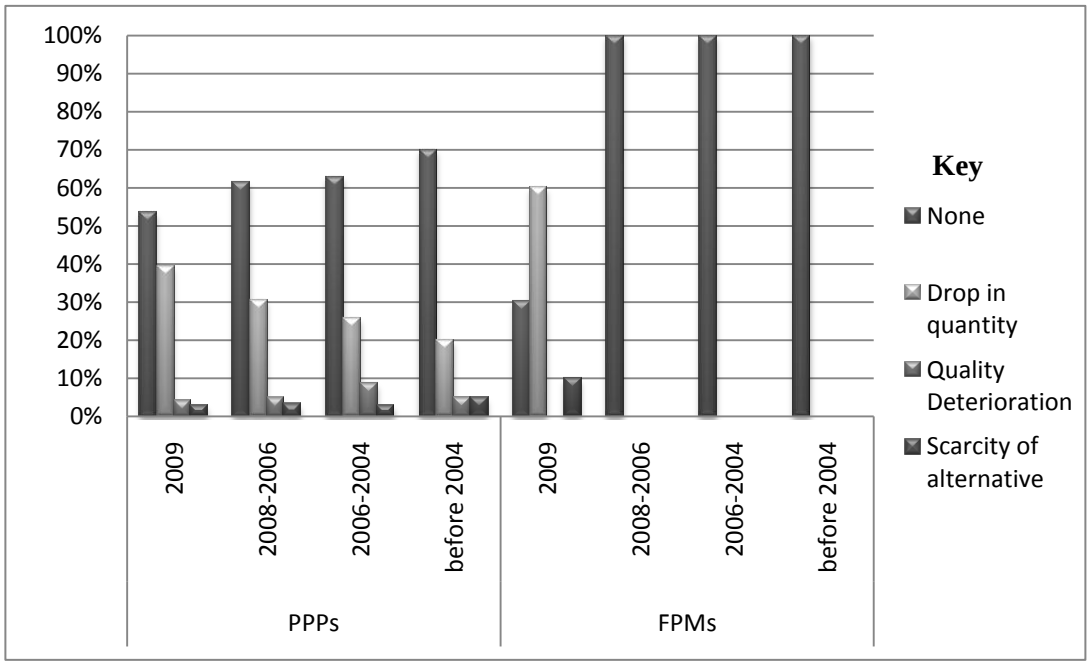

Figure 4-23: Threats faced in regard to MSPWE Water Source – Mombasa

For Kisumu City those experiencing no threats increased from 21.4-31.5% over the last five years showing an improving water source situation amongst PPP's. For the same period those experiencing quantity and quality deterioration decreased from 62.5-48% and 50% to 30% of PPP's respectively (Figure 4.24). Scarcity of an alternative source remained, more or less constant on average for about 30% of the same enterprises.

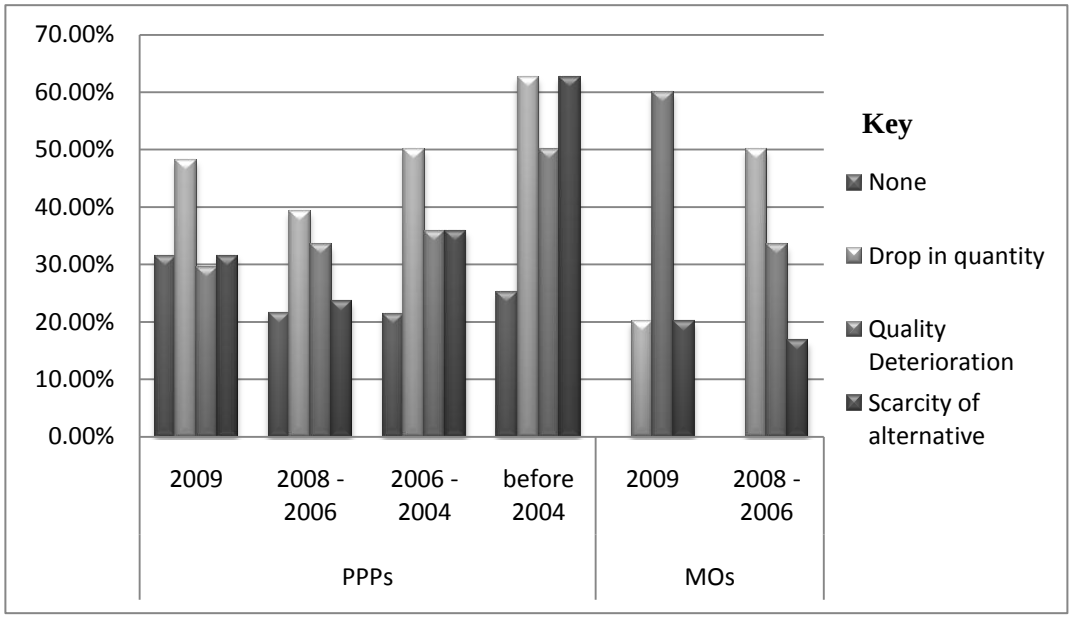

Figure 4-24 Threats faced in regard to MSPWE Water Source – Kisumu

The six MO's in operation in Kisumu obtained water from utility for selling through metered connections to retail MSPWE's and individuals. Amongst the MO's those experiencing no threats decreased from 50% to 20% over a three year period while those experiencing drop in quantity increased from 33% to 60% over a three year period. MO's did not experience any quality deterioration in the same period. Hence MO's threats to water source appeared to be on the increase over the last three years.

In-depth interviews with the water utility representatives explained that the improvement in quantity was attributable to the utility's investment in new infrastructure and the institution of new management models such as the delegated management model (DMM). However the high proportion of those reporting quality deterioration did not correspond to the findings from discussions with utility personnel who felt that utility service was quite reliable as source of good quality water. KIWASCO indicated that the quality of their water was guaranteed, but quality problems could have arisen within the reticulation network under the management of MO's and piped water retailers. KIWASCO, however, tries to mitigate against this possibility by including a precondition for MO's to have a qualified plumber in their employ to safeguard on workmanship. Under this premise it would seem therefore that the quality compromise could only arise in minor networks controlled by the retailers. The threat of deteriorating quality could therefore be a pointer to the inferiority of the retail MSPWE networks, poor operating environment and unhygienic water handling practices at this level.

In Nairobi the threats in regard to water source closely matched the trends in Mombasa where the proportion of those reporting no problem at all had been on the decline (Figure 4.25). This was not surprising, given the picture of scarcity and inadequate capacity as decried by the utilities in both cities. The highest threat in any given year was the drop in quantity while second ranked was quality deterioration. For Nairobi, those reporting no threats in the water source decreased from 60% five years ago to about 22% amongst PPP's and from 93% to 60% amongst FPM's, indicating a

significant increase in threats to the water sources for both PPP's and FPM's. The proportion of PPP's experiencing drop in quantity increased from 29% to 39% and for FPM's from 0% to 24% over a five year period. Quality deterioration increased from a proportion of 6% to 24% of PPP's and 0% to 10% of FPM's. Scarcity of alternative source was slight albeit on the increase, with the proportion for PPP's increasing from 5% to 15.2% while remaining about 7% for FPM's in the same period.

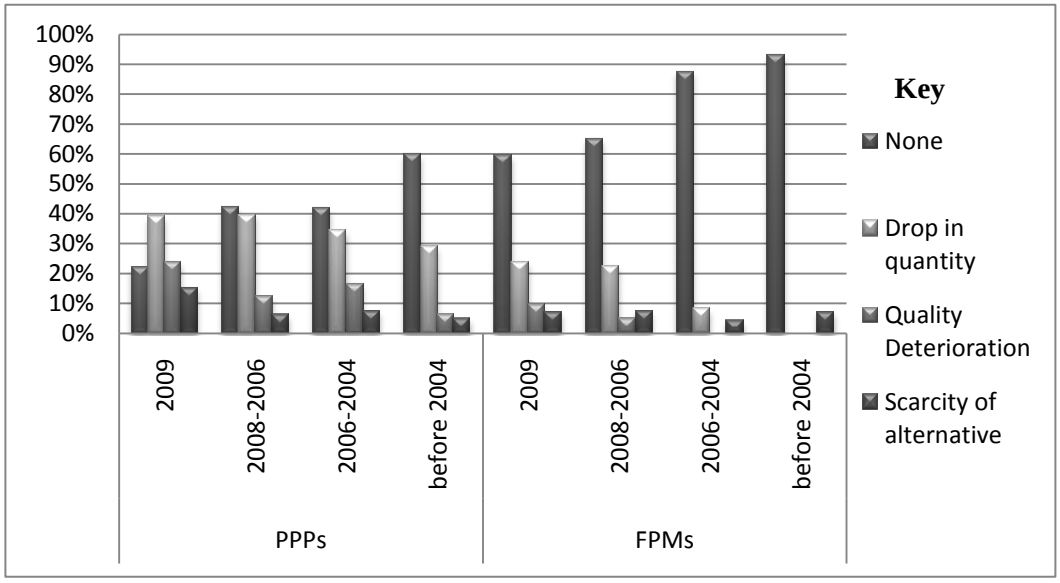

Figure 4-25 Threats faced in regard to MSPWE Water Source – Nairobi

Entrepreneurial Strategies to mitigate deteriorating water source

The MSPWE's were then asked how they would respond if the water source deteriorated. The ways in which the MSPWE's entrepreneurs would respond are summarized in Table 4.10. For Mombasa, on what they would do if the reliability, quantity-yield or quality of the current source deteriorated, high on the list of options

was to develop own or new source mentioned by 89.47% of the FPM's. Amongst the PPP's, 33% would develop own source, 36% would seek bulk purchases from a bulk supplier (private, public utility, public private partnership) whilst 32% would close business altogether because they did not see any possibility of an alternative source. However as it was the retail PPP's obtained water from the water utility, meaning if current water source, the water utility was threatened, then this would not be an alternative source implying that those indicating bulk purchase from alternative sources are not quite clear on what they would actually do. This implied that in total the sustainability of about 68% of retail PPP's in Mombasa would be threatened by a deteriorating water source as they have no clear idea on what they would do if their current water source, the water utility, deteriorated. Given that the water availability in the water utility for Mombasa has been wanting, it could be deduced that the sustainability of the majority of retail PPP's in Mombasa were threatened by the deteriorating utility supply. On the other hand about 90% of the FPM's were prepared to develop another source meaning they were more prepared to manage the change and hence their sustainability was less threatened, only about 10% would be threatened.

On how they would cope if the reliability, quantity-yield or quality of the current source deteriorated beyond retrieval, MO's and PPP's gave a similar response (Table 4.10). A high proportion of MO's (50%) would close business altogether while 33% would seek to develop own sources and thus indicating a determination to stay in business while 17% have no clue on what they would do because the bulk supplier would be the same

water utility. Retailer PPP's (56%) would seek bulk purchases from MO's or public water utility, indicating nothing different since their current source was either an MO or water utility implying they would have no alternative source. A small percentage (25%) would develop own source and another 19% bordering on likelihood of business closure as they do not see an alternative if the water utility source on which they depend deteriorated. This implies that about 75% of retail PPP's in Kisumu did not see any other alternative on what they would do if their water source deteriorated, that is, deterioration in the utility supply meaning the sustainability of 75% of retail MSPWE's and 33% of the MO's in Kisumu would be threatened by deteriorating water source.

Table 4.10: Responses to a Deteriorating Water Source

	What would you do if reliability, quantity yield or quality of your water source deteriorated?	Mombasa Count	%	Kisumu Count	%	Nairobi Count	%
PPP's	Develop own/new source	24	32.9	14	24.6	12	5.4
	Seek bulk purchases from a bulk supplier (private, public utility, public private partnership, master operator)	26	35.6	32	56.1	90	40.1
	Close business because there is no possibility of an alternative source	23	31.5	11	19.3	122	54.5
	Total	73	100	57	100	224	100
FPM's	Develop own/new source	34	89.5			21	45.67
	Seek bulk purchases from a bulk supplier (private, public utility, public private partnership, master operator)	2	5.3			17	37
	Close business because there is no possibility of an alternative source	2	5.3			8	17.4
	Total	38	100			46	100
MO's	Develop own/new source			2	33.3		
	Seek bulk purchases from a bulk supplier (private, public utility, public private partnership, master operator)			1	16.7		
	Close business because there is no possibility of an alternative source			3	50		
	Total			6	100		

In response to deterioration of the current source, entrepreneurs in Nairobi, 39.82% and 36.96% of the PPP's and FPM's respectively said they would seek bulk purchases from a bulk supplier (Table 4.10). For a majority 54.87% of PPP's however, deterioration of source would mean closure of business, a pointer perhaps to some serious handicap in exploiting alternative sources. MSPWE's who had already invested in their own sources were more likely to seek alternative sources if current ones deteriorated, pointing to a high propensity for taking risks, a key attribute of entrepreneurial behavior- thus 46% FPM's would develop own sources, 37% seek bulk purchases while only 17.4% would close business. The implication of the above is that faced by a deteriorating water source, the public water utility, the sustainability of 55% of retail PPP's in Nairobi is threatened while another 40% would also be threatened if they could not find a reliable private supplier to obtain water in bulk from if faced by deterioration of their water source . On the other hand 83% of FPM's would either develop own source or seek an alternative source and if one could not be found 46% would develop own source meaning the sustainability of 54% of the FPM's would be threatened because they would depend on sources external to them, a circumstance clearly out of their control.

According to NCWSC personnel, all PPP's operating in Nairobi got water from the utility. Direct observations and responses from the MSPWE's revealed that some MSPWE's, notably FPM's, had developed their own sources. According to NCWSC the utility supply would be expected to fluctuate in reliability as the future does not

look so bright because investments in water supply assets had not matched growth in population. Hence the MSPWE's sourcing water from NCWSC would be faced by an uncertain supply situation.

Hence faced by an uncertain water resource situation the sustainability of 68% of retail PPP's in Mombasa, 75% in Kisumu, 67% MO's and 55-95% in Nairobi would be threatened by a deteriorating water situation in the public water utilities as these indicate that they would close business or have no clear alternative, different from the current source, the public water utility. FPM's on the other hand indicated a preparedness to mitigate threats to their water sources as 90% for Mombasa would develop own source and 83% for Nairobi would either develop own source or seek another bulk supplier. Hence FPM's and on third of MO's appear more oriented to seek alternative sources than retailing PPP's in all the cities.

Although the majority of MSPWE's reported that they did not face any threats regarding their water sources, there had been a consistent decrease in those reporting no threats over the last five years, indicating that the threats were actually on the increase except for Kisumu which showed a marked decrease in threats over the last three years for PPP's. The majority of enterprises indicated that their water sources had been deteriorating in quantity and quality over the five last five years. The study results show that FPM's possess and control the water resource and that faced by an uncertain water resource situation, FPM's and MO's appeared more oriented to seek alternative

sources than retailing PPP's in all the cities indicating a higher propensity for taking risks and Need for achievement (N-Arch). From the Resource based theory, the FPM's demonstrated a capability and orientation to possess and control a valuable and rare resource and thus would be expected to achieve a sustained competitive advantage even if faced by a deteriorating water source.

4.4.4 Control of water supply infrastructure

On this market driver the study sought to determine the type of control, if any, MSPWE's in peri-urban areas of Kenyan cities had on water infrastructure which they depended upon to deliver services and how this control or lack of it influenced their sustainability. This was against a background lacking in information on the nature and extent of control of water infrastructure by MSPWE's in peri-urban areas of Kenyan cities.

Across all the cities 100% of the retailing PPP's in the three cities and MO's had control of their own localized networks after the water utility meter as opposed to complete network that includes the primary source of water, while 85-100% of the FPM's had control of the complete system including source and networks (Table 4.11). The study results show that the PPP's controlled minor localized reticulations within short distances from the water utility larger mains but with total dependence for supply of water on the water utilities while the FPM's both own and control complete localized networks.

Table 4.11: Infrastructure under control of MSPWE's Entrepreneurs

		Mombasa				Kisumu				Nairobi			
		2009	2006	2004	Before 2004	2009	2006	2004	Before 2004	2009	2006	2004	Before 2004
PPP's	Complete												
	System	0	1.6	0	0	0	0	0	0	0	0	0	0
	Network only	100	98.4	100	100	100	100	100	100	100	100	100	100
	Total	100	100	100	100	100	100	100	100	100	100	100	100
FPM's	Complete												
	System	94.7	84.6	100	100					88.6	90.2	93.1	90.5
	Network only	5.3	15.4	0	0					11.4	9.8	6.9	9.5
	Total	100	100	100	100					100	100	100	100
MO's	Complete												
	System					0	0	0	0	88.6	90.2	93.1	90.5
	Network only					100	100	100	100	11.4	9.8	6.9	9.5
	Total					100	100	100	100	100	100	100	100

On how they had acquired infrastructure control it emerged that this was through own investment by FPM's and through a license for the PPP's across the cities and formal PPP contract for the MO's. Table 4.12 summarizes how MSPWE's entrepreneurs had acquired control of infrastructure.

Table 4.12: Acquisition of Infrastructure Control by MSPWE's Entrepreneurs

		Mombasa		Kisumu		Nairobi	
		Count	%	Count	%	Count	%
PPP's	Own Investment	46	66.7	41	70.7	40	18
	Public private partnership	9	13	0	0	0	0
	Connection and licensed to sell water by public water utility	14	20.3	17	29.3	182	82
	Total	69	100	58	100	222	100
FPM's	Own Investment	37	97.4			38	95
	Private-Private partnership	1	2.6			2	5
	Total	38	100			40	100
MO's	Own Investment			0	0		
	Public-Private partnership			6	100		
	Total			6	100		

From observations, the FPM's in Mombasa typically invest in point source comprising of a well, pump, tank and standpipe for vending water. None were selling water through

metered connections and only 5.1% of FPM's had facilities for tanker filling. In Nairobi however, there was more elaborate investment in infrastructure, there were 38.3% of FPM's that had invested in tanker filling facilities and also had reticulations over relatively large zones, albeit localized, to sell water through metered points. The majority of FPM's in Nairobi retailed water at water kiosks.

In Kisumu, the 6 MO's operate under renewable contracts, in which the performance is reviewed annually. Depending on the outcome of review, the contract is renewed with areas for improvement identified or applications called if performance falls below expected level. Under the MO contract, the utility bills MO's based on master meter readings. MO's make connections to retail MSPWE's and new customers and also bill and collect revenue from which they pay the utility and keep the surplus. Extensions to the main distribution infrastructure is also allowed under supervision of KIWASCO; expenses for extension are recovered from water tariffs and therefore even extensions are owned by the utility and not the MO. The MO's get the control of infrastructure, and hence the isolating mechanism, by virtue of a renewable management contract while 70.68% of the PPP's invested in the network and got into an agreement with MO's under terms defined in the delegated management contract with the water utility or by obtaining a connection and licensed to sell water directly by the public water utility.

The utility view in Nairobi was that the company was not inclined to adopt the DMM model as it was felt that entrusting the water supply of an area to an individual or a clique would resort in huge insecurity. The water utility sees the way forward in fine sub

reticulation so that all those individuals who need a connection can be connected while those who cannot will be served through water kiosks under utility management.

The study results established that MSPWE's view infrastructure control as key to staying in business. On how they would react if they lost control of infrastructure, the MSPWE's gave mixed reactions, some feeling very threatened while others would be willing to adopt appropriate strategies in order to adapt to change and hence perpetuate their stay in business (Table 4.13).

Table 4.13: Responses to Loss of Control of infrastructure

	What do you envisage you would do if you lost control of infrastructure	Mombasa Count	%	Kisumu Count	%	Nairobi Count	%
PPP	Close business	27	38	12	23.5	128	57.3
	Relocate business	13	18.3	20	39.2	22	10.3
	Negotiate delegated management	11	15.5	12	23.5	36	16.2
	Negotiate partnership	9	12.7	6	11.8	34	15.4
	Do not know	11	15.5	1	2	2	0.9
	Total	71	100	51	100	224	100
FPM	Close business	21	55.3			13	27.7
	Relocate business	16	42.1			14	29.8
	Negotiate delegated management	1	2.7			0	0
	Negotiate partnership	0	0			18	38.3
	Do not know					2	4.3
	Total	38	100			47	100
MO	Close business			4	66.7		
	Negotiate partnership			1	16.7		
	Do not know			1	16.7		
	Total			6	100		

Figures 4.26-4.28 show how MSPWE's would react by city/model to loss of control of infrastructure. On how they would react if they lost control of infrastructure, the worst affected, it seemed were PPP's because significant proportions would close business: Mombasa (38%), Kisumu retailing MSPWE's (23.5%), Kisumu MO's (67%) and Nairobi PPP's (57.3%) showing worrying concerns about sustainability of PPP's if they lost control of infrastructure. However significant proportions of retailing PPP's in Kisumu (74.5%), Mombasa(46.5%) and Nairobi (42%) saw other business options other than closing business, amongst them relocating business, or negotiating partnerships and delegated management with a very small proportion not knowing what to do; Mombasa(15.5%), Kisumu (1%) and Nairobi (0.85%). For Kisumu only 16.67% of the MO's expect to negotiate business and the remaining 16.67% had no idea what they would do.

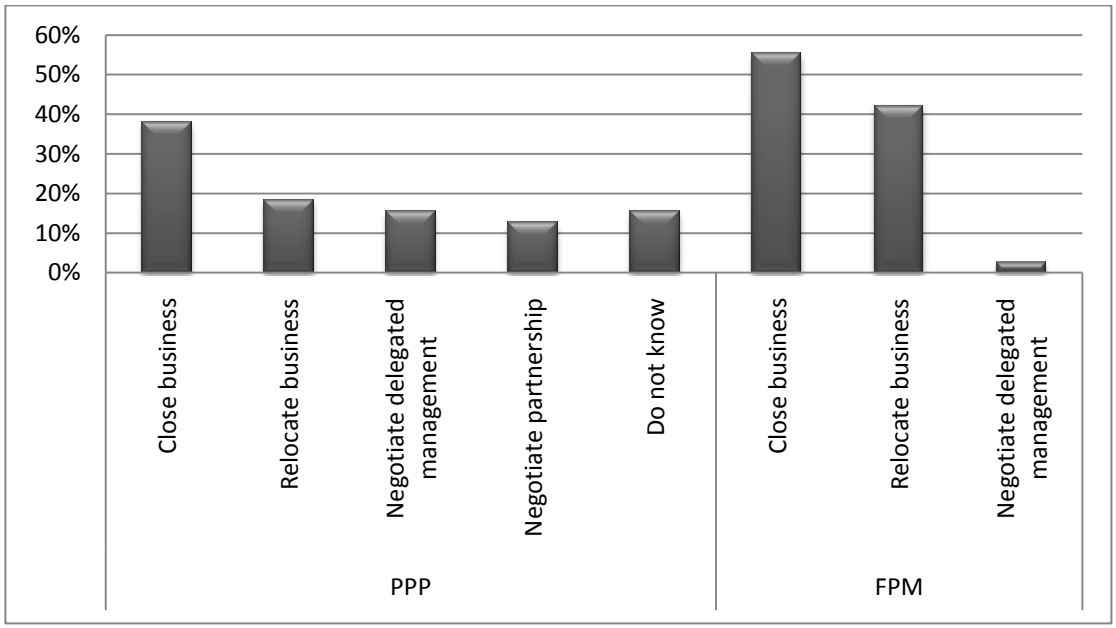

Figure 4-26: Response to Loss of Infrastructure Control – Mombasa

It may be that the fact that NCWSC position was that it would avail water as close as possible to the consumers in peri-urban areas and leave the emergence and survival of MSPWE's purely to be determined by the market forces made the MSPWE's feel they did not have an isolating mechanism over the infrastructure they had possession of at the moment. As a result such possession could be lost or imitated by other enterprises in time, hence depriving them of the competitive advantage enjoyed in the short term. For Kisumu it may have been as a result of limitations imposed by the MO, delegated management contract which is gotten through open bidding and assessed periodically. Loss of control of infrastructure would be precipitated by loss of delegated management contract and that means closing business. It was however significant that all the MO's seemed to have acquired a competitive advantage since they had their contracts renewed

every year for the three years they had been in business.

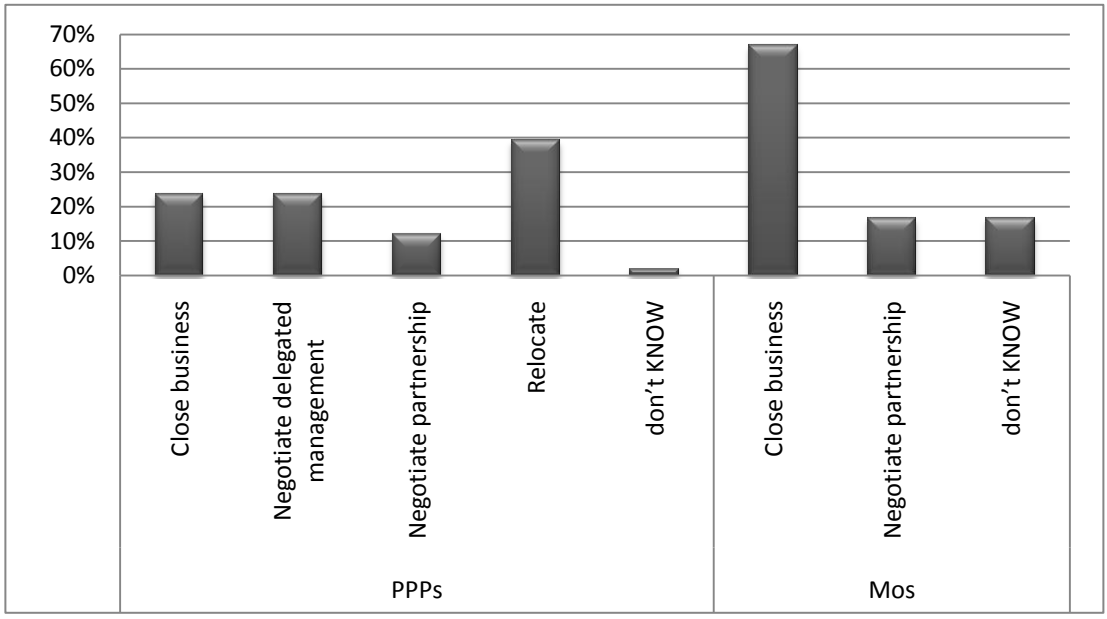

Figure 4-27: Response to Loss of Infrastructure Control- Kisumu

FPM's on the other hand showed mixed reactions in the wake of loss of control over infrastructure. In Mombasa, 55.3% would close business and another 42% relocate business while for Nairobi only 28% would close business. For Nairobi this would either mean relocating business (30%) or negotiating a partnership (38%) showing more confidence and resilience to stay in business for FPM's in Nairobi than Mombasa.

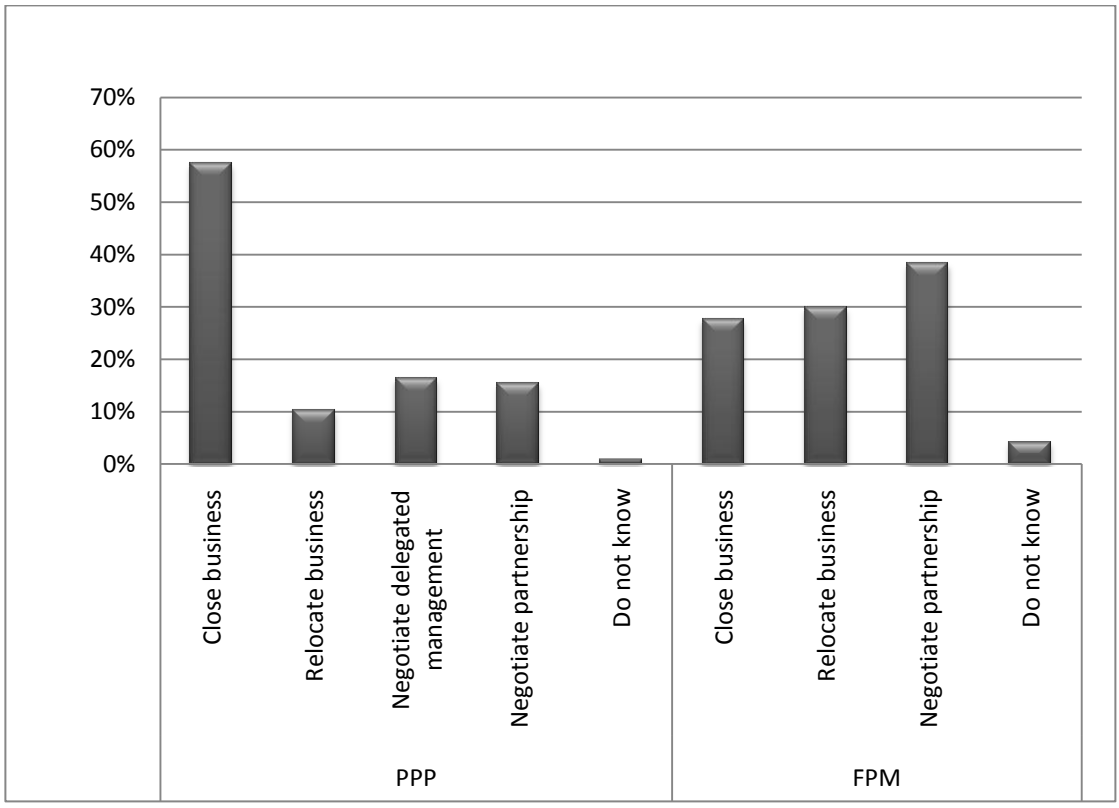

Figure 4-28: Response to Loss of Infrastructure Control – Nairobi

The control of water infrastructure, whether through ownership or by secure partnerships with bulk suppliers in defined localities was expected to provide an isolating mechanism that the MSPWE can use to control the supply and distribution of a valuable resource. According to the Resource based theory when a firm possesses and controls resources that are valuable, rare, imperfectly imitable and non-substitutable in favourable industry conditions it will withstand competitive and imitative pressures (Dollinger, 2008)). If the entrepreneur can protect these resources, through an isolating mechanism, and maintain these four qualities then the enterprise will have competitive advantage over the long term, i.e. sustainable. Hence it would be expected that if an MSPWE can possess control

and provide an isolating mechanism for the water source and the infrastructure used to deliver it in a particular area, it will have a competitive advantage in the long term, that is, sustainable. Water as a resource and the monopolistic nature of the infrastructure serving a particular zone render both water as a resource and infrastructure to have the four attributes. This study determined that MSPWE's had varying control over the infrastructure they used to deliver water services, some physical monopoly and others physical and time bound monopolies. The general trend from the study results indicated that the PPP's control minor localized reticulations within short distances from the water utility larger mains but with total dependence for supply of water on the water utilities while the FPM's both own and control complete localized networks. While FPM's had isolating mechanisms by virtue of ownership, PPP's could only secure the isolating mechanism only in partnership with the water utilities.

Across all the cities 100% of the retailing PPP's in the three cities and MO's had control of their own localized networks after the water utility meter as opposed to complete network that includes the primary source of water, while 85-100% of the FPM's had control of the complete system including source and networks. Hence by virtue of infrastructure ownership, FPM's possessed and controlled their water infrastructure but PPP's, whether retail PPP's or MO's could only control the infrastructure under an agreement with the water utility and as such they enjoyed a competitive advantage only as long as this agreement remained in force.

The study results show that the majority of MSPWE's, both FPM's and PPP's view

control of infrastructure as key to staying in business; quite consistently with the Resource based theory. If this control were to be lost by virtue of utility expansion into the areas of supply the majority of the enterprises would be keen to negotiate partnership or delegated management showing a readiness to adapt to changing market environment through reorganization. The study results show that water utilities were increasingly embracing partnerships or at the very least creating environments favourable to MSPWE businesses by allowing them to tap water from their mains at concessionary prices and in two cities, Kisumu and Mombasa go a step further to define business zones where the MSPWE had the exclusive mandate to sell piped utility water, thereby giving the MSPWE the isolating mechanism needed to mitigate the threat to loss of control of water infrastructure and hence an assurance of time bound competitive advantage .

On how they would react if they lost control of infrastructure, the MSPWE's entrepreneurs showed mixed reactions, some feeling very threatened while others would be willing to adopt appropriate strategies in order to adapt to change and hence perpetuate their stay in business. Significant proportions of retailing PPP's entrepreneurs in Kisumu (74.5%), Mombasa (46.5%) and Nairobi (42%) saw other business options other than closing business, amongst them relocating business, or negotiating partnerships and delegated management, thus providing the needed isolating mechanism with a very small proportion not knowing what to do. FPM's entrepreneurs on the other hand showed mixed reactions in the wake of loss of control over infrastructure. In Mombasa 55.3% would close business and another 42% relocate business while for Nairobi only 28% would close business. For Nairobi this would either

mean relocating business (30%) or negotiating a partnership (38%) showing more confidence and resilience to stay in business for FPM's entrepreneurs in Nairobi than Mombasa.

4.4.5 Competition

Under this variable the study sought to determine the nature of competition faced by the MSPWE's in the peri-urban areas of Kenyan cities, what influences this competition and how such competition or lack of it influenced the sustainability of the MSPWE's against a background without adequate information on the variable because there were no previous studies on MSPWE's in the peri-urban areas of Kenyan cities addressing it. The study determined the key MSPWE competitiveness indicators and sources of competitive advantage compared to the competitors.

As confirmed by the public water utilities serving the three Kenyan cities in the interviews held during the survey, MSPWE's in the peri-urban areas of these cities operated business either as fully privatized enterprises or as public private partnership in small localized networks. The question was whether or not such MSPWE's operated in competitive environments and how this influenced the MSPWE sustainability. Competition faced by the MSPWE was indicated by the presence of other service providers. The effectiveness of this competition was indicated by how the MSPWE had assessed the competitors and got convinced that it would fare well in the competition. Table 4.14 shows the competitor presence in the area of MSPWE business environment. The MSPWE's were then asked how they rated the competitors they faced in their areas

of business operations and the responses given are presented in Tables 4.15-4.17.

Table 4.14: Close Competitors in the Business Locality

	Other providers	Mombasa		Kisumu		Nairobi	
PPP's	Public Utility	72	98.6	14	24.1	40	17.7
	Manual Mobile Water Vendors	51	69.9	1	1.7	138	61.1
	Water Kiosks	64	87.7	47	81	126	55.8
	Private piped water supplies	10	13.7	45	77.6	32	14.2
	Shallow Wells	3	4.1	5	8.6	12	5.3
	None			1	1.7	4	1.8
FPM's	Public Utility	37	94.9			14	29.8
	Manual Mobile Water Vendors	27	69.2			42	89.4
	Water Kiosks	35	89.7			29	61.7
	Private piped water supplies	17	43.6			37	78.7
	Shallow Wells	3	7.7			2	4.3
MO's	Public Utility			5	83.3		
	Manual Mobile Water Vendors			0	0		
	Water Kiosks			6	100		
	Private piped water supplies			0	0		
	Shallow Wells			2	33.3		

Against the public water utility a high majority of MSPWE's were operating in areas with to some extent a presence of public utility network (Table 4.15). Real competition faced was however from other MSPWE's as the water utility had not penetrated the areas where the MSPWE's were active.

Table 4.15: Competition - MSPWE's Versus the Public Water Utility

	Reasons for being convinced you would compete favorably against public water Utility -	Mombasa Count	%	Kisumu Count	%	Nairobi Count	%
PPP	Extend services to areas not covered by the public utility	25	35.2	19	44.2	84	51.9
	Supply to areas served poorly by public utility	21	29.6	11	25.6	20	12.4
	More reliable service levels	25	35.2	13	30.2	58	35.8
	Total	71	100	43	100	162	100
FPM	Extend services to areas not covered by the public utility	23	63.9			3	6.7
	Supply to areas served poorly by public utility	9	25			7	15.6
	More reliable service levels	4	11.1			35	77.8
	Total	36	100			45	100
MO's	Extend services to areas not covered by the public utility			2	40		
	More reliable service levels			3	60		
				5	100		

In Mombasa Responses from MSPWE's show that in well over 90% of enterprises in both categories (98.6% of PPP's and 95% of FPM's) presence of water utility was felt. The presence of the public water utility was less felt in Nairobi standing at 18% and 30% of the PPP's and FPM's respectively. As confirmed by MOWASCO, PPP's enjoyed a defined service area advantage compared to FPM's. FPM's were more in competition with other FPM's indicating that these kinds of providers were concentrated in certain areas especially where Public utility network was lacking.

According to the public water utility for Kisumu, KIWASCO, there was competition for market entry for MO's as public advertisements were made for the management of

network for designated zones. The MO contracts were awarded for specifically defined zones which did not overlap and therefore the MO's, once in the market, could be seen as operating in monopolistic competition because the distances between the zones were short. Upon the award of a contract the MO enjoyed the exclusive rights to make metered connections, bill customers and collect revenue and hence was not in competition with the public water utility. The MO was not allowed to retail water and hence was not in competition with retail MSPWE's. Hence retail PPP's in Kisumu were not in competition with other categories of MSPWE's other than themselves, 76% and 24% reported the presence of the MO or utility network respectively in the area utility.

In Nairobi all MSPWE's, both PPP's and FPM's viewed the public water utility as a weak competitor, with the presence of the mobile water vendors reported by 35.9% of the enterprises. Amongst the FPM's, the main advantage was to extend services to areas not covered by the public utility for 64% of enterprises in Mombasa and providing more reliable services for 78% of them in Nairobi. The PPP's in Mombasa city were mainly extending services to localized areas not covered by the utility or coming in to offer more reliable service levels (Mombasa, 35% and 35%; Kisumu; 44% and 30%; Nairobi: 52% and 36%).

Competition between MSPWE's was mainly in the form of better service levels, assured quality of water and lower prices (Table 4.16). In Mombasa those operating alongside other private piped water supplies, a majority 59% of the PPP's, felt confident in the

reliability of service levels as an advantage while a majority 74% of FPM's said they were taking a market share due to unsatisfied demand for piped water connections.

Table 4.16: Competition between MSPWE's

		Mombasa		Kisumu		Nairobi	
	Reasons for being convinced you would compete favorably against other private piped water supplies	Count	%	Count	%	Count	%
PPP	Taking a market share due to unsatisfied demand for piped water connections	21	29.6	10	17.6	26	35.1
	More reliable service levels	39	55	7	12.3	20	27
	Consumer Confidence in source of water compared to competitors	8	11.3	28	49.1	13	17.6
	Our lower prices for the water	3	4.2	12	21.1	15	20.3
	Total	71	100	57	100	74	100
FPM	Taking a market share due to unsatisfied demand for piped water connections	28	73.7			14	30.4
	More reliable service levels	4	10.5			27	58.7
	Consumer Confidence in source of water compared to competitors	3	7.9			3	6.5
	Our lower prices for the water	3	7.9			2	4.4
	Total	38	100			46	100
MO's	Taking a market share due to unsatisfied demand for piped water connections			5	83.3		
	More reliable service levels			1	16.7		
	Consumer Confidence in source of water compared to competitors			0	0		
	Our lower prices for the water			0	0		
	Total			6	100		

In Kisumu consumer confidence in the source of water accounted for 49% while the lower price accounted for 21% of PPP's feeling competitive over other same category competitors. Taking a market share and offering more reliable services were cited as weak reasons for being competitive standing at 17.5% and 12.5% respectively. In Nairobi taking a market share was cited by 35% of the PPP's. On the other competitiveness indicators, the PPP's had a spread of reasons for being competitive with more reliable services, consumer confidence in the MSPWE's source of water and lower prices cited by 27%, 17.6% and 20,3% of PPP's respectively. These results indicated varied and spread reasons for PPP's being competitive without an overwhelming inclination to any particular indicator meaning there was high competition amongst the MSPWE's.

In Nairobi the more reliable services and taking a market share were cited by 58.6% and 30.4% of the FPM's as the source of the competiveness. Competition with mobile vendors was mainly based on consumers demand for piped water connections, consumer confidence in the source of water and the lower prices charged by the MSWPEs compared to mobile water vendors (Table 4.17).

Table 4.17: Competition- MSPWE's Versus Mobile Water Vendors

	Reasons for being convinced you would compete favorably against mobile water vendors	Mombasa		Kisumu		Nairobi	
		Count	%	Count	%	Count	%
PPP's	Consumers demand for piped water connections	33	46.5	3	11.1	44	25.9
	Mobile Water vendors would be our customers	10	14.1	4	14.8	4	2.4
	Consumer Confidence in source of water compared to mobile water vendors	21	29.56	11	40.7	52	30.6
	Our lower prices for the water	7	9.9	9	33.3	70	41.2
	Total	71	100	27	100	170	100
FPM's	Consumers demand for piped water connections	13	34.2			1	2.3
	Mobile Water vendors would be our customers	4	10.5			12	27.9
	Consumer Confidence in source of water compared to mobile water vendors	6	15.78			20	46.5
	Our lower prices for the water	15	39.5			10	23.3
	Total	38	100			1	2.3
MO's	Consumers demand for piped water connections						
	Mobile Water vendors would be our customers						
	Consumer Confidence in source of water compared to mobile water vendors						
	Our lower prices for the water						
	Total						

Mobile water vendors faired dismally on competition in the market. The consumer preference for the MSPWE to mobile water vendor included a combination of factors including consumer need for piped connections, consumer confidence in the MSPWE source of water and the lower prices for water. At best mobile water vendors were customers to the MSPWE's. Mobile water providers registered the highest presence in

Mombasa at for PPP's and FPM's operation areas (Mombasa; 70% for both; Nairobi 61% and 89%). Kisumu had the lowest activity by mobile water vendors at less than 2%.

Amongst the PPP's in Nairobi confidence in the source and lower price were the main advantages (31% and 41%;). Just as in Nairobi, the main reasons why PPP's in Mombasa felt well placed to compete against mobile water vendors were the uncertainty in the vendors' source of water in addition to consumer demand for piped water connections as cited by 30% and 47% of respondents respectively. Hence despite their high presence in the MSPWE's water markets, at best mobile water vendors were customers to the MSPWE's and did not pose any serious competition to the MSPWE's.

The study results show that category competition presented the strongest competition for both PPP's and FPM's. The water utilities were not seen as presenting real and meaningful competition because the MSPWE presence was to a large extent as a result of the water utility complete absence in the case of FPM's or depended on the consent and support of the water utility in the case of PPP's. In addition it was for the very fact that the utility services were missing or inadequate that the MSPWE's including FPM's and PPP's were in business. These findings were also consistent with the direct observations (Table 4.18).

Table 4.18: Direct Observations- Competitors Presence in Peri-urban Water Markets

			Strong		Fair		Weak	
		Competitor	Count	%	Count	%	Count	%
Mombasa	PPP's	Sole provider in the area	4.1%					
		Public Utility	8	11.8	39	57.4	21	30.9
		Other piped water enterprises	6	50	1	8.3	5	41.7
		Manual mobile water vendors	6	14	37	86.1	0	0
		Motorized mobile water vendors	0	0	0	0	4	100
	FPM's	Sole provider in the area	12.8%					
		Public Utility	6	18.2	5	15.2	22	66.7
		Other piped water enterprises	3	75	0	0	1	25
		Manual mobile water vendors	3	18.8	2	12.5	11	68.8
		Motorized water vendors	0	0	0	0	0	0
Kisumu	PPP's	Sole provider in the area	(2) 3.4					
		Public Utility	1	5.3	5	26.3	13	68.4
		Other piped water enterprises	15	48.4	13	41.9	3	9.7
		Manual mobile water vendors	0	0	1	25	3	75
		Motorized water vendors	0	0	0	0	3	100
	MO's	Sole provider in the area	0 (0)					
		Public Utility	1	7.7	6	46.2	6	46.2
		Other piped water enterprises	0	0	0	0	0	0
		Manual mobile water vendors	0	0	0	0	0	0
		Motorized water vendors	0	0	0	0	0	0
Nairobi	PPP's	Sole provider in the area	12.5					
		Public Utility	22	25.6	32	37.2	32	37.2
		Other piped water enterprises	116	61.1	50	26.3	24	12.6
		Manual mobile water vendors	16	11.4	70	50	54	38.6
		Motorized water vendors	2	6.8	10	33.3	18	60
	FPM's	Sole provider in the area	14.9					
		Public Utility	1	7.7	6	46.2	6	46.2
		Other piped water enterprises	14	32.6	22	51.2	7	16.3
		Manual mobile water vendors	2	4.7	27	62.9	14	32.6
		Motorized water vendors	5	13.2	17	44.7	16	42.1

The competition scenario observed was in agreement with earlier findings by other studies (Njiru & Albu, 2002) that MSPWE's came in to bridge gaps left by the utility mainly regarding infrastructure spread and service level as regards the quantity and frequency of supply. It is this market that the PPP's were sharing out with FPM's, the former operating in close proximity of water utility network because their source of water is the water utility and the latter operating where the public water utility was absent. Reasons why MSPWE's felt well placed to compete against utility was the extension of services to areas not covered by the public utility, the ability to offer superior services to areas served poorly by public utility and the superior water quality to that offered by mobile water vendors. For instance, by observation and also confirmed by in-depth interviews with the water utilities, in all the cities the public water utility had networks at the peripheries of the peri-urban neighborhoods but in most cases had not penetrated the neighborhoods interior. The PPP's thus took over from this point and supplied water sourced from the utility large network or developed own sources as for FPM's.

The findings agreed with studies elsewhere in the World that many water utilities in many cities of the developing world had been unable to adequately provide for the water and sanitation needs of city dwellers particularly peri-urban areas and this inability to provide a basic service had created the environment driving the rise of MSWEs (Asian Development Bank, 2006; Njiru & Albu, 2002). According to a study by Asian Development Bank (2006), it was argued that although mandated to serve all zones within the city jurisdiction including peri-urban areas, water utilities service levels were

often not tailored to demand and often these utilities did not have the flexibility and the know-how to do business in the informal setting of peri-urban areas. Moreover, international experience showed small scale piped water providers (SSPWPs), in comparison with water utilities, could be more dynamic in filling the gap between supply and demand and have more incentives to grow and expand their services. SSPWPs provide a competitive and appropriate service to households that have no access to utility connection. This was evident in Africa, Asia, and Latin America where SSPWPs serve large urban populations.

On whether monopolistic control of water supply infrastructure was a pre-requisite for the sustainability of the enterprises, there was consensus in both MOWASCO and CWSB that the definition of an area of service is good and healthy for the sake of order and accountability. Just as the Water Services Board had define water services zones and appointed various WSPs to supply services in these areas, so should the areas with gaps be zoned and enterprises licensed to operate in an arrangement similar to the KIWASCO-MO arrangement in Kisumu. This would ensure creation of economically viable entities. However care should be taken when allocating these areas to match the capacities of the entrepreneurs with the task requirements.

Similar sentiments were echoed by the NCWSC and KIWASCO representatives who concurred that monopolistic inclination would be necessary for the sustainability. However perhaps due to past experiences in Nairobi, it was pointed out that these

enterprises if left to thrive in monopolistic regime can with time mutate to become exploitative cartels. In Nairobi and Kisumu for retail PPP's connections and license to sell water were allocated without preference and entry was left purely to market forces.

4.4.6 Socio-political Support

The study sought to establish the specific socio-political support, if any, for MSPWE's in peri-urban areas of Kenyan cities and determine how such support or lack of it influenced sustainability of MSPWE's. This was against a background in which, world over, studies had established that small water enterprises faced many constraints that included administrative, legal, financial, and trading conditions in city water supply markets. The MSPWE responses are summarized in Table 4.19. Whereas the majority of enterprises, 99% of PPP's in Mombasa, 93% in Kisumu and 63% in Nairobi and 74% of FPM's in Mombasa and 77% in Nairobi felt that they enjoyed goodwill and support by public authorities, in Nairobi, however, 47% of PPP's and 36% of FPM's reported hostility and frequent harassment by public authorities, indicating a measurable not so favourable socio-political environment. Mombasa and Kisumu reported negligible hostility and no frequent harassment by the public authorities.

Furthermore the majority of MSPWE's, except for FPM's in Mombasa, enjoyed a license or a partnership with the public water utilities (86% PPP's for Mombasa, 58% of PPP's for Kisumu, 83% of MO's in Kisumu, 95% of PPP's for Nairobi 77% of FPM'S for Nairobi). MOWASCO explained the status quo by expressing concerns about the

quality of water sold by the FPM's as the reason they did not issue them with licenses although they supported them with water disinfection chemicals dipped in the wells, again recording institutionalization of improving relationships between the water utilities and MSPWE's. In addition all the utilities were unanimous that they gave water at concessionary rates to the PPP's to ensure that potable water was affordable to the poor in the peri-urban areas while ensuring that the entrepreneurs made a profit from water sales. However on their part, in almost all cases, MSPWE's in all the cities were selling water at prices higher than the one set by the water utility. The FPM's played by their own rules, that is, they produced and delivered water to the market with little support and intervention by any other actor (Table 4.19) and set prices according to their assessment of the market.

Table 4.19: Socio- political Environment

		Mombasa		Kisumu		Nairobi	
		Count	%	Count	%	Count	%
PPP	Goodwill and recognition by public authorities	72	98.6	54	93.1	72	63.7
	Partnership/license with public utilities	63	86.3	34	58.6	80	94.7
	Business improvement interventions from public authorities only	0	0	6	10.3	6	5.3
	Business improvement interventions from donors and NGOs only	2	2.7	3	5.2	9	8
	Business improvement interventions by partnerships between Government institutions donors and NGOs	0	0	6	10.3	5	4.4
	Hostile and frequently harassed by public authorities	2	2.7	2	3.5	53	46.9
FPM's	Goodwill and recognition by public authorities	29	74.4			36	76.6
	Partnership/license with public utilities	6	15.4			36	76.6
	Business improvement interventions from public authorities only	0	0			2	4.3
	Business improvement interventions from donors and NGOs only	0	0			3	6.4
	Business improvement interventions by partnerships between Government institutions donors and NGOs	0	0			2	4.4
	Hostile and frequently harassed by public authorities	0	0			17	36.2
MO	Goodwill and recognition by public authorities			5	83.3		
	Partnership/license with public utilities			5	83.3		
	Business improvement interventions from public authorities only			3	50		
	Business improvement interventions from donors and NGOs only			1	16.7		
	Business improvement interventions by partnerships between Government institutions donors and NGOs			1	16.7		
	Hostile and frequently harassed by public authorities			0	0		

Business intervention support by public authorities, whether alone or in partnership with Donors, was negligible for all MSPWE's in all the cities except for MO's in Kisumu where 50% of MO's responded that they had received business improvement interventions from public authorities and another 17% from donors and NGOs.

In-depth interviews with the water utilities in all the cities established that the enterprises operated with the goodwill and recognition by the water utilities. However while KIWASCO and MOWASCO had put in deliberate efforts to support MSPWE's either in PPP's or with water disinfection chemicals for FPM's in Mombasa, in Nairobi all categories of MSPWE's were left to emerge and survive in business according to the market environment and their own business drive, only that PPP's obtained water from the water utility at a concessionary rate.

In in-depth interviews revealed that the current socio-political environment was in favour of PPP's by giving them special price for water, even below the production cost by the utilities. For Mombasa support in favour of PPP's had been taken a notch higher by business zone delineation, giving that particular MSPWE the sole operational license to sell water in the demarcated area and in Kisumu the local utlity, KIWASCO, had delegated the management of small localized networks to MO's. From the results, it emerged that in Mombasa city, 98.63% of the PPP's felt that they were working with the goodwill and recognition by public authorities. Another 86.3% were in partnership with the utility and had a license from the water utility. The same cannot be said of the FMPs

in the coastal city as besides the goodwill and recognition which stood at 74%, less than 10% had licenses or partnership with local utility. Enterprises operating in Kisumu benefited from political goodwill of the Lake Victoria South Water Services Board and KIWASCO, to improve services for the poor. From discussions held with KIWASCO, the enterprises including the MO's were recognized also by local administrators and had the good will and support a view that was shared by all the 6 contracted MO's. 93% of retailing PPP's and 83% of the MO's felt that there was goodwill and recognition by public authorities, and another 58% of retailing PPP's enjoyed partnerships with public utilities. The MO's had also been beneficiaries of business improvement interventions in all the areas under question, with 50% of the MO's indicating that they had received business intervention support from public authorities and 17% from Donors and NGOs. This was facilitated mainly by the utility after signing of contract and prior to handing over of network. Some NGOs notably Care Kenya had also contributed to targeted interventions which had resulted in the extension of the supply line by one of the MO's.

The situation was somewhat different in Nairobi. The PPP's under NCWSC did not obtain a license and what was reported as one was simply the categorization of the connection as a kiosk. Rather the MSPWE's obtained a general trade license from the city council while the NCWSC however made no deliberate efforts to protect the interests of the enterprises, and from the views of NCWSC officials they seemed to be unwanted stop-gap measures. As can be seen from the Table 4.19, 46.90% of PPP's and 36.17% of FPM's suffered harassment by public authorities. Although the NCWSC was

not sightless to the fact that the entrepreneurs operating in its licensed area provide an important service to households that the utility would not have reached currently, it seemed that the utility strategy viewed the entrepreneurs as stop-gap measures to provide improved water services to the peri-urban areas in the short run, and to drive them out of business by way of providing better utility services (infill) in the long run. These findings, therefore, reflect an improving view and treatment of MSPWE's by the water utilities compared to the findings by Asian Development Bank(2006) and Njiru and Albu (2002).

The study established that unlike the assertions by the Asian Development Bank (2006) and Njiru and Albu (2002), the constraints faced by MSPWE's in peri-urban areas of Kenyan cities were being mitigated. According to Njiru and Albu (2002) the reality in many cities of Sub-Saharan Africa, including Kenya, was that despite the significant role played by SWEs in providing water services, they faced numerous constraints, and were usually not recognized by utilities and policy makers and SWEs often operate within a hostile environment, and this undermined their potential to make a more significant contribution to provision of good quality affordable water services to their customers.

The Asian Development Bank(2006) argued that without formal recognition and licensing by local authorities and the city water utility, small networks operated on a commercially precarious footing. Unlike these earlier assertions, the study established that in a lot of instances the MSPWE's have been licensed and given water in bulk at concessionary prices which they retailed at market driven prices. Hostility and frequent

harassment had declined and some MSPWE's such as the MO's in Kisumu had well grounded and formalized contracts with the water utilities with exclusive rights to manage and extend networks in defined localized zones. In Mombasa the water utility was sensitive to MSPWE business viability and was defining zones in which it gave MSPWE's the exclusive rights to retail water sourced in bulk from the utility at concessionary rates.

All these orientations by the water utilities had significantly eased the commercially precarious footing of the previous years articulated by the Asian Development Bank (2006) and Njiru and Albu (2002). The changing orientation was in conformity with the observations articulated by Nickson (2005) using institutionalized experiences with *Aguatero*s in Paraguay that (1) small scale private service providers can contribute to better access to services and ease financial pressures (2) large state or private monopolies are not necessarily the only or best option and (3) public limitations can be overcome by allowing appropriate private sector participation in service delivery.

The recognition and support of MSPWE's in the peri-urban areas of Kenyan cities was improving, echoing similarities and trend on the recognition of the competitive edge enjoyed by MSPWE's in peri-urban areas in other cities of the developing world, for instance Manila, Philippines; Can Tho city, Vietnam and Paraguay. In the Philippines deliberate efforts to ensure that small piped water networks are no longer the domain of informal entrepreneurs going where utilities will not or cannot go, the slums; have been implemented in a number of water utilities with the assistance of Asian Development

Bank (Asian Development Bank, 2007). The Water Utility serving Can Tho City in Vietnam, had adopted a partnership with local entrepreneurs who provide land and run small localized piped networks to provide potable water in the rapidly urbanizing Mekong Delta, as a result of the expansion of Can Tho City (Spencer, 2007). In Paraguay small water enterprises, the *Aguateros*, are allowed and licensed to invest and operate small localized water supply networks that serve substantial populations in peri-urban areas where the water utility has been constrained to operate (World Water Council, 2005).

4.5 Entrepreneurial Customer Responsiveness

The study sought to establish the specific ways in which piped water enterprises in the peri-urban areas of Kenyan cities respond to their customers in the peri-urban water market in the Kenyan cities. on the key customer responsiveness. This was against a background that no previous study in Kenya had examined these aspects on the MSPWE's in peri-urban areas of Kenyan cities. Customer responsiveness amongst the MSPWE's in this study was assessed by administration of questionnaires to MSPWE's, making observations and in-depth interviews with water services institutions with a role to play in service delivery including Water Services Regulatory Board, Water Services Boards, the Public Water Utilities and the Water Services Trust Fund.

Analysis of questionnaire responses by the MSPWE's showed that practically the majority of the enterprises viewed their services as good-fair on quantity, quality,

reliability, frequency, convenience payment system and price (Tables APP IV 1-5). However on quantity delivery, reliability and frequency the rating by PPP's was fair-weak for Mombasa and Nairobi, reflecting the situation in the water utilities that they depended on for their supply. FPM's on the other hand, dependent on their own sources rated these aspects as good-fair in most cases. WSBs, WSRB, water utilities confirmed this explaining that whereas MSPWE's may be the best on convenience, quantity delivery and reliability follow the same trend as the utility in case of PPP's. Prices could be lower, however, because the water utilities provided subsidized water in bulk, although conceding that MSPWE prices were generally market driven. Whereas water utilities could guarantee the quality of water sourced from them, they could not guarantee it at the MSWPE outlets given the lack of control on the MSPWE network by the utility, much less so for water supplied by FPM's from own developed sources.

Direct observations, summarized in the Appendix Tables APP IV 6-8 also show that the MSPWE's customer responsiveness could be rated good-fair on quantity, quality, reliability, frequency, convenience payment system and price. Customer management was also rated good –fair on timely service to customers and friendly customer service but very low on efficient technical management of customer service facilities (Table APP IV 7). The ambience at the water selling points was assessed by observations on effective drainage and safe disposal of wastewater from premises served by the enterprise. In all cases, except on safe disposal of effluents from households in the vicinity of PPP's in Nairobi and of FPM's in Mombasa, this was rated as fair-poor for

94% of PPP's and 50% of the enterprises (Table APP IV 8). A detailed analysis of the MSPWE's customer responsiveness on the attributes quantity, quality, reliability, frequency, convenience payment system and price is presented below.

4.5.1 Quantity

The study established that while FPM's had full control of their source and hence quantity, PPP's relied on the water utilities. PPP's in Mombasa rated their quantity supply to customers as good but the rating was on a declining trend falling from over 75% five years earlier to 65%. PPP's in Kisumu reported a consistent good quantity supply through five years, with over 90% indicating good-fair quantity delivery implying that the MSPWE's must have taken measures such as storage to mitigate against the acute shortages experienced in the utility mains more than three years earlier. The high rating for periods three years earlier were coincident with the improvement of the water supply situation in the utility network.

For Nairobi the PPP's that rated quantity delivery as good-fair had decreased from over 90% five years earlier to about 50%, showing a worrying decline in quantity delivery. The response from PPP's in Kisumu depicted a declining trend regarding quantity with those rating it as good dropping from a high of 62% five years ago to about 40% in the current situation. This seems to contradict the scenario painted by the water utility which implied recent investment in infrastructure and delegation of management to MO's had translated to more water being availed into the settlements. In all the cities the PPP's

could only be expected to supply in resonance to the water supply quantity delivery by the water utilities unless they had taken measures to mitigate against inadequate quantity delivery by the water utility by investing in own infrastructures.

FPM's on the other hand consistently rated their quantity delivery as good, virtually 100% for Mombasa and over 70% for Nairobi over the five year period with about 90% rating the quantity delivery as good-fair in 2009. Observations confirmed that MSPWE'S including PPP's invested in booster pumps and water storage tanks and these were used to mitigate against inadequate supply by the water utility. However, FPM's, relying on own privately developed sources, had more control.

This quantity delivery rating by PPP's in both Mombasa and Nairobi seemed too high considering the view of the water utilities, for instance that Mombasa suffered water scarcity most of the time, meeting only about 40% of the water demand, leaving 60% to be met by MSPWE's. A similar situation was prevalent in Nairobi. According to the NCWSC; the quantity supplied to vendors was not sufficient due to inadequate sources at the utility's disposal and the deficiency of infrastructure. However the fact that MSPWE's invested in water storage tanks could be the explanation for the improved quantity delivery as reported by the MSPWE's compared to the views of the water utilities in Mombasa and Kisumu. A contrasting scenario to the experience of the Nairobi and Mombasa utilities was painted in Kisumu where the local utility KIWASCO indicated that quantity delivery from the utility and hence by extension to PPP's had

improved.

Direct observations rated an overwhelming majority of MSPWE's, both PPP's and FPM's as good-fair, which seemed to confirm the enterprise positive rating of their customer responsiveness. It was considered that although the water utilities viewed the MSPWE's that they supplied could not be expected to fair better than the utility, the MSPWE's seemed to mitigate against this by investing in booster pumps and water storage tanks to bridge fluctuations in the utility water supply. Hence it was deduced that the majority of MSPWE's were responsive to their customers on quantity delivery, at least in the short term but own investments were more the reason for this than reliance on the water utilities. As the Nairobi PPP's show, long-term inadequate supply from the water utility would also render PPP's inability to deliver quantity to customer requirements. FPM's on the other hand, had more capability to deliver customer quantity requirements as the MSPWE responses, interviews with the water utilities as well as observations show.

4.5.2 Quality

While the water utilities claimed high quality for water sourced from them, they however could not guarantee water quality at the PPP's outlets, much less so for FPM's. According to the utilities in the three cities, the quality of water can be guaranteed in their networks or those concessioned to MO's in the case of Kisumu but however control is lost when the commodity entered the vendors' networks which can be wanting at

times. Also direct observations indicated weak quality regulation. As a result water vended by these enterprises is open to contamination either along vendor transmission lines or handling during storage in vendor tanks. Shallow well sources are also very prone to contamination from pit latrines.

For the PPP's in Mombasa, there was a declining trend in the quality of water that they vend with the good rating declining from about 81% to 75% over a five year period. A similar trend in quality was depicted by the PPP's in Nairobi whose rating on good-fair dropped from 83% to 61% over a five year period. Water quality did not however seem to be a critical problem according to the MSPWE's in as virtually 100% rated it as being good-fair in the same period of five years and none recording it as poor at any time over the years. This would imply that the investments in infrastructure improvement in the city had actually borne fruit as far as safeguarding quality was concerned.

For the FPM's in Nairobi, quality rating of good-fair has been constantly high but registering a slight dip from 100% to 98% over a five year period. Similarly, the quality rating was also high according to the FPM's in Mombasa, over the past five years, good-fair rating was consistently over 96%, and this was in contrast to the concerns raised by the local utility over the quality of water vended by most FPM's. In fact, the utility in Mombasa also went a step further; rather than risk the outbreak of a disease in their licensed area, MOWASCO in partnership with Municipal council Mombasa health department chlorinates the private wells for free. The concern about water quality by the

water utilities was echoed by a customer survey in 2007 by WSP. The study established that half of the households in Mukuru had misgivings about the quality of water from MSPWE's either in terms of color, taste or smell.

4.5.3 Reliability

Reliability relates to the regularity of supply by the enterprises. On reliability the PPP's, the rating were good-fair: 95%-85% for Mombasa and over 90% for four years previously, later dipping to 65% for Nairobi. Kisumu on the other hand showed an increasing trend on this rating, with the good rating increasing from 25-35% over the five years, which according to the water utility could be explained by the improving reliability in the water utility supply. These results, on average, matched the situation in the water utility supply as highlighted by the water utilities in the in-depth interviews and hence it is deduced that the PPP's supply reliability was not assured but depended on the water utility reliability. FPM's on the other hand indicated a good-fair reliability rating of over 90% for both cities where they existed. None of the FPM's rated the reliability as poor. This could be explained by their control of own networks.

4.5.4 Frequency of Supply

On frequency all MSPWE's had high good-fair ratings of over 90%. Amongst the PPP's those with a good-fair rating dipped slightly from 94-92% in Mombasa, while the biggest decline was noted amongst those in Nairobi with a drop 97-60% within a five year period. This however did not match the reports by the water utilities except for

Kisumu in the last three years which had a good rating of frequency of supply. NCWSC and MOWASCO indicated that on average their water supply could not be said to be frequently available in the peri-urban areas and by extension to the MSPWE's. However the fact that MSPWE's invested in booster tanks and water storage tanks as established by direct observations could be the explanation for the improved frequency of supply to the customers compared to the water utility. FPM's, relying on own source and networks provided a more frequent supply to their customers compared to PPP's as attested by their responses and in-depth interviews with the water utilities. This was also evident from the self assessments by the FPM's as about 100% rated their frequency of supply as good-fair in the past five years in both Nairobi and Mombasa.

4.5.5 Payment

According to the Water Services Trust Fund and Water Services Regulatory Board and the Water Services Boards, the method of payment adopted by these enterprises was pro-poor and suited to the category of consumers that they serve. This was due to the fact that it was easier for a consumer with unpredictable income to pay KShs2- 10 per day for water rather than raise KShs300 for a water bill at the end of the month, a method of charge adopted by the water utilities. According to the water utilities the MSPWE's had better knowledge of the clientele and could offer credit services to consumers that were trustworthy; a strategy that was completely out of consideration by the water utilities. In all the three cities and across the end retailers, direct observations indicated cash payments by those buying water at MSPWE outlets. Only the MO's in Kisumu and

FPM's in Nairobi had adopted pay after use method but only to the customers served through meters. In all the three cities and across the categories of MSPWE's, virtually 100% rated their payment systems as good-fair.

4.5.6 Convenience

Practically all MSPWE's rated the convenience of their supply as good-fair for the customers. According to WSTF, WSRB, WSBs and the water utilities, although the convenience to the customers might not have been as good as would be desired, the MSPWE's were offering the best options so far by taking the water closer to the consumers than the water utilities could. This convenience was market driven and hence the best the customers could expect in a profit driven water market. Direct observations also indicated that the MSPWE water selling points were closer to the customers than any other service provider had availed them. The PPP's in all the three cities rated their convenience highly with over 90% having a good-fair rating over five years. Considering those that rated convenience as good, Mombasa PPP's indicated a rise from 25- 50% which could be attributed to increase in density of MSPWE's while for Nairobi the Figure was fairly constant at 60%. Kisumu on the other hand indicated a slight drop from 50-42%.

The FPM's also rated themselves highly as far as convenience was concerned with over 98% in both cities scoring good-fair on this attribute. Over 60% rated themselves as good over the past five years in Mombasa which could be explained by the high density

of such MSPWE's in the city as opposed to Nairobi where a mere 30% rated good in any of the five years and where the FPM's were by observation much farther apart. The convenience on FPM's in Nairobi was even lower than that of PPP's in the same city suggesting the density of the former was lower in areas where they offer services which could be attributed to the difference in housing density.

4.5.7 Price

In-depth interviews rated the MSPWE prices standing in the range KShs 3-5 per 20litres or KShs150- 250/m^3 as exorbitantly high, particularly taking into account that the PPP's obtained water at concessionary rates. Regardless of the source of water, the prices charged by the MSPWE's, KShs 2–5 were considered, on average exorbitantly too high by the Water Services Trust Fund, the Water Services Boards and the Water Utilities for the income bracket that they served in peri-urban areas.

From the MSPWE responses, over 90% of both PPP's and FPM's in the three cities viewed their prices as good-fair. Amongst the PPP's 77% in Nairobi felt their prices were good through the past five years while this percentage ranged from 47-83% in Mombasa. In Kisumu and where the lowest water retail price was recorded amongst PPP's, those rating price as good ranged from 35-42%. For the FPM's 95-100% in Nairobi viewed their price as good to the consumer while 36-68% of those in Mombasa expressed similar opinion over the past five years.

Over 90% of all MSPWE's viewed their price as good for the customers. This could

indeed be the case considering that the overwhelming majority of MSPWE's charged prices determined by judgment of the market. Considering that the MSPWE's, by observation were operating in areas with multiple MSPWE activity, at fairly short distances from each other and they were in the worst case scenario in monopolistic competition, the prices of the MSPWE's appeared market driven . By observation and also coming out from in-depth inter views with WSTF, WSRB, WSBs and the water utilities, in the absence of these MSPWE's, consumers fate would be in the hands of mobile water vendors selling water at not less than Kshs10 per 20litres or equivalent KShs500/m^3, a mobile water vendor price confirmed by direct observations. Hence it is deduced that the prices by MSPWE are market driven and hence customer responsive.

4.5.8 Overall entrepreneurial customer responsiveness

By providing piped water, the MSPWE's examined in this study were customer responsive to the customer demand for piped water. In overall terms the study established that MSPWE's viewed their services as good-fair on quantity, quality, reliability, frequency, convenience payment system and price. WSBs, WSRB, water utilities observed that MSPWE's may be the best on convenience but on quantity delivery and reliability they follow the same trend as the utility in case of PPP's. Prices could be better, however, because the water utilities provided subsidized water in bulk but it was conceded that MSPWE prices were generally market driven. Whereas water utilities could guarantee the quality of water sourced from them, they could not

guarantee it at the MSWPE outlets given the lack of control on the MSPWE network by the utility, much less so for water supplied by FPM's from own developed sources.

The MSPWE's customer responsiveness determined in the study was in agreement with the Asian Development Bank (2006) where it is argued that small piped water enterprises have, relative to water utilities the know-how to do business in the informal setting of peri-urban areas. Moreover, their payment systems are well adapted to the conditions and constraints of the poor such as irregular income and small consumption capacity.

The study findings are in agreement with Spencer (2007) in the study undertaken on small scale piped water providers in the peri-urban areas of Can Tho City, Vietnam. Spencer (2007) determined that households demand service provider responsiveness on their demand for piped household water, which has become a valued resource in peri-urban areas, not just because of changes in consumption patterns, but also because residents have noticed that traditional river, canal and groundwater sources have become more polluted with rapid urban development.

The MSPWE's customer responsiveness established in this study was consistent with the Asian Development Bank (2006) where it was argued that small piped water enterprises had, relative to water utilities, the know-how to do business in the informal setting of peri-urban areas. Moreover, their payment systems are well adapted to the conditions and constraints of the poor such as irregular income and small consumption capacity.

4.6 Entrepreneurial Pricing Strategies

The study sought to determine MSPWE entrepreneurial pricing strategies as a crucial factor influencing enterprise sustainability by assessing the approaches MSPWE's used to set the price and the price competitiveness within each organization model on one hand and with public water utility for each organizational model on the other hand and the price competitiveness across the organizational models. This was against a background where there was lack of specific information what pricing strategies MSPWE's in peri-urban areas used and the price competitiveness within and across the respective organizational models in the peri-urban areas of Kenyan cities because no previous study had been undertaken on these aspects across the models. The prices charged by the enterprises exhibited noticeable variation within the enterprise models and across the cities as illustrated by the descriptive statistics of the prices presented in Table 4.20. The highest mean price was for Nairobi PPP's standing at KShs183 followed by that for Nairobi FPM's at KShs171. Mombasa FPM's had the least mean price of KShs126. Kisumu and Mombasa had very close mean prices for PPP's standing at KShs145 and KShs154 respectively. MO's for Kisumu had an equal wholesale price of KShs40 at which they sold water to retail PPP's and individuals with metered connections.

The pricing data established that on average, MSPWE's were retailing water at PPP prices ranging from 45% for Kisumu, 54% for Mombasa and 83% for Nairobi above the utility recommended and expected retail water price of KShs100/m^3. Although there was no expectation by the water utilities that FPM's retail water at KShs100/m^3, the FPM's,

nevertheless sold water at mean prices lower than the PPP's in the cities in which they operated. This meant that the FPM's prices were 26% and 71% above the utility recommended price of KShs100/m^3 for Mombasa and Nairobi respectively.

The prices of most of the MSPWE's models in the three cities had high standard deviations, indicative of high dispersion in the prices (KShs64 and KShs40 for Mombasa PPP's and FPM's respectively and KSh53 and KShs47 for Nairobi PPP's and FPM's respectively), for Kisumu retail PPP's with a standard deviation of KShs16. The relatively low standard deviation for Kisumu retail PPP's indicated relatively low dispersion in the retail prices for Kisumu. With a range of KShs 50 to KShs350, a mean of 153, a mode of 100 and a median of 150 , Mombasa PPP's had the highest standard deviation of KShs63.7, hence showing the highest price dispersion. The Mombasa FPM's prices had a range of KShs50 to KShs250, a mean of KShs126, a mode and equal median of 100 and a standard deviation of KShs40 indicating lower prices and less price dispersion for FPM's compared to Mombasa PPP's.

The Nairobi PPP's had a range of KShs100 to KShs250, a mean of KShs183, equal mode and median of KShs150 and a standard deviation of 53 indicating the same order of prices and dispersion for PPP's compared to FPM's with an equal range of KShs100 to KShs250, a mean of KShs171, equal mode and median of KShs150 and a standard deviation of KShs47. This implied that the PPP and FPM prices for Nairobi were very competitive, a finding also confirmed by the analysis of variance presented under tests of hypotheses on competitiveness in this Section.

Table 4.20: MSPWE's Price Descriptive Statistics

City	Descriptive Statistics	PPP's	FPM's	MO's
Mombasa	**N**	65	39	
	Mean	154	126	
	Median	150	100	
	Mode	100	100	
	Std. Deviation	63.7	40	
	Variance	4056.6	1600	
	Minimum	50	50	
	Maximum	350	250	
Kisumu	**N**	56		6
	Mean	145		40
	Median	150		40
	Mode	150		40
	Std. Deviation	16		0
	Variance	256		0
	Minimum	100		40
	Maximum	150		40
Nairobi	**N**	218	45	
	Mean	183	171	
	Median	150	150	
	Mode	150	150	
	Std. Deviation	53.2	47	
	Variance	2832.3	2209	
	Minimum	100	100	
	Maximum	250	250	

The price frequency distribution curves are presented in Figures 4.29-4.31 . Examination of the curves reveals that in the price ranges KShs50-200/m^3, the price frequency distribution curve for Mombasa PPP's and FPM's, and KShs80-200/m^3 for Nairobi PPP's and FPM's appear approximately bell-shaped, that is they approximate to normal distribution but with a little skew to the left.

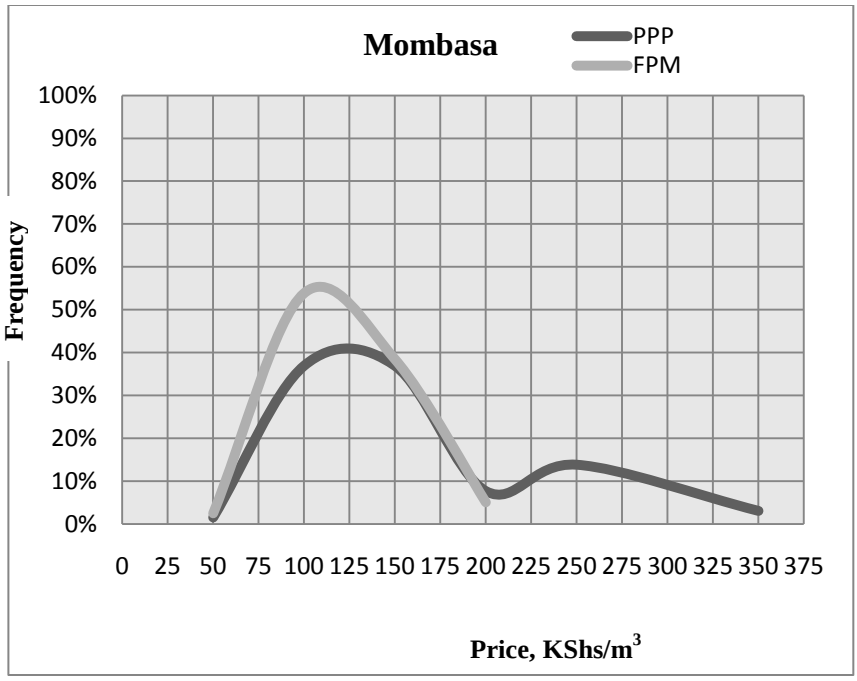

Figure 4-29:Price Frequency Distribution Curve- Mombasa PPP's and FPM's

With only two values of retail water prices, KShs100/m^3 and KShs150/m^3, Kisumu retail price frequency plot was a straight line.

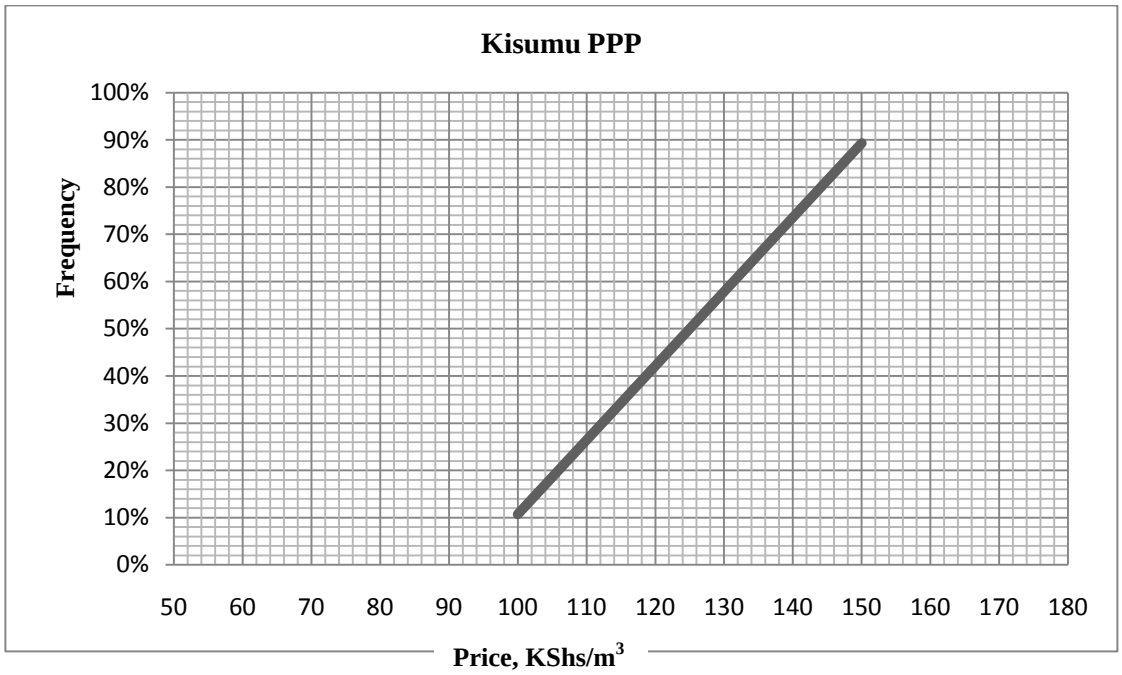

Figure 4-30: Price Frequency Distribution Curve- Kisumu PPP's

The price frequency plot for Nairobi PPP's and FPM's is presented in Figure 4.31. Both curves have a slight skew to the left.

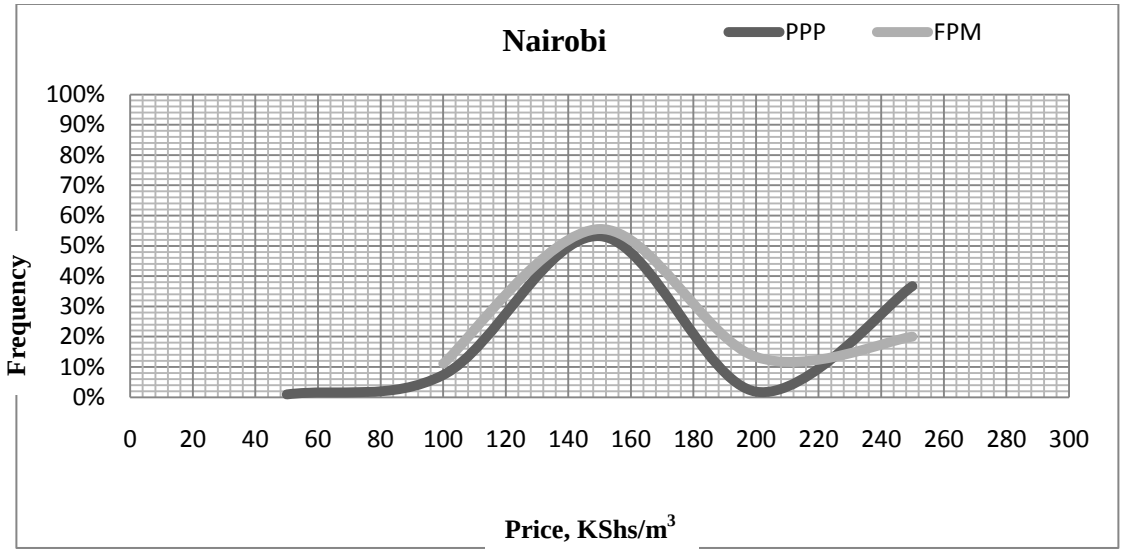

Figure 4-31: Price Frequency Distribution Curve- Nairobi PPP's and FPM's

A numerical presentation of profitability, based on the input costs and the selling prices, is given in Table 4.21. At the prices charged practically all the MSPWE's reported profitability for at least three years. It shows that over 50% of the MSPWE's, except MO's in Kisumu had profitability of above 50% for over five years for MSPWE'S in Mombasa and Nairobi and for three years for PPP's in Kisumu except MO's that indicated a profitability of below 10% and 35.9% of FPM's in Nairobi. A small proportion of MSPWE's and MO's reported no profits and loss. Since the majority of MSPWE's had shown profitability for three years and above it was deduced that they were sustainable.

Table 4.21: MSPWE Profitability

	Proportion (%)					
Profit Category (%)	Mombasa PPP	Nairobi PPP	Kisumu PPP	Kisumu MO's	Mombasa FPM	Nairobi FPM
Below 10	4.2	12.5	9.1	100	8.8	35.9
10-25	2.8	5	0.00		2.9	7.7
25-50	5.7	18.3	6.1		20.6	10.3
50-100	11.3	19.2	21.2		17.7	0.0
100-150	14.1	11.7	6.1		8.8	7.7
150-200	9.9	4.2	21.2		5.9	2.6
Above 200	52.1	29.2	36.4		35.3	35.9

The MSPWE profitability was confirmed by the MSPWE responses on the same (Table 4.22). Practically all the MSPWE's reported profitability. The numerical profitability presented in Table 4.21 is consistent with the responses from the MSPWE's presented in Table 4.22

Table 4.22: MSPWE Responses on Business Profitability

		Mombasa				Kisumu				Nairobi			
		Profitable		Not Profitable		Profitable		Not Profitable		Profitable		Not Profitable	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
PPP's	2009	54	74	19	26	55	96.5	2	3.5	97	85.9	16	14.2
	2008	48	75	16	25	46	95.8	2	4.2	95	88	13	12
	2007	34	74	12	26.1	24	96.0	1	4.0	77	89.5	9	10.5
	2006	29	80.6	7	19.4	15	100	0	0.0	57	87.7	8	12.3
	2005	24	77.4	7	22.6	7	100	0	0.0	42	84	8	16
FPM's	2009	37	97.4	1	2.6					45	97.8	1	2.2
	2008	28	100	0	0.00					44	100	0	0
	2007	11	100	0	0.00					38	100	0	0
	2006	11	100	0	0.00					31	100	0	0
	2005	7	87.5	1	12.5					24	96	1	4
MO's	2009					5	83.3	1	16.7				
	2008					5	83.3	1	16.7				
	2007					5	83.3	1	16.7				
	2006												
	2005												

As discussed earlier the majority of the MSPWE'S in all the cities and across all models assessed their enterprises as Profitable. The proportion of those reporting profitability was high and practically consistent for both PPP's and FPM's, 74-81% for Mombasa over a 5 year period, over 95% for Kisumu over a three year period and 75-80% of PPP's and 85-98% for Nairobi FPM's over a five year period (Table 4.22).

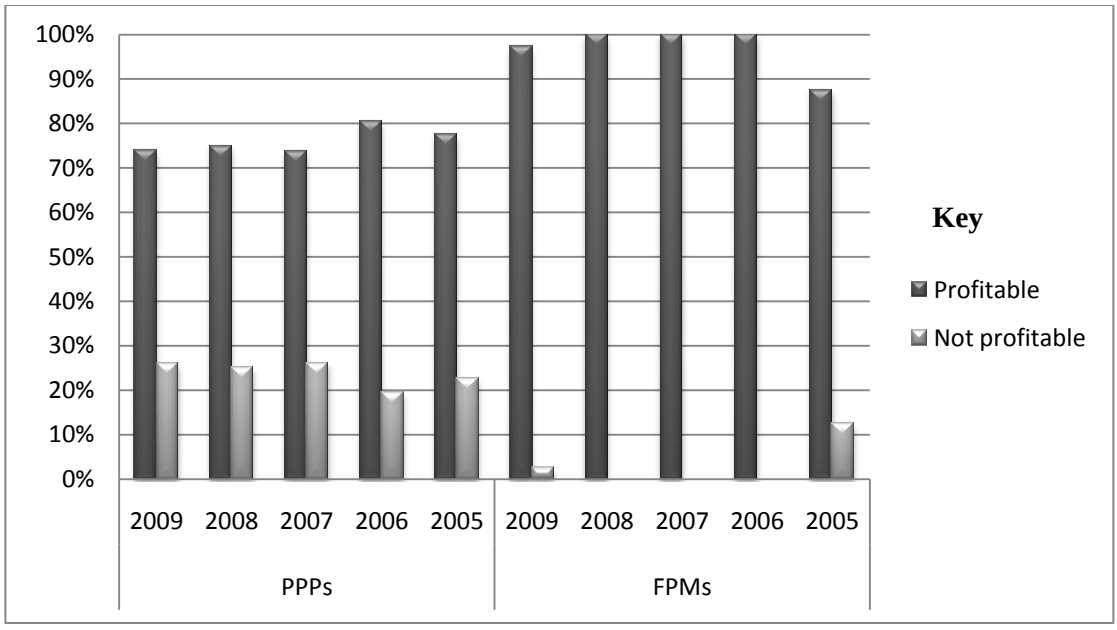

Figure 4-32: Business profitability - Mombasa

A higher proportion of FPM's reported profitability than PPP'S as illustrated in Figures 4.32 and 4.33.

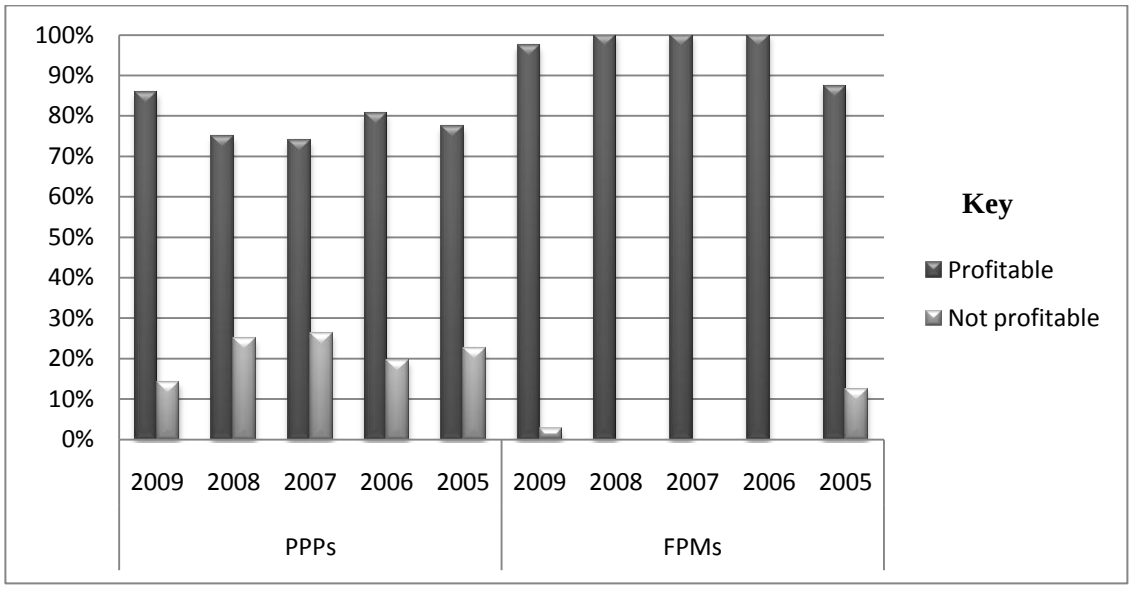

Figure 4-33: Business profitability - Nairobi

4.6.1 Entrepreneurs price determination strategies

A sustainable enterprise was expected to charge a price that ensured a profit and competitiveness. MSPWE's were expected to operate in monopolistic competition and according to McCloskey (1985) for such enterprises modest changes in the output or price of any single firm would have no perceptible influence on the sales of any other firm and an enterprise could therefore produce and sell more of its product if it reduces the price. However a sustainable enterprise was still expected to achieve full cost recovery and a profit margin such that the price, on average, exceeds the input cost. The study revealed that except for MO's in Kisumu that were bound by contractual agreement, the rest of the MSPWE's including PPP's and FPM's set the retail price of water in all the cities across all the other models, through a combination of market forces

and MSPWE collective decisions for both PPP's and FPM's (Figures 4.34-4.36).

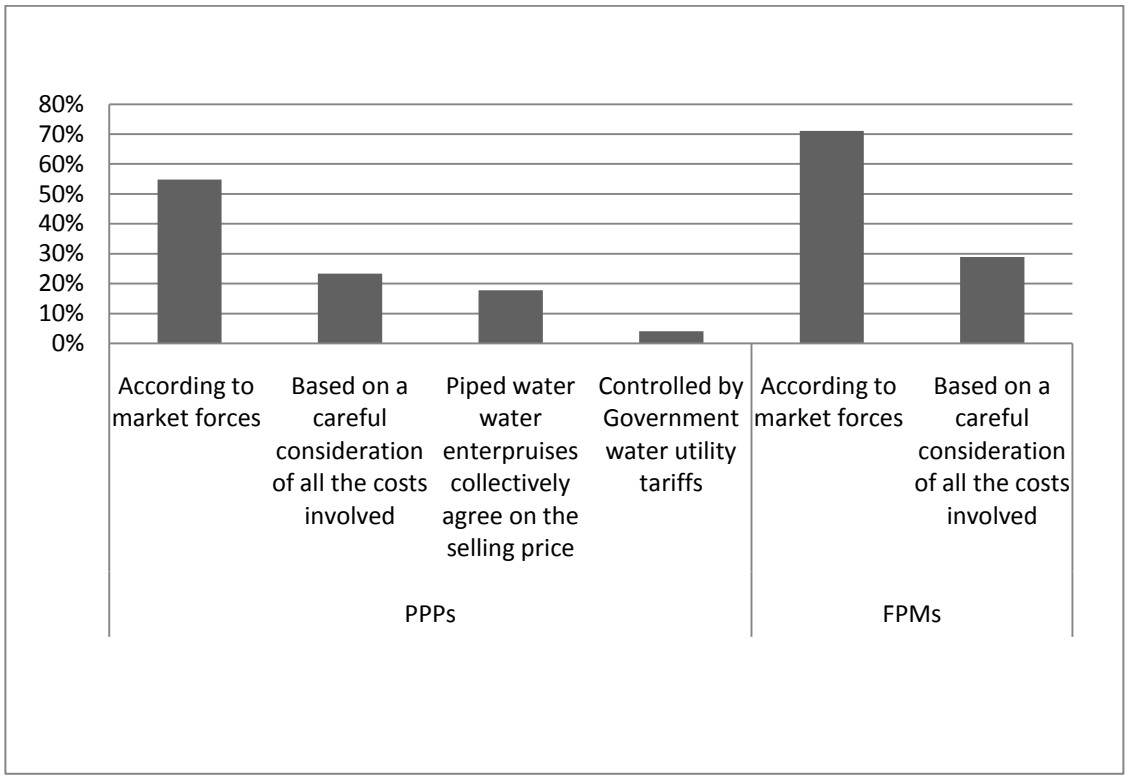

Figure 4-34: Entrepreneurs price determination strategies– Mombasa

Market forces and MSPWE collective agreements, taken together, accounted for the price setting for 73% of PPP's and 71% of FPM's in Mombasa, 90% of PPP's in Kisumu and 69% and 94% of PPP's and FPM's in Nairobi respectively. Setting the prices driven by market forces featured at 55% for PPP's and 71% for FPM's in Mombasa, 30% for PPS in Kisumu and 41% and 60% for PPP's and FPM's for Nairobi respectively. Collective agreement by MSPWE's on setting the minimum water price featured at 17.81% for Mombasa amongst PPP's and nil FPM's respectively, 60% for Kisumu amongst PPP's, 28% and 34% for PPP's and FPM's in Nairobi. It is significant that only

a relatively small proportion of MSPWE's reported price determination based on a careful assessment of costs or as per the government regulations. The MSPWE's used collective agreement in about 60% in Kisumu and 30% for both PPP's and FPM's in Nairobi. This collective price setting could be indicative of the presence of cartels.

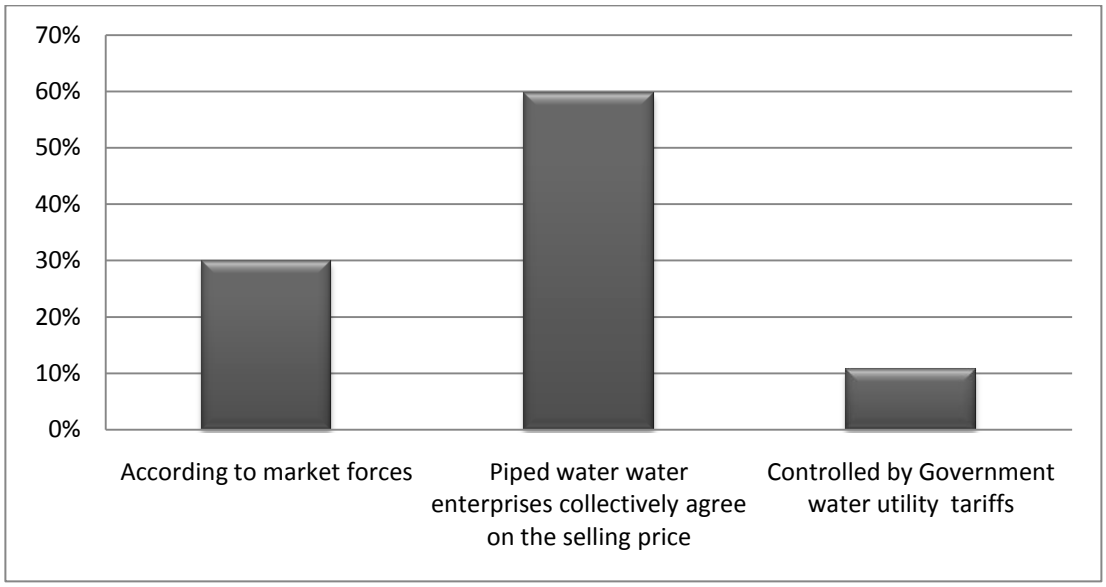

Figure 4-35: Entrepreneurs price determination strategies - Kisumu

On pricing, however, all water utilities expected the MSPWE's under PPP's to retail water at a price not exceeding KShs2 per 20 litres equivalent to KShs100/ m^3. However as the study results show, this did not seem to influence the water pricing. This was a clear indicator that the MSPWE's determined the water selling price, reportedly on the basis of market forces or collective MSPWE decisions to fix minimum price. On the other hand MO's in Kisumu, bound by firm PPP agreement, provided water in bulk to MSPWE's under PPP's at a prescribed tariff. Kisumu also indicated the highest

proportion of retail PPP's, 61%, applying a price determined collectively by groups of MSPWE's.

The results show that market forces and collective agreements, taken together, accounted for about 70% for PPP's and 94% for FPM's of the methods used by MSPWE's to set the water prices in Nairobi, with market forces accounting for the higher proportion (41% for PPP's, 60% for FPM's) while collective agreements on price accounted for 28% for PPP's and 34% for FPM's.

The FPM's in Nairobi were the most independent to set prices as can be seen in Figures 4.34- 4.36. Market forces and MSPWE collective decisions determined to a large extent the prices in Nairobi for both PPP's (68.8%) and FPM's (93.61%) with government regulation as a basis for price determination for only 18.4% for PPP's and a mere 6.4% for FPM's.

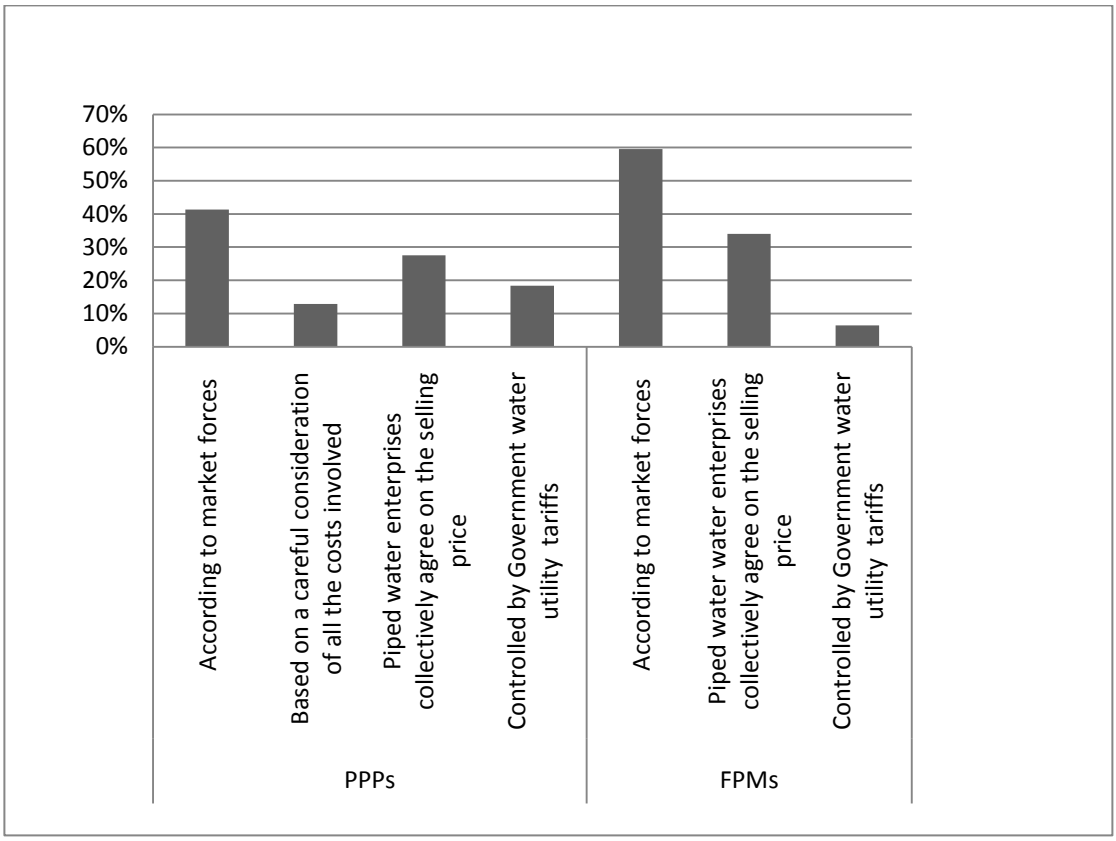

Figure 4-36: Entrepreneurs price determination strategies – Nairobi

4.6.2 Tests of hypotheses on price competitiveness

To determine the effect of the entrepreneurs pricing strategies on the price competitiveness, hypotheses were formulated and tested. The price competitiveness with the public water utility and within each model was tested using chi-squared (χ^2) as the test statistic while the price variation across the various models was tested by analysis of variance (ANOVA) at 5% level of significance. The tests were done only on retail MSPWE's but not for MO's in Kisumu which, as the study determined, applied a uniform wholesale price preset in the MO contract meaning that the MO's applied the

price set by the water utility, KShs40/m^3 in all cases.

a) Testing the Competitiveness of MSPWE prices with the Public Utility Price Ppu

The competitiveness of the prices, P, charged by MSPWE's in each organizational model in a particular city was compared with the public utility price, Ppu, as the expected value in the χ^2 test on the basis of the following hypotheses:-

Null Hypothesis, H_o: The Water price, P<= Ppu;
Alternate Hypothesis, H_1: The Water price, P> Ppu

The computed values of χ^2 were higher than the critical χ^2 for all the models at 5% level of significance (Table 4.23).The computed values of χ^2 for PPP's were 7,077.2 for Nairobi, 1,001.3 for Mombasa and 837.5 for Kisumu. These values exceeded the respective critical χ^2 values of 9.488, 11.07 and 3.8 . For Nairobi and Mombasa FPM's the computed χ^2 values were 944.9 and 326.7 respectively and these also exceeded the respective critical χ^2 values of 7.815 for each.

The Null hypotheses were therefore rejected for all MSPWE's models in the three cities and the Alternate hypotheses accepted that the retail prices for MSPWE's were significantly higher than the public utility prices. This confirmed that price regulation by the public water utilities was not effective in influencing MSPWE water prices other than for MO's in Kisumu for which the water price was firmly regulated by the contract. The findings gave more support to the study findings discussed earlier that MSPWE's

determined prices on a market driven basis.

b) Testing Price Competitiveness within MSPWE Models in the Same City

The Competitiveness of the prices, P, charged by MSPWE's in the same organizational model in the same city was tested by comparison with the mean price, $P_{E,}$ as the expected value in the χ^2 test on the basis of the following hypotheses: :-

Null Hypothesis, H_o: The Water price, $P <= P_E$

Alternate Hypothesis, H_1: The Water price, $P > P_E$

The computed values of χ^2 were higher than the critical χ^2 for all the models except Kisumu PPP's at 5% level of significance (Table 4.23).The computed values of χ^2 for PPP's were 7,164.1 for Nairobi, 1,840 for Mombasa and 3.8 for Kisumu. For Nairobi and Mombasa PPP's these values exceeded the respective critical χ^2 values of 9.488 and 11.07. For Nairobi and Mombasa FPM's the computed χ^2 values were 944.9 and 326.7 respectively and these also exceeded the respective critical χ^2 values of 7.815 for each. For Kisumu PPP's the computed χ^2 was equal to the critical χ^2 with a value of 3.8. Hence there was no significant difference in the retail prices for Kisumu PPP's. The Null hypotheses for all the other models except Kisumu retail PPP's were therefore rejected and the Alternate hypotheses accepted that the retail MSPWE prices were significantly different from each other. For Kisumu retail PPP's the computed χ^2 was equal to the critical χ^2 and hence the Null hypothesis for Kisumu retail price for PPP's was not rejected and it was concluded that there was no difference in the retail PPP prices.

This was consistent with the study findings discussed earlier, that except for Kisumu PPP's, the MSPWE's determined their prices according to market forces. The findings for Kisumu PPP's was also consistent with the findings discussed earlier that there was significant influence of collective agreement on the price setting by the majority of MSPWE's, standing at 61% of the retail PPP's in Kisumu. However, given that collective water vendor agreements could be seen as market drivers for entrepreneurial response, attempting to maximize on the market circumstances of water infrastructure held in collective monopoly by the MSPWE's, it is deduced that other than for MO's in Kisumu MSPWE prices are market driven, a market or industry condition favourable to the sustainability of MSPWE's.

Table 4.23: Chi- Squared Test Statistic - MSPWE Prices, P versus Public Utility Price, Pup

Model	Urban Centre		df	Public Utility Price Pup	Mean Retail Price P_E	Critical value	χ^2
PPP's	Nairobi	Chi-Square	4	7,077.2	7,164.1	9.488	
	Mombasa	Chi-Square	5	1,001.3	1,840	11.070	
	Kisumu	Chi-Square	1	837.5	3.8	3.8	
FPM	Nairobi	Chi-Square	3	944.9	930.5	7.815	
	Mombasa	Chi-Square	3	326.7	653.2	7.815	

c) Testing the Price Competitiveness Across organizational Models/Cities

The competitiveness of the prices μ_1, μ_2, μ_3, ...μ_n, charged by MSPWE's in the different organizational models in the three cities was tested by analysis of variance (ANOVA) using the following Null hypothesis, H_o, and the Alternate hypothesis H_1:

Null hypothesis H_0: $\mu_1 = \mu_2 = \mu_3 = \ldots = \mu_n$.

Alternate hypothesis H_1: $\mu_1 \neq \mu_2 \neq \mu_3 \neq \ldots \neq \mu_n$

On the basis of the above Null and Alternate hypotheses the following prices were compared

1. Between Nairobi PPP's and FPM's
2. Between Mombasa PPP's and FPM's
3. Between PPP's in all the Cities
4. Between FPM's in all cities, Nairobi and Mombasa only because there was no FPM in Kisumu
5. Amongst PPP's and FPM's in all the Cities

The results of the analysis of variance (ANOVA) for the above are presented in Table 4.24.

Table 4.24: Analysis of Variance for MSPWE's

City/Model		Sum of Squares	df	Mean Square	F computed	F Critical
Nairobi PPP's and FPM's	Between Groups	5296.69	1	5296.69	1.895	3.84
	Within Groups	729646.28	261	2795.58		
	Total	734942.97	262			
Mombasa PPP's and FPM's	Between Groups	19391.03	1	19391.03	6.362	3.92
	Within Groups	310897.44	102	3048.01		
	Total	330288.46	103			
PPP's Across All Cities	Between Groups	89563.01	2	44781.51	16.772	3.0
	Within Groups	897133.15	336	2670.04		
	Total	986696.17	338			
FPM's Across All Cities	Between Groups	43196.58	1	43196.58	22.590	3.11
	Within Groups	156803.42	82	1912.24		
	Total	200000	83			
PPP's & FPM's Across All Cities	Between Groups	29946.86	1	29946.86	10.624	3.84
	Within Groups	1186696.17	421	2818.76		
	Total	1216643.03	422			

The results show that the computed values of F were higher than the critical values for all cases except for PPP's and FPM's in Nairobi. Hence for Nairobi the Null hypothesis on the comparison of the mean price for PPP's and FPM's was not rejected and it was concluded that there was no difference in the mean prices for PPP's and FPM's for Nairobi. All the Null hypotheses based on all the other scenarios were rejected and concluded that there was a difference in the following mean prices:

1. Between Mombasa PPP's and FPM's
2. Between PPP's in all the Cities
3. Between FPM's in all cities (Nairobi and Mombasa only because there was no FPM in Kisumu)

4. Amongst PPP's and FPM's in all the Cities

Hence it was inferred that there was no significant difference in the mean prices for Nairobi PPP's and FPM's but other than this the prices in the MSPWE prices in the peri-urban areas were significantly different. The prices were in all cases significantly different from the price of KShs100/m^3 set as the retail price for MSPWE's in PPP's by the public water utilities. This taken together with the finding that MSPWE's set prices in response market forces shows that the MSPWE prices were in overall terms market driven and hence influenced the sustainability of the MSPWE's.

4.7 Regulatory and Business Organizational Frameworks

The study sought to determine the type of regulation frameworks and partnerships in the peri-urban water markets involving MSPWE's and how these influenced the sustainability of MSPWE's. This was against a background in which Njiru & Albu (2002) established that at the time their study was conducted, SWEs faced many constraints and a hostile environment. The study established that regulation was felt to varying degrees in the cities (Table 4.25 and 4.26).

Table 4.25: Type of Regulation

			Government		Utility		PPP		Vendor association	
			Frequency	%	Frequency	%	Frequency	%	Frequency	%
Mombasa	PPP's	Market Entry Regulation	6	8.2	64	87.7			1	1.4
		Quality Regulation	2	2.7	67	91.8			0	0
		Price Regulation	0	0	58	79.5			4	5.5
		Materials and workmanship	0	0	2	2.74			0	0
	FPM's	Market Entry Regulation	5	12.8	2	5.1			0	0
		Quality Regulation	26	66.7	3	7.7			1	2.6
		Price Regulation	2	5.1	4	10.3			2	5.1
		Materials and workmanship	0	0	0	0			3	7.7
Kisumu	PPP's	Market Entry Regulation	3	12.5	17	70.8	3	12.5	1	4.2
		Quality Regulation	3	11.1	24	88.9	0	0	0	0
		Price Regulation	2	5.9	9	26.5	2	5.9	21	61.8
		Materials and workmanship	0	0	0	0	1	50	1	50
	MO's	Market Entry Regulation			4	66.7	1	16.7		
		Quality Regulation			6	100				
		Price Regulation			6	100				
		Materials and workmanship			4	66.7				
Nairobi	PPP's	Market Entry Regulation	37	60.7	22	36.1	2	3.3	0	0
		Quality Regulation	1	2	48	94.1	2	3.9	0	0
		Price Regulation	17	50	0	0	2	5.9	15	44.1
		Materials and workmanship	0	0	9	90	0	0	1	10
	FPM's	Market Entry Regulation	14	100	0	0	0	0	0	0
		Quality Regulation	14	70	6	30	0	0	0	0
		Price Regulation	0	0	0	0	1	25	3	75
		Materials and workmanship	0	0	0	0	0	0	0	0

The majority of MSPWE's experienced regulation on market entry and water quality by either a government institution or a water utility. Retailing MSPWE's in Kisumu, however, reported no regulation by the utility but it was indicative that the MO's, on whom they principally depend upon for supply of bulk water were regulated by the water utility on market entry, water quality and price. Retail PPP's in Kisumu (61.8%) also indicated price regulation by water vendor associations. In Mombasa, regulation was mostly felt among the PPP's with 87.67%, 91.78%, and 79.45% citing market entry, quality regulation and price regulation by the water utility. The most felt regulation by FPM's was quality regulation cited by 66.67% and whose responsibility was under the local authority as opposed to the water utility.

In Kisumu retailing MSPWE's indicated little regulation. The proportion of PPP's experiencing regulation by either the government or water utility were: 12.5%, 11.1% and 5.9% market entry, quality regulation and price regulation by the water utility. However a significant 61% of retailing PPP's experienced price regulation by water vendor associations. All MO's experienced no regulation by a government institution but experienced regulation by the water utility on market entry, quality, price, materials and workmanship in the infrastructures they installed. These results established that MO's were the most regulated MSPWE's as would be expected since there was a firm MO contract.

In Nairobi retailing MSPWE's operating as PPP's indicated regulation on market entry (61%) and price regulation (50%). There was little regulation on all other aspects.

Significant proportions of FPM's experienced market entry regulation (100%) and quality regulation by government (50%).

In-depth interviews indicated that all utilities had personnel to enforce regulation. MOWASCO, for instance, had composed a special inspection unit that visited the areas of operation incognito posing as buyers in order to enforce quality and price regulation. The utility also regulated entry to the market through allocation of water kiosk license to those who fulfill its criteria. The CWSB representative however felt that due to this 'last resort attitude' and lack of proper laid arrangement to include these enterprises in the service provision chain, the relationship between the utility and the PPP's was loose and in reality there was minimal regulation for those seeking to sell water sourced from MOWASCO. Worse even FPM's were neither, registered, licensed nor regulated by the water utility. CWSB suggested remedying this situation by recognition, licensing and regulation of all water service providers in an area. In the consideration of CWSB it was desirable to create a level playing field, whereby all these players were placed under one realm of regulation and be accountable.

In Kisumu, KIWASCO personnel indicated that the utility regularly took water samples for testing routinely so as to safeguard quality of water sold in its licensed area. The utility and the MO also regulated entry to the market through allocation of water kiosk connection to those who fulfilled the laid criteria mainly payment of higher than normal deposit. None the less there was no visible presence of regulatory agents neither did the

survey team encounter anyone taking samples. From the interviews, 88.89% of the entrepreneurs seemed to be aware of this quality regulation by the various organizations. Regulation by water vendor associations was practically non-existent for all MSPWE models except amongst retailing PPP's in Kisumu, with 61.8% of them indicating this type of regulation.

Table 4.26: Observations on Regulation

		Good		Fair		Weak	
		Count	%	Count	%	Count	%
Mombasa	Presence of public authority regulatory agents	12	20.7	12	20.7	34	58.6
	Visible regulatory action by the public authority regulatory agents	2	5.4	7	18.9	28	75.7
	Collection of water samples by regulatory agents	6	7.8	9	11.7	62	80.5
	Visible compromise of regulatory agents	0	0	7	15.2	39	84.8
	Harassment by public authorities	0	0	6	35.3	11	64.7
Kisumu	Presence of public authority regulatory agents	1	2.9	5	14.3	29	82.9
	Visible regulatory action by the public authority regulatory agents	1	3.6	3	10.7	24	85.7
	Collection of water samples by regulatory agents	1	5	3	15	16	80
	Visible compromise of regulatory agents	3	8.3	15	41.7	18	50
	Harassment by public authorities	0	0	2	12.5	14	87.5
Nairobi	Presence of public authority regulatory agents	12	20.7	12	20.7	34	58.6
	Visible regulatory action by the public authority regulatory agents	2	5.4	7	18.9	28	75.7
	Collection of water samples by regulatory agents	6	7.8	9	11.7	62	80.5
	Visible compromise of regulatory agents	0	0	7	15.2	39	84.8
	Harassment by public authorities	0	0	6	35.3	11	64.7

The positive institutionalized orientation and deliberate efforts to embrace MSPWE's role in delivery of water services exhibited by the water utilities towards MSPWE's was also consistent with the views of Ouyahia (2006). Ouyahia argued that to protect consumers and private operators there was need to implement policy formulation that favours a win/win approach to private sector participation, particularly on MSPWE's in peri-urban areas. Public Private Partnerships (PPP's) are seen in this context as an effective means to establish cooperation between public and private actors and to bundle their financial resources, know-how and expertise to meet the challenges facing service provision.

Price regulation

All water utilities provided water in bulk to the MSPWE's at concessionary rates and expected the MSPWE's under PPP's to retail water at KShs2 per 20litres equivalent to KShs100/m^3. However, as the study established, the expectation of the public utilities that water would be retailed at KShs2/20litres equivalent to KShs100/m^3 did not influence the water pricing even amongst the PPP's who should have been obligated to sell water at an agreed price with the water utility since they obtained the water at a concessionary rate. This was a clear indicator that the MSPWE's water selling prices were market driven. On the other hand MO's in Kisumu, bound by firm PPP agreement, provided water in bulk to MSPWE's under PPP's at a prescribed tariff. Kisumu also indicated the highest proportion of MSPWE's, 61.8%, applying a price determined collectively by groups of retail piped water enterprises. Hence, except for the MO's price regulation was weak and the MSPWE's had a free hand to set prices according to their

own assessment of the market. Indeed the study established, as discussed under the section on pricing that the majority of the MSPWE's prices were market driven.

NCWSC explained that it does not regulate water vending prices although it supplied water to the retailing PPP's at concessionary rates with the expectation that the MSPWE's would sell the water at the pre-determined price of KShs100/m^3. In reality, however, market forces were left to determine the price at which water was retailed, the only attempt by the water company was to protect the consumers by availing as many connections as possible to interested vendors so as to stabilize the price at no more than shs2 per 20 liters. To safeguard on quality, the company had established sampling points in the informal settlements where it supplies water. Samples are taken routinely and tested. 78% of the MSPWE's reported quality regulation while 67% reported market entry regulation.

All the water utilities echoed the fact that MSPWE's under PPP's benefitted from obtaining water at concessionary prices from the public water utilities. The question of whether or not these MSPWE's would continue in business without subsidy received mixed responses, with only 49.3% of the PPP's in Mombasa willing to operate the business if there were no subsidies, 49.3% for Kisumu and 54% for Nairobi respectively. MSPWE's operating as FPM's were not subsidized and the issue of depending on subsidy was not within their expectations. All the MO's indicated willingness to remain in business even if services were not subsidized with the precondition that they be allowed to adopt market driven pricing.

Provision of subsidy to PPP's was seen as essential for continuation in business by on average 50% of retail MSPWE's in the three cities but MO's felt they could sustain their businesses even without the subsidy so long as regulatory restrictions on pricing imposed upon them were removed. A significant proportion of the MSPWE's (about 50%) would therefore continue in business with or without subsidies. Hence the majority of MSPWE's taking into account FPM's would be willing to continue in business with or without subsidies as long as they had the free hand to adopt market driven pricing. This meant that although the MSPWE's benefitted immensely from the subsidies, there was a will and determination to continue in business with or without subsidy. Hence subsidy was not seen as a factor influencing sustainability of MSPWE's.

All water utilities provided water in bulk to the MSPWE's at concessionary rates and expected the MSPWE's under PPP's to retail water at KShs2 per 20litres. This expectation was consistent with the one echoed by the United Nations Economic Commission for Africa(2005) which recognized and highlighted that one of the most challenging aspects facing PPP's remained the need to reconcile two competing aspects: governments need to find ways to fulfill their socioeconomic responsibilities for ensuring services to all citizens, on one hand, while striving to preserve the interests of private investors on the other. However, because of many difficulties related to the cost-recovery levels and priority given to meeting the social objectives, PPP's in most African countries will continue to require public funding in the form of financial allocation or direct subsidies to augment the private sources of funds in all types of

partnerships. However this study established that so far subsidies, although granted by the water utilities, did not benefit the targeted consumers. Instead the prices were market driven.

Business environment

The influence of regulation on the MSPWE business environment was assessed by asking the MSPWE's how the regulation favoured or not favoured their businesses. The MSPWE's were asked to indicate whether regulation was favourable or unfavourable on market entry, quality, price and public private partnership conditions (Table 4.27).

Table 4.27: Business environment Rating

		Mombasa				Kisumu				Nairobi			
		Favourable		Unfavourable		Favourable		Unfavourable		Favourable		Unfavourable	
	Business environment rating	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
PPP's	Market Entry	73	100	0	0	38	80.9	9	19.2	46	97.9	1	2.1
	Quality Regulation	71	97.3	2	2.7	16	50	16	50	47	100	0	0
	Price Regulation	71	97.3	2	2.7	32	65.3	17	34.7	36	97.3	1	2.7
	Public Private Partnership conditions	53	94.6	3	5.4	11	73.3	4	26.7	4	8.5	43	91.5
	Public Private Partnerships duration	2	20	8	80	10	71.4	4	28.6	1	100	0	0
	Public Private Partnerships Renewal	8	100	0	0	5	71.4	2	28.6	1	100	0	0
FPM'S	Market Entry	38	100	0	0					46	97.9	1	2.1
	Quality Regulation	25	100	0	0					47	100	0	0
	Price Regulation	15	100	0	0					36	97.3	1	2.7
	Public Private Partnership conditions	0	0	0	0					4	8.5	43	91.5
	Public Private Partnerships duration	0	0	0	0					1	100	0	0
	Public Private Partnerships Renewal	0	0	0	0					1	100	0	0
MO's	Market Entry					3	60	2	40				
	Quality Regulation					5	83.3	1	16.7				
	Price Regulation					3	75	1	25				
	Public Private Partnership conditions					2	33.3	4	66.7				
	Public Private Partnerships duration					1	16.7	5	83.3				
	Public Private Partnerships Renewal					2	66.7	1	33.3				

An overwhelming majority of MSPWE's across the cities, 60-100% viewed regulation favourable on all aspects except public private partnerships which was assessed as unfavourable by 80% of the PPP's in Mombasa and Kisumu and 90% of FPM's in Nairobi. It is noteworthy that only a small proportion of PPP's in Nairobi, less than 10%, view public private partnerships as unfavourable.

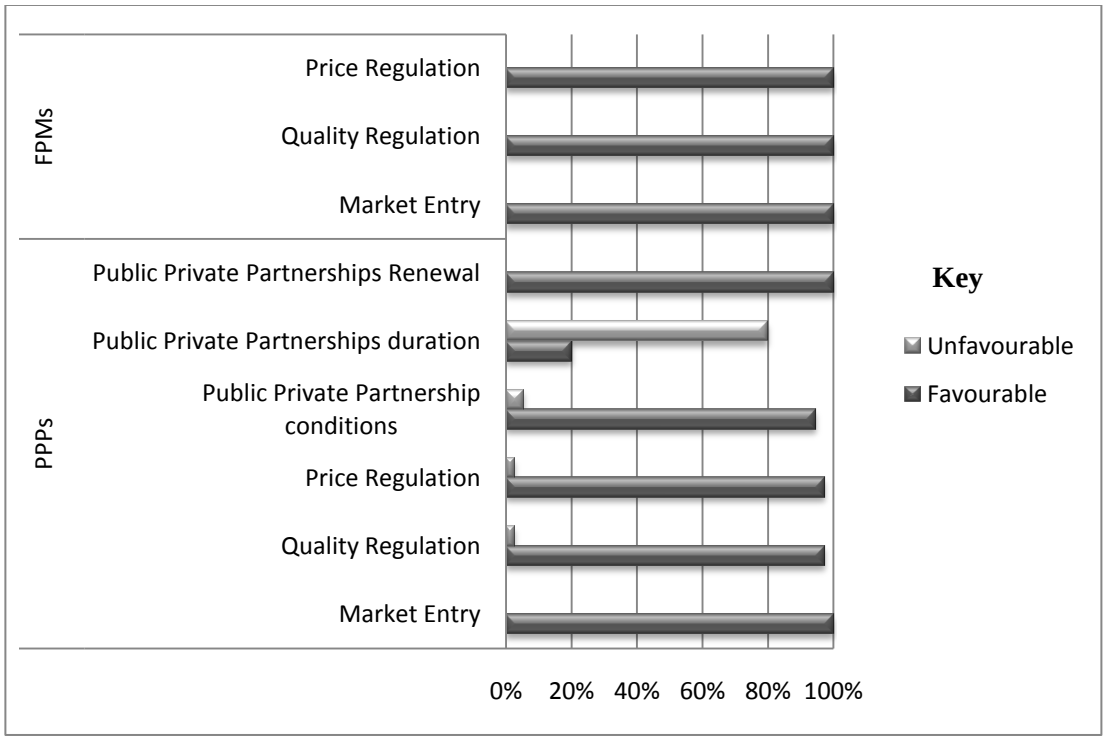

Figure 4-37: Business environment rating - Mombasa

The kind of regulation experienced (Table 4.25) by the MSPWE's taken together with the assessment of whether regulation was favourable or unfavourable (Figures 4.37-4.39) and observations in the field (Table 4.26), it emerged that what was viewed as favourable regulation was actually absent or weak regulation on many counts, for

instance prices. A majority of MSPWE's indicated that they received market entry regulation and quality regulation. However, as the observations indicated the said regulation was weak or non-existent in many cases (Table 4.26). This weak regulation or lack of it was the regulatory environment that the MSPWE's rated as favourable. It therefore emerged that weak regulation was viewed as favorable to business by the majority of the MSPWE's on many counts. This was perhaps due to the fact that the status quo posed no threat to their current business practices. It however remained to be seen what the effects would be if more effective regulation were implemented.

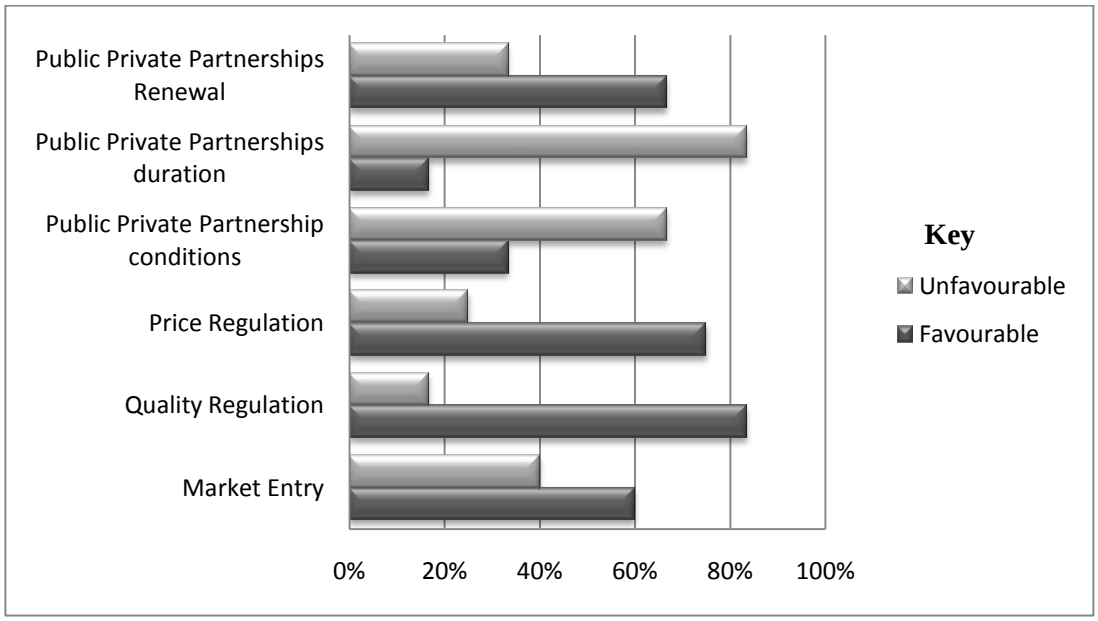

Figure 4-38: Business environment rating – Kisumu

The absence of effective regulation left the field too open and may actually be bad for business, for instance whereas quality regulation would assure consumers of the water

sourced from MSPWE's, lack of it creates uncertainty among consumers and this is not beneficial for business as it does not assure consumers that the water sold by MSPWE's was of good quality and hence make it more valuable to the consumers. Good quality water is also a scarce resource that is imperfectly imitable because of limitations on source and treatment facilities and lack of delivery and distribution infrastructure in peri-urban neighborhoods. Hence whereas MSPWE's many not view regulation as good for business, quality regulation may indeed impart a competitive advantage to an MSPWE. For example MSPWE's cited consumer confidence in their source of water as a source of competitive advantage over mobile water vendors. In addition a form of certification of MSPWE's as quality water service providers by the water utility, for instance recent certification of water tankers by NCWSc, could further assist consumers in choosing the MSPWE's from whom they purchase water.

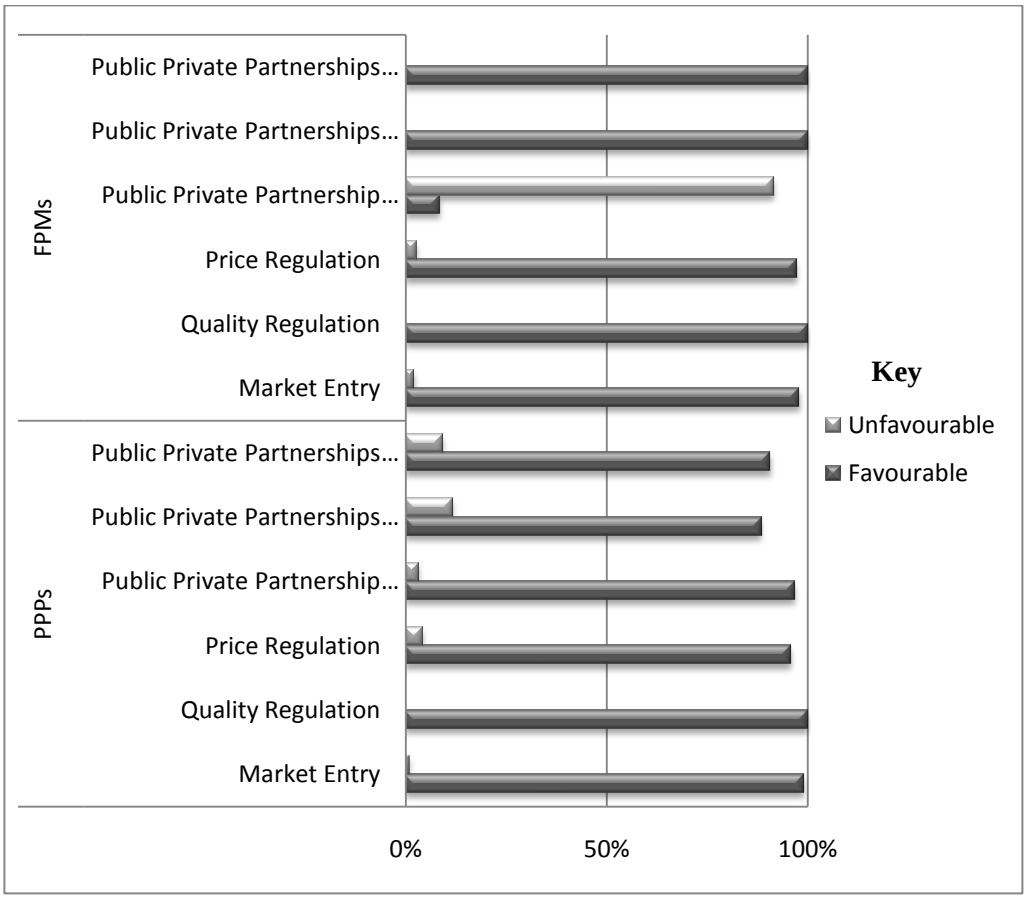

Figure 4-39: Business environment rating - Nairobi

Business organizational forms

On this variable the study sought to determine how the public water utilities in the three Kenyan cities were endeavouring to establish win/win partnerships in the peri-urban water markets involving MSPWE's and how these influenced the sustainability of MSPWE's. The study sought to establish whether the partnerships established conferred any competitive advantage to the MSPWE's and hence influence sustainability.

As discussed in section 4.1, the study established that there were the following water

business organizational arrangements in the three cities:- public-Private partnership with water utility (PPP's), Private-Private partnership with Master Operator (MO) and Fully Private Model (FPM). Of these, only public-Private partnership (PPP) with water utility were found in all the three cities, as the master operator (MO) confined only in Kisumu was a variant form of this organizational arrangement. Fully privatized MSPWE's were found in Mombasa and Nairobi only. The MSPWE's under PPP's relied on the water utility for water supply. They invested in the network needed to connect to the water utility network in the periphery of a larger neighbourhood to deliver water closer to the customers than the utility had done or was willing to do but only owned the network after the water meter. Being more versatile in business decision making, the MSPWE's seemed more willing to extend network into unplanned areas with market viability to take water closer to the consumers than the water utility could.

From the above it was clear that the PPP's were willing to go where the water utility remained constrained to go. To this extent, as explained by the water utilities in the three cities, the PPP was a useful vehicle even for the water utility to reach out to those consumers without water and the ones the utility could not cover due to constraints faced, key amongst them being the limitation that water utilities could not invest in networks in areas that were not formally planned. FPM's on the other hand invested fully in own sources and network to deliver water to the selling points located close to the consumers.

The study established that most of the MSPWE's assessed that the PPP's main benefit achieved from PPP's was the supply of water in bulk at concessionary prices. It emerged that the majority of MSPWE's did not view the licensing to sell water and delegated management as contributing to their sustainability. An overwhelming majority of MSPWE's under PPP's in all the cities felt that obtaining water in bulk from the water utility and at concessionary rates was the only significant condition favourable to their businesses (Figures 4.40-4.42). In Mombasa 81.4% of PPP's felt that they benefitted from the partnership with water utilities by getting water in bulk (Figure 4.40).

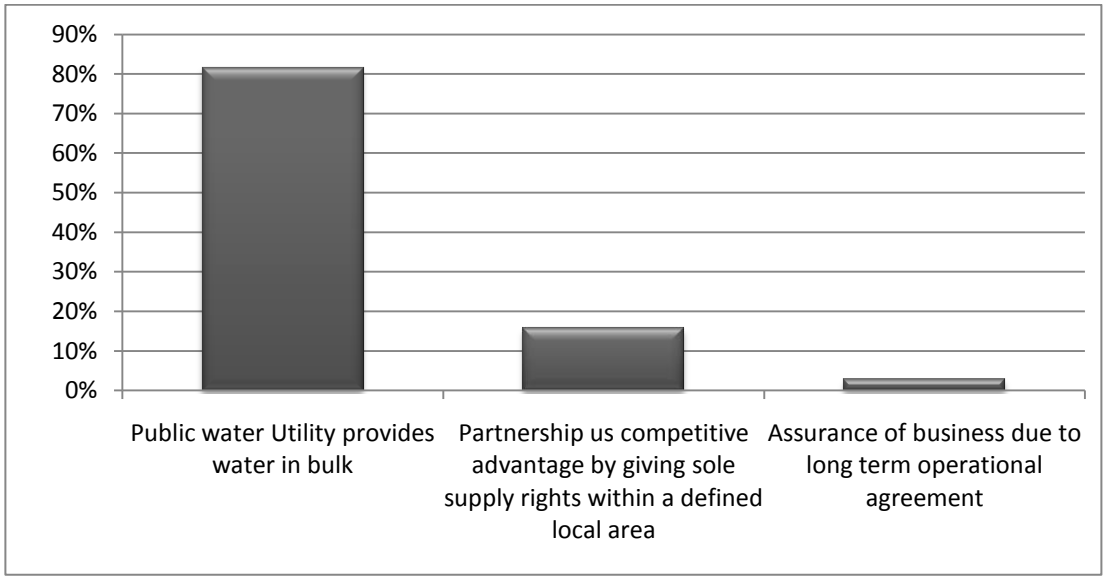

Figure 4.40: How is Public private partnership favorable Mombasa

In Kisumu 83.33% of MO's felt they benefitted from the partnership by getting water in bulk. A slightly mix response was 66.7% of retail PPP's feeling assured of long term business assurance by virtue of the PPP's with 33.33% feeling that the supply of water in

bulk was the only favourable condition they derived from the relationship (Figure 4.41).

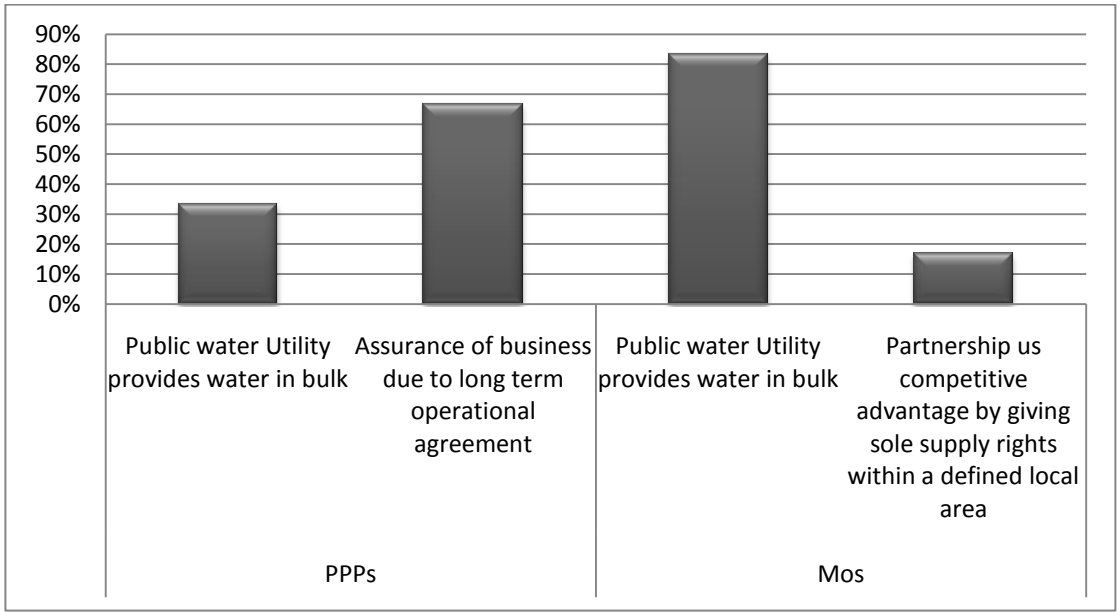

Figure 4-41: How is Public private partnership favorable Kisumu

In Nairobi a significant majority of about 60% felt they benefitted from the partnership. A small proportion of about 20% felt that the supply of water in bulk was the only favourable condition they derived from the relationship (Figure 4.42).

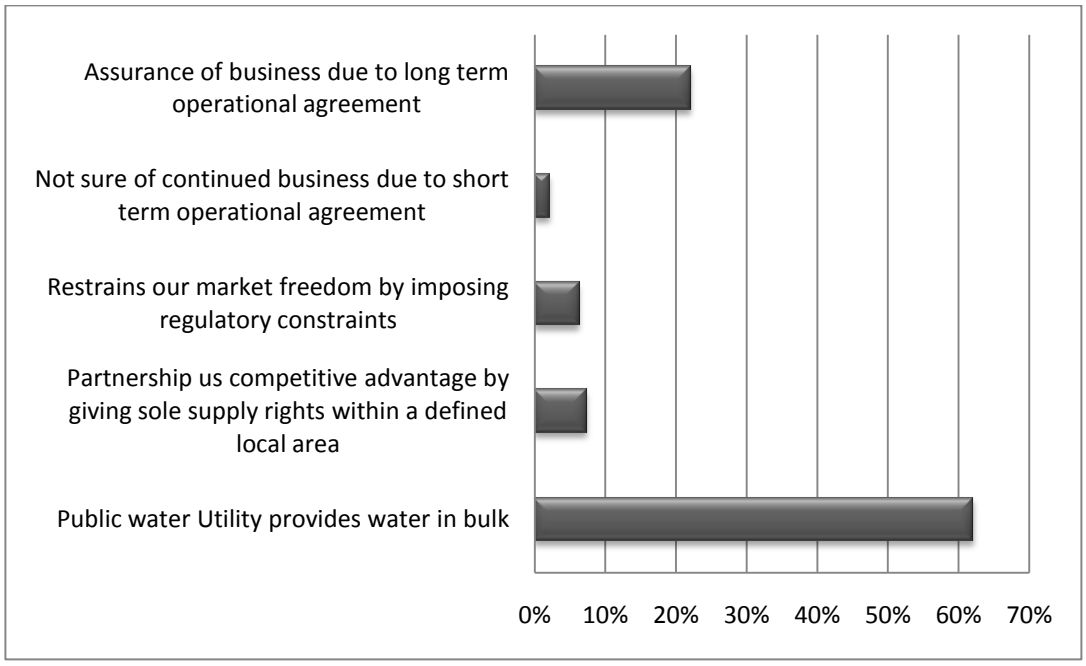

Figure 4-42: How is Public private partnership favorable Nairobi

The emerging positive orientation is consistent with experience elsewhere in the World that had shown that in recognition of the competitive advantage enjoyed by the SWEs in peri-urban areas, there was an emerging trend of deliberate efforts for cooperation between water utilities and SWEs, rather than direct competition in some cities of the developing world to deliver water services in peri-urban areas (Asian Development Bank, 2007).

In pursuit of support and win/win partnerships with SWEs Nickson (2005) argued that (1) small scale private service providers can contribute to better access to services and ease financial pressures (2) large state or private monopolies are not necessarily the only or best option and (3) public limitations can be overcome by allowing appropriate

private sector participation in service delivery. There is a strong case, for this reason alone, for tolerance and institutionalized recognition to small scale service providers because the World is full of evidence (*Aguateros* in Paraguay, SWEs in Manilla, Philippines, Can Tho City in Vietnam and others) that large utilities in developing countries, whether under public or large private company management, have been grossly unable to render services, even with the usual exclusive rights to deliver water over the city and its environs, efficiently, equitably and with adequate coverage in the peri-urban areas. Ouyahia (2006), argues that to protect consumers and private operators, Public Private Partnerships (PPP's) are seen in this context as an effective means to establish cooperation between public and private actors and to bundle their financial resources, know-how and expertise to meet the challenges facing service provision.

4.8 Interventions for Acquisition and Improvement of Entrepreneurial Skills

The study sought to establish the nature of interventions for acquisition and improvement of entrepreneurial skills by MSPWE's and the influence of such interventions on sustainability of MSPWE's in peri-urban areas of Kenyan cities. The study was undertaken against a background in which there was lack of information on the types of business interventions on MSPWE's operating in peri-urban areas and the influence of these interventions on the sustainability of the enterprises, more particularly recognizing the specialization required in investing, operating and managing piped water supply networks. The study established that in all the MSPWE's, other than MO's in Kisumu, there had been little such interventions (Table 4.28).

Table 4.28: Interventions for Acquisition and Improvement of Entrepreneurial Skills

	Business improvement interventions	Mombasa Count	%	Kisumu Count	%	Nairobi Count	%
PPP's	General Business management training	5	7.1	6	10.3	14	12.4
	Customer Care	7	10	7	12.1	15	13.3
	Coping with changes in business environment	4	5.7	4	6.9	16	14.2
	Training in specialized technical skills	4	5.7	4	6.9	13	11.5
	Finance Management	3	4.3	5	8.6	10	8.9
FPM's	General Business management training	5	13.2			0	0
	Customer Care	2	5.3			0	0
	Coping with changes in business environment	1	2.6			0	0
	Training in specialized technical skills	1	2.6			0	0
	Finance Management	1	2.8			0	0
MO's	General Business management training			6	100		
	Customer Care			6	100		
	Coping with changes in business environment			6	100		
	Training in specialized technical skills			6	100		
	Finance Management			5	83		

In acknowledging the fact such interventions could improve the MSPWE's do their business, the WSTF revealed that the organization has developed procedures and toolkits to train MSWPEs operating in informal settlements on critical areas of business acumen. The WSTF also looks for funds for investments in these areas. These toolkits have been piloted in Mavoko, Athi River and Ongata Rongai. Despite there being no targeted training, 4 -10% and up to 13% of the PPP and FPM in all the three cities, respondents respectively said they had acquired training that could enhance their business skills in various fields as enumerated in Table 4.29.

Discussions with the asset holder and the utility in Mombasa indicated that there had been no targeted training for any of the enterprises. However there were credit facilities such as the Urban Project Concept under the WSTF and Output Based Aid under the World Bank. The utility/CWSB could borrow to improve infrastructure in an informal and peri-urban areas and with a capacity building component in both of these facilities that could be used to train the entrepreneurs. None of these facilities had been used so far but there was potential for their use in future where MWSPE operators can receive targeted training. The NCWSC in partnership with NGOs working in the settlements takes community oriented self help groups running water and sanitation facilities for training on governance and management of facilities.

Table 4.29: Acquisition and Improvement of Entrepreneurial Skills as a Result of Interventions

		Mombasa		Kisumu		Nairobi	
		Count	%	Count	%	Count	%
PPP's	General Business management training	4	25	3	5.4	11	9.9
	Customer Care	3	20	3	5.4	15	14.2
	Coping with changes in business environment	1	7.1	4	7.1	15	14.3
	Training in specialized technical skills	3	20	5	8.9	14	13.2
	Finance Management	2	13.3	5	8.8	10	9.5
FPM's	General Business management training	1	5.3			0	0
	Customer Care	1	5.3			0	0
	Coping with changes in business environment	0	0			0	0
	Training in specialized technical skills	0	0			0	0
	Finance Management	0	0			0	0
MO's	General Business management training			6	100		
	Customer Care			6	100		
	Coping with changes in business environment			6	100		
	Training in specialized technical skills			6	100		
	Finance Management			5	83		

The experience of MO's in Kisumu was, unlike the other MSPWE's, a target of business interventions on water service providers. There were targeted interventions on MO's in Kisumu. Upon selection and signing of a contract all MO's undergo an intensive one week course. All the five critical areas under probe in this study are normally covered namely; general business management training, customer care, coping with changes in business environment; training in specialized technical skills and finance management.

Amongst other categories of MSPWE's, however there was no collective approach to obtaining this training amongst the small enterprises under MO and Utility. Furthermore, the provision of such interventions by the public authorities, donors, NGOs and other entities was even lower amongst the MSPWE's; except for the MO's rates ranging between 0-10% as can be seen in Table 4.19. In all cases the enterprises whose operators had training felt that there were improvements notably in general business management and specialized technical skills as a result of it. Amongst the MO's, 83-100% felt that the improvement interventions that they had received had a positive effect on their business operations. Table 4.31 outlines the areas in which operations had improved. This underscored the fact that such targeted interventions could actually help the enterprises improve business. Even though not much in business improvement interventions had been carried out as evident from entrepreneur responses, customer management in the delivery of services was observed to be good. By observation, none of the MO's in operation had in place information management systems despite having as many as 140 connections of different categories. Billing and customer account management were done manually.

KIWASCO felt that MSPWE's with multiple and increasing customer bases, such as the MO's could manage their customers more efficiently if they applied computerized customer management systems by adoption of appropriate software. This could for instance be achieved through specially tailored interventions with willing donors.

Based on the MO's experience, the study established that MSPWE's acknowledge that acquisition of entrepreneurial, managerial and technical skills improved the way they conducted and managed their business. Indeed all of them assessed that the business training they had acquired, whether through own efforts or through targeted interventions improved their business. This was consistent with the expectation expressed by Mullei and Bokea (1999) postulating that if business skills are taught, and appropriate advisory and support services are provided, this should have a significant impact in the number of new ventures that are created, survive and prosper. This view is also upheld by Rosa and Scott (1996) who argue that entrepreneurship education is an intervention that can contribute to stimulating entrepreneurial supply and performance.

According to the RBT, the entrepreneur and the human organization or network that he/she creates can be a source of competitive or even sustained competitive advantage (Dollinger, 2008)). Hence as per this theory MSPWE's require entrepreneurial, managerial and technical skills for the specialized area of operations in piped networks to be successful. These skills may be improved through business development services (Mullei and Bokea, 1999; Rosa & Scot, 1996). It was therefore

deduced on the basis of RBT that the improvement of the skills of the entrepreneur was a source of competitive advantage and hence influenced sustainability of MSPWE's.

4.9 Sustainability

Sustainability was studied as the dependent variable with profitability adopted as the indicator and operational variable. The postulated factors (independent variables) influencing sustainability were market drivers for entrepreneurial response, entrepreneurial customer responsiveness, entrepreneurial pricing strategies, regulatory and business organizational frameworks and interventions for acquisition and improvement of entrepreneurial skills. The key findings on sustainability as predicted by application of the resource based theory on the measurements of the independent variables and as measured using profitability as the key indicator and operational variable are presented in sections 4.9.1 and 4.9.2 respectively. The discussion on sustainability is capped and concluded by a comparison of sustainability as predicted and as measured in section 4.9.3.

4.9.1 Prediction of the effect of the independent variables on sustainability

The independent variables under study included market drivers for entrepreneurial response, entrepreneurial customer responsiveness, entrepreneurial pricing strategies, regulatory and business organization frameworks as well as interventions for acquisition and improvement of entrepreneurial skills. The effect of these variables on the dependent variable- sustainability, was discussed and predicted on the basis of the resource based theory in sections 4.4- 4.8. The key findings on the predicted

effect of the respective independent variables on sustainability are outlined below.

a) Market drivers for entrepreneurial response

It was predicted, on the basis of the resource based theory, that Market drivers for entrepreneurial response including demand for piped water services, gaps in utility networks, water source, control of water infrastructure, competition and socio-political support influence the sustainability of MSPWE's. High water demands, as a result of high scarcity of water in peri-urban areas with high population densities, created and perpetuated the business opportunity for the MSPWE entrepreneurs to exploit. This created favourable industry conditions which, according to RBT, was predicted to positively influence sustainability. PWU network expansion had been witnessed to spur MSPWE growth rather than eliminating the existing ones. This was because the PWU network expansion brought the water sources closer for the MSPWE's to exploit in serving areas where PWU networks were non-existent and constrained to penetrate. This not only provided water as the valuable, rare, difficult to copy and non-substitutable resource but also created a favourable industry condition for the MSPWE's which was predicted, according to RBT, to influence sustainability positively.

Possession and control of the water resource and infrastructures was a first mover advantage acquired through self ownership by the FPM's or through PPP's in form of license to retail PPP's or delegated management to MO's by the PWUs. These gave the MSPWE's possession and the isolating mechanism to control the water resource and associated infrastructure as a valuable, rare, difficult to copy and non-substitutable resource. This resource scenario was predicted, on the basis of RBT, to

confer competitive advantage and hence positively influenced sustainability of the MSPWE's.

The competitive environment was one where the competition was monopolistic competition between MSPWE's in ecological niches, such that each MSPWE had its zone of command, albeit small where it had competitive advantage. Mobile water vendors and PWUs did not pose any competitive threat. Furthermore socio-political support was increasing and there was an emerging trend where the PWUs were recognizing the MSPWE as the versatile vehicle in peri-urban areas where PWUs face serious constraints to penetrate due to lack of physical planning. PWUs were therefore increasingly embracing MSPWE's as partners in sustainable delivery of piped water in peri-urban areas. The nature of competition faced by the MSPWE's and the socio-political support therefore presented favourable industry conditions which was predicted, according to RBT, to positively influence sustainability.

The market drivers for entrepreneurial response, therefore, presented opportunities, resources and conducive environment in the market in which the MSPWE's were active. These drivers were such that the majority of MSPWE's possessed and controlled water as a resource that was rare, valuable, difficult to copy and non-substitutable in ecological niches, albeit small localized networks, under favourable industry conditions. Hence from the Resource based theory it was predicted that market drivers for entrepreneurial response positively influenced sustainability of MSPWE's.

b) Entrepreneurial customer responsiveness

It was predicted on the basis of RBT that entrepreneurial customer responsiveness influenced sustainability of MSPWE's. The study established that MSPWE's were the most customer responsive service providers in their area of operations compared to the water utility and mobile water vendors. Through entrepreneurial determination of specific customer needs, the MSPWE entrepreneurs were able to respond to the specific customer needs by offering a service package comprising quantity, quality, frequency, convenience, price and payment system that aimed to best meet assessed specific customer demands. In so doing the MSPWE's entrepreneurs were able to collect entrepreneurial rents. Hence it was predicted in accordance with RBT that entrepreneurial customer responsiveness was a source of competitive advantage and hence influenced MSPWE sustainability.

c) Entrepreneurial pricing strategies

The study determined that the entrepreneurial pricing strategies adopted by the majority of MSPWE's positively influenced sustainability. The entrepreneurial pricing strategies adopted by the majority of MSPWE's were market driven and aimed to optimize the competitive positioning and competitive advantage of the MSPWE in the market. Responses from the MSPWE's entrepreneurs confirmed that they set prices according to own judgment of the market except for MO's in Kisumu for which the prices were contractually regulated.

The study also determined that enjoying a minimum radius of 800m for drilling a borehole in the case of FPM's, and defined business zones for retail PPP's in Mombasa and MO's in Kisumu, MSPWE's were substantially natural monopolies,

albeit on a small scale, operating in ecological niches. The price variability as indicated by high standard deviations in the majority of cases provided qualitative quantitative evidence of the entrepreneurs freedom in setting the prices, based on own judgement of the market. Responses from the MSPWE entrepreneurs, the relatively high prices compared to expected prices by PWUs and price variability indicated by high standard deviations amongst MSPWE's indicated that the entrepreneurs understood the ecological niche and monopolistic nature of the market and adopted appropriate entrepreneurial pricing strategies taking into account the market circumstances.

The price variability was confirmed by tests of hypotheses that showed that the MSPWE prices were significantly different in the majority of cases except for Kisumu MO's whose prices were contractually regulated and Kisumu retail PPP's that set prices set by collective agreements between themselves. This collective agreement was, however, a variant and up-scaling of the single MSPWE ecological niche strategy to a larger collective ecological niche encompassing effective consolidation of infrastructure monopoly by collective agreement.

The market driven prices were also high enough to ensure profitability above 10% in the majority of MSPWE's. The entrepreneurial strategies adopted resulted in handsome and consistent profitability for periods of over three years for the large majority of MSPWE's. It was therefore predicted on the basis of the resource based theory that the entrepreneurial pricing strategies positively influenced sustainability of MSPWE's.

d) Regulatory and business organizational forms

The study determined that majority MSPWE's were increasingly experiencing favourable regulation on market entry, quality and price. Majority of PWUs had taken deliberate steps to bring on board MSPWE's as partners in the sustainable delivery of piped water in peri-urban areas. On price regulation the study determined that there was relaxation on MSPWE pricing, thus making it possible for the majority of MSPWE's to sell water at prices determined by the market forces. MSPWE'S operating as FPM's were not subjected to any price regulation but reportedly were on quality to safeguard the consumers. Regulation drives industry conditions to be favourable or unfavourable and hence according to RBT regulation influences sustainability. Business organization, whether FPM's or PPP's, provided MSPWE's with the isolating mechanism they need to protect themselves from imitative pressures and according to RBT this was predicted to positively influence sustainability.

e) Interventions for acquisition and improvement of entrepreneurial skills

The study determined, based on the evidence from MO's, that acquisition of entrepreneurial, managerial and technical skills improved the way MSPWE's entrepreneurs perceived their markets, served their customers and managed their enterprises. This gave the MO's relevant and not commonly available bundle of competencies and capabilities which according to RBT was predicted to positively influence sustainability. MO's seem to have consolidated their first mover advantage indicated by the renewal of their contracts and this confirmed that the interventions

for acquisition and improvement of entrepreneurial skills they underwent in the initial stages of their contracts seemed to enhance their competitive advantage. Hence interventions for acquisition and improvement of entrepreneurial skills influenced sustainability of MSPWE's according to RBT.

4.9.2 Measurement of sustainability using profitability as indicator and operational variable

As discussed in section 4.6 a majority of MSPWE's were assessed as profitable in questionnaire item 23 and 35. Sustainability was measured in the study by consistent profitability over a period of about 3 or more years. As discussed in section 4.6 over 70% of MSPWE's reported consistent profitability over a period of about 3 years. Over 65% of the MSPWE's had profitability of 50% and above, a small minority had profitability below 10%. Hence on the basis of measurements of sustainability using consistent profitability the large majority of MSPWE's were sustainable.

4.9.3 Comparison of sustainability as predicted on basis of independent variables and as measured on basis of profitability

The study showed that the postulated factors (independent variables) included market drivers for entrepreneurial response, entrepreneurial customer responsiveness, entrepreneurial pricing strategies, regulatory and business organizational frameworks and interventions for acquisition and improvement of entrepreneurial skills. The study determined that these factors enabled the majority of MSPWE's entrepreneurs possess and control water and associated infrastructure as a resource with the four CA attributes or created favourable industry conditions. It was therefore predicted on the basis of RBT that the majority of MSPWE's should have acquired competitive advantage, that is sustainability.

Measurement of profitability as the operational variable for sustainability showed that the majority of MSPWE's had consistent profitability for over three years; thus confirming the prediction of sustainability by the application of RBT on the measurements of the independent variables. Hence market drivers for entrepreneurial response, entrepreneurial customer responsiveness, entrepreneurial pricing strategies, regulatory frameworks and business organization forms as well as interventions for acquisition and improvement of entrepreneurial skills influence the sustainability of MSPWE's.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusions and recommendations of the study. The purpose of the study was to investigate the factors influencing the sustainability of micro and small piped water enterprises (MSPWE's) in piped networks in peri-urban areas of cities in Kenya. The study was undertaken against a background where no previous study had been undertaken to generalize on the factors influencing the sustainability of MSPWE's in peri-urban areas of Kenyan cities. This study aimed to fill the gap in knowledge by examining the MSPWE's operating in the peri-urban areas of the Kenyan cities - Nairobi, Mombasa and Kisumu.

The postulated factors (independent variables) were market drivers for entrepreneurial response, entrepreneurial customer responsiveness, entrepreneurial pricing strategies, regulatory and business organizational frameworks and interventions for acquisition and improvement of entrepreneurial skills. The dependent variable was sustainability with profitability adopted as the indicator and operational variable. The thrust of the study was to determine, on the basis of the resource based theory (RBT), whether the postulated factors enabled MSPWE's possess and control resources with the four competitive advantage (CA) attributes: valuable, rare, imperfectly imitable and non-substitutable; and create favourable industry conditions in MSPWE's water markets.

The study adopted mixed model research design. The subject of analysis was the individual MSPWE and the target population were 2,742 MSPWE's occurring in three business organization forms – the fully privatized enterprise (FPM), public private partnerships (PPP's) with public water utilities (PWUs) in form of retail PPP's and bulk sale PPP's, referred to as master operators (MO's). The sample comprised 503 MSPWE's selected by stratified random sampling. Data were collected by administering questionnaires to the MSPWE's entrepreneurs, conducting interviews with top management in key institutions on water services delivery and direct observations. The response rate was good, standing at 88.9%.

The study showed that the postulated factors enabled the majority of MSPWE's entrepreneurs possess and control water and associated infrastructure as a resource with the four CA attributes and created favourable industry conditions. It was therefore predicted on the basis of RBT that the majority of MSPWE's should have acquired competitive advantage, that is sustainability. Measurement of profitability as the operational variable for sustainability showed that the majority of MSPWE's had consistent profitability for over three years; thus confirming the prediction of sustainability by the application of RBT on the measurements of the independent variables. Hence it was concluded that market drivers for entrepreneurial response, entrepreneurial customer responsiveness, entrepreneurial pricing strategies, regulatory frameworks and business organization forms as well as interventions for acquisition and improvement of entrepreneurial skills influence the sustainability of MSPWE's.

5.2 Summary

5.2.1 Enterprise growth

The study determined that the majority of MSPWE's (80%) were single water selling point outfits with only one employee with the exception of MO's in Kisumu and 40% FPM's in Nairobi that had multiple water selling points and more than one employee. The growth of the MSPWE's was spurred by improving water supply to peri-urban areas, for instance in Nyalenda Kisumu and Mukuru, Nairobi. However, despite favourable change in industry conditions, MSPWE's registered more of horizontal growth than vertical growth. The appropriateness of the MSPWE as the competitive and versatile actor in the peri-urban water market coupled with the KIWASCO experience with MO's and the FPM's in Nairobi investing and managing multiple connections demonstrated that MSPWE's had the potential for growth to enable them manage larger networks in partnership with the water utilities.

5.2.2 Market drivers for entrepreneurial response

The operational variables for the market drivers for entrepreneurial response included water demand, gaps in utility networks, water source, control of water supply infrastructure, competition and social-political support. The study determined that the market drivers for entrepreneurial response ensured that the majority of MSPWE's entrepreneurs possessed and controlled water as a resource that was rare, valuable, imperfectly imitable and non-substitutable in favourable industry conditions. Hence from RBT, market drivers for entrepreneurial response influence sustainability of MSPWE's. The MSPWE's entrepreneurs assessed high water

demands in the peri-urban areas as the opportunity and favourable industry condition which they could exploit profitably. The entrepreneurs had assessed this high scarcity of water to be a result of the absence of public water utility networks, few piped water sources and poor service level in the utility mains. This opportunity was sustained and perpetuated by the socio-economic and geo-demographic dynamics precipitated by intense rural to urban migration in the peri-urban areas characterized by high population densities and inadequate services by the PWUs.

On gaps in utility networks the expectation was that expansion of PWU networks would reduce water service delivery gaps that MSPWE's entrepreneurs were exploiting and hence work against the sustainability of the MSPWE's. Consistent with this expectation was the finding that the majority of MSPWE's entrepreneurs viewed possibility of water utility network expansion as a threat. However the study determined that the majority of MSPWE's entrepreneurs were prepared to adapt to change brought about by expanding water utility network by relocating business or negotiating PPP's with PWUs. Available evidence showed the feasibility of this adaptation to change by the MSPWE entrepreneurs in that PWUs network expansion into peri-urban had spurred the growth of MSPWE's rather than driving existing ones out of business, for example Nyalenda in Kisumu, Mukuru in Nairobi. Furthermore, the water utilities, constrained to invest in areas without physical development plans, viewed the MSPWE's as the versatile and competitive vehicle in the peri-urban areas. PWUs therefore viewed network expansion as likely to eliminate gaps upon which FPM's were thriving but were prepared to enter into PPP's with willing MSPWE entrepreneurs as had happened in Mukuru, Nairobi and Nyalenda, Kisumu.

Hence gaps in utility networks influence sustainability.

The study determined that all MSPWE's entrepreneurs viewed control of infrastructure as key to business sustainability; quite consistently with the RBT. If the control were to be lost, the majority of the MSPWE's entrepreneurs were keen to relocate/adapt through partnering with PWUs in order to retain or regain control or source water from private suppliers. The study determined that majority of MSPWE's entrepreneurs had the first mover advantage and an isolating mechanism. Possession and control of the water resource and infrastructures was a first mover advantage, that made the MSPWE's have and control a rare and valuable resource. Furthermore the PWU orientation was increasingly shifting to defining business zones or ecological niches for MSPWE's. In the case of FPM's, regulation specified the minimum radius for borehole development as 800m, meaning the first FPM to drill a borehole within such radius enjoyed first mover advantage and isolating mechanism through ownership. PPP's (retail PPP's in Mombasa and MO's in Kisumu), had defined business zones where they enjoyed a first mover advantage and the isolating mechanism through definition of service zones by PWUs. Hence according to the RBT the type of control MSPWE's had influences sustainability.

The competitive environment was one where the public utility was not viewed as a competitor as such but was at best when close enough a supplier of water for retail by the MSPWE's operating as PPP's. Meaningful competition faced was from other MSPWE's in monopolistic competition such that each MSPWE had its zone of command – an ecological niche, albeit small where it had competitive advantage. Mobile water vendors were at best customers to the MSPWE's and did not pose any

meaningful competition as the MSPWE price was lower and consumers had higher confidence in the source of MSPWE water than that of mobile water vendors.

On socio-political support the majority of the MSPWE entrepreneurs felt that they enjoyed goodwill and support by public authorities except in Nairobi where 47% of PPP's and 36% of FPM's reported hostility and frequent harassment. There was therefore evidence of improving orientations by water utilities in favour of MSPWE's - recognition, reduced harassment, licenses, delegated management, thus easing the precarious commercial footing faced in previous years and therefore precipitating a fvaourable industry condition. Hence the socio-political support was increasingly making the industry conditions more favourable and hence influences sustainability of MSPWE's according to RBT.

5.2.3 Entrepreneurial customer responsiveness

Majority MSPWE's entrepreneurs viewed their services as good-fair on quantity, quality, reliability, frequency, convenience payment system and price. However on quantity delivery, reliability and frequency rating by PPP's entrepreneurs was fair-weak for Mombasa and Nairobi, reflecting the situation in the water utilities that they depended on for their supply. FPM's entrepreneurs on the other hand, dependent on their own sources and able to guarantee delivery to their customers, rated these aspects as good-fair in most cases. Direct observations rated the MSPWE's as customer responsive on quantity delivery, quality, pricing, convenience and reliability. WSBs, WSRB, water utilities agreed that MSPWE's may be the best on convenience but quantity delivery and reliability follow the same trend as the utility in case of PPP's. The MSPWE's were therefore the most customer responsive service

providers in their area of operations compared to the water utility and mobile water vendors. Customer responsiveness was a direct result of entrepreneurial assessment of specific customer needs and then combining the enterprise resources (such as water resource, ecological niche, isolating mechanism, appropriate technology) to acquire enterprise distinctive capabilities compared to its competitors as indicated by abilities to deliver on quantity, quality, frequency, price and convenience. Hence in accordance with RBT entrepreneurial customer responsiveness was a source of competitive advantage and hence influenced sustainability.

5.2.4 Entrepreneurial pricing strategies

MSPWE's confirmed that prices were market driven except for MO's in Kisumu for which the prices were regulated. As natural monopolies, albeit on a small scale, most MSPWE's were operating in ecological niches. The entrepreneurs had studied the market and adopted entrepreneurial pricing strategies taking into account the ecological niche status of the market in the majority of cases except MO's in Kisumu as indicated by price variability. Kisumu retail PPP's had prices set by collective agreements between themselves. This was a variant and up-scaling of the single MSPWE ecological niche to a larger one encompassing effective consolidation of infrastructure monopoly by collective agreement.

On average, PPP's were retailing water at prices much higher than PWUs prices ranging from 45% for Kisumu, 54% for Mombasa and 83% for Nairobi above the PWUs expected retail price of KShs100/m^3. FPM's mean prices were lower than the PPP's. Prices within each MSPWE category in each city except for Kisumu PPP's

showed noticeable variation indicated by high standard deviations. Tests of hypotheses determined MSPWE prices were significantly different from PWUS, within and across MSPWE's except in Nairobi and Kisumu. The Price variability verified by the test of hypotheses was an indicator of the entrepreneur's pricing strategies informed by the ecological niche status of the peri-urban water market considering that at the prices charged the large majority of MSPWE's sold adequate quantities of water at Profitable margins. Hence entrepreneurial pricing strategies influence sustainability of MSPWE's.

5.2.5 Regulatory Frameworks and Business Organization Forms

Majority MSPWE's reported increasing favourable regulation on market entry, quality and price. Majority of PWUs had taken deliberate steps to bring on board MSPWE's as partners in the sustainable delivery of piped water in peri-urban areas. This was indicated by supply of water at concessionary prices, licensing to sell water from the utility mains and formalized and delegated management contracts with the MSPWE's. On pricing the study determined that there was relaxation on price regulation, thus making it possible for the majority of MSPWE's to sell water at prices determined by the market forces. MSPWE'S operating as FPM's were not subjected to any price regulation but reportedly were on quality to safeguard the consumers.

PWUs claimed to be regulating quality but direct observations indicated little regulation on all aspects by PWUs , except on MO's. It seemed MSPWE's view of favourable regulation is based on little/ weak regulation observed and in such environment had their way in business. Regulation drives industry conditions to be

favourable/unfavourable. It remained to be seen what would happen to the MSPWE's if the existing regulation was strictly enforced. Business organization whether FPM's or PPP's could provide MSPWE's with the isolating mechanism they need to protect themselves from imitative pressures. Hence according to RBT regulation and business organization forms influence sustainability.

5.2.6 Interventions for acquisition and improvement of entrepreneurial skills

The study established that interventions for acquisition and improvement of entrepreneurial skills was experienced by all MO's. However there were only few retail MSPWE's that had been exposed to some acquisition of business management skills and in any case such exposure was general and not tailored to the MSPWE's as water service providers. MO's were required to undergo a tailored training immediately on signing the delegated management contract. Amongst the MO's, 83-100% felt that the improvement interventions received had a positive effect on business operations. In all cases there were perceptions of improvements notably on better business management, customer care, coping with changes in business environment, specialized technical skills and finance management.

Based on MO's experience it was determined that acquisition of entrepreneurial, managerial and technical skills improved the way MSPWE's entrepreneurs perceived their markets, served their customers and managed their enterprises. This gave them relevant competencies and capabilities which in the case of MO's seems to have consolidated their first mover advantage in that the contracts of all MO's had been renewed. This was consistent with the expectation expressed by Namusonge in

Mullei and Bokea (1999) and Rosa and Scott (1996) that business skills and appropriate advisory support should have a significant impact in the number of new ventures that are created, survive and prosper. Hence on the basis of evidence from MO's, the study established that interventions for acquisition and improvement of entrepreneurial skills influences sustainability.

5.2.7 Sustainability

Sustainability was measured in the study by consistent profitability over a period of about 3 or more years. Over 70% of MSPWE's reported consistent profitability over a period of about 3 years. Over 65% of the MSPWE's had profitability of 50% and above, a small minority had profitability below 10%. Hence measurements of sustainability using consistent profitability confirmed predictions of sustainability by application of the resource based theory on the measurements of the independent variables.

5.3 Conclusions

The study determined that the factors postulated to influence sustainability, that is, market drivers for entrepreneurial response, entrepreneurial customer responsiveness, entrepreneurial pricing strategies, favourable regulatory frameworks and interventions for acquisition and improvement of entrepreneurial skills influenced sustainability of MSPWE's. These factors enabled the majority of MSPWE's possess and control water and associated infrastructure as a resource that was valuable, rare, imperfectly imitable and non-substitutable and created favourable industry conditions. This meant that these factors led to the attainment of the conditions needed to acquire competitive advantage according to the RBT. Hence it was

concluded, according to the RBT, that market drivers for entrepreneurial response, entrepreneurial customer responsiveness, entrepreneurial pricing strategies, regulatory and business organizational frameworks as well as interventions for the acquisition and improvement of entrepreneurial skills influence the sustainability of MSPWE's.

5.3.1 Enterprise growth

The study determined that the majority of MSPWE's were sustainable but were single water selling point single employee outfits. The appropriateness of the MSPWE as the competitive and versatile actor in the peri-urban water market coupled with the KIWASCO experience with MO's and the FPM's in Nairobi investing and managing multiple connections demonstrated that MSPWE's had the potential for growth to become businesses that could manage larger, albeit localized networks in partnership with the water utilities. When opportunities for new venture creation arose, as happened when water supply flow into the mains close to Nyalenda in Kisumu, Mukuru in Nairobi was improved, there was more of horizontal growth and little vertical growth.

5.3.2 Market drivers for entrepreneurial response

Market drivers for entrepreneurial response including demand for piped water services, gaps in utility networks, water source, control of water infrastructure, competition and socio-political support influence the sustainability of MSPWE's. High water demands, as a result of high scarcity of water in peri-urban areas with high population densities, created and perpetuated the business opportunity for the

MSPWE entrepreneurs to exploit. PWU network expansion had been witnessed to spur MSPWE growth rather than eliminating the existing ones. Possession and control of the water source and infrastructures was a first mover advantage acquired through self ownership by the FPM's or through PPP's in form of license or delegated management by the public water utility. These made the MSPWE's have and control a rare and valuable resource, which according to the RBT, was a source of competitive advantage.

The competitive environment was one where the competition was monopolistic competition between MSPWE's in ecological niches, such that each MSPWE had its zone of command, albeit small where it had competitive advantage. Mobile water vendors and PWUs did not pose any competitive threat. Furthermore there was an emerging trend where the PWUs were recognizing the MSPWE as the versatile vehicle in peri-urban areas where PWUs face serious constraints to penetrate due to lack of physical planning and are increasingly embracing MSPWE's as partners in sustainable delivery of piped water in peri-urban areas. All these factors drove the market in which the MSPWE's were active, ensuring that the majority of MSPWE's possessed and controlled water as a resource that was rare, valuable, imperfectly imitable and non-substitutable in favourable industry conditions. Hence from the Resource based theory, market drivers for entrepreneurial response influence sustainability.

5.3.3 Entrepreneurial Customer responsiveness

Entrepreneurial customer responsiveness influences sustainability of MSPWE's. The study established that MSPWE's were the most customer responsive service

providers in their area of operations compared to the water utility and mobile water vendors in that they offered a service package comprising quantity, quality, frequency, convenience and payment system that aimed to best meet assessed specific customer demands. Through entrepreneurial determination of specific customer needs the MSPWE entrepreneurs were able to respond to the specific customer needs on quantity, quality, reliability, frequency, convenience and price and the MSPWE's entrepreneurs were able to collect entrepreneurial rents. Hence in accordance with RBT entrepreneurial customer responsiveness was a source of competitive advantage and hence influenced their sustainability.

5.3.4 Entrepreneurial pricing strategies

MSPWE's confirmed that they set prices according to own judgment of the market except for MO's in Kisumu for which the prices were regulated. As natural monopolies, albeit on a small scale, most MSPWE's were operating in ecological niches. The entrepreneurs had studied the market and adopted an entrepreneurial pricing strategies, taking into account the ecological niche status of the market in the majority of cases except MO's in Kisumu as indicated by price variability. Kisumu retail PPP's had prices set by collective agreements between themselves. This was a variant and up-scaling of the single MSPWE ecological niche to a larger one encompassing effective consolidation of infrastructure monopoly by collective agreement.

5.3.5 Regulatory and business organizational forms

Majority MSPWE's reported increasing favourable regulation on market entry, quality and price. Majority of PWUs had taken deliberate steps to bring on board

MSPWE's as partners in the sustainable delivery of piped water in peri-urban areas. On pricing the study determined that there was relaxation on price regulation, thus making it possible for the majority of MSPWE's to sell water at prices determined by the market forces. MSPWE'S operating as FPM's were not subjected to any price regulation but reportedly were on quality to safeguard the consumers. PWUs claimed to be regulating quality but direct observations indicated little regulation on all aspects by PWUs , except on MO's. It seems MSPWE's view of favourable regulation is based on little/ weak regulation observed and in such environment had their way in business. It remained to be seen what would happen to the MSPWE's if the existing regulation was strictly enforced. Regulation drives industry conditions to be favourable or unfavourable. Business organization whether FPM's or PPP's could provide MSPWE's with the isolating mechanism they need to protect themselves from imitative pressures. Hence according to RBT regulation and business organization forms influence sustainability.

5.3.6 Interventions for acquisition and improvement of entrepreneurial skills

Based on the evidence given by the MO's, the study established that interventions to acquire and improve entrepreneurial skills contributed to more entrepreneurial business management and hence influenced sustainability of MSPWE's according to RBT.

5.4 Recommendations

5.4.1 Interventions on growth of MSPWE's

Having determined that MSPWE's in peri-urban areas were single water selling point single employee outfits there is need to train the MSPWE entrepreneurs on opportunity recognition and benefits of joining forces together rather than have a proliferation of MSPWE's. By joining forces together the MSPWE's would be able to install and manage larger and more efficient networks in defined zones as opposed to discrete small diameter pipes for each MSPWE. If organized this way, they would make it easier to be targets of interventions to enhance their capability to be more customer responsive and hence more sustainable.

5.4.2 Streamlining policy and regulatory environment in support of MSPWE's

Having determined that the regulation under which MSPWE's operate was weak and that in the view of MSPWE's this was favourable regulation, it was not clear what would happen to the MSPWE's if the existing regulation was strictly enforced. For instance if the water utility price regulation that water be sold at the recommended price was firmly implemented it would have devastating consequence for the MSPWE's because as the study showed the majority of MSPWE's were retailing water at market driven prices much higher than the utility price. This study recommends that regulation be streamlined to ensure consumer safety while giving room for the MSPWE's business to be driven by market forces. This will remove a probable false feeling of favourable regulation by MSPWE's while in reality enforcement of existing regulation remained a potential threat to the MSPWE's.

5.4.3 Design and implementation of tailor-made interventions for acquisition and improvement of entrepreneurial skills for MSPWE entrepreneurs

Having determined that only a small segment of the MSPWE's entrepreneurs had been targeted for interventions for acquisition and improvement of entrepreneurial skills, and that no intervention had targeted MSPWE's as specialized service providers, the study recommends that tailor-made interventions be designed and implemented. These interventions ought to take into account the nature of the MSPWE businesses as providers of piped water in peri-urban environment, aiming to improve the capabilities of MSPWE's on recognition of opportunities for vertical growth, entrepreneurial management, entrepreneurial customer responsiveness and customer care in a peri-urban environment, specialized technical skills for piped network management and finance management. This would result in enhancement of entrepreneurial management of the MSPWE's as specialized businesses and could spur the growth of the MSPWE's. Specifically for MO's and FPM's managing multiple connections specialized technical and managerial training to enable them effectively manage high customer density and large customer bases.

5.4.4 Upscaling the involvement of MSPWE's in water service delivery in peri-urban areas

This study recommends that more water utilities enter into delegated management with MSPWE's benchmarking the KIWASCO-MO delegated management model, relaxing business stifling regulation and in-building clauses that permit market driven business. This approach will permit creativity and innovation for more effective and efficient resource utilization and better service delivery to consumers in peri-urban areas.

5.5 Suggestions for Further Studies

The study identified three areas, as outlined below, that could be addressed by further studies to enable fuller understanding and broadening of knowledge of the factors influencing the entrepreneurial behavior of MSPWE's in the peri-urban areas of Kenyan cities. These further studies could provide additional information for interventions to enhance the entrepreneurial behavior of MSPWE's in the peri-urban areas of Kenyan cities.

5.5.1 Factors constraining vertical growth of MSPWE's

The study determined that the majority of MSPWE's were sustainable but were single water selling point, single employee outfits, showing horizontal growth in the overwhelming majority of MSPWE's rather than vertical growth even when there were favourable industry conditions for vertical growth. In view of this it is suggested that a further study on factors constraining vertical growth of MSPWE's in peri-urban areas of Kenyan cities be undertaken.

5.5.2 Factors influencing socio-political support and regulation of MSPWE's

This study determined that the regulation under which MSPWE's operate was weak although in the view of MSPWE's this was favourable regulation. It was therefore not clear what would happen to the MSPWE's if the existing regulation was strictly enforced. Furthermore although the majority of MSPWE's entrepreneurs felt that they enjoyed goodwill and support by public authorities this was substantially different in Nairobi where 47% of PPP's and 36% of FPM's reported hostility and frequent harassment. Considering that favourable socio-political support and regulation are needed to create favourable industry conditions for MSPWE's growth,

it is suggested that a further study on factors influencing socio-political support and regulation of MSPWE's in peri-urban areas of Kenyan cities be undertaken. Based on this study recommendations could be made to streamline and create dependable socio-political support and regulation to allow market driven MSPWE activity while ensuring consumer safety.

5.5.3 MSPWE's customer responsiveness

The entrepreneurial MSPWE customer responsiveness determined in this study was based on the MSPWE as the respondent, interviews of the top management of key institutions responsible for the delivery of water services in Kenya as well as direct observations of the MSPWE activities. This study did not collect and analyze data from the MSPWE customers, that is the consumers, on the responsiveness of the MSPWE's to their expectations. It is therefore suggested that a further study be undertaken to determine consumer satisfaction with customer responsiveness of MSPWE's in peri-urban areas of Kenyan cities.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

STUDY ON FACTORS INFLUENCING SUSTAINABILITY OF MICRO AND SMALL PIPED WATER ENTERPRISES IN PIPED NETWORKS IN PERI-URBAN AREAS

(STRICTLY CONFIDENTIAL)

Tel No of Respondent…….

1. How long have you been running your water enterprise?

   Number of Years…….

2. Please Indicate Number of employees in your business

Currently	1 -3 Years Ago	3 -5 years Ago	More than 5 Years Ago

3. Please indicate number of water selling points (meters/water kiosks/standpipes) operated by your business

Currently	1 -3 Years Ago	3-5 years Ago	More than 5 Years Ago

4. What is the organizational arrangement under which you run your business?

Business Organization Type			Membership To Water Vendor Association	
	YES	NO	YES	NO
Fully Privatized				
Public-Private Partnership with water utility				
Private-Private Partnership with a Master operator(MO)				
Private-Private Partnership with a private enterprise(NOT MO)				

5. Please indicate the water supply scarcity in the areas to which your enterprise delivers water services

	High	Low	None	
Currently				
1-3Years Ago				
3-5 Years Ago				
Over 5Years Ago				

6. Indicate reason(s) for demand for your piped water services

	Currently	1 year ago	3 years ago	5 years ago	More than 5 years ago
Few/None Existing piped water sources					
Gaps in areas not covered by the public water utility					
Poor Supply to areas served by the public water utility					

7. Is the possibility of public utility network expansion into your area of operations a threat to your business?

   (1)YES (2)NO (3) DO NOT KNOW

8. Have you ever closed a piped water business or relocated it because of expanding public utility network**?**

   (1) YES (2) NO

9. How would you respond if the public water utility network was expanded into your area of operations?

   1. Stop business altogether
   2. Close business in existing area and move to a new area without public utility network
   3. Negotiate a partnership with the public water utility
   4. Not worried because of existing partnership/Agreement with public utility
   5. Would compete with the public water utility

10. From which source do you obtain the water that you sell?

	Currently	1 year ago	1-3 years ago	3-5 years ago	More than 5 years ago
Own developed borehole/well/other (specify)					
Wholesale purchase from master operator					
From public water utility					
Directly from River/Lake					
Other (specify)					

11. How do you rate each of the following aspects of your water source?

Scale : 4-5 (Good) 2.5- 3 (Fair), Below 2.5 – Poor

	Currently	1-3 Years Ago	3 -5Years Ago	More Than 5 Years Ago
Quantity Yield				
Quality				
Reliability				
Environmental Sustainability				

12. What threats have you been faced by in regard to your water source?

	Currently	1-3 Years Ago	3 -5 years Ago	More than 5 years
None				
Drop in quantity				
Quality Deterioration				
Scarcity of alternative water sources				

13. What would you do if the reliability, quantity yield or quality of your current water source deteriorated

    1. Develop own/new source
    2. Seek bulk purchase from a bulk supplier (private, public water utility, public-private partnership bulk master operator)
    3. Close business because there is no possibility of an alternative source

14. What part of the water infrastructure do/did you have sole control over?

	Currently	1-3 Years Ago	3 -5 years Ago	More than 5 years
Complete System				
Source Only				
Network Only				
None				

15. How did you acquire the stated control of infrastructure?

	Own investment	Public-Private Partnership	Connection and licensed to sell water by Public-water utility	Private – Private Partnership
Complete system				
Source Only				
Network Only				

16. What do you envisage you would do if you were to lose control over the water infrastructure that you currently control?

Loss of Control	Close Business	Relocate Business	Negotiate Delegated Management	Negotiate Partnership	Do not Know
Complete system					
Source Only					
Network Only					

17. Which other kind of service providers are in your area of operations?

    1. None 2. Public Utility 3. Mobile water vendors 4. Water Kiosks 5. Private piped water suppliers 6. other (specify)

18. Reasons for being convinced you would compete favourably against Public water Utility
    1. Extend services to areas not covered by the public utility
    2. Supply to areas served poorly by public utility
    3. More Reliable Service levels
    4. Other (specify)

19. Reasons for being convinced you would compete favourably against other private piped water enterprises
    1. Taking a market share due to unsatisfied demand for piped water connections
    2. More Reliable Service levels
    3. Consumers confidence in our source of water compared to competitors
    4. Our Lower prices for the water
    5. Other (specify)

20. Reasons for being convinced you would compete favourably against mobile water vendors
    1. Consumers demand for piped water connections
    2. Mobile Water Vendors would be our customers
    3. Consumers confidence in our source of water compared to mobile water vendors
    4. Our Lower prices for the water
    5. Other (specify)

21. How is the socio-political environment in which you operate? Tick as appropriate.

	YES	NO
Goodwill and recognition by Public Authorities		
Partnerships with public water utilities		
Licenses by public water utilities		
Business Improvement Interventions from public authorities ONLY		
Business Improvement Interventions from Donors and NGOs ONLY		
Business Improvement Interventions by Partnerships between Government Institutions, Donors and NGOs		
Hostile and frequently Harassed by Public Authorities		

22. Rank your service delivery to the consumers on the following aspects of your water service by indicating a score according to the following Scale: 4-5 – Good; 2.5-3.9- Fair; Below 3 – Poor

	Score			
	Currently	1 -3 Years Ago	3-5 Years Ago	More than -5 Years Ago
Quantity delivery				
Quality				
Reliability				
Frequency of Supply				
Payment System				
Convenience				
Price				

23. Please give the following information in respect of your water business

Quantity of Water Produced (m^3) per month	Quantity of Water Purchased in bulk (m^3) per month	Production Cost (KShs) per month	Bulk Purchase Price from bulk supplier (KShs) per m^3	Bulk Sale Price (KShs) per m^3	Retail Selling Price KShs) per m^3

24. How do you set your water prices?

1. According to Market Forces
2. Based on a careful consideration of all costs involved
3. Piped Water Enterprises collectively agree on the selling price
4. Controlled by Government water utility tariffs
5. Controlled by partnership contracts
6. Other (specify)

25. What is the payment mode you adopt for water sold?

	Pre-paid	Deposit & Post paid	Post Paid -No Deposit	Paid on delivery	Other (Specify)
Bulk Sales to piped water network operators for on selling					
Metered Consumer Connection					
Water Kiosks/Standpipes					
Mobile Water Vendors (Tankers)					
Mobile Water Vendors (Manual)					

26. What is the payment mode preferred by your customers?

	Pre-paid	Deposit & Post paid	Post Paid - No Deposit	Paid on delivery	Other (Specify)
Bulk Sales to piped water network operators for on selling					
Metered Consumer Connection					
Water Kiosks/Standpipes					
Mobile Water Vendors (Tankers)					
Mobile Water Vendors (Manual)					

27. Are your services to consumers subsidized and if so by whom? Tick as appropriate

	Provider of Subsidy			
Subsidy	Public Water Utility/Government/Local authority	NGO	Donor	Other(specify)
YES				
NO				

28. If your services to consumers are subsidized would you be willing to operate business in this area if there were no subsidies?

(1) YES (2) NO

29. What is your responsibility in the water services delivery? Tick as appropriate

Full private investments and management	
Delegated management under Public-Private Partnership with limited investments in local networks, making connections and Revenue Collection	
Delegated management under Public-Private Partnership. Responsible only for making Repairs, Connections and Revenue Collection	
Delegated management under Public-Private Partnership. Responsible for Revenue Collection only	

30. If you are in a public-private partnership with public water utility, how is the partnership favourable to your business?

    1. Public Water Utility provides water in bulk
    2. Partnership gives us competitive advantage by giving sole supply rights within a defined local area
    3. Restrains our market freedom by imposing regulatory constraints
    4. Not sure of continued business due to short-term operational agreement
    5. Assurance of business due to long term operational agreement
    6. Other (Specify)

31. Indicate type of regulation your business is subjected to and responsibility

	Government Institution	Water Utility	Partnership with Water Utility	Water Vendor Association	Other (specify)
Market Entry Regulation					
Quality Regulation					
Price Regulation					
Other (specify)					

32. How do you rate the business environment in which you operate

Market Entry Regulation	Favourable	Unfavourable	Number of (Years)
Quality Regulation			
Price Regulation			
Public-Private Partnerships conditions			
Public-Private Partnerships duration			
Public-Private Partnerships Renewal			

33. Have you received business improvement interventions in any of the following areas?

	YES	NO
General Business Management Training		
Customer Care		
Coping with changes in business environment		
Training in specialized technical skills (e.g. laying pipes, pump repairs, water treatment, making pipe connections, pipe)		
Finance Management (Billing, revenue collection, keeping financial records)		
Other (Specify)		

34. Has your business improved in any of the following areas as a result of business interventions?

	YES	NO
Administration and Business Management		
Customer Care and relations		
Enhanced creativity and coping with change		
Enhanced specialized technical skills (e.g. laying pipes, pump repairs, water treatment, making pipe connections, pipe)		
Finance Management (Billing, revenue collection, keeping financial records)		
Other (Specify)		

35. How has your business been performing?

	Currently	2008	2007	2006	2005
Profitable					
Not Profitable					

APPENDIX II: INTERVIEW GUIDE

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
A STUDY ON FACTORS INFLUENCING SUSTAINABILITY OF MICRO AND SMALL PIPED WATER ENTERPRISES IN PIPED NETWORKS IN PERI-URBAN AREAS

(STRICTLY CONFIDENTIAL)

1. What are the specific determinants of demand for water services that could be met by MSPWE's in the peri-urban areas of Kenyan cities?
2. If it is the case that micro and small piped water enterprises have entered the peri-urban water markets to exploit the lack of coverage or gaps by the public water utility, what would be the fate of MSPWE's should the water utility network expand into the peri-urban areas thus eliminating the apparent gaps that offered the business opportunities to MSPWE's? What could be done to ensure that the MSPWE's are not driven out of business as a result of the expanding water utility network?
3. What are the water sources and how reliable and sustainable are the sources from which MSPWE's serving peri-urban areas of the Kenyan cities obtain the water they sell?
4. How much control do the enterprises operating in the piped networks in peri-urban areas have over the water infrastructure which they depend upon to deliver services?
5. Is a monopolistic control of water supply infrastructure a pre-requisite for the sustainability of the MSPWE's?

6. Is there any competition for the market and in the market by the MSPWE's in the peri-urban areas of Kenyan cities?
7. What socio-political constraints do MSPWE's in peri-urban areas face and how could socio-political support in favour of MSPWE's be improved?
8. What have the public utilities and their development partners done or doing to ensure adequate tariff policy, cost recovery and profitability for MSPWE's?
9. In your opinion how are MSPWE's operating in peri-urban areas of Kenyan cities responding to the customer expectations on quantity delivery, quality, reliability, frequency, payment system, convenience and price?
10. How do the existing regulatory, institutional, organizational and partnership arrangements in the management of water affairs support a conducive environment for MSPWE's in peri-urban areas? How can these aspects be improved?
11. How are the city authorities and water utilities in the peri-urban areas of the three Kenyan Cities endeavouring to establish win/win organizations and partnerships in the peri-urban water markets involving MSPWE's?
12. What business development interventions have been made to produce entrepreneurs capable of running sustainable businesses in increasingly competitive market driven water markets in Kenya? How have such interventions impacted on the sustainability of MSPWE's

APPENDIX III: STRUCTURED OBSERVATION SCHEDULE

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
A STUDY ON FACTORS INFLUENCING SUSTAINABILITY OF MICRO AND SMALL PIPED WATER ENTERPRISES IN PIPED NETWORKS IN PERI-URBAN AREAS
(STRICTLY CONFIDENTIAL)

1. Type of Enterprise organizational Model…….

2. Evidence of Demand for Enterprise Services

	Available	Strong	Fair	Weak
High Density housing				
Frequent Customers to water points operated by the enterprise				
Many connections managed by the enterprise				

3. Piped Water Service Providers in the area

	Available	Strong Competitor	Fair Competitor	Weak Competitor
Sole Provider in the Area				
Public Utility				
Other Piped Water Enterprises				
Manual Mobile Water Vendors				
Motorized Mobile Water Vendors				

4. Water delivery facilities

	Available	Good Condition	Fair Condition	Poor Condition
Piped reticulations and metered points				
Stand Pipes				
Water Kiosks				
Mobile Manual Water Vendors				
Motorized Water Vendors				

5. Customer Responsiveness

	Available	Good	Fair	Weak
Quantity delivery				
Quality				
Reliability				
Frequency of Payment				
Convenience				
Price				

6. Management of Externalities

	Available	Good	Fair	Weak
Effective Drainage at water selling points (No water stagnation, water pools etc)				
Safe Disposal of water based effluents from premises served by the enterprise (sewers, septic tanks, cesspools)				

7. Regulation

	Available	Good	Fair	Weak
Presence of public authority regulatory agents				
Visible regulatory action by the public authority regulatory agents				
Collection of Water Samples by regulatory agents				
Visible compromise of regulatory agents				
Harassment by public authorities				

8. Customer management in delivery of services

	Available	Good	Fair	Weak
Timely service to customers				
Friendly Customer Service				
Efficient Technical Management of customer service facilities customer				

APPENDIX IV: TABLES ON DETAILED CUSTOMER RESPONSIVENESS

Table APP IV 1: MSPWE Water Service Rating Mombasa PPP's

		Quantity Delivery		Quality		Reliability		Frequency of Supply		Payment System		Convenience		Price	
			%		%		%		%		%		%		%
currently	Good	47	66.2	54	75	22	52.4	30	41.7	56	77.8	35	48.6	41	56.9
	Fair	21	29.6	17	23.6	14	33.3	35	48.6	16	22.2	36	50	23	31.9
	Poor	3	4.2	1	1.4	6	14.3	7	9.7	0	0	1	1.4	8	11.1
	Total	71	100	72	100	42	100	72	100	72	100	72	100	72	100
1-3 years	Good	42	71.2	49	84.5	21	36.2	24	41.4	47	81	21	36.2	32	55.2
	Fair	14	23.7	9	15.5	34	58.6	29	50	11	19	37	63.8	21	36.2
	Poor	3	5.1	0	0	3	5.2	5	8.6	0	0	0	0	5	8.6
	Total	59	100	58	100	58	100	58	100	58	100	58	100	58	100
3-5 years	Good	27	79.4	27	79.4	13	38.2	16	66.7	27	79.4	11	32.4	19	82.6
	Fair	7	20.6	7	20.6	20	58.8	5	20.8	7	20.6	23	67.7	3	13
	Poor	0	0	0	0	1	2.9	3	12.5	0	0	0	0	1	4.4
	Total	34	100	34	100	34	100	24	100	34	100	34	100	23	100
Over 5 years	Good	12	75	13	81.3	6	37.5	8	50	14	87.5	4	25	7	46.7
	Fair	4	25	3	18.8	10	62.5	7	43.8	2	12.5	12	75	7	46.7
	Poor	0	0	0	0	0	0	1	6.3	0	0	0	0	1	6.7
	Total	16	100	16	100	16	100	16	100	16	100	16	100	15	100

Table APP IV 2: MSPWE water service rating Mombasa FPM's

		Quantity Delivery		Quality		Reliability		Frequency of Supply		Payment System		Convenience		Price	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
2009	Good	37	100	26	72.2	27	75	27	75	25	69.4	22	62.9	24	68.6
	Fair	0	0	9	25	9	25	9	25	11	30.6	13	37.1	10	28.6
	Poor	0	0	1	2.8	0	0	0	0	0	0	0	0	1	2.9
	Total	37	100	36	100	36	100	36	100	36	100	35	100	35	100
2006-2008	Good	27	100	20	74.1	24	88.9	20	74.1	14	53.9	16	64	13	54.2
	Fair	0	0	6	22.2	3	11.1	7	25.9	12	46.2	9	36	10	41.7
	Poor	0	0	1	3.7	0	0	0	0	0	0	0	0	1	4.2
	Total	27	100	27	100	27	100	27	100	26	100	25	100	24	100
2004-2006	Good	11	100	9	81.8	10	90.9	7	63.6	4	36.4	4	36.4	4	36.4
	Fair	0	0	2	18.2	1	9.1	4	36.4	7	63.6	7	63.6	7	63.6
	Poor	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	11	100	11	100	11	100	11	100	11	100	11	100	11	100
Before 2004	Good	3	100	1	33.3	3	100	2	66.7	0	0	2	66.7	0	0
	Fair	0	0	2	66.7	0	0	1	33.3	3	100	1	33.3	3	100
	Poor	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	3	100	3	100	3	100	3	100	3	100	3	100	3	100

Table APP IV 3: MSPWE water service Rating- Kisumu PPP's

		Quantity Delivery		Quality		Reliability		Frequency of Supply		Payment System		Convenience		Price	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
2009	Good	23	39.7	15	25.9	20	34.5	19	33.3	24	41.4	24	42.1	20	35.1
	Fair	32	55.2	43	74.1	38	65.5	38	66.7	34	58.6	33	57.9	37	64.9
	Poor	3	5.2		0		0		0		0		0		0
	Total	58	100	58	100	58	100	57	100	58	100	57	100	57	100
2006-2008	Good	22	42.3	22	42.3	12	23.1	16	30.8	22	42.3	20	39.2	19	37.3
	Fair	30	57.7	30	57.7	40	76.9	36	69.2	30	57.7	31	60.8	32	62.8
	Poor		0		0		0		0	0	0	0	0	0	0
	Total	52	100	52	100	52	100	52	100	52	100	51	100	51	100
2004-2006	Good	8	61.6	3	23.1	3	23.1	3	23.1	4	30.8	5	41.7	5	41.7
	Fair	5	38.5	10	76.9	10	76.9	10	76.9	9	69.2	7	58.3	7	58.3
	Poor	0	0	0	0		0		0	0	0	0	0	0	0
	Total	13	100	13	100	13	100	13	100	13	100	12	100	12	100
Before 2004	Good	5	62.5	1	12.5	2	25	2	25	3	37.5	4	50	3	37.5
	Fair	3	37.5	7	87.5	6	75	6	75	5	62.5	4	50	5	62.5
	Poor	0	0	0	0	0	0	0	0	0	0	0	0		0
	Total	8	100	8	100	8	100	8	100	8	100	8	100	8	100.

Table APP IV 4: MSPWE Water Service Rating Nairobi PPP's

		Quantity Delivery		Quality		Reliability		Frequency of Supply		Payment System		Convenience		Price	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
2009	Good	23	26.6	15	62	20	22.1	19	13.3	24	84.1	24	60.2	20	77.9
	Fair	32	24.8	43	24.8	38	43.4	38	46	34	13.2	33	32.7	37	15.9
	Poor	3	48.7		13.3		34.5		40.7		2.6		7.1		6.2
	Total	58	100	58	100	58	100	57	100	58	100	57	100	57	100
2006-2008	Good	22	36.6	22	64.4	12	36.5	16	34.6	22	82.7	20	59.6	19	77.9
	Fair	30	29.8	30	25	40	38.5	36	43.3	30	15.4	31	37.5	32	19.2
	Poor		33.7		10.6		25		22.1	0	1.9	0	2.9	0	2.9
	Total	52	100	52	100	52	100	52	100	52	100	51	100	51	100
2004-2006	Good	8	55.2	3	81	3	50	3	39.7	4	84.5	5	62.1	5	77.6
	Fair	5	36.2	10	10.3	10	41.4	10	50	9	13.8	7	36.2	7	19
	Poor	0	8.6	0	8.6		8.6		10.3	0	1.8	0	1.7	0	3.4
	Total	13	100	13	100	13	100	13	100	13	100	12	100	12	100
Before 2004	Good	5	65.8	1	83.3	2	63.9	2	50	3	88.9	4	61.1	3	83
	Fair	3	29	7	8.3	6	30.6	6	47.2	5	8.3	4	36.1	5	11.4
	Poor	0	5.3	0	8.3	0	5.6	0	2.8	0	2.8	0	2.8		5.7
	Total	8	100	8	100	8	100	8	100	8	100	8	100	8	100

Table APP IV 5: MSPWE's Water Service Rating Nairobi FPM's

		Quantity Delivery		Quality		Reliability		Frequency of Supply		Payment System		Convenience		Price	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
2009	Good	23	73.9	15	80.4	20	30.4	19	40	24	91.3	24	34.8	20	95.7
	Fair	32	15.2	43	17.4	38	67.4	38	55.6	34	8.7	33	63	37	4.5
	Poor	3	10.9		2.2		2.2		4.4		0		2.2		0
	Total	58	100	58	100	58	100	57	100	58	100	57	100	57	100
2006-2008	Good	22	79.1	22	76.7	12	30.2	16	39.5	22	95.4	20	27.9	19	95.4
	Fair	30	9.3	30	20.9	40	69.8	36	60.5	30	4.7	31	69.8	32	4.7
	Poor		11.6		2.3		0		0	0	0	0	2.3	0	0
	Total	52	100	52	100	52	100	52	100	52	100	51	100	51	100
2004-2006	Good	8	84.4	3	93.8	3	34.4	3	34.4	4	100	5	28.1	5	96.9
	Fair	5	12.5	10	6.3	10	65.6	10	65.6	9	0	7	71.9	7	3.1
	Poor	0	3.1	0	0		0		0	0	0	0	0	0	0
	Total	13	100	13	100	13	100	13	100	13	100	12	100	12	100
Before 2004	Good	5	77.3	1	95.5	2	45.5	2	45.5	3	95. 5	4	31.8	3	100
	Fair	3	22.7	7	4.6	6	54.6	6	54.6	5	4.6	4	68.2	5	0
	Poor	0	0	0	0	0	0	0	0	0	0	0	0		0
	Total	8	100	8	100	8	100	8	100	8	100	8	100	8	100

Table APP IV 6: Direct Observations on MSPWE's Customer Responsiveness on Water Supply Delivery

		Customer Responsiveness on Water Supply Delivery	Good		Fair		Weak	
			Count	%	Count	%	Count	%
Mombasa	PPP's	Quantity Delivery	54	77.1	16	22.9	0	0
		Quality	56	80	14	20	0	0
		Reliability	26	37.1	40	57.1	4	5.7
		Frequency of payment	49	76.6	11	17.2	4	6.3
		Convenience	31	48.4	28	43.8	5	7.8
		Price	36	59	16	26.2	9	14.8
	FPM's	Quantity Delivery	34	91.9	3	8.1	0	0
		Quality	31	86.1	5	13.9	0	0
		Reliability	33	89.2	4	10.8	0	0
		Frequency of payment	35	94.6	2	5.4	0	0
		Convenience	30	83.3	6	16.7	0	0
		Price	29	82.9	4	11.4	2	5.7
Kisumu	PPP's	Quantity Delivery	23	45.1	26	51	2	3.9
		Quality	20	40	29	58	1	2
		Reliability	20	42.6	26	55.3	1	2.1
		Frequency of payment	21	40.4	30	57.7	1	1.9
		Convenience	16	34	30	63.8	1	2.1
		Price	14	26.9	38	73.1	0	0
	MO's	Quantity Delivery	4	66.7	2	33.3	0	0
		Quality	1	16.7	5	83.3	0	0
		Reliability	4	66.7	2	33.3	0	0
		Frequency of payment	5	83.3	1	16.7	0	0
		Convenience	5	83.3	1	16.7	0	0
		Price	6	100	0	0	0	0
Nairobi	PPP's	Quantity Delivery	90	41.3	100	45.9	28	12.8
		Quality	100	46.7	72	33.7	42	19.6
		Reliability	54	25.5	88	41.5	70	33
		Frequency of payment	144	66.7	66	30.6	6	2.8
		Convenience	108	50.9	90	42.5	14	6.6
		Price	128	60.4	72	34	12	5.7
	FPM's	Quantity Delivery	35	76.1	11	23.9	0	0
		Quality	32	74.4	8	18.6	3	7
		Reliability	13	30.2	28	65.1	2	4.7
		Frequency of payment	40	93	3	7	0	0
		Convenience	10	23.3	29	67.4	4	9.3
		Price	40	93	0	0	3	7

Table APP IV 7: Direct Observations -MSPWE Customer Service

			Good		Fair		Weak	
			Count	%	Count	%	Count	%
Mombasa	PPP's	Timely service to customers	60	84.51%	11	15.49%	0	0.00%
		Friendly customer service	64	91.43%	6	8.57%	0	0.00%
		Efficient Technical Management of customer service facilities	0	0.00%	1	100.00 %	0	0.00%
	FPM's	Timely service to customers	35	92.11%	3	7.89%	0	0.00%
		Friendly customer service	35	97.22%	0	0.00%	1	2.78%
		Efficient Technical Management of customer service facilities	0	0.00%	0	0.00%	0	0.00%
Kisumu	PPP's	Timely service to customers	42	73.68%	13	22.81%	2	3.51%
		Friendly customer service	35	67.31%	17	32.69%	0	0.00%
		Efficient Technical Management of customer service facilities	2	40.00%	3	60.00%	0	0.00%
	MO's	Timely service to customers	4	66.67%	2	33.33%	0	0.00%
		Friendly customer service	6	100.00 %	0	0.00%	0	0.00%
		Efficient Technical Management of customer service facilities	2	33.33%	4	66.67%	0	0.00%
Nairobi	PPP's	Timely service to customers	174	81.31%	36	16.82%	4	1.87%
		Friendly customer service	168	80.77%	36	17.31%	4	1.92%
		Efficient Technical Management of customer service facilities	10	13.89%	40	55.56%	22	30.56%
	FPM's	Timely service to customers	42	89.36%	5	10.64%	0	0.00%
		Friendly customer service	40	86.96%	6	13.04%	0	0.00%
		Efficient Technical Management of customer service facilities	11	28.95%	17	44.74%	10	26.32%

Table APP IV 8: Direct Observations- MSPWE Water Selling Point Ambience

			Good		Fair		Weak	
			Count	%	Count	%	Count	%
Mombasa	PPP's	Effective drainage at water selling points	29	40.9	35	49.3	7	9.9
		Safe disposal of water based effluents from premises served by the enterprise	2	28.6	3	42.9	2	28.6
	FPM's	Effective drainage at water selling points	11	29	18	47.4	9	23.7
		Safe disposal of water based effluents from premises served by the enterprise	1	25	1	25	2	50
Kisumu	PPP's	Effective drainage at water selling points	13	32.5	14	35	13	32.5
		Safe disposal of water based effluents from premises served by the enterprise	11	34.4	12	37.5	9	28.1
	FPM's	Effective drainage at water selling points	0	0	1	16.7	5	83.3
		Safe disposal of water based effluents from premises served by the enterprise	0	0	0	0	0	0
Nairobi	PPP's	Effective drainage at water selling points	86	43.4	60	30.3	52	26.3
		Safe disposal of water based effluents from premises served by the enterprise	6	6.8	34	38.6	48	54.6
	FPM's	Effective drainage at water selling points	31	67.4	9	19.6	6	13
		Safe disposal of water based effluents from premises served by the enterprise	2	20	5	50	3	30

APPENDIX V: LETTER OF INTRODUCTION TO COLLECT DATA