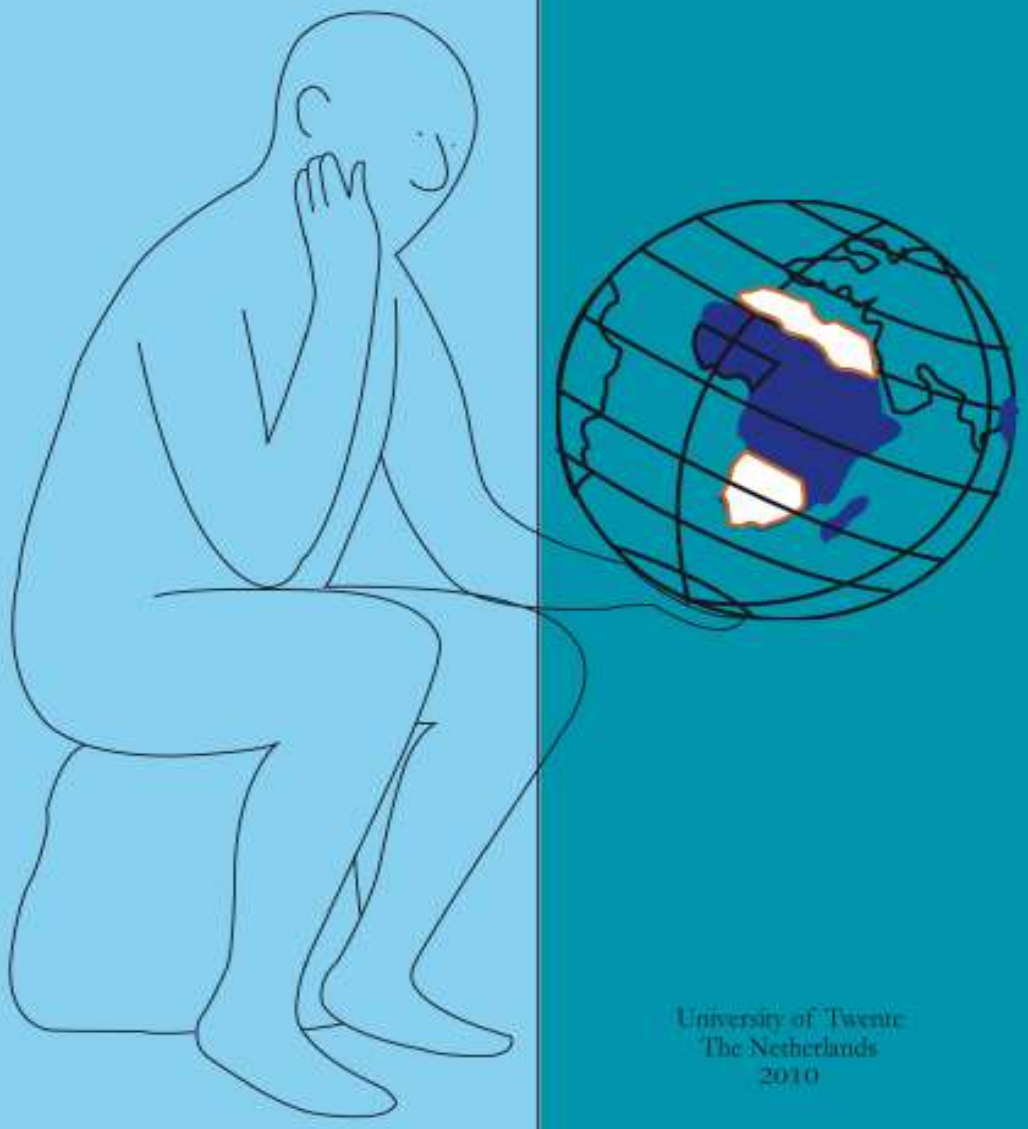
Charles Ndandiko

PRIVATE PROVISION OF PUBLIC SERVICES IN DEVELOPING COUNTRIES ?



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PRIVATE PROVISION OF PUBLIC SERVICES IN DEVELOPING COUNTRIES?

DISSERTATION

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"The illiterate of the future are not those who can't read or write but those who cannot learn, unlearn, and re-learn." – Alvin Toffler (1999)

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ABSTRACT

Private provision of public services has been a contentious topic for decades in both the academic and practice literature. The coherent remedy to the mystery arising from the public services' attributes of *non-excludable* and *non-rival* was public sector provision. However, in an era where policy demands that government and her agencies uphold private involvement in public service delivery rather than in-house delivery, the interest in private provision of public services is rekindled.

This thesis questions the wisdom of indiscriminately prescribing private sector provision as a remedy for public sector provision failure. Our motivation is both theoretical and empirical. Theoretical motivation has to do with the very nature of developing countries and the urge to introduce private provision no matter what! Empirical motivation has to do with the inconclusive debate on which sector exhibits superior efficiency.

While in general the idea of private sector provision of public services is theoretically appealing, its practical implementation in developing countries may not be as obvious as theory suggests. Our study sought to establish the extent to which private providers are comparable to the public providers in achieving higher efficiency levels in public service provision. The co-existence of public and private service providers in the waste collection and water supply services constituted an opportunity to examine the claim that private provision leads to higher efficiency than public service provision.

Data Envelopment Analysis was used to determine efficiency levels of service providers in up to 32 local government units, and regressions and simple averages to explain the efficiency distribution. Accordingly we established that contrary to theory, private involvement in local service delivery may not imply the attainment of superior levels of efficiency; perhaps owing to, in the context of a developing country, the absence of strong public and private institutions, competition and an enabling environment.

We conclude that private provision in a developing country should be accompanied by financial and skills' enhancement of both the private and public institutions and improved and systematic regulation. Public policy makers ought to establish prevalence of conditions that favour private provision before transferring a service to the private sector; otherwise the anticipated solution to the problem ends up creating a much bigger problem!

PART ONE: INSPIRATION AND PERSPECTIVE FOR RESEARCH

CHAPTER ONE: INTRODUCTION TO THE RESEARCH

1.1 Background and Orientation

For much of post world war two, the majority of governments both in the developed and developing countries entrusted the delivery of services such as transport, telecommunication, energy, water, health, education, policing, defense, etc. to the public sector, including government departments and/or state owned enterprises (Grimsey, 2002; Harris, 2003). It was taken for granted that the existence of market failure and imperfections implied that government was the only plausible provider of most goods and services. In many countries, the situation was that government builds or purchases a physical asset, retains ownership, uses public sector employees or a private contractor to deliver the required service (Grout, 2003) – the traditional approach to procuring infrastructure and delivery of public service. However this mode of procuring infrastructure and delivering public services proved untenable as the public sector entities mandated with provision and execution were characterized by insufficient government investments, budget deficits, inefficiencies, poor pricing policies, corruption, overstaffing, mismanagement, and stagnation (Harris, 2003; Rwelamira, 2004) and therefore did not provide value for money to the public clients. Hence in the last three decades governments in both the developed and the developing world have been moving away from the traditional approaches; where government is solely and completely involved, to alternative arrangements that embrace more private sector involvement, in provision and delivery of public service. Concomitant to this are persistent debates on the appropriateness of private provision vis-à-vis public sector provision; whether the public sector or private sector is a more efficient service provider is still a contentious and empirical issue since the results are mixed.

1.2 Inspiration for the Study

1.2.1 The Pessimist View Of The Public Sector In Service Provision

One strand of literature has painted a negative picture of service provision by the public sector. This strand contends that the public sector can never be expected to deliver services as efficiently as the private sector because the public agencies lack incentives to perform efficiently. They are inefficient because they address the objectives of politicians rather than maximise efficiency (Boycko et al, 1996; Shleifer et al,1994); they provide services desired by politicians rather than by consumers (Shleifer et al, 1994); they are overstaffed due to the fear of losing votes of the otherwise retrenched state-employees, and due to the political bargaining power of trade unions (Boycko et al, 1996; Shleifer et al, 1994); they have no bankruptcy and takeover constraints and threats (Vickers et al, 1988) and that generally they have no competitive pressures that would force them maximise efficiency since they tend to be

monopolies – as Public choice theory suggests that if public officials monopolize service delivery, then the result is oversupply and inefficiency (McMaster et al, 1996). The property rights view, most commonly associated with Alchian (1965) and Alchian and Demsetz (1972), suggests that public ownership attenuates property rights, leading to monitoring problems and adverse behavioural incentives, creating mismanagement and inefficiency.

1.2.2 Global Interest In Private Provision Of Public Services

Frustration of service delivery by public sector in the 1970s and 1980s led to the expanded experimentation with private sector provision in many countries (Warner, 2008). Private provision of public services was popularized by the UK and US governments of the 1980's after they deliberately adopted the privatization policy. The motives were many but the anticipation of reduced fiscal pressures and higher efficiency underscored the expectations of the governments. In the 1980's Governments world over found themselves with large budget deficits in the aftermath of the oil crisis and the subsequent debt crisis; both domestic and foreign borrowing could not sustain financing of the deficits. Private involvement was seen as a way of improving cashflow by reducing the outflow of cash (in the form of subsidies and grants) to the loss making and inefficient state owned enterprises. It was believed that due to incentives originating from agency, property rights and competition the private sector was bound to deliver services more efficiently. The increasing inadequacy of traditional public organizations in satisfying their public clients' requests therefore pushed toward externalization of public service provision (Ancarani, 2003). It was envisaged that private sector involvement enables competition which results in improved outcomes such as greater efficiency, higher quality of service, a clearer focus on clients and better value for money (Parker, 2000 in Ancarani, 2003); that the private sectors' skillful management and capacity to innovate would lead to increased efficiency (Hemming, 2006).

1.2.3 The Paradox Of Private Provision In Developing Countries

Whereas the developed world consciously operationalized private provision basing on some intrinsic merits, the developing world launched private provision under pressure. In the developing world, the interest in private sector involvement in service delivery was not only due to the need for exploiting efficiency gains but rather more of pressure by international lending agencies (George, 1997 in Miraftab, 2004). World Bank (WB), International Monetary Fund (IMF), United States Agency for International Development (USAID) and other multilateral organizations put pressure on developing countries to pursue a policy where the private sector plays an increased role in public service delivery as part of a package of economic and structural reforms (Aylen, 1987; Batley, 1996). Such pressure came at a time when a big proportion of developing countries' budgets were being funded by donors and multilateral organizations. These organizations conditioned the release of financial aid and loans on the adoption of greater market freedom and in desperate need, developing countries allowed private involvement without proper analysis and visualization of its appropriateness.

Kirkpatrick et al (2003), provide a summary of the critical differences between the markets, management, property rights and government in developed and developing countries elaborated in Table 1.1 below. When the perceived justification for private provision are mapped against the common features prevailing in the developed and developing world, the differences demonstrate contradictions which augment the debate on private provision of services in developing countries. For instance, competition is listed as a major driver for private involvement that explains efficiency, but the common feature shows insufficient

competition in developing countries. In similar vein, a skilled and financially strong private sector is proffered as justification for private provision, but the features indicate inadequacy in this aspect as well. Is it not a contradiction that the same government exhibiting incompetence in service provision must take responsibility for regulating private firms without any deliberate enhancement? In light of this scenario is it realistic to homogeneously launch private provision without paying attention to the country situation.

Table 1.1 Mapping Justification for Private Provision against Common Features of Developed and Developing Countries

Justification for Private Provision (Mapping)	**Commonly found features of[**]:**	
	Developed Countries	**Developing Countries**
Competition on products (to supply)	Competitive product markets	Imperfectly competitive and incomplete markets
Competition – Provision of capital (financing)	Competitive capital markets	Under-developed capital markets
Exploiting – managerial and innovative skills	Organised and competitive labour markets	Regionalised and sometimes ethnically distinct labour markets, with appointments through connections
Exploiting – managerial skills	Competitive managerial labour markets; Institutionalized management training	Management weaknesses and patronage in appointments
Property rights and the use of private assets	Protected and well-defined private property rights; understood standards of business conduct	Poorly protected private property rights; under-developed business codes of behaviour
Public sector capacity (supervision and regulation)	Relatively high standards of probity in public administration	Relatively low standards of public administration, including cronyism and corruption

[**]Adapted from Kirkpatrick C and Parker D (2003)

1.2.4 Perspective for Research

While private provision arrangements of public services have received much publicity as efficient and effective modes of implementing public procurement policy in the developed world, little has been considered in the context of a developing country (Ndandiko, 2006). While in general the idea of private sector provision is theoretically appealing, its practical implementation in developing countries is not as easy as theory suggests (Pessoa, 2006). The common features highlighted by Kirkpatrick et al (2003) above show clearly that developing countries' markets are underdeveloped, with less competition, and weak private and public

sectors – the basis of arguments for choosing between the two modalities of service provision. In view of such circumstances is it reasonable to expect higher efficiency levels? Besides, studies show inconclusive evidence on efficiency and quality standard in the private relative to the public sector (Parker et al 2002; UNDP-HRD Report, 2003).

1.3 Research objective

The assumption for private provision originates from the pessimistic view of public provision. It is portrayed that the public sector providers are bound by bureaucratic inertia, lacking incentives to be efficient (Kessler, 2004). That private provision – perceived to obtain superior efficiency, is the remedy of public provision failure. However we do not share the enthusiasm of those who suggest that private provision always yields superior efficiency considering that the empirical and theoretical research is fairly inconclusive (Parker et al 2002; UNDP-HRD Report, 2003). Some studies of private sector versus public sector performance, for example by Davies (1971, 1977), Cubbin et al (1986), Boardman et al (1989), Burgat and Jeanrenaud (1990), Galal et al (1994), Dewenter et al (1998), Megginson et al (1994), Estache and Kouassi (2002) and Kirkpatrick et al. (2006), have reported higher efficiency in the private sector. Yet on the contrary Tyler (1979), Caves et al (1980), Byrnes et al (1986), Millward (1988), Nelson et al (1988), Bruggink (1982), Lambert et al (1993), Parker et al (1998), Garcia-Sanchez (2006), and Garcia-Sanchez (2008) have reported results more favourable to the public sector or no statistically significant differences. These studies allow us to pose questions about policies that favour, without a doubt private provision. Moreover most of the literature on the private providers' superior efficiency comes from the developed and advanced economies whose features are quite different from that of developing countries.

Our study is an attempt to contribute to the debate on the relative efficiency of private provision vis-à-vis public provision of public services but concentrating on developing countries. We question the pragmatism of private provision in the absence of ideological conditions that justify it. Does private provision per se make sense in the absence of the salient conditions? It is understood that private provision thrives under conditions of well developed capital markets; sufficient competition; a vibrant, skilled and financially sound private sector; and an organised public sector competent in supervision and regulatory roles.

Our ultimate goal is bring to bear new insights to the existing literature on private provision and ignite debate on policy change in light of a developing country situation.

Research Goal and Questions

From the foregoing discussion it is clear many questions remain unanswered with respect to public provision vis-à-vis private provision. Our study will be guided by the following goal and questions

Research Goal

We aim to determine whether there is a difference in the relative efficiency of private and public service providers in developing countries and factors explaining their efficiency levels.

The Main Research question

1. To what extent are private providers comparable to the public providers in achieving higher efficiency levels in public service provision
    a. Why is it worthwhile to measure the efficiency of service providers?

b. How can the efficiency of service providers be measured?
c. What are the relative efficiency levels of public and private providers of the waste collection and water supply services in Uganda? And is there a difference between the efficiency levels of the public and private service providers?
d. Does modality of service provision (Public or Private) explain efficiency levels of service providers
e. What are the other factors that explain the efficiency levels of service providers (based on public and/or private modalities)
f. What support is there for the policy of private involvement in public services and how has this affected efficiency

Other supporting research questions

2. What is the nature of private and public sectors? How is the nature of the individual sectors relevant to service provision?
3. What are the various modality of public service provision? How can they be utilised in practice?
4. What are the pre-conditions for private provision of public services
5. What are the challenges of private and public provision?
6. How can private and public provision be enhanced to realize their potential?

1.4 The Uganda Situation: as a qualified choice of study

Since we conveniently chose Uganda as our unit of analysis, representing developing countries, it is imperative that we introduce the country's historical perspective to public sector provision and evolution towards private sector involvement in service provision.

The evolution of the service provision: from private to public to private

Since attaining independence from Britain in 1962, Uganda has almost registered as many policy shifts as there have been regime changes. However four regime eras are worth a review because they have had significant policy implication on the country's public and private sectors; these include the Obote I era of 1962-1971; the Amin era 1971-1979; the Obote II era 1980-1985 and the Museveni era 1986 todate.

The Obote I era 1962-1971

Upon attaining independence on 9th October 1962, the government adopted a mixed-economy strategy, with private ownership sanctioned by the constitution. However, later the regime took a nationalist approach that was fashionable with most post-independent African states. The government introduced policies that were in-ward looking based on import substitution and central planning. Government thought it prudent to replace private provision with public provision and maintain control over "strategic" areas of the economy in order to promote internal growth and diversification. It was felt that the state was the impetus in the economy implying direct control of major sectors. Using the "Common Man's Charter 1969", the government nationalized private enterprises by acquiring a stake in most of them. The focus of nationalization was on the so called "strategic sectors" including mining, banking, insurance and textiles but later expanded to include transport, hotels, tourism, insurance, foods etc. "…Strategic became merely a euphemism for total control" (Bigsten et al, 1999). Consequently a rapid expansion of the public sector in service provision was observed during this period.

The Amin era 1971-79

When Amin took over power after a military coup in 1971, his regime embarked on policies that would seriously affect the Uganda economy and the wellbeing of the people for decades (Bigsten, 1999). The major one being the "Africanization" of the economy in 1972, where Ugandan-Asian business families were given 90 days to leave the country and a total of 5655 businesses and real estate were redistributed to indigenous Ugandans most of whom were military officers, and others nationalized. This event resulted into 1. unskilled managers replacing the skilled – most businesses closed shop; and 2. earned the country a reputation for lawlessness and insecurity of property rights – scaring away foreign investments. Half of the nine years of this regime, the government was under international trade and investment sanctions which crippled the economy. Ultimately, private production declined and the disoriented public sector expanded further.

The Obote II Era 1980-1986

When Obote returned to power at the end of 1980, he sought support from the IMF and the World Bank. A package of economic reforms was thus embarked on. The priorities of the Obote II government, as outlined in policy statements, were to raise efficiency in the productive sectors, prudent use of funds and the creation of incentives for both domestic and foreign investors (Bigsten, 1999). The reforms involved the floating of the Uganda shilling; increased producer prices for export crops; removal of price controls; rationalization of tax structures; control of government expenditure and increased public sector accountability. However, the Obote government's attempts at reform and the economic recovery were halted in 1984. The NRA guerrilla war that had been waged against the government led to a sharp increase in military expenditure. The government was no longer able or willing to keep within the expenditure limits agreed with the international financiers and donors. In 1984 alone there was a four-fold increase in public-sector wages, bank credit to government increased by 70 percent and money supply increased by 127 percent (Bigsten, 1999). The IMF withdrew its stand-by programme and the economy plunged into further crisis.

The Museveni era 1986-todate

We have so far observed that the period between 1970 and 1986 were turbulent both politically and economically. When Museveni's NRM guerrilla movement took power, it inherited 146 public sector enterprises, excluding banks (Ddumba-Ssentamu et al, 2001); enterprises dealing in wide range of businesses including supermarkets, road transport – buses, hotels, hardware, insurance, airline, etc. The majority of these performed poorly as a result of country's violent political history and collapsed economy. The public sector enterprises suffered from low capacity utilization, large operating losses or low profitability, and being illiquid and indebted (Ddumba-Ssentamu et al, 2001). Like any other developing country, the confluence of poor performance of the public enterprises, budgetary pressure and donor demands prompted the government of the day to align with private provision! In the late 1980s the government commenced WB and IMF sponsored economic and structural recovery programme that was pegged on public sector and market reforms, and trade liberalization. In the early 1990s the government embarked on transforming the economy from an in-ward centrally planned and dominated by the public sector to an out-ward looking economy where service provision is decentralized to the private sector and the lower tiers of government. This was done without critically appreciating the conditions prevailing in terms of competition, property rights, management as outlined in Kirkpatrick (2003). Accordingly the government was at odds with Ancarani (2003) who has observed *'…despite the well known benefits expected from entrusting the service provision with private partners, there is need for exercising caution in extending its*

application to situations where both markets and government regulatory capacity may be weak".

The political and economic evolution and the prevailing situation in Uganda described above makes the country a good benchmark case for our study. Like most developing countries, for many years public sector provision was the norm and therefore, the country's private sector had no track record to exhibit in most of the service sectors; yet the government still moved to entrust service provision to the private sector. Consequently, to enhance our research questions, in the absence of some contextual policy on private provision, should we expect private providers to be superior?

1.5 Contribution of the Research

Private provision of public services is relatively a neglected field in literature (Mulder 2005). Governments have abandoned most services and contracted the private sector to provide services on their behalf. There is still limited knowledge about the performance of private providers vis-à-vis public providers, more so in the developing countries' situation.

The study applies the market phenomena on a developing country and highlights the flaws that need to be addressed. That applying the concept of private provision wholesale does not yield anticipated positive results. Introducing a one-fit-all policy, from one context will normally not work if the basic conditions justifying it are not dealt with. Conditions for enabling private provision must be available.

Any policy decision at macro level, to involve private sector in service delivery for efficiency gains, should first assess whether the salient conditions that justify efficiency are available that is, competition, management, property rights, skills, regulation etc, so that if unavailable, government policy deliberately and simultaneously creates these conditions.

Public procurement practitioners find themselves being told to use private provision instead of public provision based on some minimum monetary threshold without any assessment. As to whether this course of action is better than the in-house provision; or whether there is competition; or whether relevant private providers exist, is not considered. The study highlights to the public procurement policy maker the need to incorporate an assessment of the salient conditions that make private provision work in the decision making process.

The current study is the first to the best of our knowledge to address, in a more robust way, the relative efficiency of public and private provision in Uganda's local governments; handling multiple variables. DEA analysis as a benchmarking tool creates efficiency variables for use in practice. The variables used for the specific services such as waste collection and water supply services could be utilized in practice for LG performance benchmark assessments. Accordingly, keeping of records on such variables can be encouraged as matter of practice.

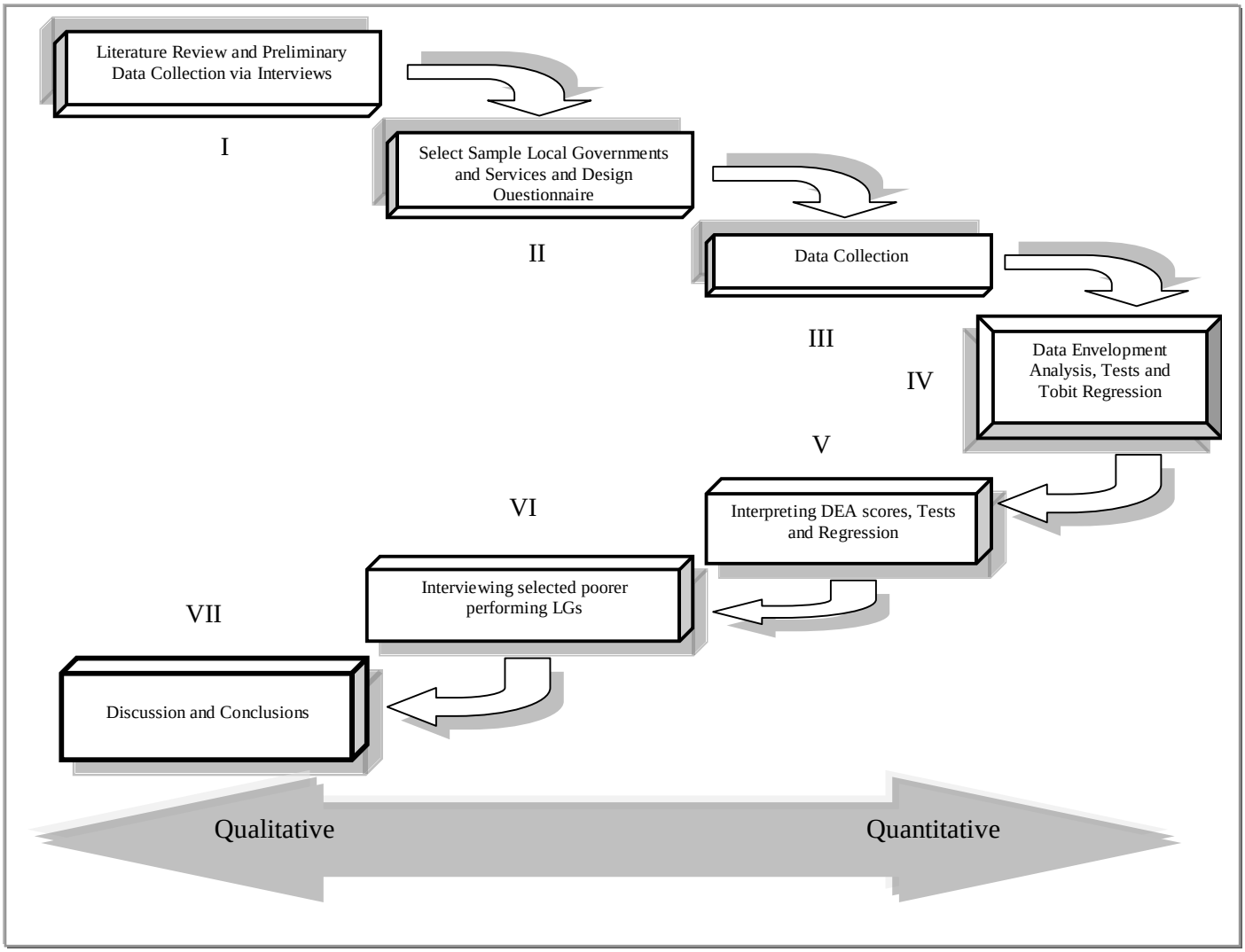
1.6 Research Roadmap

Stages of the research

In order to test our hypothesis and answer the research questions, our study blended both qualitative and quantitative techniques which involved several stages in which a step-by-step move towards data collection, data analysis and discussion of results took place as depicted in Figure 1.1.

I. We initially reviewed literature on public and private provision which allowed us to formulate study areas and concepts. ULG at both municipal and town council level were targeted units of analysis because they were at the forefront of implementing private participation arrangements in their traditional services.
II. Preliminary interviews with technical officers in seven pilot LGs allowed us to identify services that were common to most LGs and establish input and output parameters used in measuring efficiency.
III. A comprehensive questionnaire was designed and sent to 50 ULGs that were purposively selected based on size, geographical region, availability of common services and the modality of service provision. At this stage most services including waste collection, municipal markets, street cleaning, street parking, street lighting, recreation, public transport, water supply etc were a target of research and therefore covered in the questionnaire. We initially got data relating to the financial year 2006/2007 from 45 ULGs. On scrutinizing the returned questionnaires only two services were noticeable; waste collection and water supply had meaningful data across several LGs and therefore necessitated detailed analysis. Unavailability of relevant data across services and LGs restricted us to assessing the efficiency of only 28 LGs for waste collection services and 32 LGs for water supply services. Street lighting whose data was slightly exploitable was used to enhance the validation of results from the detailed analysis. Other services were dropped.
IV. To evaluate the relative efficiency of public and private service provision, we use a well established nonparametric efficiency measurement technique known as Data Envelopment Analysis (DEA) approach which is a mathematical programming based technique for determining the efficiency of individual systems as compared to their peers involving multiple performance measures. Measuring efficiency in this manner is consistent with both literature associated with the efficiency analysis of government service providers in general, such as Kittelison (1992) and Carrington et al (1997), and with past empirical approaches to efficiency measurement in local public sector notably Charnes et al (1989); Grosskopf (1990); De Borger (1996); and Worthington (2001). Detailed discussion of this issue is in Chapter seven.

Figure 1.1 Research Roadmap



V. Simple averages and regression analysis was performed to identify the sources of efficiency (further discussion is in Chapter Seven).
VI. Based on interpretations of individual service sectors, we did joint analysis to compare and contrast outcomes and also further interviews of LGs.
VII. From the joint analysis and further analysis, conclusions were derived.

1.7 Organization of the Thesis

The thesis is organized in four major parts, with an overall of 13 chapters. ***Part one*** details the inspiration and motivation for the research comprises of *Chapter one* in which we position the perspective for our study, aiming to determine the relative efficiency of the public and private providers and the potential sources of efficiency in the absence of the conditions that warrant the use of private providers. We conclude that our motivation is plausible and crucial given that debate on which sector is superior is inconclusive. ***Part two*** is composed of four chapters which bring to bear the theoretical direction for this thesis. *In Chapter two*, we trace the origin of the public and private sector divide in the nature of goods and services including *public*

goods, *private goods* and *mixed goods*. We show that the justification for using either the public or the private sector to provide services could largely be influenced by the very nature of goods and services. We conclude that even though either sector can provide any of the categories, for some public and mixed goods, due to their properties (*non-excludability and non-rivalry*); certain conditions must be present for private providers to exhibit superior efficiency. This conclusion in part questions the policy decision to indiscriminately transfer local services to the private sector based on some monetary threshold and without thorough analysis of other factors like regulation and adequate supply of private sector players. *In Chapter three*, we explore theoretical foundations and justification of private sector involvement in public service delivery besides identifying decision making possibilities. We demonstrate that private provision comes in various forms and therefore theory support is not enough rather calculated and analytical support is vital. This necessitates exploiting the strengths and weaknesses of each arrangement vis-à-vis the objectives, pre-requisites and nature of goods. Ultimately, we find the decision to utilize private provision without guidance suspicious in terms of anticipated efficiency supremacy! *In Chapter four* we delve into the practical situation with regard to private involvement in public service provision in the developing world. The situation reveals inadequacies in performance. Based on the review, we conclude that when the critical success factors that assure private provision performance are absent, mere introduction of private provision will not make this mode of service delivery efficient; it is not enough to transfer services to any private sector, i.e. for the sake of it, the private sector must have the capacity to accomplish the responsibilities. *In Chapter five*, we explore the local governments and the reformation process in developing countries that simultaneously introduced decentralization (*transfer of roles and responsibilities from the central to local government level*) and private involvement (*transfer of roles and responsibilities from public sector to the private sector*). We note that the reform was done without substantial financial resources' support and capacity enhancement for both the LGs and the private sector. For some developed world countries, alternative service delivery systems were suggested. Nonetheless, we conclude that inadequate capacities of both the decentralized LGs and the private sector participants effectively impair attainment of higher efficiency. ***Part three*** of our thesis details our research design and techniques. *In Chapter six* we introduce and make a case for performance management and measurement. We conclude that the decision to utilise the public sector or the private sector should be based on some sort of empirical evidence i.e. the much hyped superior efficiency of one against the other should be supported by hard facts and not mere rhetoric. Performance measurement of service providers is an endeavour towards obtaining facts. This provides us with guidance on why and how we obtain the ultimate study conclusion. *Chapter seven* concentrates on efficiency – our choice of assessment amongst the performance management components and *Chapter eight* profiles our research approach including the study choices we made, how we obtained data and how we arrived to our conclusions. ***Part four*** covers the presentation of findings, their analysis and conclusions and it is discerned in *Chapters nine* and *ten* which detail the waste collection and water supply services respectively. *Chapter eleven* provides a further analysis using street lighting service to strengthen conclusions. A joint analysis of all services is done in *Chapter twelve* and reveals that private sector provision per se is insufficient; it must be reinforced by presence of strong private sector players, competition, and a regulatory environment, and Conclusion and issues of further research are handled in *Chapter thirteen*.

PART TWO: THEORETICAL DIRECTION

CHAPTER TWO: THE NATURE OF PUBLIC AND PRIVATE SECTORS

2.1 Introduction

Public service provision involves the relative use of two sectors that is the public and private sectors at varying degrees of participation. An analysis of the public and private sectors is therefore worthwhile in order to inform the arguments for either or both in partnership. In this chapter, we present an analysis of the two sectors with a view of identifying their strengths and weaknesses in providing public services as well as their differences and commonalities. This kind of analysis provides insights on the nature of the two sectors in relation to provision of public services.

2.2 Nature of Goods and Services

In order to critically analyze the nature of public and private sectors it is imperative that we understand the nature of goods and services considering that the provision of goods and services is a major defining factor of the sectors.

The neoclassical model categorizes goods and services as public, private or mixed and properties such as excludability and rivalry are used to define each of the categories. The non-excludability and non-rivalry characteristics of public goods provide a key two-part test for determining whether public or private provision of services should be considered.

Public goods (and services)
Public goods are neither excludable nor rival. People can not be prevented from using a public good, and one person's enjoyment of a public good can not be reduced by another person's use. For example the national defense force or street lights, where one individual can gain the benefit of the defense force product or street light and not exclude others from the same benefit. Given this situation, a private supplier may find it difficult to recover the costs of providing a public good because too few people would be willing to pay for the service and too many would try to free ride on it. In that situation, the service may not be provided at all unless government intervenes and subsidises the private supplier or directly provides the service itself, recovering its costs by taxing the people that benefit.

Private goods (and services)
Private goods are both excludable and rival. These include the products such as hardware, clothes, bananas and restaurants. These goods are excludable because it is possible to prevent someone else using them. They exhibit rivalry because if one person consumes the product others cannot use it at the same time, hence there is an element of competition. Most goods and services consumed or enjoyed by the public are private goods. Private goods can be supplied and charged for directly by private firms on a for-profit or not-for-profit basis. Competitive markets for private goods, supplemented by regulation where necessary, help

ensure that economic resources are directed to the production of goods and services that consumers value most.

Empirical research spanning 25 years has found that private goods are best supplied by the private sector (Local Government Forum, 2008). There is no compelling strategic or public policy reason for LGs to be engaged in such private good activities. Exiting from private good activities allows LGs to focus more intensively on their important public good roles and perform them better.

Mixed goods (and services)

Mixed goods have some but not all of the characteristics of private and/or public goods. Apart from defence, street lighting, footpaths and civil defence the list of pure public goods provided by government at any level is not extensive. However, there is a variety of goods that fall between pure public goods and private goods. These exhibit some excludable or rivalrous characteristics. Some of them are congestible in that they are public goods that become crowded at some level of use so that consumption becomes rival; further rises in their use impose additional costs, either through increased congestion among users or the need to provide additional capacity (for example, public road networks). Public libraries, museums and swimming pools are examples of non-pure public goods. They do not fully satisfy the principles of being non-excludable and non-rival. Charging arrangements are feasible and are sometimes employed in all cases. Users of libraries could be excluded if they did not pay a subscription or borrowing fee, and when a book is lent to one borrower, it is not available to another. The benefits of reading a book are largely enjoyed by the borrower, not by other people. Alternatives to public libraries, such as book shops, illustrate the point that similar services can be provided privately. Similarly, barring congestion, visitors to museums are not rivals in consumption. At the same time, it can be argued that there is a public good element in the provision of all such services. Library services may contribute to literacy, which may benefit the community at large by helping people become functioning members of society (just as education has a public good element, especially at the primary and ordinary levels). Private and public museums may be of value to the community by contributing to a national identity and culture. Such public good elements may or may not provide a justification for some local government involvement in such services.

Comparing the characteristics of excludability and rivalry

Table 2.1 below categorises services commonly provided by local governments according to their varying degrees of excludability of and rivalry in consumption. Those towards the bottom right-hand corner of the figure are close to private excludable goods, and there is little economic basis for their provision as public goods. Those towards the top left-hand corner have more of the collective characteristics of public goods, such as street lighting and central waste collection services.

In between these two extremes are activities with some public good features. Some of them, such as local roads, have high rivalry that creates congestion, but it is not currently technically feasible to charge for them at a reasonable cost. In other cases, funding via a mix of user charges and rates is appropriate.

Another dimension in considering local public good provision is the extent to which the service would lead to positive externalities (or avoid negative externalities). For instance, it is sometimes argued that waste collection should be subsidised to avoid littering and illicit

disposal of bulk waste materials on another's property. It is also said, in some countries, that public transport should be subsidised to reduce car usage and congestion.

Table 2.1 Characteristics of public services based on excludability and rivalry

	Rivalry in Consumption →			
		Public Good		
Excludability in Consumption ↓		Low	Medium	High
	Low	Street lights, traffic signs, local defence, regulatory functions	Low use roads, foot paths	Eradication of pests, pollution
	Medium	Flood controls	Sports grounds, public toilets	High use of roads, promotion of tourism
	High	Museum	Public libraries, public venues	Airports, car parks, waste disposal
				Private Goods

Adapted from: Local Government Forum (2008)

Categorising local services and drawing a line between public and private goods may be a difficult exercise at the margin. Even if services can be identified as non-rival and non-excludable, they can still be provided inefficiently if the funding mechanism used obscures the public's true willingness to pay. As long as there is a reliance on revenue mechanisms that separate users of services from contributors to funding, there will be public debate about what goods and services to provide, how to provide them and who benefits from them. LGs do not have to provide a service simply because it is shown to have public good characteristics. Such provision is inefficient unless it passes a cost-benefit test and provides net social benefits (Local Government Forum, 2008). Hence the choice of public-private provision will largely incorporate the nature of goods and services.

Conventionally governments (the public sector) and markets (implied in private sector) are two of society's mechanisms for coordinating economic activity. Each plays a role in providing private as well as public goods and services. A typical example is provided in Table 2.2 below.

Table 2.2 Mapping nature of goods and services against potential provider

		Provider	
		Public	**Private**
Good / Services	**Public**	**I** Typical public goods like defense, public order, roads	**II** Informal house to house waste collection,
	Mixed	**III** Public libraries	**IV** Foot paths, public transport, waste collection
	Private	**V** Government may temporarily takeover provision as capacity is developed, e.g. Mining	**VI** Typical private goods, like clothes, hardware

Samuelson assumes that the market is the norm; that the market realm is both non-state and private; and therefore for reasons of efficiency, private goods should be produced in markets – i.e. private sector as in Box VI in the matrix. Accordingly the provision of private goods is assigned to the market and there is no serious contention on that; a large body of empirical research over the years has found that private goods are best supplied by the private sector (Local Government Forums (2008). Failure by the publicly operated enterprises to provide private goods and their eventual transfer to the private sector has been comprehensible.

The term "public" reflects the fact that goods and services are produced for the benefit of the public at large i.e. goods whose consumption yields collective benefits. It is argued that public goods and services are unlikely to be provided by a private firm under market conditions because they are prone to 'free riders,' making it too risky for a private firm to invest in producing them. Box I provides examples of such goods. However we note that increasingly such goods are being given to the private sector for instance the US coalition military in countries like Iraq, and Afghanistan is using private agencies to do military work though with some regulation. Thus, public services are goods that an unregulated market will tend to under provide (Besley and Ghatak, 2003)

There is considerable contention as to whether public goods and services could be correspondingly assigned to the government and not the private sector i.e. Boxes I and II situations. We note that, although many goods and services can be classified as public it is not obligatory that they be publicly provided. It is therefore essential that provision and production is critically assessed considering that recent years have witnessed a prolific increase in the

utilization of the private sector in provision of public services. Hence the focus for us is the way to select Box I against II or III against IV.

2.3 Provision and Production of Public goods and services

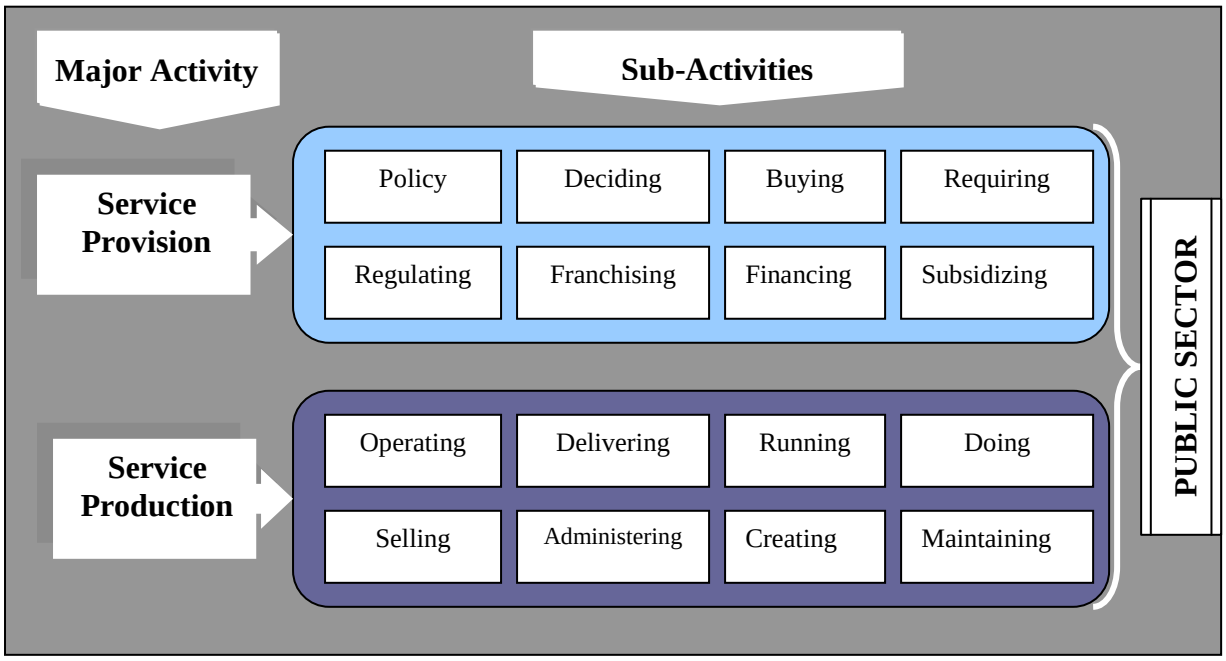
For many years economists and public policy makers' world over have debated the declining trends in public service provision. Analysis of these problems often leads to the debate over who should assume responsibility for providing the solutions: the public or the private sector.

Kolderie (1986) argues that governments perform two quite separate activities including *service provision* and *service production*. That service provision comprises of activities such as policy making, deciding, buying, requiring, regulating, franchising, financing and subsidizing; while service production, includes activities such as operating, delivering, running, doing, selling and administering of the service Kolderie (1986). In effect, the responsibility for arranging a service to be delivered is separated from the actual delivery of the service (Savas 1987).

To appreciate the public-private divide, we visualize three major options based on Kolderie's idea of what governments perform; we then derive a distinction that we utilize to define public and private provision in our study.

Option I: Public sector performs major activities: Service provision and production
In Option I, depicted in Figure 2.1, almost all the two major activities that is, provision and production are performed by the public sector – this reflects the traditional approach to public service provision.

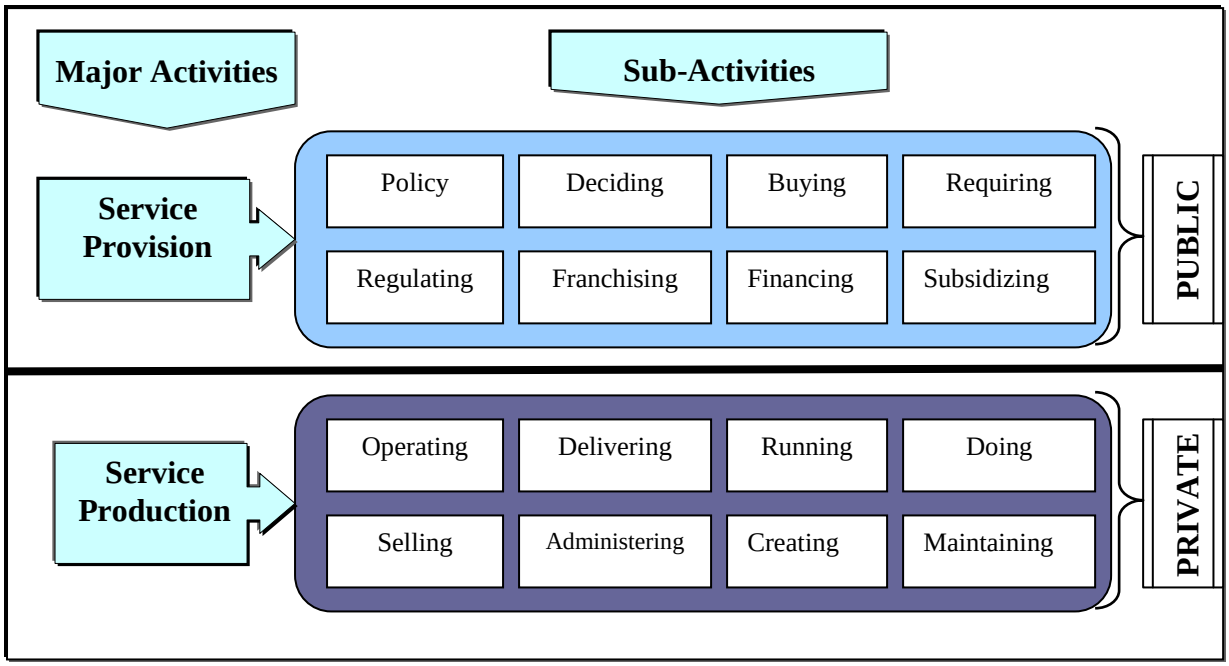
Figure 2.1 Option I; Public Sector performs all functions – Service Provision and Production



Option II: Public Performs Service Provision while Private performs Production

It has been observed that provision and arranging for the service is reflected as government's concern while production and delivery could be done by either of the sectors – public or private (Savas 1987). This permits the possibility of having option II depicted in Figure 2.2; where the public sector performs service provision while the private sector performs service production and their responsibility divide is clearly demarcated.

Figure 2.2 Option II; Public Performs Service Provision, Private; – Production

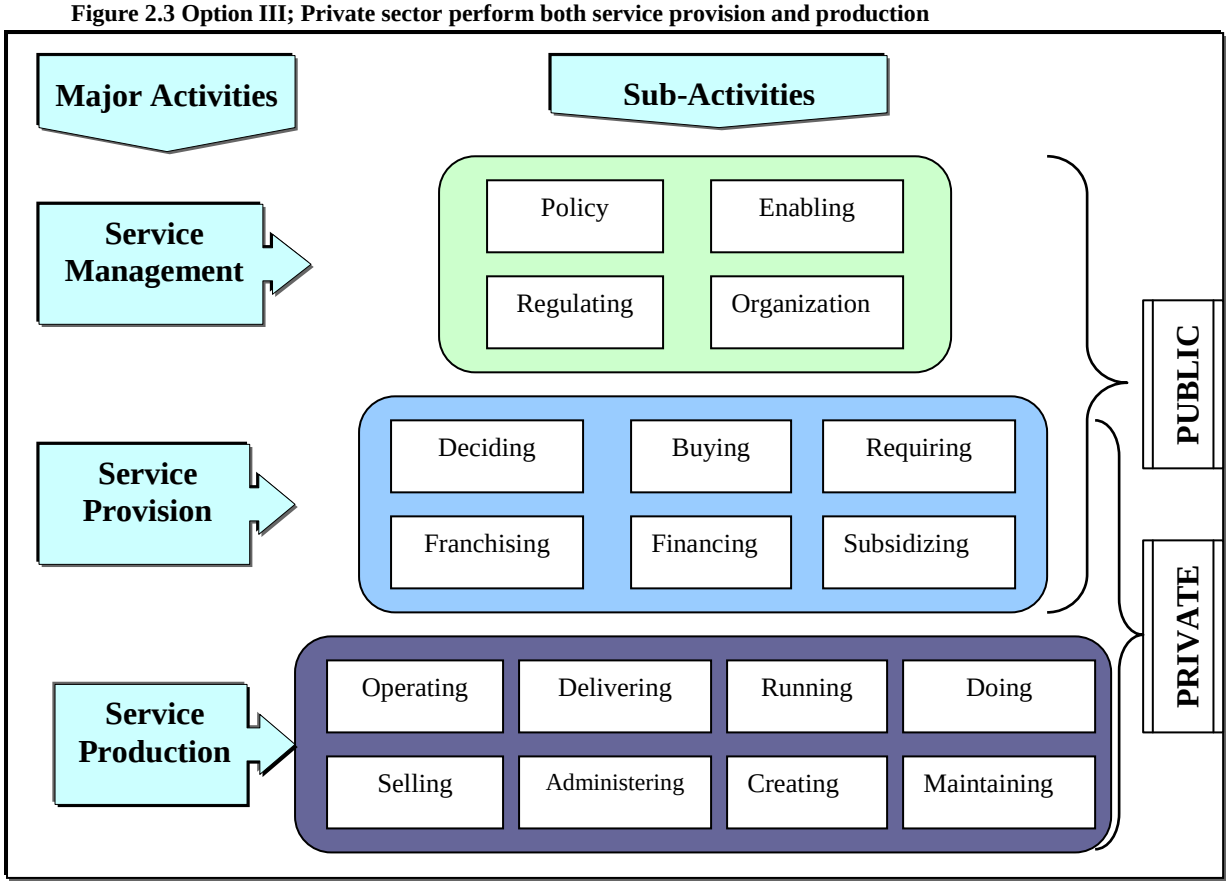


A critical look at the sub-activities reveals that, in practice Option II can create analytical constraints since involvement by either the private or public sector in the sub-activities is not straightforward. For instance, in Kolderie's grouping, as illustrated in Figure 2.1 and Figure 2.2, financing is a sub activity of service provision while operating belongs to service production, but it is increasingly common practice to find the private sector performing both financing and operating activities of a service, and therefore this situation does not fit in Option II.

Option III Private Sector performs both service provision and production

The practical inadequacy of Option II, allows us to consider Option III; where the private sector is viewed from the perspective of performing some activities in the service provision category on a case by case basis. Accordingly the public sector is left with inherent responsibilities of policy formulation and regulation which seem un-transferable; in our view this creates a major activity we shall term *service management* reflected in Figure 2.3. Service management caters for the activities and/or roles that the government cannot reasonably divest itself from. At all times and in whatever arrangement of private involvement, government will be responsible for policy making. Similarly it is the role of government to regulate or even create an environment that assures private involvement. Also the decision to use the private sector or not (the organizational arrangement) is made by government.

Figure 2.3 Option III; Private sector perform both service provision and production



At the centre of Option III, is the notion that separating these activities provides benefits of both public sector engagement and market discipline.

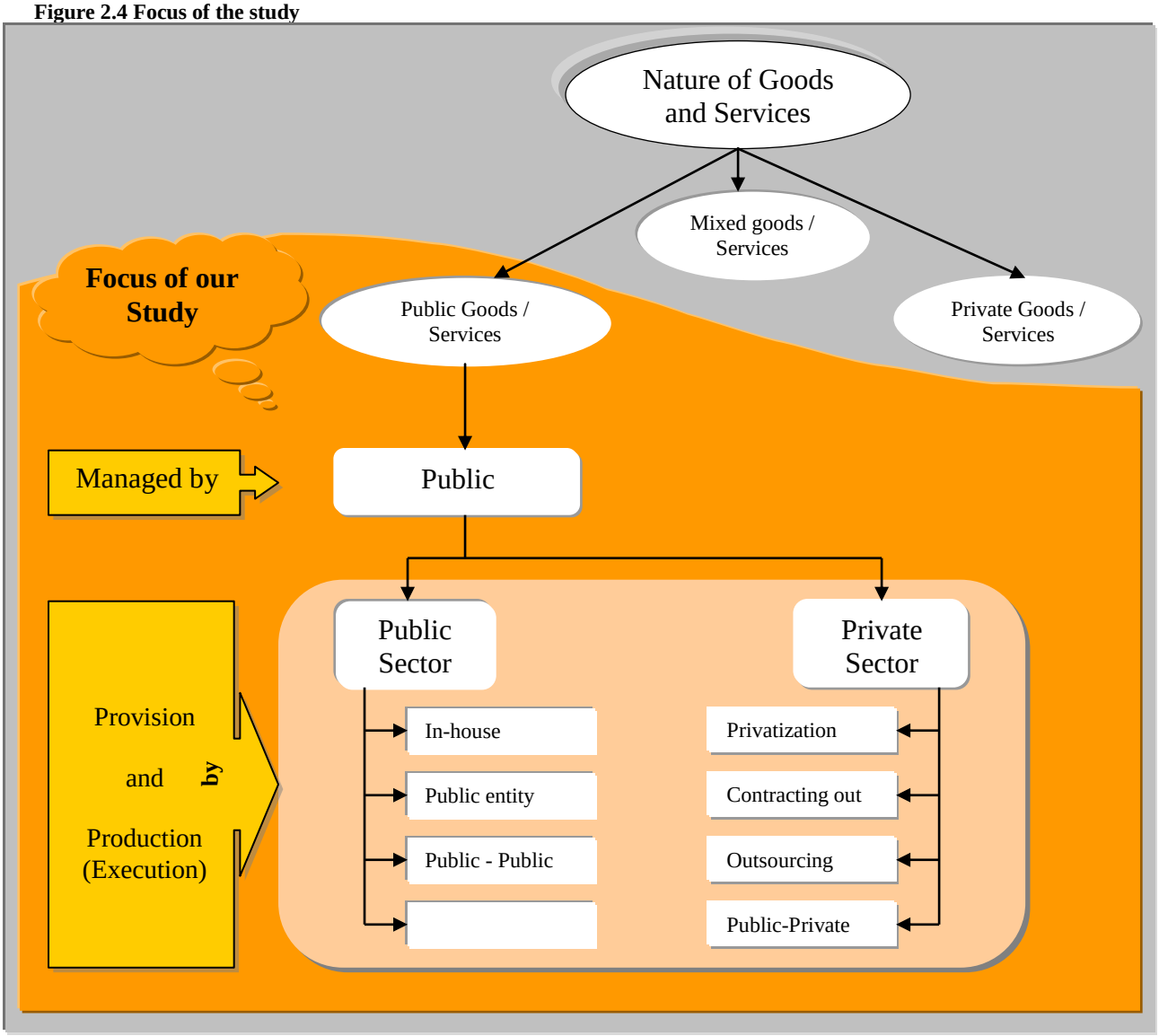
The Public-Private Divide in Public Service Provision

Option III in our view is more practical and is consistent with the distinction made by Batley (1996) in which they distinguish 'direct provision' and 'indirect provision'. In our study, Option I, where both service provision and production are done by the public sector constitutes public provision and Option II and III where the private sector is involved in activities of either or both of the activities of service provision and production is equated to private provision. Thus for purposes of this study, private provision is defined as such when the private sector engages in activities that appear in both service provision and production. Accordingly government concentrates on service management and allows the private sector to handle sub activities.

2.4 Schematic Presentation of Focus of of Study

From the foregoing discussion, a schematic summary and therefore the focus of our study is presented in Figure 2.4.

Figure 2.4 Focus of the study



From Figure 2.4, it can be observed that the nature of goods and services can be reflected as public, mixed and private. However we have highlighted that whereas theoretically and empirically there is no serious contention as to who manages, provides and produces private goods and services, the debate is enormous and inconclusive with respect to public goods and services because of their nature (described in section 2.2 and 2.3). This motivates our study to focus on management, provision and production of public goods and services. As reflected in Figure 2.4, the public sector has the overall responsibility of managing the provision and execution of public goods and services. In this capacity it will decide whether provision and execution should be directly done via the various in-house arrangements – public provision or indirectly done via various private sector arrangements – private provision. We thus focus on the difference between service provision and production by a public organization and/or a private organization whatever the form of relationship.

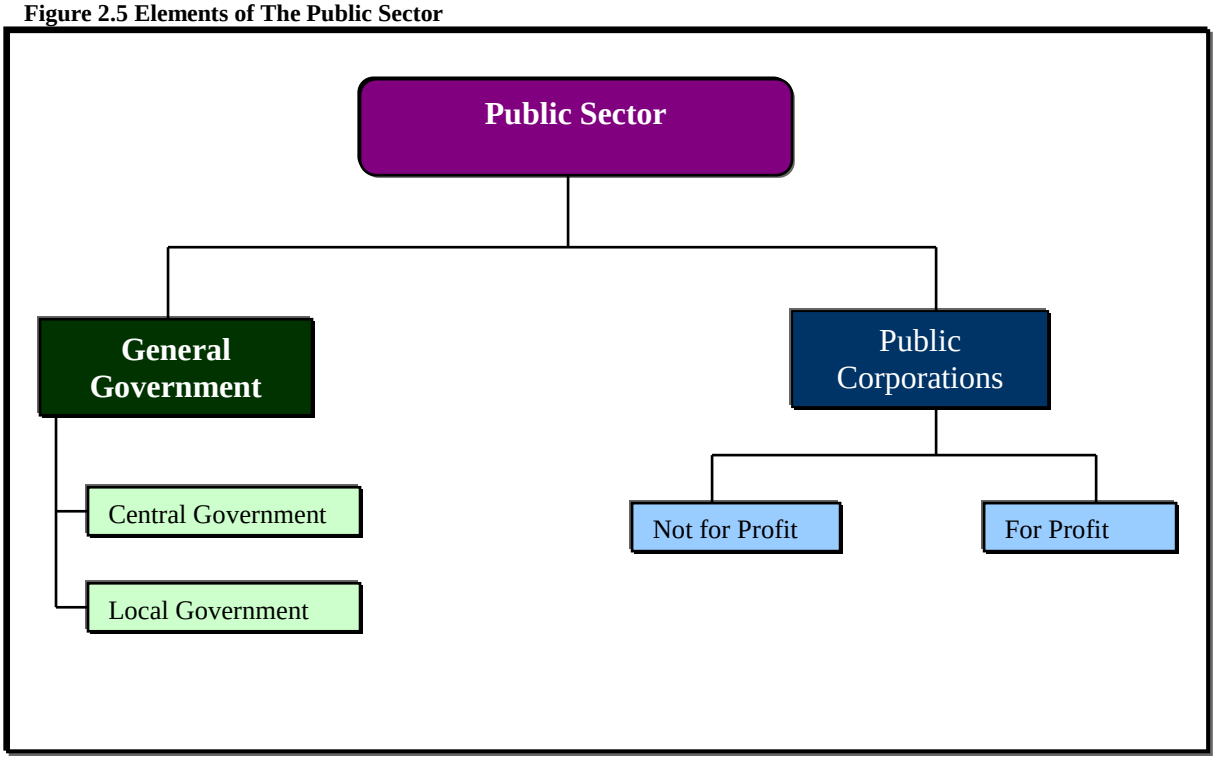
Our study equates ***private provision*** to the private sector performing some activities in both service provision and service production while ***public provision*** is when the public sector does all activities in both. Having highlighted our study focus, we now find it essential that subsequent sections concentrate on the individual sectors to further inform and enhance the research underpinnings.

2.5 Analysis of Public Sector

The public sector is a component of the economy that has the responsibility of providing, producing and delivering goods and services on behalf of government to the citizens. Such services basically include defence, education, health, water, etc.

The composition of the public sector varies from country to country but it is common to find national, regional or local/municipal (referred to as *general government*) as the mainstream agencies forming the sector. In fact IMF GFSM (2001) indicates that the public sector is comprised, at the broadest level, of general *government* and *public corporations* reflected in Figure 2.5. General government in totality executes direct administrative roles funded through taxation with the delivering entities generally having no specific requirement to meet commercial success criteria, and production decisions determined by the respective government. Public corporations created by government are part of the public sector, but differ from the general government agencies in that they have greater commercial freedoms and often times are expected to operate according to commercial criteria, and production decisions are not generally taken by government but an appointed board of directors (although goals may be set for them by government).

Figure 2.5 Elements of The Public Sector



Adapted from IMF GFSM (2001)

General Government
In providing and delivering of services the general government is exhibited in tiers and the most prominent is the first tier, that is, the *central government*. Other lower tiers of government such as *regional* and *local governments* are created as a matter of policy depending on the country. In the case of Uganda, the local government is the next lower tier of government since the regional tier is not yet operational.

Central government
As depicted in Figure 2.5 central government is part of the general government, but with authority over the entire country both politically and economically. The traditional government model of service delivery expects central government provision with an attempt to realize a fairly uniform system of delivery across the nation as a whole. The central government typically is responsible for providing services such as national defense, relations with other countries, public order and safety, and the efficient operation of the social and economic system of the country (IMF GFSM, 2001); services that are of national perspective. It is believed that central governments have the capacity to raise revenue and subsidize some lower tiers of government efficiently particularly where services meet a national set level of benefits. Major initiatives are dictated by the centre and it is the central governments' major responsibility to devise policies and ensure that they are implemented. Accordingly the policy as to which services should be delegated to the lower tiers of government is the responsibility of the central government besides ensuring its implementation.

Local government
Local government is the collective term for local councils, sometimes referred to as local authorities. Local governments work within the powers laid down under various Acts of Parliament and Central Government Policy. Their functions are comprehensive but restricted to smaller geographic areas distinguished for administrative and political purposes (IMF GSFM 2001). Some functions are mandatory, which means that the local government must do what is required by law while others are optional, allowing the local government to provide the services if it wishes. It is acknowledged that central government provision tends to focus on a one-size-fits-all situation yet local governments located in different geographic areas could have needs, preferences and priorities that are different. Because of their local nature, provision and delivery of services such as waste collection, water supply, street lights, recreation, kindergartens etc are often delegated to the local governments. It is observed that the nature and size of local government constrains service delivery and they have limited sources of revenue thus their budgets are financed by central government grants and releases.

Public corporations
Corporations are created legally to provide and produce goods and services for the public clients. The area of operation for a corporation can be at either central or local government level depending on the law that creating it. Public corporations are owned by government as a major shareholder with authority to appoint directors responsible for its general management. They may be a source of profit or other financial gain to the government depending on the reasons for their establishment; hence as reflected in Figure 2.5 public corporation can be for profit or not for profit.

2.5.1 Choice of focus – The Local Government Level

In order to appreciate our focus, we first distinguish two vital issues that enable us understand the public sector: 1. as a *supplier* of the service and 2. as a *recipient* of the service.

1. It is acknowledged that a central government, a local government or a public corporation can variously provide and execute a public service; i.e. can be supplier of the service. For instance, water supply service can be directly provided by the central government – e.g. a department in a Ministry or by a local government – a municipal department or a public corporation – created for that purpose. Our study understands this situation as public provision.

2. It is appreciated that the public sector, especially central and local government can be the 'recipient' of the service. Both central and local governments often times engage a provider to deliver a service to the citizens on their behalf. For instance, for water supply service, the central and local governments can individually engage a public corporation or even a private firm to deliver the service on their behalf; in which case they become recipients of the service. When the public corporation delivers a service, we treat this as public provision; on the other hand when the private sector firm delivers the same, we understand this as private provision. This issue is vital in explaining our preferred unit of analysis – the local governments.

From the distinction above it is clear that public service provision whether by the public or private sector can be 'managed' at both the central and local level. We have accordingly chosen to focus our study of private vis-à-vis public provision at the local government level.

The choice of local governments is motivated by the reported simultaneous shift of central government roles to the operation of the market and the lower tiers of government (Benett, 1990 in Mitfab, 2004) that is, private involvement in service delivery occurred at the same time with increasing LG roles. Yet it has been observed that local governments are given more responsibilities but not the matching capacity; neither adequate funds nor the technical capacity needed (Mitfab, 2004). This makes local government better unit of analysis in our search for the efficiency of modalities of public service provision.

2.5.2 What Is The Justification For Public Sector Provision?

According to Batley (1996), the case for public intervention has to be exceptional, resting on the argument that there are situations where the market will fail to perform efficiently. Williamson (1975 and 1985) argues that markets may fail to perform efficiently because of high transaction costs (arising from uncertainty, lack of information, complexity) leading firms to develop more vertical integration or more enforceable contracts in order to introduce greater certainty into exchanges. In traditional economic theory, arguments for government intervention include: *market failure* and *market imperfections.*

Market Failure

As observed earlier, the concept of *non excludability* follows the argument that there are some goods and services (public goods) which would not be provided by the market, because it would not be possible to exclude those who chose not to pay from using the service – "free-rider problem" implying a market failure. In similar vein public goods can be defined in relation to *non-rival* consumption, that is, although it may be possible to exclude those who do not pay from receiving a service, this may not be desirable as such people could be served without any additional cost to the producer of the service: consumption by one person does not preclude consumption by anyone else e.g. police, street lighting, street sweeping, central waste collection etc.

An illustration would be solid waste collection from a central collection system; a service for which a local government is responsible. This service is *non-exclusive,* meaning that once it is provided to some portion of a community it benefits the overall public welfare, not only the resident that specifically receives the service. The service is also *non-rivaled,* meaning that any resident can enjoy the benefit of the service without diminishing the benefit to anyone else. Beyond this, it is not feasible to exclude from service those who do not pay, because public cleanliness and the safe disposal of waste are *essential* to public health and environmental protection (Cointreau-Levine, 1994).

If non-excludability and non-rival consumption were the only ways in which markets failed, then this would result in a very limited role for public sector activity (Hallighan, 2001). Hence the condition under which markets failure is broadened to include market imperfections – that is, when a market for a good or service exists but its operation is imperfect in some way.

Market Imperfections

In a wide variety of circumstances, even where private enterprise could operate, it may fail to do so efficiently due to market imperfections which derive from:

- ❄ Economies of scale and monopoly supply
- ❄ Externalities (positive or negative)
- ❄ Justice in the distribution of income and wealth

❄ *Economies of scale and monopoly supply*

The nature of a service could lead to economies of scale which make it difficult for new entrants to the market to offer competitive prices resulting in monopolistic tendencies. Public utilities like water and electricity supply have traditionally been defined as natural monopolies, because the initial cost to enter this market is so high and the cost to marginally increase the scale of operations for those already in the market is relatively low. Establishing a competitive market is therefore difficult, and there is potential for monopoly suppliers to take advantage of this through charging higher prices and/or providing a poorer quality of service. Hence, the responses to the problems of monopoly supply have taken the form of either regulating monopoly suppliers or taking them into public ownership (Hallighan 2001). Hence national governments have found it worthwhile to intervene based on this argument.

❄ *Externalities (positive or negative)*

Further market imperfection relates to the concept of externalities. It is argued that market systems do not provide incentives or controls to ensure that private businesses take account of the social and long-term costs (or benefits) of their activities. The costs and benefits are referred to as externalities. The argument is that under a free market system, private businesses would not take into account the external costs on society for instance municipal waste disposal has significant negative spillovers on society in terms of water and air pollution which require control, and that it might not be advisable to let the private sector provide the activity; hence the reason why such a service requires public provision.

❄ *Justice in the distribution of income and wealth*

Potential consumers do not enter the market with equal resources. It is argued that equity should be one of society's objectives and that there is a subsequent role for the state in ensuring that goods and services are distributed between members of a society in a way that is considered to be fair and just. For instance, a service like waste collection in a municipality, it is argued that if such a service is left to the market mechanism, consumers from the poorer

suburbs of the municipality who are incapable of paying will miss out on the service since the private providers will only target the affluent areas which are profitable. Hence, public intervention assures service delivery to the poorer suburbs. The redistribution of wealth within a society is achieved by means of the taxation system and various government benefits (transfer payments). Thus the public sector is perceived to be better at redistribution of wealth.

Market failure and imperfections: private involvement paradox in a developing country

Market failure and imperfections are used to justify public intervention, but they seem overlooked when private intervention is prescribed particularly for developing countries. As earlier observed public goods and services are those that an un-regulated market will under provide due to their non exclusive and non rival tendencies which translates into the free rider problem; a justification for public intervention. If this is the case, logically should we not expect that assuring a regulated market is a pre-requisite for transferring provision of a public service to the private sector? The same question applies to externalities and the redistribution of wealth; but local governments in developing countries have been portrayed as weak in regulation! The issue of economies of scale and monopoly supply is worth mention; public intervention was preferred in the 1960s, because few private sector firms were available to take on the mantle. But this situation has not changed in many of developing countries especially sub-Saharan Africa. Why then introduce private involvement for the sake of it?

2.6 Analysis of the Private Sector

The private sector is an important concept of our study and therefore needs to be analyzed in some detail. It should be noted that the public and private sectors perform different though interrelated roles in the establishment of a productive economy. As a result, there should be close cooperation between these sectors working jointly in the national interest (Porter, 2003). In particular, these two sectors need each other and therefore should co-exist in a symbiotic manner.

The private sector is not monolithic in nature since it is composed of organizations of different sizes, complexities and interests and it comprises personal and corporate firms. For the purposes of our study, the private sector is regarded as the totality of organizations that are outside the public sector and engaged in activities for profit purposes (Osborne, 2000). This delimitation is necessary because there are some organizations that fall outside the public sector (for instance not for profit) yet they are of little, if any, relevance to the context of private involvement in this study.

It is envisioned that the relentless needed to generate profits and to compete in the marketplace forces the private sector to be more efficient and innovative; to be more responsive to customer needs because of the need to compete with other providers; and to develop business management and expertise which the public sector does not have, or in which it does not specialize, such as project management and the assessment of the commercial opportunities of new businesses. Hence the private sector is viewed as a repository of managerial efficiency, professional knowledge and advanced technology (Scharle, 2002). These attributes of the private sector together with the entrepreneurship spirit it possesses makes it attractive and indeed, a strong case for private sector involvement in executing public policy (Nisar, 2007).

Rosenau (1999) has observed that the private sector is better at performing economic tasks, innovating and replicating successful experiments, adapting to rapid change, abandoning unsuccessful and obsolete activities, and performing complex technical activities.

However, the above ideas are taken with caution. The term private sector is ambiguous in relation to private provision. When researchers write about the private sector, what kind of private sector are they referring? Are they referring to large, multi national enterprises or small medium enterprise (SMEs) which also will variously depend on the country's level of development; our view is that the private sector portrayed in literature is certainly not the kind that is prevailing in developing countries! The private sector in the developing world is composed of micro, small, and medium enterprises with limited access to finance, inadequate entrepreneurial and managerial skills. But such are the private sector firms entrusted with private provision especially in the lower tiers of government. It is of utmost interest to us to establish how such private firms perform.

The gist of our study is private involvement in public service provision hence its justification is extensively covered in chapter four. We now try to distinguish public and private organizations in order to further provide ground for understanding the public private divide that should enable us appreciate the influence on efficiency.

2.7 Distinguishing Public And Private Organizations

Pressure and incentives aspects

Pitelis (1993) has suggested pressures and incentives that purportedly exist in the private sector but not in the traditional public sector. Some key differences include the fact that public sector organizations:

Pricing of products

- Do not have a profit motive, and instead are guided by social and political objectives; typically seek to achieve a multiplicity and diversity of objectives; these objectives and performance towards them are difficult to measure. For instance: *Pricing of Products:* In their decisions about what and how much to produce, public agencies are rarely guided by price. Rather, the modus operandi tends to be to (i) produce as many units as possible within a given public budget, (ii) fulfil orders with available supplies in response to requests from a hierarchically structured system, and (iii) provide those units to consumers free. or at highly subsidized rates. In a worst case scenario, a public agency could be producing and supply a good or service at two to three times that it could be provided by the private sector, but not know it.
- In the competitive private sector, on the other hand, firms are continually being pressured to produce more at less cost, in fiercely competitive markets. Pressure is exerted by other competitive firms that try to produce more for less, and appeal to consumers by pricing their products more cheaply. If the firms with overpriced products fail to cut their costs (and prices), then consumers go elsewhere, profits fall, and the firms go out of business. It is the discipline of minimizing costs and estimating prices that construes private sector managers with a sharp competitive edge.

Raising Funds

- Receive funds indirectly from an involuntary taxpayer rather than directly from a satisfied and voluntary customer; *How funds are raised:* To produce public goods and services, public sector organizations rely heavily on general revenue sources (taxes) and historically replenished budgets. In many instances, the justification for budgetary increases amounts to little more than a historically determined percentage increase over last years allotment. Such practices may allow a sense of complacency and dependency on traditional sources of funding. Moreover, were a taxpayer to be informed of, and disagree with how funds are going to be spent, it tends to be difficult if not impossible for that taxpayer to withhold or withdraw his/her funds. This means that the consequences of mismanagement are heavily deflected.
- In contrast, when funds are raised in the private sector (e.g., through share offerings), investors seek compelling information that the new venture offers attractive benefits, that costs are manageable, and that the use of funds will be strictly monitored. Satisfying venture capitalists requires that private sector agents communicate and document their plans and expectations as thoroughly as possible. This means that private sector entrepreneurs are strongly motivated to research their market, their competitors, and the quality/appeal of their product. Often several independent analysts come into play who will rank each company, its past profit performance, and the financial appeal of new offerings.

Resource Allocation

- have less exposure to the market and its incentives for cost reductions, operating economies, and efficient resource allocation; resources tend to be allocated based on equity considerations and political pressures; *Resource allocation decisions:* It is well known that shifting political agendas and lack of transparency can result in prior resource allocation decisions being changed to suit special interest groups, or political whims. When this happens, public managers tend to lose control over the priority setting and resource allocation decisions that may have been based on a well formulated plan. In contrast, the private sector is relatively immune from such influences, with resource allocations being guided largely by efficiency criteria.
- have difficulties in identifying the organization's "customer," as there are typically a number of different publics being served by a given agency, department, or unit;
- produce services that have consequences for others beyond those immediately involved; have greater accountability for the indirect consequences of their actions;
- are subject to public scrutiny, such that major decisions have to be made with transparency; decisions must involve consensus among and consultation with a variety of interest groups and constituencies;

Ownership of assets

In the literature on public administration, politics and economics the conventional distinction between public and private organizations is based on ownership (Rainey et al 1976). That is, private firms are owned by entrepreneurs or shareholders and public agencies collectively by members of political communities. However, this distinction is associated with two further public/private contrasts.

- Unlike their private counterparts, public agencies are funded largely by taxation rather than fees paid directly by customers (Walmsey, 1973)
- Public sector organizations are controlled predominantly by political forces, not market forces (Dahl, 1953). Hence the way resources are distributed in public organizations is through democratic means, whilst in the private sector it is through the price system.

In public agencies, managers may control how assets are used, but they do not have any ownership claim on them, and are not entitled to sell them. In contrast, the manager of a private enterprise under single ownership can sell his/her firm's property rights and therefore has complete entrepreneurial control. The more completely that ownership of resources falls on the shoulders of managers and their employees, the stronger are the incentives to use, preserve, and maximize the value of those resources efficiently. Some authors (like Demborger, 1996) note, however, that it is not ownership per se which is crucial for efficiency, but, rather it is the degree of competition which exists in the final product market). This wisdom is reflected in commonplace observations that resident owners of dwellings tend to be more motivated to maintain or improve the premises than do renters.

Accountability to Clients

The public and private sector can be sharply distinguished in terms of the speed by which client feedback can affect production, performance, and job tenure. When services are underprovided or of poor quality in the public domain, negative client feedback often takes considerable time, through public opinion polls, media coverage, and eventual changes in political candidates and platforms via the voting process. All of this implies a lagged process whereby public administration officials may be misinformed about client demands for some time.

In contrast, private sector markets can signal dissatisfaction within days through declining demand for products in competitive markets. This forces producers to adjust prices downwards or improve quality. If shareholders become increasingly agitated by falling stock shares, the manager of a firm becomes increasingly vulnerable to being fired, or seeing the company taken over via a merger.

Bounded Rationality

In a public agency where the threat of competition is minimal, managers and employees can afford to be relatively inward looking with respect to how they are doing things, including the efficiency of their production processes as well as the range of goods and services they offer. This may result in a kind of bounded rationality meaning a reduced (or underutilized) capability of individuals to have and act on information about all alternatives.

In the private sector, however, there is great pressure to be aware of one's competitors, including the nature of their product, demand, price, and profitability. Though monitoring such external phenomena incurs transaction costs, it can also contribute to the knowledge that one's competitor may be doing something better and why. To the extent that this results in an outward looking mentality and continuous interest in other options, it tends to reduce the effects negative of bounded rationality on competitiveness and performance.

Interest

The public sector is interested in legislation, regulation, and authorities; political opinion and political influence; democratic decision-making processes; the minimization of risks; and the realization of social goals (Reijniers, 1994). The public sector draws attention to public interest, stewardship, and solidarity considerations. It is better at openness to public scrutiny, employment concerns, "policy management and regulation, ensuring equity, preventing discrimination or exploitation, ensuring continuity and stability of services, and ensuring social cohesion. (Osborne and Gaebler, 1992). The public sector is oriented toward social responsibility and environmental awareness (UNDP, 1998).

Reijniers (1994) observes that the private sector is oriented towards achieving returns on the invested funds; daring to take business risks; having to anticipate market and competitive developments; and realizing corporate goals.

Publicness

By arguing that no organization is wholly public or private, Bozeman (1987) synthesized three variables – ownership, funding and control – into a dimensional model of a construct denominated publicness. Then he located private firms and public organizations on these three dimensions.

Property rights theory suggests that common ownership results into lower efficiency in public sector (Clarkson, 1972). This is because for private firms it is assumed that owners and shareholders have direct monetary incentives to monitor and control the behaviour of managers, and these, in turn are likely to perform better if they own company shares as their wage is linked to the organization's financial success. By contrast, property rights in public sector are diffuse and vague since monitoring is a public good and citizens have little gain from increasing effort in this activity. In addition, managers usually do not gain any direct financial reward from improving organizational efficiency.

Also, the funding dimension embedded in the publicness has been stressed by public choice theory. According to this perspective, organizations that receive revenues from "political sponsors" are likely to be unresponsive to the preferences of the people who receive their services (Boyne, 2002).

2.8 Public Service Provision: Which Is The Better Sector?

Public services can be delivered either by the public sector or by the private sector (including not for profit organizations). There is a certain consensus in the policy literature to the effect that government does some things best, the private sector other things, and the not-for-profit still different things (Ghere, 1996).

When the government fulfils a public policy function better, in terms of lowest cost and improved quality, there may be no reason to seek private particiaption. When the private sector yields better quality at lowest costs without untoward externalities, this should be the preferred organizational form (Rosenau, 1999). Hence, it may well be that there are things that government can do better than private business, or even that only government can do. (A Survey of Social Insurance, 1998)

However, there is no evidence, that in general the private sector, the public sector, or public private cooperation will be superior. In addition, the performance of all of them may vary from sector to sector (Rosenau, 1999). Evidence relating to the efficiency of modality of service is not conclusive. Government has to decide whether to choose the traditional public sector delivery or whether to opt for more private sector involvement.

Thus the key choice is between public sector provision and a private involvement, or other variants on these options, as has been clearly emphasised by IMF which advises that; When considering such options, the government has to compare the cost of public investment and government provision of services with the cost of services provided by the private sector (IMF 2004). Providing an enhanced decision making process based on evidence is the gist of this study.

2.9 Chapter Summary

In this chapter, we have provided insights on the public and private sectors vis-à-vis the nature of goods. The choice of sector can exploit properties of the nature of goods that is, excludability and rivalry which enhance success considering that the two sectors exhibit different intrinsic strengths and weaknesses on such properties. We have accordingly presented and emphasized the focus of our study as public goods and services because which sector is more qualified to provide them is still a contentious issue that needs to be studied more so given the situation prevailing in the developing world.

CHAPTER THREE: THEORETICAL CONTEXT FOR PRIVATE PROVIDERS OF PUBLIC SERVICES

3.1 Introduction

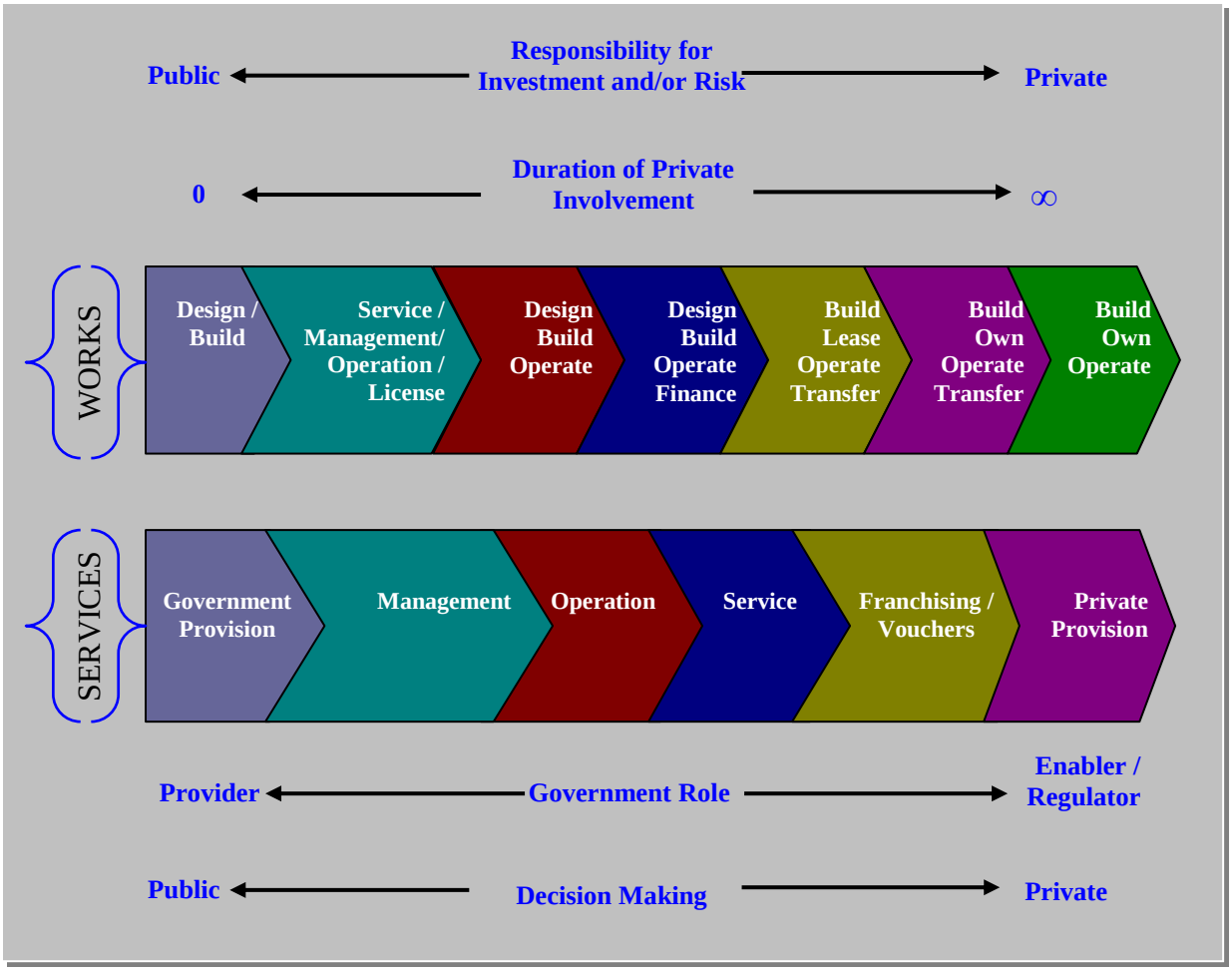
In the previous chapters we have delved into the public-private sector divide and appreciated their individual potential in respect to public service delivery. In this chapter we concentrate on the theoretical basis for private sector provision of public services considering that the last three decades have witnessed a proliferation of schemes promoting co-operation between the public and private sectors in providing public services over a wide range of economic activities.

3.2 Various Forms of Private Sector Involvement in Public Service Provision

Private sector involvement in public service provision can be conceptualized in various ways. Ross (2004) has categorized various forms of private involvement based on the extent to which roles, responsibilities, and risks are "bundled" to the private sector. This distinction is described in terms of a continuum as depicted in Figure 3.1 with, at one end the public sector retaining all responsibility for say financing, operating and maintaining assets, together with the responsibility for assuming all associated risks and, at the other end, the private sector assuming all of these responsibilities. The vast majority of private sector involvement arrangements are considered to fall at different points on the continuum, with risks and responsibilities shared between the public sector and private sector at varying degrees.

One way to visualize private involvement in public services is identify arrangements that require substantial physical infrastructure and therefore necessitate activities such as design, construction and ownership; generally referred to as works procurements. on the other hand there are public services that by their nature will not require substantial physical infrastructure to be made; which we refer to as service procurements. Hence the scope of government and the extent to which private involvement is contemplated does not concern all services and contracts with the same intensity. Some services and contracts require the private provider to invest substantially and be offered longer periods to recoup their investment e.g. roads, airports etc, while others may only need management and operational expertise e.g. water supply, waste collection etc. Success will depend on picking the right form for a particular public service; an unsystematic implementation not yielding good results.

Figure 3.1 Continuum Mapping Various Forms of Private Sector Involvement



Choosing among the various forms depends on the degree of control and responsibilities the government envisages. As observed in section 2.7, Bozeman (1987)'s concept of *'publicness'* uses ownership, funding and control to distinguish public and private organizations. The properties of publicness that is, *ownership*, *funding* and *control* are useful in deriving the various forms of private involvement. For instance, whether ownership is public or private or joint; whether funding (source of capital investment) is public, or private or joint; and control (operation and maintenance) is public or private or joint and in services, the level of services suffice.

Various well-defined forms of private involvement can be identified on the basis of permutations and combinations of the properties of publicness and a matrix Table 3.1 is generated. Such combination has been useful in identifying levels of private involvement in services such as water supply, waste collection as well as physical infrastructure including roads, hospitals etc.

Table 3.1 Mapping elements against the Various Forms of Private Involvement

Option	Form of Contract	Asset Ownership	Capital Investment	Design / Build	Operation / Maintenance	Commercial Risk	Duration in Years
Service	**Management Support**	Public	Public	Public	Public / Private	Public	> 2
	Operation and Management	Public	Public	Public	Private	Public	3-5
	Franchising and Vouchers	Public / Private	Public / Private	Public / Private	Public / Private	Public / Private	> 2
Management	**Lease / 'Affermage'**	Public	Public / Private	Public	Public / Private	Public / Private	8-15
	Concession	Public	Private	Private	Private	Private	20-30
Construction Support	**DBO**	Public	Public	Private	Private	Public / Private	20-30
	BOT	Public / Private	Private	Private	Private	Private	20-30
	BOO	Public	Private	Public	Private	Private	20-30
Divestiture / Privatization	**-**	Private	Private	Private	Private	Private	Indefinite

Adapted from Thomsen (2005)

In the following section we tabulate detailed characteristics of the various forms that are observed in practice together with their potential usage.

3.3 Characteristics of the main forms of private involvement in practice

Form	Features	Potential Application	Potential Strengths	Potential Weaknesses
Service Contracts	Private sector hired to carryout one or more specified tasks or services for a period of time; i.e. can be technical know-how; or operation and maintenance Public sector remains primary provider and is responsible for funding any capital investment needed to expand or improve the facility or service.	Where terms and evaluation criteria are clear and easily defined Where several firms have capacity to perform the contract Where the contractor does not have to make large new capital expenditures Where the contract is subject to renewal and negotiation regularly Short tem contracts Examples: Waste collection, Water supply	Low risk option for expanding the role of private sector Improves monitoring Increases competition Reduces costs	Does not inject new capital Lowest of bidder as opposed to value for money

Form	Features	Potential Application	Potential Strengths	Potential Weaknesses
Management contracts	Public sector retains overall ownership of the assets, but delegates the responsibility for their operation to a private operator for a definite (often long) period of time Private sector contractor recovers its costs in whole or in part from user charges. Key driver is the *Polluter Pays Principle*, in addition to utilizing private finance and transferring design, construction and operating risk	Suited to projects that provide an opportunity for the introduction of user charging. Particularly suited to roads, water (non-domestic) and waste projects. Examples: Examples observed in public transport, hospitals, prison, municipal markets, container terminals at ports, bus terminals power generation and distribution, and water and sanitation, Telecommunication	As for Design, Build, Operate and Finance plus: Facilitates implementation of the *Polluter Pays Principle*; and Increases level of demand risk transfer and encourages generation of third party revenue.	As for Design, Build, Operate and Finance plus: May not be politically acceptable; and Requires effective management of alternatives or substitutes (for example, alternative transport routes and forms; alternative waste disposal options).

Form	Features	Potential Application	Potential Strengths	Potential Weaknesses
Franchising and Vouchers	**Franchise** The government awards a finite-term zonal monopoly (a franchise) to a private firm for the delivery of service. The franchise award is made after a competitive qualification process. The private firm deposits a performance bond with the government and pays a license fee to cover the government's costs of monitoring. The private firm recovers its cost and profit through direct charges to the users and establishments that are served. **Vouchers** The users are allowed to choose from amongst the service providers	Waste collection, Water supply, education	Private sector investments	Monopoly tendencies
Design and Build (DB)	Contract with a private sector contractor to design and build a public facility. The facility is financed, owned and operated by the public sector. Key driver is the transfer of	Suited to capital projects with small operating requirement. Suited to capital projects where the public sector wishes to retain operating responsibility. Examples: Roads	Transfer of design and construction risk. Potential to accelerate construction program.	Possible conflict between planning and environmental considerations. May increase operational risk. Commissioning stage is critical. Limited incentive for whole life costing

Form	Features	Potential Application	Potential Strengths	Potential Weaknesses
	design and construction risk.			approach to design. Does not attract private finance (if it is required).
Design, Build and Operate (DBO)	Contract with a private sector contractor to design, build and operate a public facility for a defined period, after which the facility is handed back to the public sector. The facility is financed by the public sector and remains in public ownership throughout the term of the contract. Key driver is the transfer of operating risk in addition to design and construction risk.	Suited to projects that involve a significant operating content. Particularly suited to water and waste projects.	Transfer of design, construction and operating risk. Potential to accelerate construction program. Risk transfer provides incentive for private sector contractor to adopt a whole life costing approach to design. Promotes private sector innovation and improved value for money. Improved quality of operation and maintenance. Contracts can be structured to address most concerns. Government able to focus on core public sector responsibilities.	Possible conflict between planning and environmental considerations. Contracts can be more complex and tendering process can take longer than for Design and Build. Contract management and performance monitoring systems required. Cost of re-entering the business if operator proves unsatisfactory. Does not attract private finance (if it is required) and commits public sector to providing long term finance.
Design, Build, Operate and Finance (DBOF)	Contract with a private sector contractor to design, build, operate and finance a facility for a defined period, after which the facility is handed	Suited to projects that involve a significant operating content. Particularly suited to roads, water and waste projects.	As for Design, Build and Operate plus: Attracts private sector finance;	Possible conflict between planning and environmental considerations. Contracts can be more complex and tendering process can take longer than

Form	Features	Potential Application	Potential Strengths	Potential Weaknesses
	back to the public sector. The facility is owned by the private sector for the period of the contract and the private sector recovers its costs through public subvention. Key driver is the utilization of private finance in addition to the transfer of design, construction and operating risk. Variant forms involve different combinations of the responsibility for design, build, finance, operate, own and transfer.		Attracts debt finance discipline; Delivers more predictable and consistent cost profile; Greater potential for accelerated construction program; and Increased risk transfer provides greater incentive for private sector contractor to adopt a whole life costing approach to design.	for Design, Build and Operate. Contract management and performance monitoring systems required. Cost of re-entering the business if operator proves unsatisfactory. Funding guarantees may be required. Change management system required.

Adapted: Ireland PPP Framework 2000, Bennet et al 1999

From the above discussion we note that different forms have different strengths and weaknesses that should be considered when making a choice of mode of private involvement. Logically this implies that the choice must take care of the objective of government in involving the private sector. Governments usually have multiple objectives for involving the private sector including among others the need to exploit technical and managerial expertise, improve efficiency, large-scale private investment, reduced public subsidies, etc and each of the forms highlighted above exhibits different strengths when related to the objectives. For instance service contracts are not a good choice for a government that has the objective of exploiting private investment since the public sector is expected to continue financing the service besides the contractual duration spans a short period which may not allow recouping of investment. In this regard, a concession might be feasible since it allows introduction of new financing and also spans a longer period. Hence a mapping of the various forms of private involvement vis-à-vis the objectives for which it is being sought can be derived as in Table 3.2 to help in decision making.

Table 3.2 Mapping Various Forms against the Objective of Private Involvement

Objective / Option	Form of Contract	Technical Expertise	Managing Expertise	Operating Efficiency	Investment in Bulk	Investment in Distribution
Service	Management Support	YES	NO	NO	NO	NO
	Operation and Management	YES	YES	SOME	NO	NO
Management	Lease / 'Affermage'	YES	YES	YES	NO	NO
	Concession	YES	YES	YES	YES	YES
Construction Support	DBO	YES				
	BOT	YES	SOME	SOME	YES	NO
	BOO	YES	YES	YES	YES	YES
Divestiture / Privatization	Private	YES	YES	YES	YES	YES

We earlier noted that an unregulated market tends to undersupply public goods; the idea behind market failure vis-à-vis public sector provision. The need for regulation and other pre-requisites can also be put forward as the various options tend to require different environments as in Table 3.3 below.

Table 3.3 Mapping Various Forms against the pre-requisites of Private Involvement

Requirement / Option	Form of Contract	Political Commitment	Regulatory Framework	Good Information	Cost-covering Tariffs
Service	**Management Support**	Low	Low	Low	Low
	Operation and Management	Moderate	Moderate	Moderate	Moderate
Management	**Lease / 'Affermage'**	Moderate	Moderate	Low	Moderate
	Concession	Moderate	High	High	High
Construction Support	**DBO**	Moderate	High	High	High
	BOT				
	BOO	High	High	High	High
Divestiture / Privatization	**Private**				

Further analysis can be made based on the nature of goods. Below we make an effort to map the various forms against the public, private and mixed goods that we explored in the previous chapter.

Table 3.4 Mapping Various Forms against the Nature of Goods and Services

Nature of Goods / Option	Form of Contract	Public Goods	Mixed Goods	Private Goods
Service	Management Support		+ -	J
	Operation and Management		+ -	+-
Management	Lease / 'Affermage'		+ -	+ -
	Concession		+ -	
Construction Support	DBO			
	BOT		+ -	
	BOO		+ -	
Divestiture / Privatization	Private	-	+ -	+

Adapted from Aktan

Notes to the Table

+	The most successful arrangement
+-	Market arrangement is considered more successful than government. However, limited government regulation and control may be required.
-	The arrangement is not successful.
J	Arrangement is successful, but government interference should be minimal and management and operation should be performed by the private firm.

The above tables (3.1 to 3.4) clearly highlight the necessity of identifying the elements, the objectives, and pre-requisites of private involvement before undertaking a particular form besides reflecting the nature of goods under consideration. It may not be enough that private involvement is sought, but imperative that the decision is well thought, adequately paying attention to various perspectives. Reflecting along these mappings could be very helpful to the developing world case where private involvement is introduced based on thresholds and less on the suitability of form to a service.

3.4 Theoretical Insights on Private Provision

There are several strands of literature pertinent to the private sector provision concept. These include the property rights literature, the public choice literature and the literature on regulated monopolies. These have been reviewed in the earlier studies of efficiency in local services, and therefore will only be mentioned in stylized form here. These theories in totality have one message filtering through: support for private sector provision.

The public choice

The central criticism of public choice against traditional public provision is that reward systems in the public sector do not promote effective performance and that politicians and bureaucrats have no incentives to control costs (Bartley et al, 2004). The public sector is said to be self-servicing resulting into opportunism and dishonest behaviour by employees, clients and politicians. The public sector as principal cannot effectively monitor the behaviour of its agents, who do not have identical interests and who have information that is not accessible to it (Dixon, 1998). As a consequence of weak monitoring, public choice theorists such as Niskanen (1971) suggest that politicians and bureaucrats may substitute their own goals and preferences, such as employment and prestige, over efficiency and productivity considerations. In the absence of any automatic disciplining mechanism such as competition and market forces, government agencies oversupply collective goods in order to maximize budgets and reap rents (Niskanen, 1971; Tullock and Eller, 1994). This results into wastage of resources and an in built tendency for expenditure to grow and for delivery to take precedence over productivity. Hence public choice theory suggests that the public sector will perform less efficiently than the private sector and provides some theoretical inspirations for reforms that have encouraged private sector involvement as cures for the 'ills' of public service provision (Bartley et al, 2004). Moreover, the private providers can be held accountable for their actions, while it is difficult for the government to be held accountable for its own actions.

It is envisaged that when private provision is introduced, the public sector performs monitoring roles to keep private providers in line with public sector interests. In effect; there is a presumption that capacity to execute such monitoring roles is available, and that it is beneficial; private sector is superior in efficiency.

Competitive market

The standard market model envisions many markets composed of a large number of buyers and sellers, complete knowledge of information on quality and production costs, arms length negotiations, no impediments to entry of firms. If all of these conditions hold, the market is considered to be a producer and allocation of social services superior to the government (Kee, 2002). Apparently, in a competitive environment, private firms must perform efficiently to make a profit and to maintain their position in the market place (Cointreau, 1994). Demsetz (1968) argues that competitive tendering provides an effective alternative to regulation and state monopoly. By putting the right to be a monopoly provider of a service up to auction and awarding that right to the bidder offering the lowest consumer price, competition for the market replaces competition in

the market (Reeves, 2000). Competition therefore is indicated as a central feature of the private involvement in service delivery and that optimum efficiency does not occur when there are no opposing competitive forces (Cointreau, 1994). But contracting problems can arise as a result of a limited pool of bidders; especially in developing countries there are often only a few suppliers for complex government goods and services; in Uganda some LG services have continued to be delivered by the public sector because of non response by the private sector. The nature of service, the information needed to operate efficiently, and up-front capital requirements, serve as barriers to firm entry (Sclar, 2000). To what extent is the competitive model useful in explaining private involvement in service provision for the developing world?

The property rights theory

Property rights refer to the rights of individuals to use resources. Property rights theory offers a means of understanding the incentives for performance that exist in private ownership and for identifying whether they can be introduced into the public sector (Bartley et al, 2004). Owners often do have full control of their assets since their rights may be restricted by other shareholders' claims, by legal obligations, by the claims of creditors, or by the rights of employees. They have only 'residual control', in return for which they have a right to residual profits that is, to the balance of profits after other claims have been met. Owners' interests, though restricted by other claims, are nonetheless aligned to those of the firm. Managers and employees could also share on the residual profits of the firm through bonus schemes, share options and pay rises. Hence they also have an incentive to perform. In contrast, the typical public sector does not cater for financial return and does not match ownership, responsibility for decision making and distribution of returns. A system of property rights assigns to particular individuals the "authority" to select, for specific resources, any use from an unprohibited class of uses. The property rights view, most commonly associated with Alchian, Becker, and Demsetz, suggests that public ownership attenuates property rights, reducing incentives to minimize costs. The property rights school suggests that when a firm has no dominant residual claimant over its profits then it will be operated inefficiently (Alchian, 1965). They contend that while state owned firms may be concerned with profitable operation, they must also pursue other objectives, which impairs their ability to achieve efficiencies and financial objectives (Martin and Parker, 1997). Moreover, because no distinct individual or group can clearly benefit from a public firm's profits, no one has the incentive to monitor or hold public managers accountable for their decisions. Hence property rights posit that the distinguishing feature of private ownership is that it allows for transferable residual claims on a firm, providing a financial incentive for individuals—specifically, inside shareholders— to take actions that increase the firm's value. Private involvement allows the profit motive to work its wonders, which benefits the shareholders (residual claimants) of the firm involved and, provided a reasonable amount of competition exists, also benefits the economy as a whole. Consequently, property rights theorists contend that private ownership is inherently superior to state ownership (De Alessi, 1983). Hence, organizational reforms have been proposed to mimic the property rights of the private sector by aligning managers' incentives with the performance of the organization (Lane, 2000).

Agency theory

Agency theory suggests separation of the identity of the principal from the agent and their roles should be clear. The principles of agency theory have motivated reforms in public sector management with emphasis on performance measurement and incentives (Bartley, 2004). The theory formalises assumptions about the distribution of property rights and information in the writing of contracts that define organisations. In particular, it focuses on the relationship between principals and agents who exercise authority on behalf of organisations. Lane (2000) and Walsh (1995), examine organizational relationships as a tension between the principal who demands a service and the agent who provides it. Agency theory therefore posits that principals must solve two basic tasks in choosing and controlling their agents: first, they have to select the best agents, whether employees or contractors, and create inducements for them to behave as desired. Second, they have to monitor the behaviour of their agents to ensure that they are performing as agreed (Ayee, 2005). Although in its initial stages agency theory was applied exclusively to the firm, it was soon used more widely once its explanatory powers were recognized (Dollery, 2001). In this regard private involvement creates a principal-agent relationship with the public sector becoming principal while the private provider agent.

Transaction cost economics

TCE draws a distinction between 1. contractual relationships between separate organizations in the market, and 2. the vertically integrated internal organization of a firm or bureau (Lane, 2000) each has advantages in terms of efficiency. Focusing on the contracts, the TCE theory views the parties attempting to engage in exchange as contracting both the terms of the exchange and their execution Ayee (2005). It is envisioned that contractual relationships specify the basis on which performance will be monitored and offer powerful incentives of positive results.

New Public Management

New Public Management theory looks at private involvement as an attempt to increase the efficiency of the public sector through the introduction of managerial skills, entrepreneurship, and expertise drawn from the private sector. A fundamental premise behind the emergence of NPM is that public sector managers have been insulated from the same kinds of pressures/incentive structures that prevail in the private sector breeding inefficiency. It is argued that the absence of these private sector pressures has maintained inefficient bureaucratic organizations, permitted complacency to prevail over dynamic innovation, and penalized rather than rewarded entrepreneurial staff in public sector agencies (Awortwi, 2004).

Issue coming out of the Theories

The above strands of theories' have been influential in projecting the private sector ahead of the public sector in public service provision in terms of efficiency. They all have a common conviction that the private sector under conditions that allow competition, monitoring and regulation gets induced to be more efficient in providing public services. Logically, it should follow that in the absence of such conditions the private sector will be inefficient. Private provision thrives where the competitive and regulatory environments are well developed; therefore it might be irrational to pursue private sector

involvement in developing countries without creating the conditions that make it succeed!

3.5 Potential Benefits of Private Provision

According to Palmer (2009), the arguments put forward to support private initiatives are primarily based on economy, efficiency gains and reducing government overload (Starr, 1989). Below we highlight the potential benefits that are usually portrayed in literature:

Value for Money

The underlying rationale for private sector involvement is that it offers value for money. Value for money, (a vital precept of public procurement) is anticipated to be realized because costs are shared, economies of scale and synergies are achieved, and decision making is shortened due to the cooperation between public and private partners (Klijn, 2000). For instance in Australia the states of New South Wales and Victorian as a policy require that privately financed options demonstrate superior value-for-money to the Government and community compared to traditional, publicly funded approaches to infrastructure provision. Besides off-balance sheet borrowing is not an attraction in its own right when considering private financing and delivery since both States having low debt levels (NWS Treasury, 2002).

Risk Transfer

One of the core objectives of private sector involvement is said to be the potential for risk transfer. The transfer of risk is a driver of value for money. The appropriate risks are allocated to the party best able to manage them and respond to the incentives they offer. Only by transferring risk can there be certainty that the private sector has the incentives to price and produce efficiently. Risk can take many forms including those relating to operation, the size of the market (demand risk), the cost of operations and maintenance, declarations of force majeure, and changes to the law and regulations. The desired balance to ensure best value (for money) is based on an allocation of risk factors to the participants who are best able to manage those risks ultimately leading to improved service delivery in terms of time, cost and quality, elimination of over specification and improved maintenance of public infrastructure (Dixon, 2005).

Easing Budget constraints

According to Spackman (2002), reducing budget deficits will depend on whether the private arrangement is self-financing. For instance when the private sector finances, and operates water supply services and recovers costs through direct charges on consumers – the government does not have to borrow or levy taxes to finance the service because it is paid for by direct user charges. When the service is not self-financing the government has to levy taxes to meet payments to the private sector provider. This does not necessarily mean that the government has to raise taxes since the service could be financed from within the existing tax framework. Private sector financing allows governments to bring forward projects that might otherwise be delayed because of budget constraints. Delaying projects can have adverse consequences for instance the public sector will often find it difficult to provide dedicated funding for large projects out of

annual budgets. In the past, this has resulted in lengthy delays before projects proceed and/or projects proceeding incrementally over a number of years.

Management and implementation skills
Governments can gain new skills, technology and knowledge, as a result of undertaking introducing private sector. The procuring body remains in control, specifies outcomes and standards, monitors performance, agrees to business plans and controls payments to the supplier. It remains ultimately accountable. Renda et al (2005) observes that the justification for private sector involvement is the possibility to exploit the management qualifications and the efficiency of the private sector without giving up quality standards of outputs, thanks to appropriate control mechanisms from the public party. It is argued that the private sector is able to provide both infrastructure and services at lower cost due to economies of scale, more experience, better incentives and greater ability to innovate. Hence, the private sector is better able to provide services to a higher level of efficiency and effectiveness than the public sector which is typically hindered by its bureaucratic, mechanistic and politicized method of operation.

3.6 Arguments against private sector provision

Savas (2000) has observed that some critics see private-sector involvement as a plot to establish a completely free market with overtones of dog-eat-dog survival of the fittest, and culling of the weakest. Other commentators interpret private involvement as an attack on government, government programs, and direct beneficiaries of government programs, including employees; therefore, they defend these interests by attacking private-sector involvement. The common arguments against private involvement include:

Private Companies Will Sacrifice Quality for the Sake of Profit
It is argued that the profit motive will drive the private sector to a lower quality of service. That the very structure of all PPP arrangements creates incentives that make it advantageous for the private sector to reduce costs and optimize revenues, even if this negatively affects levels of service or causes the service delivery to cost more than it would have with public ownership and normal procurement procedures. Hence, s*ervice-users and citizens* fear becoming objects of a profit-making calculus rather than a public service ethos (Rosenau, 2000).

Reduced quality or efficiency of service
If not properly structured, public private partnership contracts can result in a reduction in service quality, inefficient service delivery or a lack of proper facility maintenance. For example, cost-plus contracts provide little incentive for the private partner to maintain quality or increase efficiency.

Higher cost, less value
On the cost side, opponents argue that private provision is more expensive because private sector firms face constraints such as the higher cost of private borrowing; the need to make a profit and associated other potential inefficiencies; and higher procurements costs.

Politicians fear losing control over policy-making and service management.
This is perhaps an example of the perennial reluctance of politicians to share power, e.g. with other partners, even though doing so would widen the realm over which power is exercised, e.g. by 'growing the business' to serve other areas.

As with conventional forms of service delivery, there are risks as well as potential benefits associated with public private partnerships. Local governments can reduce or eliminate the risks by understanding what they are and addressing them through well-conceived negotiations and contractual arrangements, and the involvement of stakeholder groups.

Inability to benefit from competition
Competition among private firms is an important benefit for governments. Competition leads to innovation, efficiency and lower costs however developing governments may not be able to benefit from considering that there are only a limited number of potential private firm with the expertise or ability to respond to a request for proposals.

3.7 Chapter Summary

In this chapter we have presented a theoretical basis for private involvement introducing the various forms available to governments that want to venture into this mode of service delivery and the possible decision-making tools (maps) for choice and the implication. Also discussed is the theoretical basis for private involvement and the reservations expressed by its detractors. Such a discussion heightens our perspective to the next level: whether the situation prevailing in developing countries warrants private involvement wholesale without exploiting the decision-making tools. Inquiry into such perspectives necessitates probing practice!

CHAPTER FOUR: APPLICATION OF PRIVATE PROVISION WITH A FOCUS ON DEVELOPING COUNTRIES

4.1 Introduction

The previous chapter has exposed the theoretical underpinnings of private provision including preconditions, various forms, and the arguments for and against the mode of service delivery. In this chapter we explore the practical application of private provision globally and particularly in the developing world. Almost every country has divested some or all of its state enterprises to the private sector or involved the private sector in managing and financing activities previously owned and operated by the state (Kakeri and Nellis; 2004). We review the trends, the success and failure stories.

4.2 Global Situation Analysis

Provision of public services was for a long time the exclusive role of the public sector. However since the 1980's a move towards greater private provision of public services has been observed, in both the developed and developing countries. Initially focussing on economic infrastructure, private provision has evolved to include the procurement of social infrastructure assets and associated non-core services. The UK is recognized as a modern mastermind of this wave of private sector involvement, with the introduction of the Private Finance Initiative (PFI). PFIs have been used to develop and deliver various infrastructure and services and now represent 10 to 13% of all UK investment in public infrastructure; close to 100 PFI projects are initiated or completed per year (Deloitte 2006).

According to Palmer 2009, the growing use of PFIs inspired governments worldwide to adopt private sector involvement arrangements. The Australian government has used private sector involvement to deliver several social infrastructure projects; Ireland has the private sector in design and construction of transport infrastructure; in the Netherlands, roads, social housing, and urban regeneration programs have been delivered through private provision; India is investing heavily in highways through private provision; Japan has around 20 new private sector involvement in the pipeline; in Canada, 20% of new infrastructure are designed, built and operated by the private sector; the USA is a pioneer with contracting out and have started experimenting with other forms of private sector involvement; emerging democracies from central Europe are also following suit. South Africa has used private involvement in prisons, hospitals and roads and in Botswana it has been observed in Universities.

A PwC 2006 study (Figure 4.1 and Figure 4.2) shows that private provision arrangements have been utilized in various sectors including airports, railways, defense, prisons, housing, health and hospitals, IT, ports, roads, schools, sports and leisure, water supply, waste collection, waste treatment etc and procurement transactions are at varying stages towards completion.

Figure 4.1 Summary of Private Provision by country and sector in selected countries of the EU

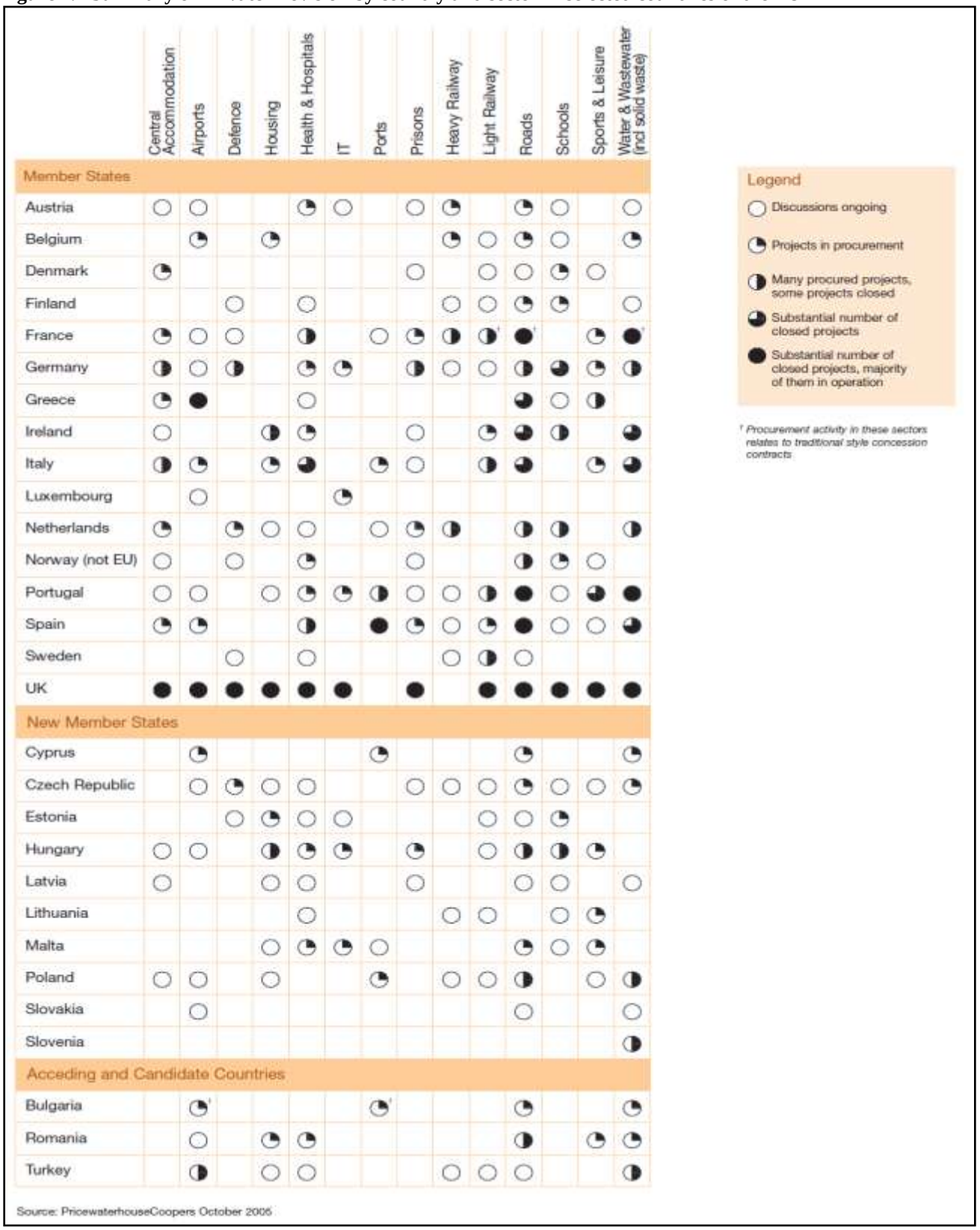
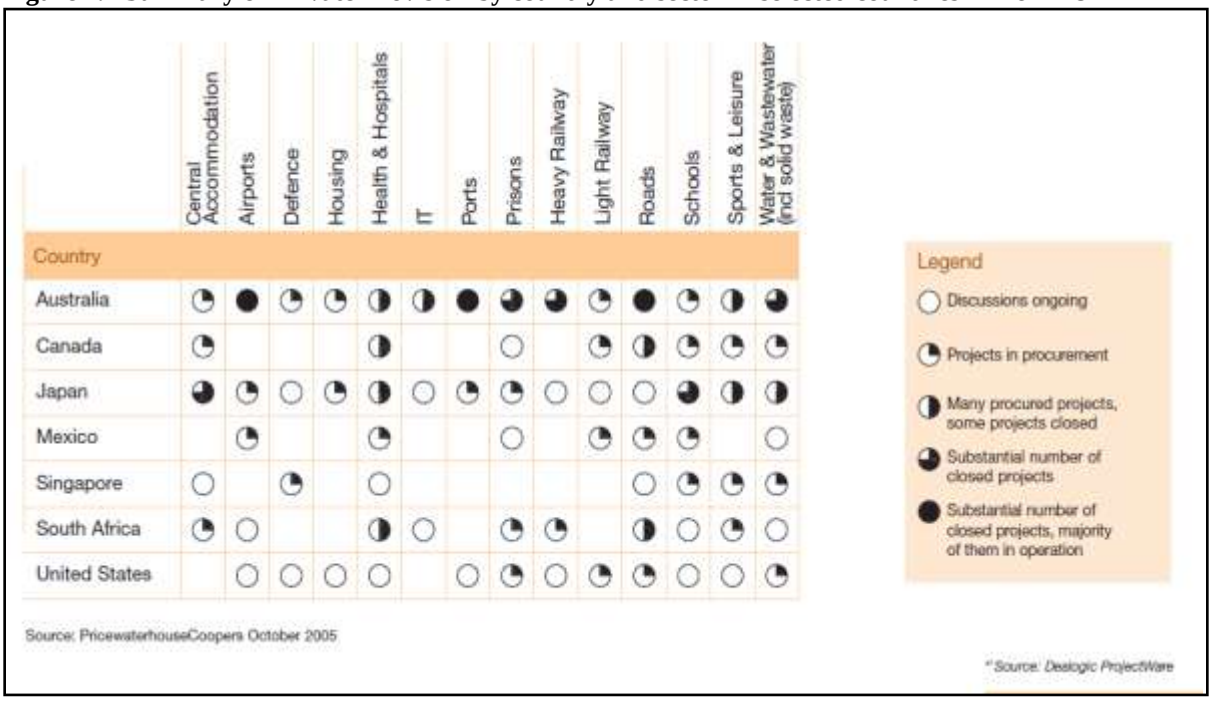


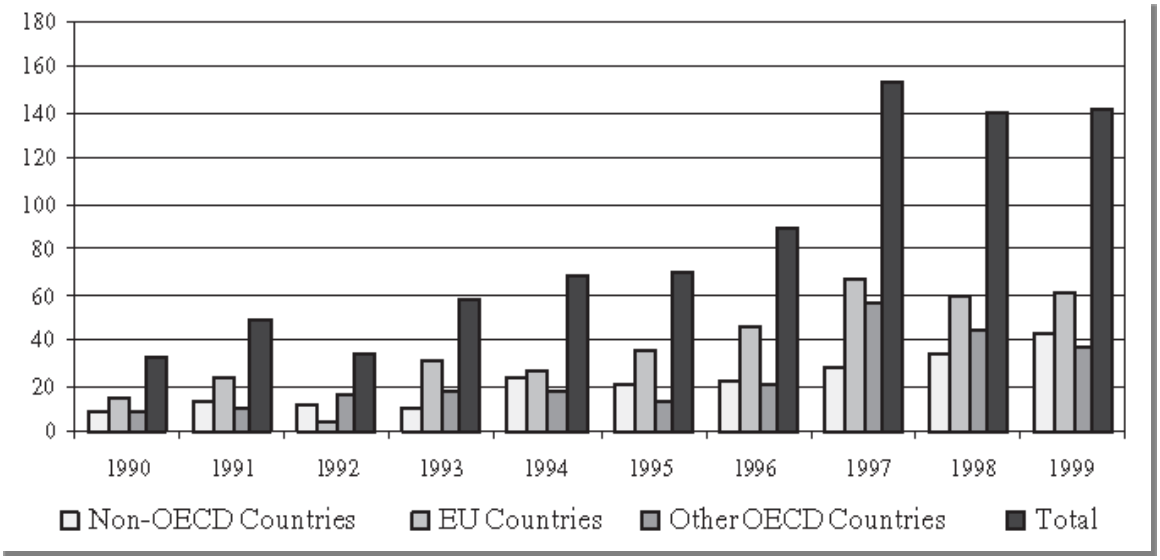
Figure 4.2 Summary of Private Provision by country and sector in selected countries in Non-EU



Global Trends

Globally, private sector involvement in public service delivery commenced slowly in most of the 1980s, but peaked in the mid-1990s and then declined after 1997. Between 1990 and 1999, global proceeds totalled US$850 billion, growing from $30 billion in 1990 to $145 billion in 1999 (Figure 4.3). Organisation for Economic Co-operation and Development (OECD) countries, alongwith Brazil, account for the overwhelming bulk of the proceeds, mainly from public offerings of large firms in countries of the European Union (Mahboobi, 2000).

Figure 4.3 Global Private Involvement Proceeds (1999-99) US$ Million



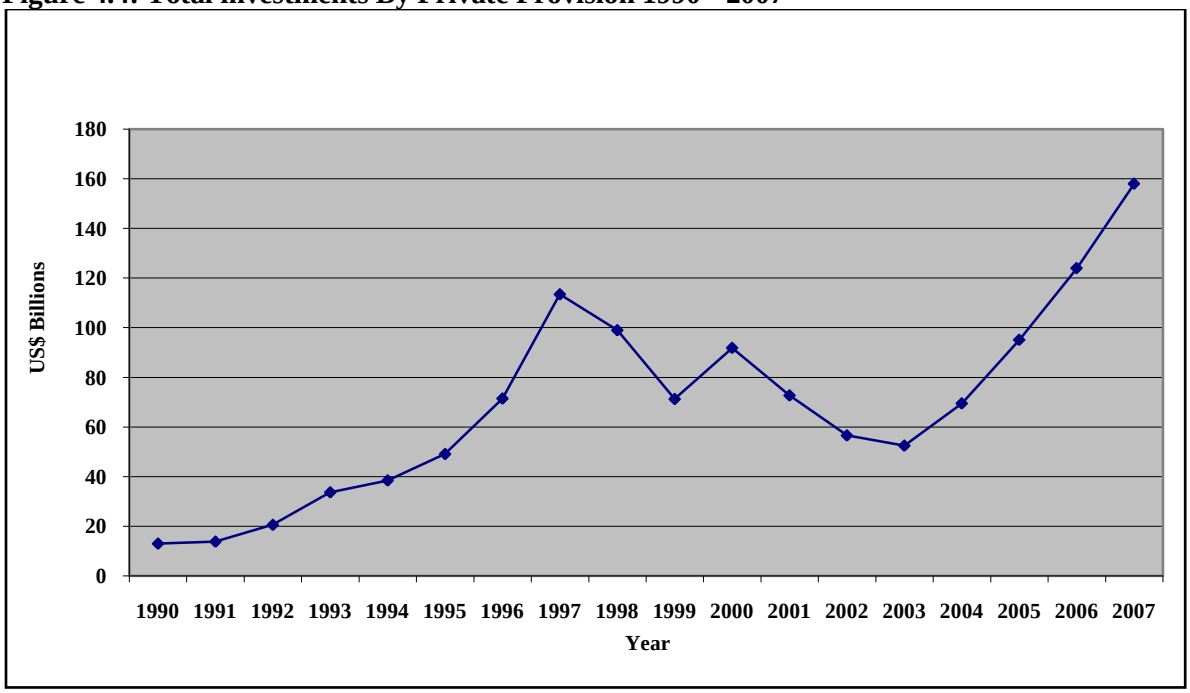
Source: Mahboobi 2000, in Kikeri and Nellis (2004)

4.3 Trends of private provision in Developing Countries

In developing countries, private provision was introduced in the mid 1980s during the first wave of governmental privatisation of state enterprises, under IMF/WB supported structural adjustment programs. Policies were adopted to address the perceived lack of managerial capacity in government, as well as the need to stop the continued dependence of state enterprises on state subsidies (OECD, 2009).

Almost all developing countries have undertaken private provision in various sectors. The degree of participation across countries is as diverse as the sectors, with some countries like Brazil and China dominating the scene. According to the PPI database (World Bank, 2009), between 1990 and 2007, the private sector got involved in 4088 projects in various infrastructural sectors in developing countries attracting investment commitments of over US$ 1241 billion. The projects were executed under schemes ranging from management contracts (with or without investment commitments) to deliveries, to build operate own or build operate transfer contracts for Greenfield projects with merchant facilities. From Figure 4.4 it is observed that PPP investments grew strongly from US$ 13 billion in 1990 to peak at US$ 117 billion in 1997, but subsequently fell in the next two years. Although in 2000 an increase was recorded the years up to 2003 were not good, the decline is attributed to the possible financial crises in the home countries of the firms involved in private provision and also the fact that the state owned enterprises (SOE) being sold off by Governments had reduced, nonetheless since 2004 investments related to private provision have been on the rise.

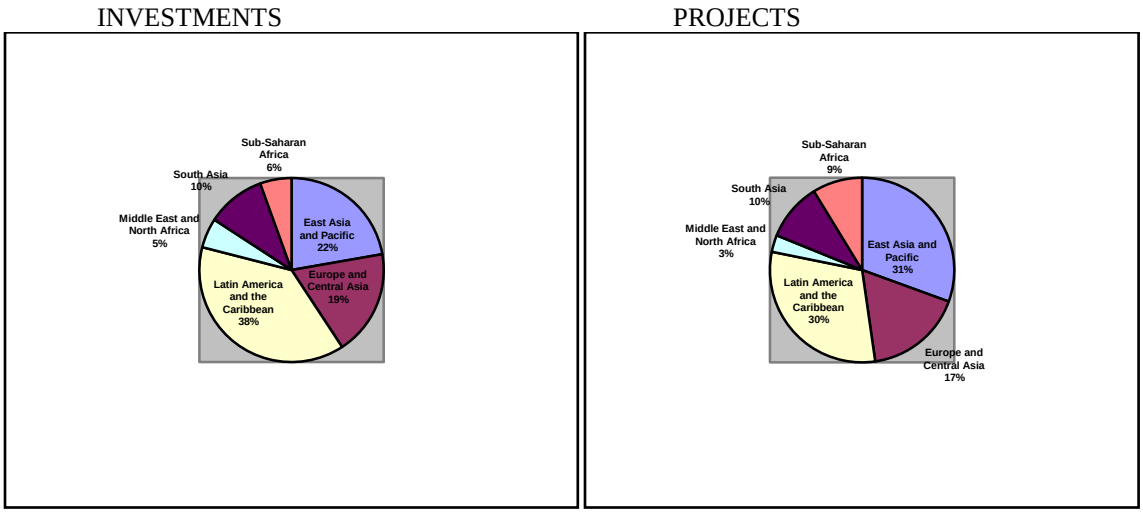
Figure 4.4: Total investments By Private Provision 1990 - 2007



Source: World Bank PPI data base

The analysis of the importance of private provision in developing countries shows a concentration around few regions, sectors and countries. Figure 4.5 shows, that the Latin America and Caribbean leads other regions in both total investments and attracting number of projects at 38% and 30% respectively. It is followed by the East Asia and Pacific region although the two regions combined attracted more than 60% of total private sector investment and 61% in number of projects.

Figure 4.5 Distribution of Private Involvement by region 1990 – 2007 (Percentage)



Source: World Bank PPI data base

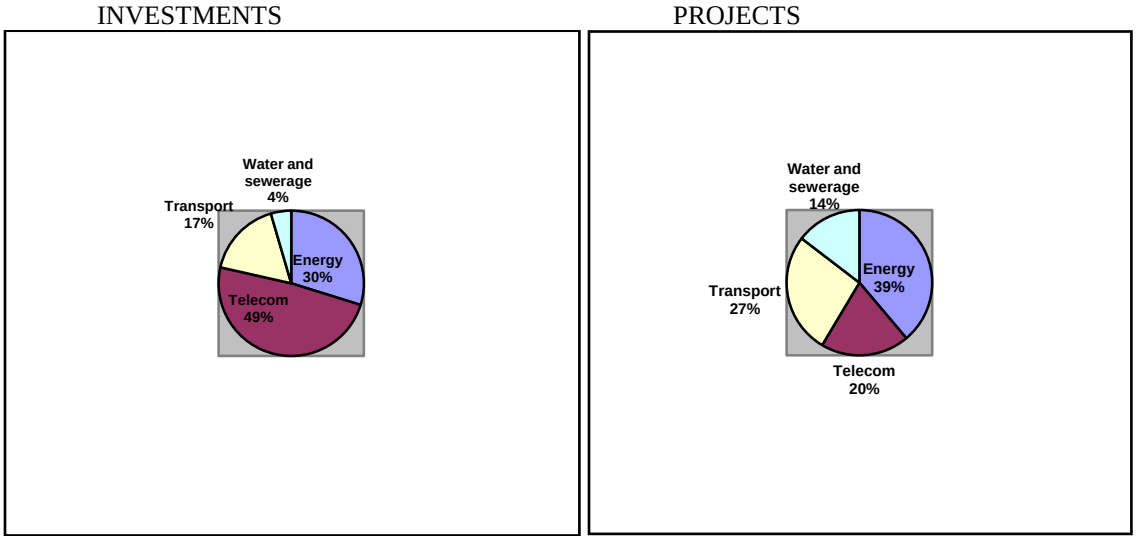
Furthermore, although almost all developing countries have witnessed some form of private investment in infrastructure since 1990, private investors in infrastructure have tended to be directed to a small group of developing countries, that is the ones with relatively large, rich or fast-growing markets. The top 10 destinations for private provision in the 1990-2007 period which are presented in Table 4.1 account for almost 64% and 62% of total investment and number of private provision respectively. Among the developing regions, Latin America accounted for the great bulk of the cumulative investment in infrastructure. Together 3 Latin American countries (Brazil, Argentina and Mexico) account for more than a third of total PPP investment in the developing world.

Table 4.1 Top 10 countries out of 141 by projects investment and count, 1990-2007

Country	Investment	Country	Count
Brazil	196,308	China	805
China	99,953	Brazil	328
India	96,130	Russian Federation	310
Mexico	86,126	India	306
Argentina	78,420	Argentina	193
Russian Federation	61,530	Mexico	176
Malaysia	50,204	Colombia	132
Philippines	42,243	Chile	107
Indonesia	40,676	Malaysia	96
Turkey	36,851	Thailand	96

In terms of sectors, Figure 4.6 shows that private involvement is concentrated in the telecommunication sectors which accounted for 48% of the cumulative investment between 1990 and 2007 albeit when combined with energy, they attract 78% of investments. However, in terms of number of projects, the energy sector leads with 38% of projects. Private involvement in the water sector has been limited, accounting for 5% of the cumulative investment over the same period. The limited participation in water sector could reflect the inherent difficulties that face private provision in this sector in terms of nature of the product.

Figure 4.6 Distribution of private provision by sector 1990 – 2007 (Percentage)



Source: World Bank PPI data base

4.4 A Review of some empirical studies in Developing Countries

In Africa, a 2004 study by Kirkpatrick et al (2004), covering 110 African water utilities, including 14 private, found no significant difference between public and private operators in terms of cost.

A survey of 18 cities in Asia (including Manila and Jakarta), conducted by the Asian Development Bank (ADB) in 2004, established that private sector operators in the water sector, were performing significantly worse than most public sector operators on four indicators of coverage, investment, and leakage. On six indicators (unit production costs, percentage of expenses covered by revenue, cost to consumers of constant level of usage per month, 24 hour supply, tariff level, connection fee) their performance is middling, not outstanding. The private cities perform relatively well on two indicators: revenue collection efficiency, and minimizing the number of staff per 1000 connections.

In Brazil a study of about 4000 sanitation operations found that there is no significant difference between public and private operators in terms of the total variation in

productivity. Regional operators have lower productivity levels than municipalities (Moreira, 2004).

Awortwi (2004), researching private involvement in local governments (LG) service provision in Ghana exposes the gap between private provision policy expectation and outcomes, which they attribute to getting the fundamentals wrong. They found out that contrary to the benefits portrayed in literature, almost no gains arose from the private provision arrangement in Ghana. There was no evidence of private provision improving service quality; no cost savings instead the LG and users were paying more than they used to when services were delivered directly (in-house); no efficiency gains were recorded and that the private companies did not bring in any substantial financial and managerial expertise. Governance shortcomings escalated in that PPP provided a new means through which the power of central government and rent-seeking private individuals is exercised. The LG failed to separate the principal and agent, which created conflicts of interest. Contract discipline enforcement and monitoring of contract terms, competition, and LG capacity were poorly developed hence the disappointing results. They conclude that private involvement is not the solution to poor service delivery and high costs but the problem is the inability of the LG to become smart actors able to regulate, monitor and facilitate new ways of solving public problems.

In the case of Senegal, private provision provided low quality service in education because the private partners wanted to make money and therefore cut costs (Nordtveit, 2005). Furthermore private sector poor performance in developing countries is also attributed to the inappropriateness of the policy framework especially its failure to provide for the regulation, control and supervision of the private sector activities and to facilitate its efficiency objectives (Karanja, 2003; Pongsiri, 2002). Lack of stakeholder consultation is also mentioned (UNCHS Habitat, 2000; Karanja, 2003).

In the East Africa sub region, UHCHS Habitat (2000), found that there were no appropriate legislation and clear policies to support and guide on private participation in municipal services. Besides LG resisting sharing of responsibilities, they lack capacity. Also the private sector entrepreneurs in the sub-region have limited organizational capacities; inadequate professional and technical staff and lack financial resources. Moreover they are unable to mobilize capital inputs to sustain their privatization operation. Better performance is only reported in areas where consumers can pay leaving out poor.

The empirical studies reviewed above highlight the challenge that developing countries have encountered in their endeavor to introduce private provision. The prerequisites for the success of private sector provision are generally missing. It would then be interesting to find out why in the circumstances they go ahead and introduce such arrangements.

Cancelled / Distressed Projects in Developing Countries

According to Thomsen, 2004, a large number of private provision projects have either been cancelled1, classified as distressed or their terms have had to be renegotiated under duress. In fact the World Bank PPI data base (Table 4.2) shows that between 1990 and 2007, 247 projects worth USD 86.3 billion in developing countries were cancelled or distressed, representing 6% of total number of private provision projects and 9% of total investment.

Table 4.2 Projects Cancelled or Distressed by region 1990-2007 (US$bn)

Region	No of projects	% of total projects	Value of cancelled or distressed investment	% of committed investment
East Asia and Pacific	65	5	26.8	10
Europe and Central Asia	21	3	3.8	2
Latin America & Caribbean	117	9	48.9	10
Middle East and North Africa	6	5	1.0	2
South Asia	7	2	3.9	3
Sub-Saharan Africa	31	9	1.9	3
Total	**247**		**86.3**	

Source: World Bank PPI database, 2008

The greatest number of troubled projects has been in the water sector, followed by transports, energy and telecommunications. As a share of total investment in each sector, water and sewerage has had the least favourable experience with 29% of investment in cancelled or distressed projects. In contrast, the telecommunications sector has one of the highest success rates in terms of investment in on-going projects probably because of the nature of this sector.

Table 4.3 Projects Cancelled or Distressed by sector 1990-2007 (US$bn)

Sector	No of projects	% of total projects	Value of cancelled or distressed investment	% of committed investment
Energy	90	6	30.0	8
Telecoms	42	5	22.6	4
Transport	62	6	17.4	8
Water	53	9	16.4	29
Total	**247**		**86.4**	

Source: World Bank PPI database, 2008

It is argued that in the telecom sector, fees and returns are easier to collect and return on investment can be assessed with greater efficiency, however, in the water sector clear definition is lacking and therefore regulation and commitment is imperative (Farlam, 2005)

[1] Cancelled projects are those in which private sponsors sell or transfer their economic interest back to the government; remove all management and personnel; or cease operation, service provision, or construction. Distressed projects are those under international arbitration or for which cancellation has been formally requested.

4.5 Why Private Provision fail in developing countries

The reasons that private provision arrangements have sometimes performed below expectations vary from case to case. However below are some reasons behind the failure as identified by Institute of Public Private Partnership (IP3) and Southern Africa Development Community (SADC) countries; also highlighted in the case by Water Aid below:

- It is indicated that an *inadequate legal and regulatory framework* (lack of or weak independent regulation, weak rule of law, poor enforcement of contracts and/or regulations, inadequate dispute resolution mechanism, etc.) has been the major cause of failure. Existing legislation in many developing countries was designed to define public sector responsibility in infrastructure and is inadequate in a situation of private involvement

- *Public governance* – any private investors have had to contend with conflicting public authorities, for instance central versus local governments, or regulatory bodies versus ministries. In addition, non-existent or inexperienced regulators created avoidable uncertainty about price and tariff setting. In Uganda this has been a common phenomenon with private operators getting conflicting directives concerning service delivery (Ndandiko, 2006).

- *Low levels of cost recovery* (due either to poor payments practices by end users – including government itself – or to tariffs or user fees that are set below cost recovering levels).

- *Poor technical performance and/or deteriorating assets* (due to poor management of the enterprise, inability to fund or lack of attention to preventive maintenance, vandalism or theft or lack of proper incentives to improve performance, amongst others);

- *Lack of human capacity* (both in terms of experienced managers to run and operate a company or system, and in terms of experience with PPP; it is sometimes the case that both the government and the private contractor lack the skill sets or the dedicated team required to manage private provision (Grimsey 2004). In addition, human capital with relevant regulatory expertise is in short supply and many countries lack experience in private provision (PwC 2006).

- *Lack of information* (little or no information on current and historical performance of the enterprise and/or sector, poor or inadequate record-keeping, unreliable data or financial records, etc). Insufficient communication and cooperation between government and contractor can lead to project failure as together they need to agree on personnel, financial and material resources required to successfully meet the objectives.

- *Award procedures* – the award procedures often lack transparency and are not based on objective evaluation criteria. Corruption has been a problem – in general, and in

the specific context of awards. Also, some projects have been compromised by official preference for local participation, preferred sub-contractors or suppliers and the employment of weakly qualified local staff.

Case study 1: Why did City Water Fail? *The Rise and Fall of Private Participation in Dar es Salaam Water Supply*

From 1997 to 2003, the Government of Tanzania was involved in protracted negotiations with international water companies and donor agencies that culminated in an agreement to lease Dar es Salaam's water supply infrastructure from the state-owned Dar es Salaam Water and Sewerage Authority (DAWASA) to City Water Services Ltd. (CWS), a joint venture between British, German and Tanzanian companies. The lease contract was part of the $164.6 million Dar es Salaam Water and Sanitation Services Project (DWSSP), financed mainly with loans from the World Bank (WB), the African Development Bank and the European Investment Bank.

Though CWS was awarded a ten year contract beginning in August 2003, its lease was abruptly terminated by the government less than two years later. It was replaced with the newly formed Dar es Salaam Water and Sewerage Corporation (DAWASCO), a publicly owned company holding an almost identical lease with DAWASA.

The three major players – government, financiers and private actors – share responsibility for what went wrong. Furthermore, regulatory, governance and political pitfalls, coupled with the financial viability of the lease contract are listed as the other main drivers for failure.

Finally, the case report cautions that twenty-five years of decline cannot be fixed by changing managers, and that the work required to do so will not happen overnight. Time and finance are both required, along with further institutional reforms that go beyond the water sector.

Source: Water Aid (2008)

- *Existing service providers* – where incumbent service providers, often state owned, remain in the market they are often the subject of preferential treatment. This goes hand in hand with a tendency, in many countries, to invite private participation in the absence of a commitment to overall sectoral liberalization.

- *Political commitment* – in countries where the rule of law is not firmly entrenched governments have reneged on contracts signed by previous administrations. There also have been several cases of governments reneging on contractually agreed terms (e.g. the right to levy cost-recovering tariffs) in the fact of public dissatisfaction.

4.6 Critical Success Factors

Legal and Regulatory Framework

Private provision is best undertaken within a legal and regulatory framework. Partnerships between organizations that are founded on entirely different principles, like it is the case with the public and private sectors, necessitate provision for continuous guidance that streamlines the legal, regulatory, commercial and financial aspects of the private provision arrangement and preclude political interference, corruption, non-compliance and poor quality services. Hence, for private provision to be successfully

initiated and implemented, the presence of a conducive and enabling legal and regulatory framework is a critical prerequisite (Bing, 2005; Zhang, 2005).

It is therefore of critical importance that, in promoting private provision, legal and regulatory frameworks must be in place to safeguard the interests of both the public and private organizations. In particular, for the private sector to be engaged in the provision of public services for a prolonged period of time, there must be some assurance that their interests will be protected. Legal and regulatory frameworks are of critical importance in this regard because they provide assurance to the private partner, that the legal system includes the protection from expropriation, arbitration of commercial disputes, respect for contract agreements, and legitimate recovery of costs and profit proportional to the risk undertaken (Jamali, 2005). Additionally a sound regulatory framework can also ensure that the partnership works efficiently and optimally utilizes the resources at the disposal of the partnership. In this way, the regulatory framework can also benefit the public partner especially when efficiency is enhanced and resources are optimally used (Pongsiri, 2002).

Regulations ensure that each partner fulfills his/her obligations. They clearly stipulate the steps to be followed in the event of non-performance and the possible action to be taken against the partners should they fail to meet their obligations. In this regard, Kroukamp (2004) has argued that the success of, in particular, collaborative arrangements depends on all partners fulfilling their respective responsibilities including the responsibility to hold others accountable and take corrective action when necessary.

Rules and regulations alone may not be adequate without appropriate structures to enforce them. In this regard, both the judiciary and the law enforcement agencies must be perceived to be sufficiently capable of enforcing such rules and regulations in such a way that both the private and public sector have the confidence of engaging in private provision.

The need for an Independent Regulator

The need of efficiency calls for the existence of independent regulatory bodies. Changes that have occurred with respect to provision of public services, both in developed and developing countries, call for strong and competent economic regulation of infrastructure and social sector services, in order to ensure that the interests of all parties involved are protected. Such protection is necessary first and foremost, to defend the customers' interests but also those of the public and private parties to a contract. A Regulator could either take the form of an independent regulatory agency, or be set up as a specialised cell under line Ministries, or even be a department within line Ministries. Private provision model countries such as the UK, Canada, Australia, South Africa, have regulators reflected in the central PPP units.

According to UNECA (2005), the role of an independent regulator is regarded vital, especially in developing countries which are characterized by low literacy levels, scarcity of infrastructures, non-competitive industry structures and/or lack of capital market. Besides developing countries also face other specific challenges, when large portions of

the customer base for infrastructure services are poor and unconnected, tariffs are being kept artificially low, baseline information for decisions tends to be limited or unreliable and the regulators have difficulties in establishing their credibility and in implementing sound governance arrangements.

Political Leadership and Commitment

It is worthwhile for the political and organization leadership to support the private provision initiative. In particular, political leadership should be seen by the public to be in support of private sector involvement and actually taking part in educating the public on such partnership initiatives (Carley, 2006). Leadership is central to the success of private sector involvement in that all other antecedents for successful implementation of the initiative depend on leadership (Diamond, 2006). Leadership can make things happen in the sense that it controls the resources that are necessary for the implementation of the initiative. However, sensitization on the part of those in leadership positions is necessary for them to understand the concept well in order to play their roles meaningfully (Armistead & Pettigrew 2004; Carley, 2006).

Sensitization of the stakeholders

It is essential that stakeholders are sensitized on various facets of private sector involvement. The public and private sectors together with the public clients must have an understanding of private provision before its implementation in order to enhance acceptability of the policy. Often times, insufficient understanding of a policy is recipe for resisting change; for instance in the East Africa sub region, UHCHS Habitat (2000), found what they termed a "conceptual confusion or ambivalence" with regard to private involvement in municipal services which impaired implementation.

Furthermore, private provision entails changed roles; with the public sector becoming service monitors and supervisors instead of being service providers. However, public sector staff sometimes lack in-depth understanding of monitoring, supervisory and negotiation roles relevant to private provision. Hence it is imperative that public officials who are involved in the implementation are given sufficient training to enable them have confidence and capacity to cope with the intricacies of these partnerships. In particular, the public sector employees should be trained to a level where they would understand their counterparts in the private sector in order to effectively protect the interest of the public sector.

Enhancing the performance of service providers

UNECA 2005 observes that the implementation by governments of sound capacity-building programmes, especially at local level, remains a key policy factor to promote a demand-responsive approach aimed at enhancing the performance of services providers and community outreach. Capacity-building measures that enable all stakeholders to function and build successful partnerships should include:

- Carrying out targeted training to communities, private sector, NGOs, and local/national governments in order to familiarize them with new innovative tools and methodologies and especially encourage training-by-doing at all levels;
- Developing training programmes that are time-bound, output- and impact-oriented, with performance monitoring and targets to measure capacity and achieve goals;

- Providing opportunities for local stakeholders, including private sector, local governments, and NGOs, to participate in workshops, conferences, and forums to assist in building their own capacities.

4.7 Private Provision in Uganda – the case study

The urban local governments in Uganda permitted private sector participation in their traditional public services provision (refer Table 4.4). Over the past ten years we witness a number of contracts in which the private sector entities are obligated to operate, expand and modernize public facilities like the municipal markets, bus parks, and slaughter houses and in return obtain service user fees. In addition PPP contracts have been concluded for provision of services in areas such as solid waste collection, street parking space management, street lighting maintenance, street repairs and their general cleanliness.

Table 4.4 Survey of Providers of Municipal services in the 4 major municipalities 1997/98

Service	Kampala	Jinja	Mbale	Mbarara
Water	NWSC	NWSC	NWSC	NWSC
Sewerage	NWSC	NWSC	NWSC	NWSC
Refuse collection	LG;P	LG;P	LG;P	LG;P
Public transport	P	P	P	P
Emergency (fire/ambulance)	NG;P	NG;LG	NG;P	NG;P
Road Maintenance	LG	LG	LG	LG
Education	LG;P;NG	LG;P;NG	LG;P;NG	LG;P;NG
Healthcare	LG;P;NG	LG;P;NG	LG;P;NG	LG;P;NG
Public Housing*	LG;P;NG	LG;P;NG	LG;P;NG	LG;P;NG
Recreation and sports	LG,P	LG,P	LG,P	LG,P

Source: UNCHS (Habitat) 2000

Key:
NCSW - National Water and Sewerage Corporation
LG - Local Government
NG - National Government
P - Private (including NGOs, missionary and religious organizations)
* - The National Government is currently disposing of all its houses under the pool housing scheme by sale to sitting tenants

There is no coherent rationale for different types of service that can be provided through private involvement in different service sectors. Furthermore, there is no appropriate legislation and clear policies to support and guide private participation in municipal service delivery (UNCHS Habitat, 2000); probably why there are reports of many failed contracts, non-compliance, confusion and other anomalies (see case 1 and 2).

Case 2: Private Operators fight for affluent areas of operation

The Newvision Newspaper, Wednesday, 13th July, 2005

By Gerald Tenywa and Samuel Okiror

Kira Road Police yesterday deployed to quell a fight that took place when Nabugabo Updeal encountered a team of Bin-It workers removing waste on Acacia Avenue, Kololo, a posh residential suburb.

Kampala City Council (KCC) is facing protests from the firms and environmental activists over the collection and disposal of solid waste.

Michael Komakech of Bin-It said yesterday that KCC officials were imposing unacceptable conditions on them to work under Nabugabo Updeal, contrary to garbage laws.

.He said they wanted mayor Ssebaana Kizito to intervene in the row that has pitted them against Nabugabo, which was given an exclusive contract two years ago. This follows a spate of clashes between the two companies, the latest involving the intimidation of clients in Kololo and impounding of property belonging to Bin-It.

Komakech said KCC should reconsider the terms of the contract because Nabugabo was using it to take over Kololo, Naguru and parts of Bugolobi, where Bin-It has clients.

Nabugabo manager A. Ssonko said they had incurred a loss amounting to sh230m because of the small garbage companies that had previously been given licenses. He said they would have to recover the money from the profits of the companies, including Bin-It, at any cost.

The motivation for allowing private involvement in municipal service provision by LG includes the need to increase revenue collection, increase efficiency, reduce fiscal burden, and develop the private sector (UNCHS Habitat, 2000). Worth noting is that, in contrast to the developed world, adoption of innovation and new technology, risk transfer, ownership and increasing coverage were not seen as important.

Ndandiko (2006) observes that whereas in the developed world, motivation for private involvement has moved towards sharing of responsibilities, risk, resources and collaborating to exploit the advantages of the individual sectors to achieve improved services and value for money, in Uganda and other developing countries, private sector involvement schemes are seen as a way to increase revenue collection, which is why even the services that were wholly financed by the LG like waste collection; the basis for private involvement depends largely on how much the private party is willing to remit to the LG in form of fees.

Uganda's Private sector

The private sector in Uganda, like any other developing country is composed of micro, small, and medium enterprises most of which are family businesses with no serious corporate structure to talk of – which to us makes the threat of takeover managerial incentive in agency theory almost irrelevant. Such firms constitute 90% of Uganda's private sector (Uganda Investment Authority 2008). According to UIA 2008 "… inherent challenges faced by SMEs in Uganda include limited access to finance, lack of

entrepreneurial skills, lack of general skills, marketing and financial planning, lack of business plans, lack of business records, deficient corporate governance, poor banking and borrowing history and a culture that disrespects business contracts." But such are the private sector firms entrusted with private provision especially in the lower tiers of government.

4.8 Chapter Summary

Many governments in developing countries have seen private investors simply as a source of financing to be used to supplement dwindling public funds Thomsen 2004. In doing so they have failed to recognize the minimum expectations – what Awortwi 2004 calls the private provision fundamentals. The lack of a suitable enabling environment and a policy framework that streamlines the legal, regulatory, commercial and financial aspects breeds political interference, corruption, non-compliance and poor quality services and consequently the reported high failure and distressed cases.

It has been argued that the best that developing country authorities, acting on their own, can do to enhance the chances of successful private involvement arrangements is to develop a better knowledge of the obstacles, take steps to address these and prepare better all levels of the public administration before embarking upon such venture.

If properly structured in appropriate areas, private sector involvement arrangements can be beneficial to both the public and the private organizations. In line with, our study explores these possibilities.

CHAPTER FIVE: LOCAL GOVERNMENTS AND SERVICE PROVISION

The previous chapters have dwelt on detailing private involvement in service delivery – a major study area. It is now in order to introduce our units of analysis – local governments. This chapter explores the linkage between the study areas including; local governments and local services' provision. Alternatives service delivery arrangements available for use by local governments are identified which provides a good foundation for setting the context for measuring and benchmarking performance.

5.1 Local Government Services

Local governments play a significant role in providing essential (social) services to the public. They provide vital community services as well as regulating local and commercial activities. However it has been observed that local governments can be constituted in a number of different ways, depending upon the roles and responsibilities they are expected to perform. In Denmark and Sweden local governments take responsibility for virtually all locally delivered services; including social services, primary education and primary health care – with more scope to deliver specialist services and make efficiencies (HCCLGC, 2009). Municipalities have substantial revenue raising power with over 60% of total revenue coming from local taxes. Central government in these countries focuses on macro-economic stability and the setting of minimum acceptable standards of service, leaving local governments considerable space to operate within overall expenditure limits and priorities hence they are empowered to devise and deliver local services and priorities without reference to or interference from centre. Elsewhere, local governments have a more demarcated range of functions, for instance in Australia the core local government responsibilities are limited to property-related services, with the states delivering education, most social services, fire services and the more local aspects of policing. Hence most of the recent local government reforms have targeted the extent to which roles and responsibilities are shared between the central and lower tiers of government.

5.2 Local Government Reforms

The importance of decentralization for effective public sector reform is widely recognized (Fukasaku et al, 1998; ILO, 1998). Many countries have decentralized responsibilities to lower tiers government and have signed either the European Charter of Local Self-Government or its global equivalent (IULA World Wide Declaration of Local Self Government (Bach, 2000). The extent of decentralization varies considerably and is related to historical and political development. In many developing countries, a practice of centralization stems in part from the long period of colonial administration (Stein, 1998). Attainment of independence from colonial powers in itself did not overturn this pattern of governance (Bach, 2000). Confronted with poor infrastructure, an underdeveloped private sector and widespread poverty, the State in many of the

developing countries needed to take on the mantle of guiding the economy and establishing public service provision. However, by the 1980s, the donor community including World Bank and the International Monetary Fund (IMF) suggested that the existence of poor management and corruption was encouraged by policies of centralization which concentrated power in the hands of a small urban élite (Bach, 2000). These criticisms marked the start of an era of "structural adjustment" in which financial support was linked to market reforms (including the need to engage the private sector) and managerial changes in the public sector. Hence, a central theme of many of these changes was an emphasis on decentralization that aimed to transfer political and economic responsibilities to local governments. Hentic and Bernier (1999) estimate that more than three-quarters of the countries in transition and developing countries, with a sizeable population (over 5 million inhabitants), have endorsed programmes of decentralization.

Unfortunately, LGs encounter the problem of insufficient means and financial resources; the capacity to assume this new role is either absent, or is lacking, especially in emerging markets and fragile states (Palmer, 2009). The transfer of responsibilities from the central government to local governments has not generally led to corresponding transfer of resources from national to local levels. Moreover, financial and economic crises and structural adjustment policies have led countries to cut back their public financing for local services by transferring responsibility to the local authorities. The large number of functions assumed by local governments as a result of central government delegation has generated a substantial increase in the number and diversity of alternative governance mechanisms.

5.3 Decentralization and Local Government Service Provision

Decentralization, defined as the transfer of authority to perform certain duties, from central to local governments, is seen as one of the public sector reform strategies meant to enhance service delivery. It is incontestable that the way services are delivered has changed over the years, distancing itself from traditional management involving bureaucratic control mechanisms and in-house production to the adoption of alternative arrangements to deliver public services based on the externalization of service delivery, either using market approaches or allowing private sector participation. The conceptualization of governments' responsibility for and role in providing public services has undergone a notable reversal since 1980 (Miraftab, 2004). In the 1970s, public services were acknowledged to be the responsibility of the central government, however, that role has since shifted to the operation of the market (*including private provision*) and the lower tiers of government (*through decentralization policy*) (Bennett, 1990; Rondinelli, 1983; in Miraftab, 2004). Bennett (1990) distinguishes two strategies of decentralization: one that shifts responsibilities to the lower tiers of government and one that shifts the responsibilities away from the government to the private sector. Like Miraftab (2004), our study looks at the conjuncture of the two strategies, namely, the shift of responsibilities to local governments who in turn reach out to the private sector through various private provision arrangements.

The rationale for private provision in the developing world fits in well with that for decentralization (Bennett, 1998). However, it has been observed that decentralization in most developing countries, gave more responsibilities to lower tiers of government but not the matching capacity—neither adequate funds nor the technical capacity needed (Cheema, 1993; Amos, 1993, in Miraftab 2004).

In some cases, it is argued that decentralization has achieved only the creation of new dysfunctional administrative structures, especially if the local government budget still comes from the central government earmarked for specific activities. For example, the sub-Saharan local governments, 80 percent of whose budgets are transfers from the central government, have no autonomy; not much can be expected from them (Ahwoi, 1998, in Miraftab 2004). Their financial dependence, combined with their limited technical and financial capacity to handle their new responsibilities, leaves local governments little power of independent decision making and hence little influence on private provision transactions.

5.4 Alternative Service Delivery (ASD) Arrangements in Local Government

While the assumption that the public sector is responsible for the delivery of basic services remains deeply rooted in minds of many policy makers, the methods by which these services are created, procured and delivered have been gradually changing. Administrative and institutional capacity constraints, ineffectiveness, inefficiency, lack of adequate funds and failure to respond adequately to the needs of citizens have forced policy makers and political leaders to rethink the role of public institutions (Khumalo, 2003). Governments world over have considered alternative and innovative means of delivering local services, involving the private sector as well as partnering with other LGs and other spheres of government. They realized have that they alone cannot address the service delivery constraints particularly considering the immense resources required to meet the service delivery needs. Hence, the need for finding alternative delivery mechanisms and financing options.

What is Alternative Service Delivery as it applies to LGs?

ASD can be defined as an organizational option or response to the challenge of improving the capacity of governments to manage change, promote innovation and meet their infrastructure and service delivery obligations more efficiently and effectively (Fyfe, 2004). It refers to service delivery mechanisms where other parties outside of government are used in the delivery process

Rationale for Alternative Service Delivery

The use of alternative service delivery options (ASDs), which often involve the private sector and the application of market mechanisms, is seen as a strategy to aid delivery through the mobilization of additional financial resources from the private sector. Adopting private sector's entrepreneurial and innovation approaches is seen as a way to help rekindle the public sector and make it more efficient and effective in using

resources. The rationale for the use of alternative service delivery mechanisms is to provide innovative options to improve service delivery in terms of quality, quantity, timeliness, access and cost (Peters et al, 1999). Peters et al, (1999) also provides additional reasons for experimenting in new ways of delivering publicly funded services viz:

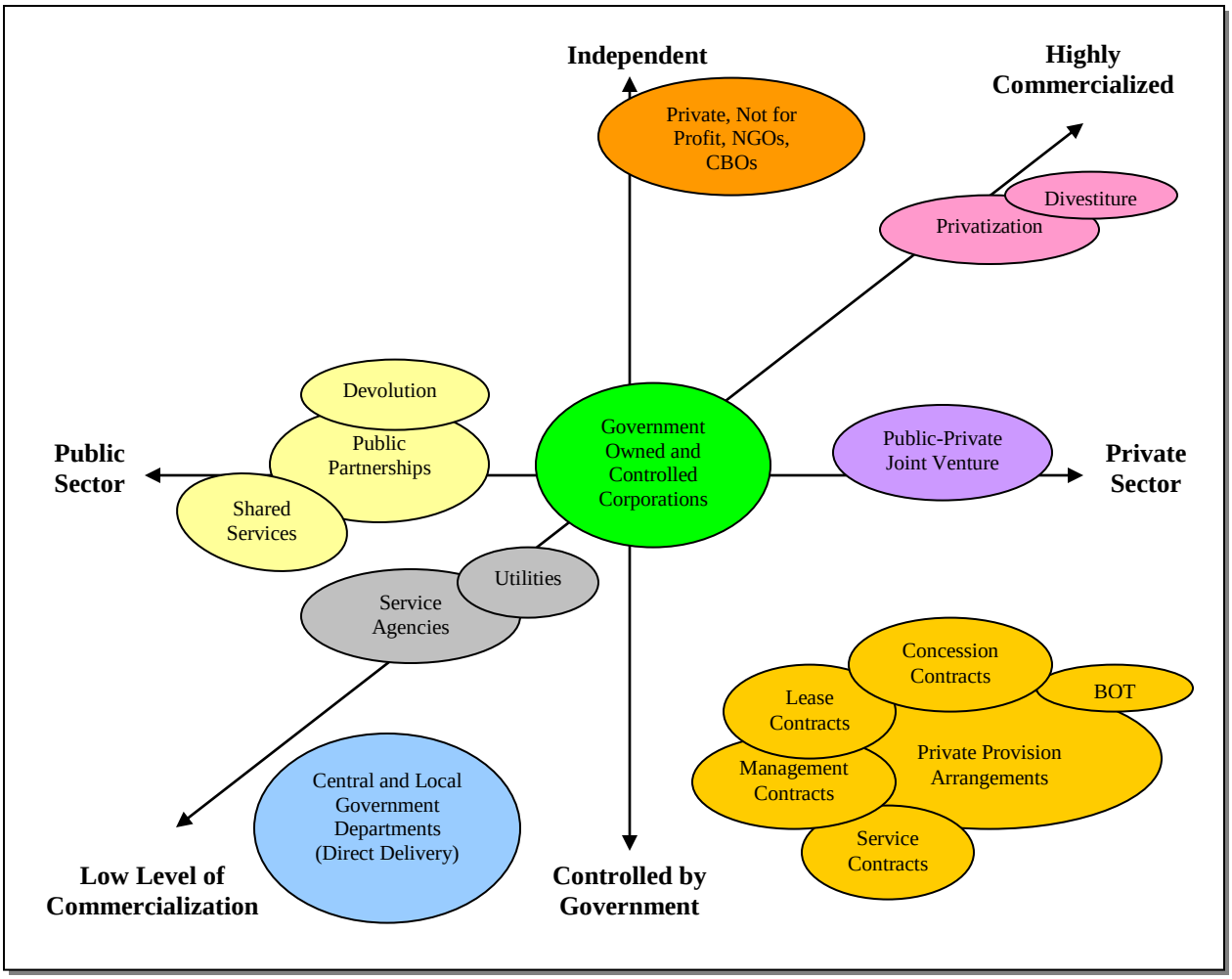
- Encouraging innovation
- Reducing complacency
- Empowering and motivating employees
- Rebuilding trust in public institutions
- Reducing and changing the role of the state to where government is less producer of goods and services and more of a supervisor/facilitator of how things are done and services are rendered.

Potential Alternative Service Delivery Options in Local Governments

The Treasury Board of Canada Secretariat presents a typical array of ASD options used in a government setting as depicted Figure 5.1 Framework for Alternative Service Delivery. The Framework slightly modified by Good and Carin (2003) arrays alternative service delivery along three important dimensions. The horizontal dimension in the framework is between the *public and private sector* and it illustrates the use of various options in the delivery of public services. The vertical dimension deals with the question of the *extent of government control* and indicates how new approaches to service delivery do not necessarily require that the government completely controls all aspects of the delivery of public services. Many aspects of service delivery can be controlled by a third party organization, such as a voluntary non-profit organization that is outside of, and independent from, government. The third dimension, the oblique dimension, is the *level of commercialization of the service* and deals with the extent to which the organization makes a profit by selling its goods or services. Recently, in many countries more of the services that governments have traditionally provided for "free" are now paid for by user fees.

These various options for alternative service delivery can be directly related to Figure 5.1 and positioned along the three dimensions. For example, *devolution* is positioned in the upper left quadrant and is associated with transferring a service delivery responsibility, which generally has a relatively low level of commercialization, from one government to another or from one government to a non-profit organization. Private provision is positioned in the lower right quadrant and is associated with the government contracting with an independent private sector organization for a service that has a relatively high level of commercialization.

Figure 5.1 Frameworks for Possible Alternative Service Delivery in Local Governments



Adapted from: Good and Carin 2003; LGSP II Phillipines 2003

Eight clusters of mechanisms for service delivery are distinguishable namely:

1. ***Privatization*** – The Local Government completely abandons the activity to the private sector. *The LG* sells its assets or its controlling interest in a service to a private sector company, but may protect public interest through legislation and regulation.
   a. *Service Shedding* – Government retains the facility but it sheds away or abandons particular services which are taken over by the private sector.
   b. *Divestiture* – Government abandons the entity altogether under the assumption that the services formerly provided by the entity will be picked up by the private sector.
2. ***Public Partnerships*** – The Local Government partners with another (i.e., municipality with town, inter-municipality, city/municipality etc.) to jointly provide a service to its citizens.
   a. *Devolution*: Government transfers the responsibility for delivering service to: a) other levels of government, b) profit or non-profit organizations that receive transfer payments to deliver the service

b. *Shared Services* – This arrangement is much like a joint venture agreement with the private sector, except now the partner is another local government. The circumstances of such an arrangement might include a joint effort of adjoining LG wishing to provide a service such as water supply to its citizens through a single facility. The corporate legal form will depend upon the circumstances and the nature of the agreement between the two LGs.

3. ***Private Provision Arrangements*** – The Local Government relinquishes partial control over the delivery of a service through contracting or it engages the private sector to initiate a particular activity or service because it is better able to do so. There are a variety of contracting arrangements ranging from lesser to greater relinquishment of control over the activity or service as earlier noted in Chapters 3 and 4.
   a. *Service Contracts* – The LG finances the investment and directly operates and manages the system. It enters into a contract with a private party to undertake a portion of an activity or service for a fee; this is common with waste collection especially the central collection system.
   b. *Management Contracts* – The LG finances the investment and enters into a contract with a private party to manage the activity or service. The private party completely operates and manages the activity or service and in turn, is paid a management fee by the LG. This is common with water supply service, public toilets and local markets contracts.
   c. *Lease Contracts* – The LG finances the capital expenditures and leases the facility to the private sector. The private sector assumes the commercial risks and the responsibility to operate and maintain the activity or service. To recover its costs, the private party is allowed to collect user fees as well as any other charges on behalf of the LG. Common with some water supply and local markets contracts.
   d. *Concession Contracts*, i.e. franchising – The LG enters into a contract with a private party to undertake the investment. The private party assumes the assets of the LG and undertakes to expand the services according to the terms and conditions of the contract. The private party is allowed to operate the system and to collect user fees to recover its costs and earn a reasonable return on its investment. After the contract expires, the system reverts to the LG or may be contracted out again by the LG. Not yet utilized by the LGs in Uganda.
   e. *Build – Operate – Transfer (BOT)* – The private sector finances the investment, operates it for a certain period of time after which the asset is transferred to the LG. The private party is allowed to collect user fees to recover its costs and earn a reasonable rate of return on its investment. The LG and the BOT proponent negotiate on the risk sharing. There are several variations as earlier observed in chapter 4. Some local markets and slaughter houses have symptoms of this arrangement.

   We note that the water supply in over 60 towns in Uganda use service and management contracts; these arrangements also prevail in the waste collection service. **Our study therefore equates such contracts to private provision.**

4. ***Private-Not-For-Profit Entities*** – Private, socially-oriented entities providing parallel or complementary services to citizens.
   a. *Non Governmental Organizations / Civil Society Organizations* (*NGOs/CSOs)* – Local Government enters into some type of working arrangement where the NGO

or CSO participates in the delivery of the activity or service. The agency could be engaged through a contribution agreement or some other legal instrument. Common in waste collection and public health services.

b. *Community Based Organizations (CBO)* – LG creates similar arrangements with groups involved in similar or complementary activities and services.

5. ***Public/Private Joint Venture Agreements*** – In this case, the agreement may involve the creation of a new limited company where government and the private sector party are shareholders and participate in the management and financing of the company in a manner specified in the shareholder agreement. Not common.
6. ***Government Owned and Controlled Corporations*** – LG creates a wholly owned and controlled corporation. A separate board of directors manages the corporation on an arm's length basis; however, appointments to the board are ultimately controlled by the LG. The LG finances the activities of the corporation in whole or in part. Not common at local government level but being used at national level via 'corporitization'. Buchanan and Bowman (1990) define corporatization as the process where functions that were undertaken by government departments are transferred to state owned corporations. According to Ruiters, (2005) corporatization, where services are ringfenced into stand-alone 'business units' owned and operated by the state but run on market principles. Elected officials still set standards and service delivery goals for a corporatized service unit, as well as monitor and evaluate its activities, but the daily management and long-term planning of the unit are done by the ringfenced management team.

   In the case of Uganda, National Water and Sewerage Corporation (NWSC) which is mandated to supply water to large towns is an example of a corporatized institution. **Our study, equates such arrangement to public sector provision.**

7. ***Service Agencies*** – Local government creates a business-like entity through special legislation and financing arrangements.
8. ***Direct Delivery*****:** the LG delivers the services directly through its departments, through business planning, focusing on results, cost recovery, getting the best value for the money, and customer service. This is commonly utilized in waste collection, local markets, public latrines etc.

From the above framework for possibilities we note that there are various alternative service delivery mechanisms (ASDs) available to LGs to enhance service delivery to the communities they serve. Our study will specifically assess clusters 3, 6 and 8 since they are the ones prevailing in the LGs in Uganda.

5.5 Local Government reforms in Uganda

Since the 1986, The Uganda Government undertook structural reforms with a view to promoting efficient service delivery. Decentralization and private sector involvement in service delivery were seen as public sector reform strategies to increase and enhance service delivery. Uganda's 1995 constitution and 1997 Local Government Act specify five levels of local government – district, county, sub-county, parish and village, among

which the 79 districts and more than 900 sub-counties have political authority and financial autonomy. Each of the decentralization efforts (political and financial) had specific goals of improving service delivery (Muriisa, 2008).

In the second schedule of the Act, functions and services of local government are elaborated which among others include provision of public street lighting, street maintenance and repairs, waste collection and street cleaning services, water supply, municipal markets, recreation and park maintenance, public transport terminal management, and other decentralized services. The local governments are obliged to establish, prescribe, control and administer the form in connection with these services; they have the power to provide such services directly (in-house), or utilise the private sector or share responsibility with the private sector. The choice of form is supposed to be premised on the grounds of efficiency and effectiveness of the modality.

Local Government Set Up in Uganda

The basic organ of local government is the district council (or city council in the case of urban areas). In the districts, there are town councils and sub-county councils. In some areas there are big towns which are municipal councils.

The system of local government is based on the district, as a unit under which there are lower local governments and administrative units. Within each area the highest political authority is the council.

As of 2007

Local Governments Level	Number
No. of Cities	1
No. of Districts	79
No. of City Divisions	5
No. of Municipalities	13
No. of Municipal Divisions	37
No. of Sub counties	958
No. of Town Councils	83

Substantial powers, functions, and responsibilities are devolved to local governments by the LGA. Local Governments have the powers to make and implement development plans based on locally determined priorities. They have the power to make, approve and execute their own budgets; and to raise and utilize resources according to individual priorities after making legally mandated disbursements. Similarly, local governments can make ordinances and by-laws, which are consistent with the constitution and other existing laws, ordinances and by-laws. In addition, local governments are mandated to hire, manage and fire personnel. They manage their own payroll and separate personnel systems. The district, city and municipal councils have mandate to manage the procurement process in accordance to the public procurement laws; which gives them mandate to source service providers.

Challenges of the reform process in Uganda

Donor influence, institutional collapse, lack of resources and inability of existing structures to mobilize resources and deliver services led to the decentralization of power and responsibility to LGs (Golooba, 2003). It was envisaged that new local level institutions with devolved powers and responsibilities would do a better job of revenue collection and service delivery than weak and over burdened centralized structures. However, it was later argued that local level institutions showed no capacity to deliver services any more than their central level counter parts and the need, on grounds of efficiency and effectiveness, to involve the private sector.

The local governments (LGs) inherited stark backlogs of infrastructure and poor quality service delivery systems and yet the resources available to them are insufficient to make real improvements and expansion. Resources both financial and human are often unable to meet the unlimited requests for physical and social infrastructure. The prevailing facilities in most local governments in Uganda were planned to cater for much smaller demands. The expansion in business and industrial development coupled with rapid population growth in the towns is not matched by the rise in the quality and quantity of public infrastructure and services. In Uganda LGs are constantly faced with declining revenue sources due to the scraping of some local taxes; growing service delivery responsibilities due to escalating rural-urban migration and the decentralization policy, which transferred certain tasks to LGs. Hence alternative service delivery approaches that involve the private sector were envisaged as potential substitutes to getting LGs out of this quagmire.

It should be pointed out that the most daunting challenge facing decentralisation as a framework for service delivery is a lack of capacity and personnel at local government level to exercise their responsibility for service delivery. The local governments are inadequately equipped to manage public finances and maintain proper accounting procedures.

We note that since the inception of private sector involvement in local government service delivery, their results or the preconditions for success have yet to be empirically analyzed.

5.6 Chapter summary

We have dealt with local governments and their reformation process in developing countries which simultaneously introduced decentralization (*transfer of roles and responsibilities from the central to local government level*) and private involvement (*transfer of roles and responsibilities from public sector to the private sector*). We have observed that this was done without substantial financial resources' support and capacity enhancement for both the LGs and the private sector. We conclude that inadequate capacities of both the decentralized LGs and the counterparts, the private sector participants provide challenges.

PART THREE: RESEARCH TECHNIQUES AND DESIGN

CHAPTER SIX: PERFORMANCE MEASUREMENT IN LOCAL GOVERNMENT

Having introduced the study areas and units of analysis in the previous chapters, we now detail our research design and techniques. It has been observed by several authors that private provision is likely to be better than public provision when among others factors performance can be measured and evaluated (Leland and Smirnova (2009). In this chapter we explore and understand the conceptual issues to be tested on units/areas i.e. the concept of performance particularly the efficiency component, and why it is worthwhile to utilize them in benchmarking the different modes of local service provision.

6.1 The importance of performance management in local government

Performance is a measure of how well a local government meets its objectives given the external constraints placed on it. Performance management (PM) uses evidence from measurement to support governmental planning, funding, and operations. PM is regarded an ongoing, systematic approach to improving results through evidence-based decision making, continuous organizational learning, and a focus on accountability for performance. It includes the concerted actions an organization takes to apply objective information to management and policy making in order to improve results (Ammons 2008). Better information enables elected officials and managers to understand stakeholder concerns, recognize success, identify problem areas, and respond with appropriate actions – to learn from experience and apply that knowledge to better serve the public.

Why is performance management important?
In many countries performance management has been recognized as a key component of good governance and has played an increasingly vital role in the management of public services (Jeanrenaud et al 2005). It is becoming recognized as an approach that addresses three fundamental challenges of government (NPMAC 2009):

- ***The need to focus the organization on results that are important to stakeholders*** – Performance management begins with setting objectives and targets that are relevant to stakeholders' needs and wishes, and focuses the organization's resources and efforts toward achieving results that will make the most difference to stakeholders.

- ***The need to improve results within resource constraints*** – Governments are constantly challenged to provide higher quality services and improved outcomes within limited resources. Performance management builds a culture of continuous improvement in which organizations are motivated to find and apply interventions that offer the best results for the least amount of money.

- ***The need to gain and keep the public's trust and confidence*** – Performance management promotes accountability and supports confidence in government not only by communicating results but by improving the government's capacity to provide better services.

Jeanrenaud et al 2005 provides a list of the major reasons for the increasing importance of performance management:

- *Fiscal stress:* many local governments, faced with growing pressure on public spending have had to review their budgets and prioritize services in order to make cost savings. Hence the need to secure value for money services has in turn seen LGs focus attention on performance and increased demand for reliable performance information;

- *Managerialism:* over the last two decades managerialist practices have increasingly been adopted by governments at both national and local levels and a range of management approaches adapted from the private sector (including management by objectives, quality assurance and performance measurement techniques) have been used in local public services;

- *Rising public(service users') expectations* has been fuelled partly by better experiences of private provision arrangements and by the way in which they have been encouraged to think of themselves of customers with rights to certain service standards and to redress where services fail; necessitating performance management;

- *Accountability* to the public has been recognized as a key condition of effective governance. Regularly updated and widely reported performance measures provide the public with information that can be used to hold service providers accountable. In some countries local politicians have also become more closely involved in overseeing services and they too have needed better performance data in order to fulfil this role;

- *Benchmarking:* traditionally local public services have not been exposed to direct competition of the kind that exists in the private sector. Comparisons of performance between services and between authorities have increasingly been used as proxies for market signals in order to identify best practice and to highlight instances where services need to be improved;

- *Competitive tendering*: in some countries some local public services have been exposed to competition. In these cases local authorities have had to develop

performance measures in order to develop specifications for tenders and to monitor contract compliance.

Hence, the increasing role and importance of effective performance management has been clearly recognized by Osborne and Gabler 1992, whose work has been a major influence to public sector reform. They argue that effective performance management is a key feature of successful organisations in both the public and private sectors because:

- if you don't measure results, you can't tell success from failure
- if you can't see success, you can't reward it
- if you can't reward success, you're probably rewarding failure
- if you can't see success, you can't learn from it
- if you can't recognize failure, you can't correct it
- if you can demonstrate results, you can win public support
- what gets measured gets done (Osbourne & Gabler, 1992)

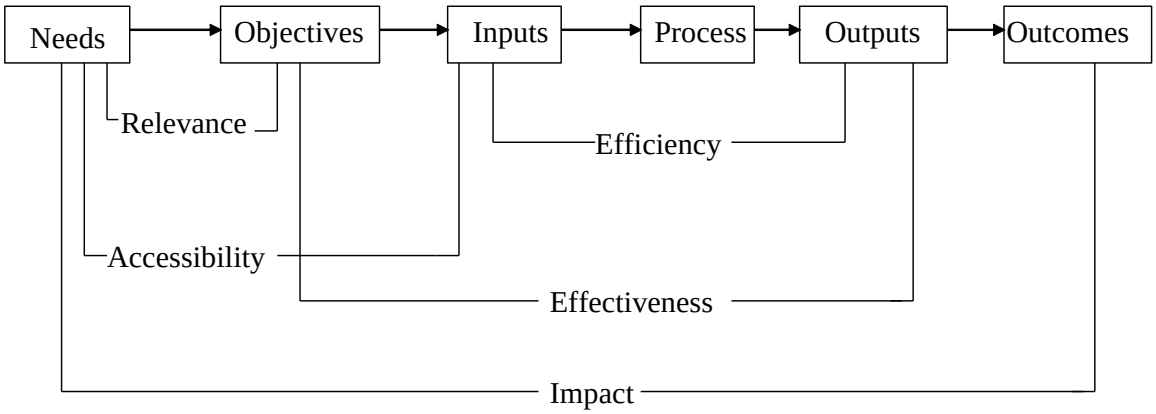
Based on the three authors, (Osbourne & Gabler, 1992; Jeanrenaud et al 2005; NPMAC, 2009), performance management matters to stakeholders who want to see citizens better served by local authorities and their partners. LG managers can use it to ensure that services are improving and are more efficient. Policy makers can use it to ensure that policy decisions are being carried out and citizens are being well served. Increasingly, citizens can use aspects of performance management, such as public reporting, to hold the local authorities to account. As the SCRCSSP 1997 observe that providing an indication of how much performance differs and which organizations are the best performers is potentially of value to the providers of funds and the clients of these services – members of the community – as well as to those managing the service provision – governments, departments and service providers. Concerned citizens are able to use publicly available information on the performance of different service providers to make governments more accountable for the expenditure of taxpayer funds, and to exercise client choice more effectively. Our study therefore is an effort to provide insights on the performance of LGs and service providers.

6.2 Performance Measurement

Performance measurement and performance management are often used interchangeably; however, they are distinctly different. For decades, some governmental entities have measured outputs and inputs, and, less commonly, efficiency and effectiveness (NPMAC, 2009). Performance management systematically uses measurement and data analysis, as well as other tools, to facilitate learning and improvement and strengthen a focus on results. Performance measurement helps to monitor performance. Early practitioners of performance measurement who relied on rudimentary measures of inputs and outputs have been frustrated that their investments did not yield the benefits outlined above (NPMAC, 2009). Hence performance can be measured using the dimensions of economy, efficiency or effectiveness and their respective indicators. Figure 6.1 provides a

basic performance framework for LGs that can be useful in understanding and identifying measurement variables.

Figure 6.1 Basic Performance Framework for LG



Adapted from Yawe 2006

Explaining the framework

- ***Objectives*** are the intended outcomes of the policy and programmes need to be considered in order to ensure that the choice of measures is right from the start

- ***Inputs*** - the resources used to produce a service including finance, staffing, equipment and land/property. Inputs are usually measured in financial terms i.e. the costs of acquiring or using a resource but they can also be measured in terms of other physical units such as the numbers of staff, hours of staff time, number of skips (containers) or trucks used in waste collection.

- ***Process*** encompasses the activities, systems, cultures and procedures required to design and deliver a service. They may include organisation and management, infrastructure and technology and procedures such as partnership working between agencies and service user involvement.

- ***Outputs*** - the units of service delivered to users. They can be measured in terms of capacity (e.g. the number of facilities built, volume of waste collected, volume of water delivered), throughput (e.g. the number of customers/clients using facilities or taking up places, frequency of waste collection) or level of service (e.g. hours water is available in a day). Related measures include levels of awareness of the availability, levels of citizen participation in the design and delivery of services, and the level of take-up of services.

- ***Outcomes*** - the effects that a service has both directly on users/recipients and indirectly on the wider community/locality. Outcomes (sometimes referred to as impacts) may include intended and unintended effects; they may be positive or negative; and they can include political outcomes (such as increased public participation) as well as economic and social impacts. Measures of outcomes often include user satisfaction.

- ***Efficiency*** – is the extent to which the objectives have been achieved while at the same time minimizing the use resources. It is the success with which an organization uses its resources to produce outputs; that is the degree to which the observed use of resources to produce outputs of a given quality matches the optimal use of resources to produce outputs of a given quality.

- ***Effectiveness*** – refers to the extent to which outputs of service providers meet the objectives set for them by government or achieve government's desired outcomes; without any account being taken at this level of the costs (of production factors) incurred or the volume of outputs produced. Thus an organization is effective when it attains the targets set for it (targets for revenue, improvements to customer service, social integration, etc).

  Askin and Standbridge (1993) define effectiveness as doing the right task, efficiency as doing a task right, and performance as accomplishing the right task efficiently. Sink and Tuttle (1989) maintain that system performance is a function of the complex interaction among seven criteria. These criteria are efficiency, effectiveness, quality, productivity, quality of work life, innovation, and profitability.

- ***Impact*** is concerned with the 'net added value' of a service in terms of its overall benefit to a community or locality. This includes indirect effects (such as 'capacity-building' in economic, social and political terms) and unintended 'side-effects'. Cost-benefit or cost-effectiveness analyses measure so-called 'social efficiency' – the relationship between final outcomes in terms of a 'net social benefit' and 'social costs'. They can incorporate user costs and indirect costs, as well as direct production costs. As with quality and effectiveness, user or public satisfaction is often a useful measure of impact.

Why Performance Measurement

According to SCRCSSP 1997, Governments can use performance measures to:

- stimulate policy development by highlighting the effect on the performance of government determined aspects of the operating environment (for example, client choice, extent of competition). Performance measurements are used as a focus for decision making and action, enabling service providers to prioritize the achievement of the most important outcomes. The process of discussing targets can in itself help to clarify options, identify the trade offs that exist and encourage innovative thinking about how best to achieve policy outcomes; *our study aims to refocus and emphasizing thinking about targets.*
- facilitate monitoring of public sector managerial performance and improve accountability within government. Performance measurement results can be used to a check on service providers (who can be public or private) to ensure that they are delivering the best possible value for service users and tax payers. Performance measures help local managers and politicians and national policy makers to know how well services are performing and to alert them to instances where corrective

action is needed; *in assessing the relative efficiency our study provides this knowledge.*

- promote 'yardstick competition' by providing a means of comparing the performances of those responsible for similar aspects of service provision where there is little direct competition in input and/or output markets. Performance measurement can be used as a means of comparing the performance of different services and different service providers in order to identify best practice and to choose between alternative providers. Comparative performance measurement is also a powerful management tool for both agency managers (such as department heads) and individual service provider managers (for example, hospital or police station managers). The objective of comparative performance measurement is to facilitate a program to improve performance, not to provide a simple grading of service providers. Identifying major gaps in performance can provide the impetus for an organization to fundamentally rethink how it does things. *Using DEA, our study provides an opportunity rethink the modes of service delivery.*
- assist the resource allocation/budgeting process by providing a means of allocating funding based on agreed plans for improved performance, rather than on the assumption that performance should equal past levels. The process of performance measurement has the value of identifying performance variations, and hence providing encouragement and direction for performance improvement. First, measuring performance requires a clear understanding and articulation of the resources being used, and the outputs being produced, in the process of providing a service. Making the inputs and outputs transparent can allow a critical assessment of why particular resources are being used to provide particular outputs, clarifying service provision objectives and priorities. *Our study endeavours to prescribe inputs and outputs.*

The objectives for performance measurements are in line with the envisioned objectives of our research study.

6.3 The Concept of efficiency

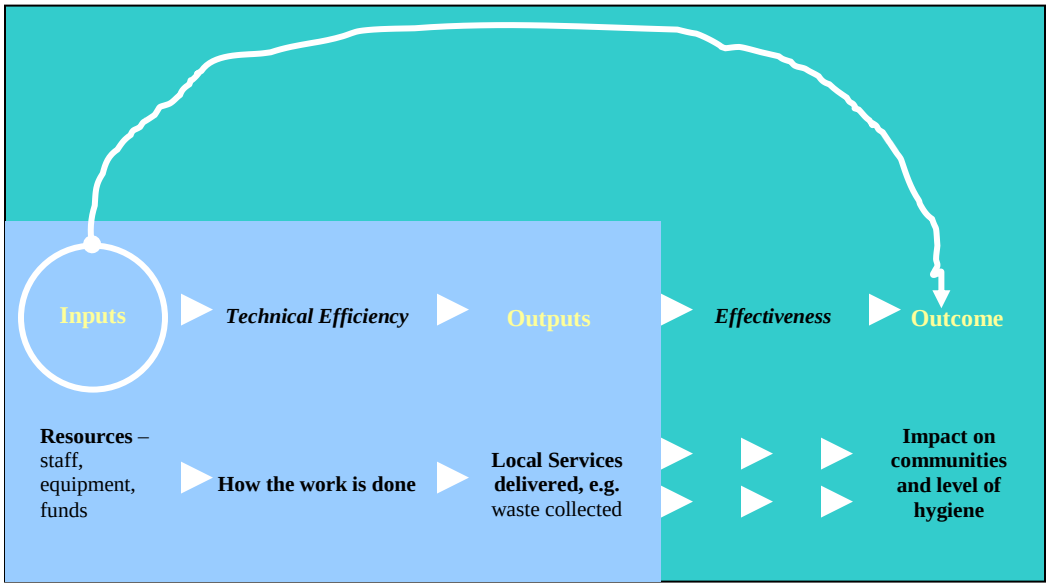
Government world-over stake their political credibility on delivering significant and noticeable improvements to public services. Annually, through budget proposals, substantial increases in resource allocations to various sectoral activities are made and targets set. The extent to which these increased resources are translated into improved outcomes for citizens and/or users will depend on the efficiency, or productivity, of public service providers. Additionally, the extent to which public sector productivity improvements materialize will have implications for the government's aim of increasing the rate of productivity.

These targets raise issues about how the efficiency of individual service providers is measured, and also about whether the set of efficiency measures produced can be used to give service providers incentives for improved performance. Reliable measures of both outcomes and provider efficiency are particularly important if they are to be used to

target resources to more efficient providers, to act as a motivational tool or to detect failing providers.

The main concern of our study is efficiency of service providers (whether public or private). It is therefore imperative that the concept of efficiency is explored and understood, since as depicted in the Figure 6.**2**, there are many possible dimensions to the concept of "efficiency".

Figure 6.2 Diagrammatic presentation of The concept of Efficiency



Adapted from: Spottiswoode, (2005)

The diagram shows the relationship between inputs, outputs and outcomes. The typical interpretation of "efficiency" considers the relationship between inputs and outputs – shown as shaded. The widest concept of efficiency then considers the relationship between inputs and outcomes – the bold arrow at the top of the diagram. The widest definition of efficiency implicitly captures two concepts:

- *Technical efficiency:* ensuring that the highest level of outputs is delivered for a given level of inputs. Outputs or services will often require a variety of inputs. The relationship between inputs and outputs may change with innovation in service delivery, organizational improvements or changes in technology
- *Effectiveness:* ensuring that the right outputs are delivered to meet the desired overall outcomes, and that the outputs are of good quality.

Hence the most common efficiency concept is *technical efficiency*, a*llocative efficiency, and dynamic efficiency.*

Technical or productive efficiency – is the ability of firms to use the minimum inputs to achieve a particular level of output. This obviously requires choosing the appropriate level of technology and machinery, good management practices and work procedures and elimination of wastage. Hence technical efficiency implies firms are:

- ✓ Using the least costly labour, capital and land inputs;
- ✓ Utilizing best available technology;
- ✓ Employing best production processes;
- ✓ Exploiting all potential economies of scale; and
- ✓ Minimizing the wastage of resources in their production processes

A firm operating at best practice in comparison to all others in the sample is said to be totally technically efficient. Firms are benchmarked against the best and their technical efficiency is expressed as a percentage of best practice. Managerial practices and the scale of operations affect technical efficiency. Hence, technical efficiency could be defined as using the least amount of resources to produce a given good or service. In other words, output is being produced at the lowest possible unit cost. Our study concentrates on technical efficiency.

Allocative efficiency – is the market condition whereby resources are allocated in a way that maximizes the net benefit attained through their use. Allocative efficiency is achieved when firms produce the mix of goods or services most desired by consumers. That is resources are allocated to industries and firms in accordance with how much consumers want the output they produce. Firms can achieve allocative efficiency by producing up to the point that price is equal to the cost of producing the last unit of the good or service. Hence allocative efficiency deals with the minimization of cost of production with proper choice of inputs for a given level of output and set of input prices, assuming that the organization being examined is already fully technically efficient. Allocative efficiency is expressed as a percentage score, with a score of 100 percent indicating that the organization is using its inputs in the proportions which would minimize costs. An organization that is operating at best practice in engineering terms could still be allocatively inefficient because it is not using inputs in the proportions, which minimize its costs, given relative input prices.

Dynamic efficiency – is having organisational structures that can ensure that efficiency is achieved over time. That is technological improvements are adopted, and innovations made that ensure that firms and industries can rapidly adapt to changing market conditions. Time is the central difference between allocative and dynamic efficiency. Whereas allocative efficiency deals with the most efficient use of resources at a given point in time, dynamic efficiency deals with the evolution of a more efficient mix of resources for the market over time. It relates to efficient technology choice and timely and efficient capacity investment decisions both on the supply side and the demand side of the industry. Hence, dynamic efficiency requires that proper incentives exist to make long-term decisions, such as those about investment and the introduction of new products and services. It also requires that the effects of decisions in one period be taken into account for future periods.

6.4 The Basic Efficiency Measurement Model

The whole idea of efficiency measurement relies on production theory, which sees a firm as a production system where inputs are the resources that are utilized by the firm or the organization and are transformed into desirable outputs, hence:

Efficiency = Inputs / Outputs

This measure of efficiency had its own drawbacks, some of which are described below.

a. Inability of the model to incorporate multiple inputs and outputs.
b. Real life scenarios that incorporate other process dimensions such as quality and outcomes cannot be easily incorporated in one single equation.
c. Environmental factors that affect the process under study cannot be easily modeled.
d. As a continuation of a. above, in the presence of multiple inputs and outputs, varying units of the variables cannot be handled.

Farrell 1957, refuted the idea of an absolute measure of efficiency and proposed that efficiency be measured relative to a best-performance frontier determined by a representative peer group. He further provided the definitions and computational framework for technical and allocative (in)efficiency. His approach can best be explained graphically, by considering a process that produces a single output, Q, with two inputs, *x* and *y* (see Figure 5.3).

In explaining Farrell's ideas, we begin with the assumption that there exist a number of similar organizational units, each producing different amounts of outputs or outcomes, *y*, given a different combination of inputs, *x*. The economic theory of production is based on the construction of a production set *P* containing every feasible combination of these *x* and *y*.

$$P = \{(x,y) | \ x \text{ produces } y\} \qquad (6.1)$$

The production set can be adjusted to include the impact of environmental factors, *z*, which lie outside the control of the organisational unit.

$$P=\{(x,y,z) | \ x \text{ produces } y \text{ given } z\} \qquad (6.2)$$

As well as containing all technically possible input-output combinations, it is possible to identify a frontier of *P* which represents the maximum feasible level of *y* given *x* and *z*. Any organizational units which lie on this frontier can be said to be 'technically efficient' inasmuch as they make the best possible use of the inputs. However, there will also be at least one point on the frontier that is not only technically efficient but 'allocatively efficient' as well. Allocative efficiency captures the extent to which inputs are used in correct proportions, given their prices and marginal productivities.

These two concepts can be illustrated using Figure 6.3[2] below.

This represents the production of a single output using two inputs, labour and capital.

The 'isoquant' curve QQ represents every combination of the two inputs that together produce an equal amount of output. By contrast, the 'isocost' line CC represents every combination of inputs that can be afforded within a set budget, *B*. This might be based on a wage rate, *w*, for labour and an interest rate, *r*, for hired capital, so that (*w* x labour) + (*r* x capital) = *B*.

Clearly, any unit on QQ is technically efficient since it is impossible to produce any more output without increasing at least one of the inputs. Similarly, any unit on CC is allocatively efficient since, to remain within budget, any increase in one input must be offset by a reduction in the other.

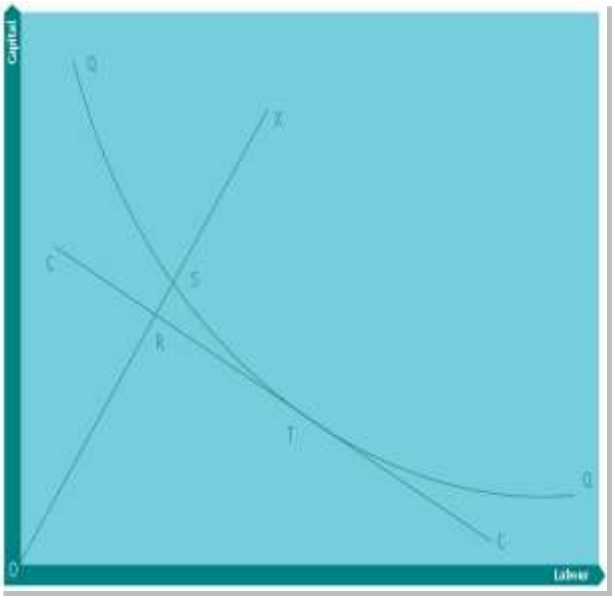


Figure 6.3 **Graphic Interpretation of Technical and Allocative**

An organisational unit at point T (where the line CC just touches the curve QQ) is therefore both technically and allocatively efficient. Now suppose there is an organisational unit at point X producing the same amount of output as one on QQ. Clearly, it is both technically and allocatively inefficient. One way to estimate these inefficiencies is to use the radial distance of X from the origin.

OS/OX is clearly proportional to the distance that X is from the isoquant curve QQ and provides a measure of technical efficiency. Similarly, OR/OS gives a measure of allocative efficiency. These can then be combined to measure overall efficiency:

Overall efficiency = Allocative efficiency x Technical efficiency = $\frac{OR}{OX} = \frac{OR}{OS} X \frac{OS}{OX}$

The concept of allocative efficiency can also apply to the situation where there is a single input (e.g. net expenditure) and multiple outputs or outcomes. The difference is that, in many cases, these outcomes cannot be priced directly and so some other way must be found to judge their relative merit. For example, key stakeholders could be asked to quantify the relative importance of each outcome on some common measure.

[2] Graphic Diagram adapted from Spottiswoode, (2005)

6.5 Why we choose technical efficiency?

Our study concentrates on technical efficiency of service providers. The main reasons for examining technical efficiency as opposed to another type of efficiency are expressed by Kumbhakar and Lovell (2000). They state that technical efficiency is a purely physical notion that can be measured without recourse to price information and having to impose a behavioral objective on producers. It is well known that price data is often difficult to find and/or flawed especially when dealing with the public sector. For this reason alone, one might decide to focus on technical efficiency. On the other hand, cost, revenue and profit efficiency are economic concepts whose measurement requires both price information and the imposition of an appropriate behavioral objective on producers. In addition, measuring output based technical efficiency seems to be more relevant in real life scenarios. A firm could more easily attempt to increase output with a given amount of inputs rather than decrease inputs to produce a given amount of output. In many cases, inputs lack liquidity or are costly to eliminate (e.g. unemployment benefits).

6.6 Chapter Summary

In this chapter we have introduced the wider picture of performance management and its usefulness. We have underscored the need to keep track of performance of the service providers so that their praise is based on real facts and not mere rhetoric! Measuring performance especially its sub-element efficiency on a benchmark basis enables comparison of the local service providers such that the choice between the public and private sectors is not based on mere assumptions like apparently it is!

CHAPTER SEVEN: TECHNIQUES FOR MEASURING EFFICIENCY

7.1 Introduction

The previous chapter has highlighted the role of performance management and the framework available to ensure performance is measured for the benefit of the organization. Since 1978 remarkable progress has been made in the theory and empirical estimation of models of efficiency. Ratio analysis and frontier techniques are often used in the measurement of efficiency, but the latter have been widely employed in the analysis of the efficiency of local government services. In this chapter we discuss the alternative efficiency measurement techniques zeroing on our choice – Data Envelopment Analysis (DEA).

7.2 Ratio Analysis

The measurement of productive efficiency by means of ratio analysis generally entails computing and comparing one or both of the following two types of ratios, namely, input to output ratios as well as cost of inputs to output ratios (Bitran, 1992). The input to output ratio approximates technical efficiency, whereas the cost of inputs to output ratio approximates economic efficiency. Simple ratio measures, such as water delivered per staff and operating costs per connection, are widely used performance measures. The popularity of these ratio measures, stems from the fact that they are easy to construct and also easy to interpret. However, in many cases these ratio measures are unreliable indicators of the "true productivity" of the organization. For instance a particular water service provider firm could have high operating costs per connection because it is poorly managed and wasteful, or it alternatively it could be due to factors not under the immediate control of the managers, such as:

i) having high volumes per connection (due to a large proportion of non-residential customers or due to climatic factors);
ii) servicing an area with a low population density;
iii) owning assets which have a high average age and hence require more maintenance costs;
iv) being a small business and hence suffering from diseconomies of scale; and so on.

Furthermore, a major shortcoming of this method is its inability to handle multiple input versus multiple output production. This shortcoming notwithstanding, our study finds ratio analysis useful when assessing the performance of service providers of street lighting which did not make it to our major study area due to data constraints.

7.3 Frontier Methods

Farrell (1957) is generally regarded as the father of frontier techniques, although their roots are to be found in Koopmans (1951) and Debreu (1951). The basic aim of frontier techniques is to model the production process in order to explain the relative efficiency of different production units. Thus the production frontier is made up of the most efficient

production units in a given sample (whether they be firms, other organizations or any other decision-making level). The efficiency of the other units is assessed relative to this empirical frontier.

Globally research on the efficiency of local government varies widely in many aspects, ranging from their aims to their conclusions. From De Borger and Kerstens (2000) two strands of empirical research in local government efficiency literature is identified; on one hand, there are studies that evaluate efficiency in a global way covering all or at least several services provided by local governments for instance, Tickner & Mcdavid (1986); Lawarree (1986); Domberger et al (1986); Cubbin et al (1986); Burgat & Jeanrenaud (1990); De Borger et al. (1994); De Borger and Kerstens (1996); Worthington (2000); Prieto and Zofio (2001); Balaguer-Coll et al. (2002); Loikkanen and Susiluoto (2005); Moore et al 2005; and Afonso and Fernandes (2006, 2007) among others. On the other hand, there are studies that evaluate a single local service, as it is the case, for instance, waste collection Burgat and Jeanrenaud (1994); Bosch (2001); and Worthington (2001); fire protection Bouckaert (1992); local police units Davis and Hayes, (1993); water provision, Kirkpatrick (2006); and Public libraries Vitaliano (1998)

The difficulty in identifying a straightforward process of efficiency measurement is not surprising in view of the nature of the phenomenon being studied. Inefficiency is inherently unobservable. Estimates of inefficiency must therefore be derived indirectly, after taking account of observable phenomena. In crude terms, this entails the following process:

i) measuring observable phenomena (for instance, inputs, outputs, prices, costs);
ii) specifying some form of relationship between these phenomena;
iii) defining 'efficient' behavior;
iv) calculating the difference between each organization's observed data and the maximum achievable as defined by the specified relationship; and judging how much of the difference is attributable to inefficiency.

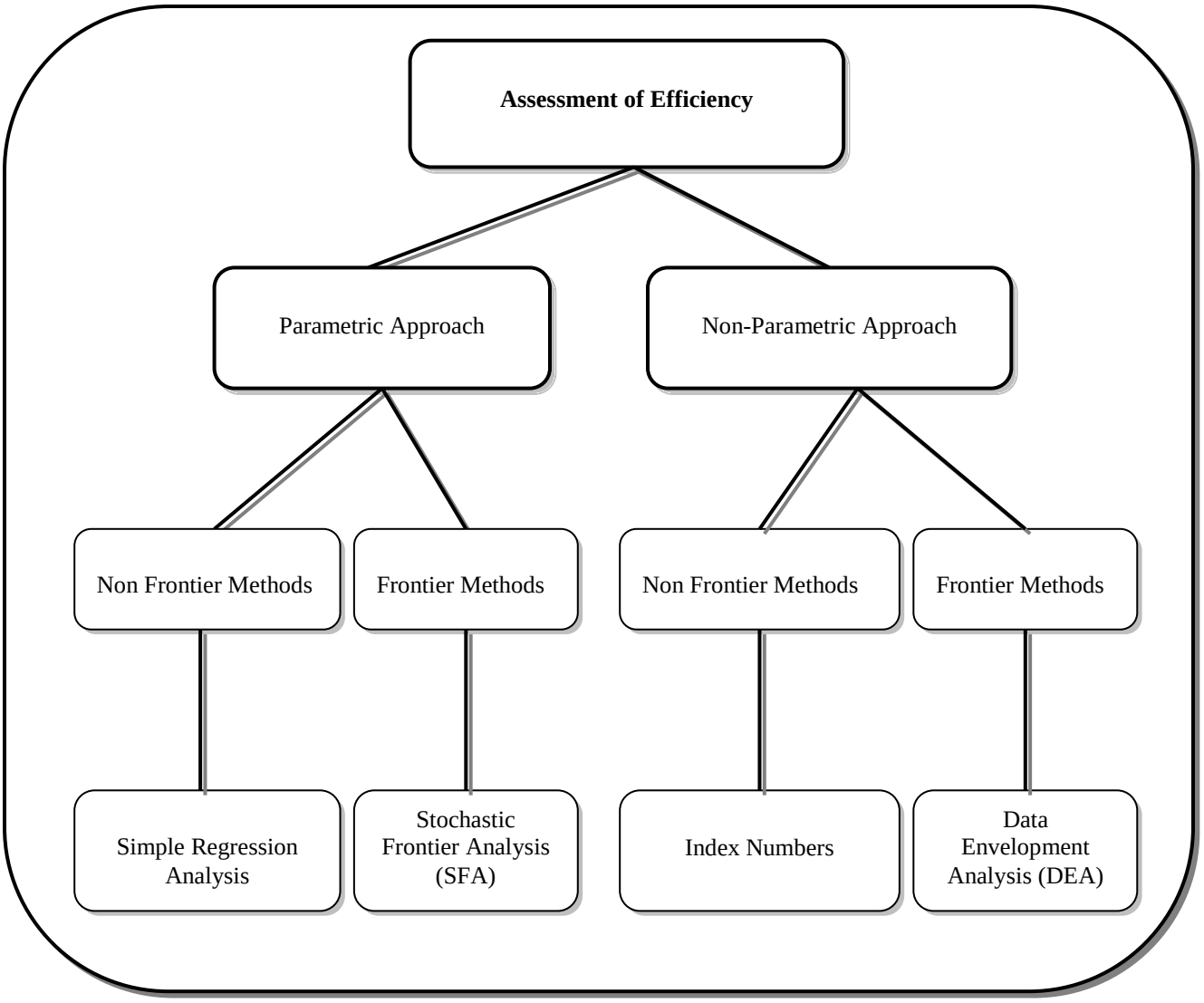
More detail on the theoretical underpinnings of the approaches appears in Greene (1993); Coelli et al. (1998).

The choice of estimation method has been an issue of debate, with some researchers preferring the parametric approach and others the non-parametric approach. Most of the studies above have based their analysis either on parametric or on non-parametric methods. The main difference between the parametric approach (or, more strictly, the statistical approach) and the non-parametric approach approaches is that the former specifies a particular functional form for the production or cost function while the latter does not.

As depicted in Figure 7.1 the parametric approach relies on econometric techniques and includes simple regression analysis and Stochastic Frontier Analysis (SFA). Whilst simple regression analysis typically seeks to estimate a production or cost function, SFA is an extension of that methodology to estimate the "frontier" of a set of functions with different underlying levels of efficiency.

The non-parametric approaches use mathematical programming techniques, and the main nonparametric frontier analysis technique, known as Data Envelopment Analysis (DEA), can be seen as an extension of the simple technique of index numbers.

Figure 7.1 A possible taxonomy of efficiency techniques



Adapted: Sarafidis, (2002)

Simple Regression Analysis

Simple regression analysis or ordinary least squares (OLS) regression entails the use of the method of least squares for estimating – among other statistical relationships between variables – production or cost functions and thereby for measuring relative efficiency within a sample of comparators. Least squares is a method for fitting the "best" line to the sample and involves minimising the sum of the squared (vertical) deviations of actual observations from the fitted line. One way of determining whether a relationship exists between inputs and outputs is to construct a linear regression model that can be written as follows

$$y = a = \beta' x + \mu \text{ where } \mu \sim N(0,\sigma^2) \qquad (7.1)$$

and y represents the single output (or input)
x represents the multiple inputs (or outputs)

In the simple case of a single input and output this is equivalent to drawing a line of best fit between the data points, as shown in Figure[3] 7.2. The dashed lines, known as 'residuals', measure the vertical distance of each data point from the regression line. The assumption that the μ term is normally distributed in Equation 7.1 means that this line is constructed in a way that minimizes the sum of the squared residuals. This is what is meant by 'best fit' and it is why the technique is also known as Ordinary Least Squares (OLS).

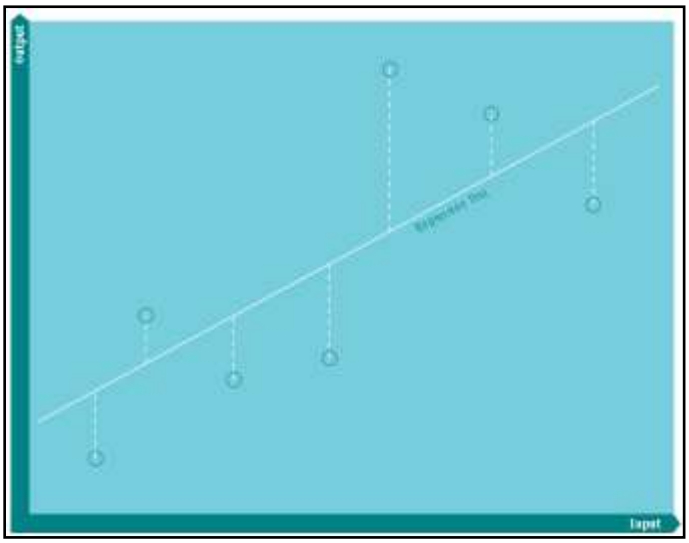


Figure 7.2 Ordinary Least Squares regression

[3] Graphic Diagram adapted from Spottiswoode, (2005)

Note that the stochastic error term μ also means that the regression line does not model the actual relationship between the input and the output. Instead it represents the best guess of what this relationship might look like.

Figure 7.3 indicates that the actual relationship could be somewhat different.

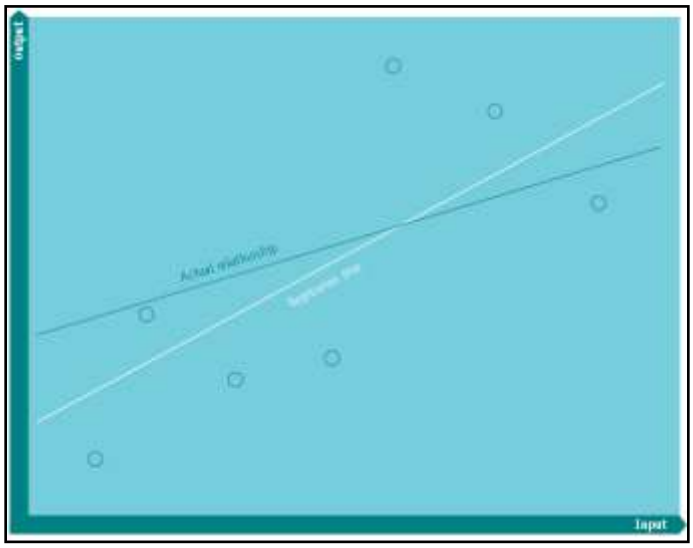


Figure 7.3 Regression Versus Reality

Stochastic Frontier Analysis (SFA)

SFA is identified as an extension of the classical linear regression model. Instead of estimating a line of best fit, SFA estimates a frontier that encloses the data, based on an estimate of organisational inefficiency. The technique was initially developed by Dennis Aigner, Knox Lovell and Peter Schmidt in 1977 (Aigner et al. 1977). The main technical difference between SFA and classical linear regression is that instead of using a normally distributed, symmetrical error term, SFA uses a composite error term.

$$y = \alpha + \beta' x + \varepsilon \text{ where } \varepsilon = \mu - u \qquad (7.2)$$

$$\mu \sim N(0,\sigma^2 \mu) \quad u \sim f(0,\sigma^2 u)$$

and x now represents an $1xs$ vector of inputs (and input prices)

Equation 7.2 represents an SFA production function, where u is a non-negative variable representing forgone output. For a cost function we would use $\varepsilon = \mu + u$ where u represents unnecessary expenditure.

In Figure[4] 7.4, the single data point above the stochastic frontier is 100% efficient. The deviation between it and the frontier is entirely accounted for by data error. More typically, the distance between an organisational unit and the frontier will be partly attributable to data error (μ) and partly attributable to inefficiency (u).

The distribution of the inefficiency component must be decided upon prior to estimation. Common forms include half-normal, exponential or truncated normal forms. However there exists little evidence as to which is the most suitable, (The single, overriding criterion is that the distribution should be non-negative), and indeed this may be an empirical matter, dependent upon the nature of the output being produced.

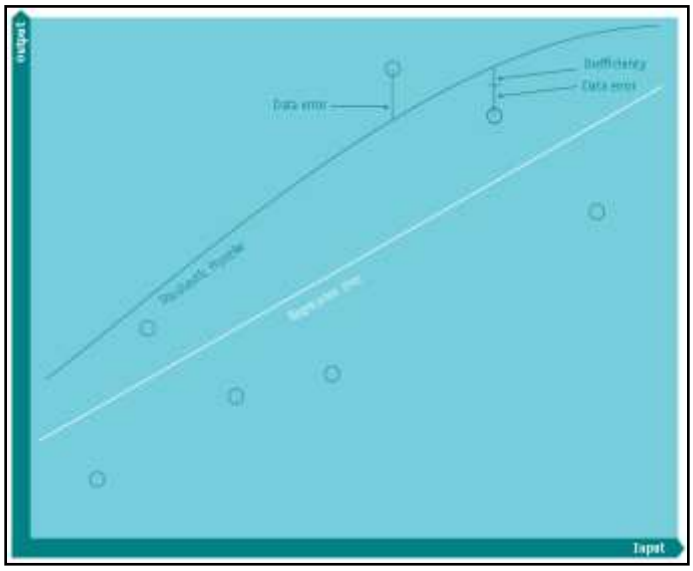


Figure 7.4 Stochastic Frontier Analysis

Data Envelopment Analysis (DEA)

Data Envelopment Analysis (DEA) was originally developed in 1978 by Abraham Charnes, William Cooper and Edwardo Rhodes. It represents a specific example of a more general technique known as 'linear programming', the purpose of which is to maximize (or minimize) a mathematical function, subject to a number of constraints.

A piece-wise surface (frontier) over the data, consisting of input and output variables, for a sample of firms can be constructed and the efficiency of each firm is measured through calculating the distance between each data point and the point on the frontier, and lies between 0 and 1. The frontier represents the most efficient firms with technical efficiency equal to one, the so-called peer firms. DEA is focused on measuring the efficiency of production, that is, production efficiency for each production unit of a set of comparable producing units. Comparability means that the set of producers is producing similar outputs using similar inputs with the same technology. DEA focuses too on productive efficiency to the extent that it can be determined by the decision makers of the producing unit; hence, the reference to the producing units as decision-making units (DMUs) and DEA's value as a management tool.

[4] Graphic Diagram adapted from Spottiswoode, (2005)

Given a collection of $i = 1, 2, \ldots, n$ organizational units (also known in the literature as 'decision-making units', or DMU's) DEA attempts to maximize the ratio of outputs y to inputs x by attaching weights in order to show each DMU in its best light, subject to the constraint that no other similar-sized DMU can achieve an efficiency score greater than one with the same set of weights.

In Figure 7.5, DMUs A, B and C together define the efficiency frontier. By contrast, DMU X clearly lies inside this frontier and its vertical distance from this frontier can be used to calculate its efficiency (around 40%). DMU's B and C provide a reference 'peer group' which can be used to set input minimization or output maximization targets for X.

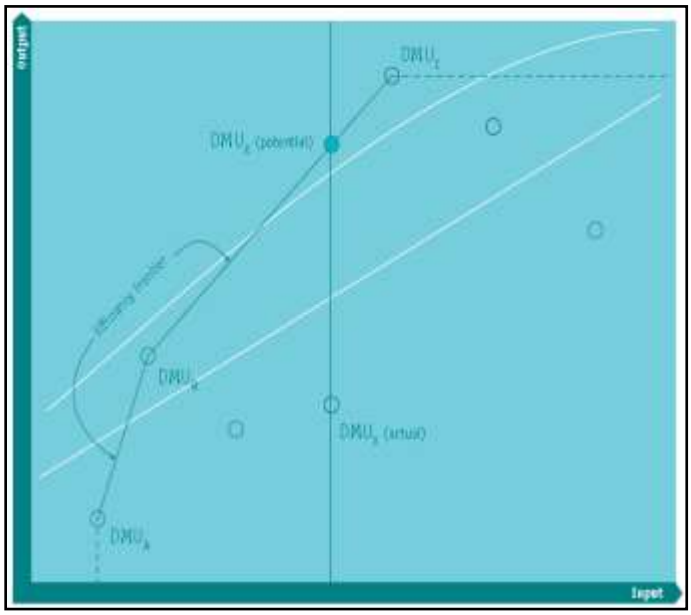


Figure 7.5 Data Envelopment Analysis

Detailed discussion on DEA appears in Section 7.11

Stochastic Frontier Analysis Versus Data Envelopment Analysis

There are basically two approaches for estimating the comparative efficiency of organizational units. The two methods that have been proposed are stochastic frontier analysis (SFA) and data envelopment analysis (DEA). It is important to ascertain whether these techniques are really robust and general enough to achieve the purposes for which it has been suggested they are used.

The dots represent observed input and output combinations for six organizations. The two sets of lines (the solid curved line and the dotted line made up of lots of straight segments) are 'frontiers' and show the maximum output that could be produced for each level of input. The two frontiers represent the outcomes of the two methods of measuring efficiency, SFA and DEA.

Stochastic frontier analysis **–** uses statistical methods to fit a frontier like the solid curve in Figure 7.6. The idea is to identify the relationship between output and input(s) whilst allowing for two types of deviation from this relationship.

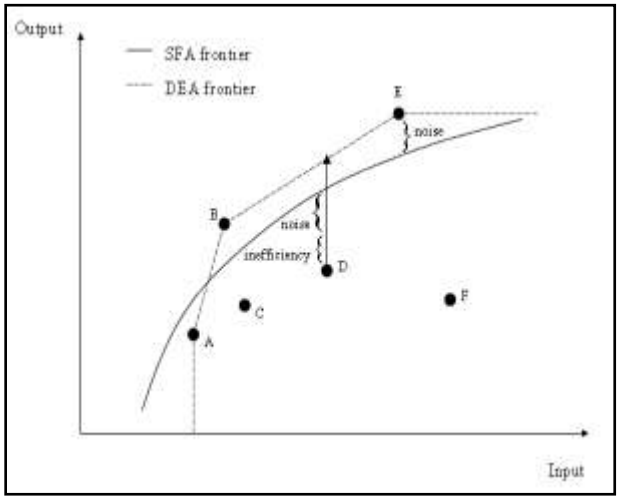


Figure 7.6 Comparing SFA and DEA

One is statistical 'noise' – in other words, random variations in the data caused by inaccuracy in the measurement of output and by other errors. This first type of deviation is assumed to be zero on average, so that, on average, output is measured accurately (as

long as this noise is not correlated with either the inputs or the second type of deviation, it is of no particular interest). The second type of deviation is a measure of inefficiency. It is one-sided: if a firm were fully efficient, it would be zero, and the more inefficient the organisation is, the more negative the deviation. These two types of deviation from the efficient frontier are shown in the figure by the curly brackets for organisations D and E. In this case, organisations B and E are classed as efficient as they lie above the frontier and organisations A, C, D and F are inefficient to some degree. The extent to which an organisation's total deviation from the frontier is designated to be noise versus inefficiency depends on the choices made about the joint distributions of the two components.

***Data envelopment analysis* –** is a non-statistical approach to the problem of efficiency measurement. Put simply, it takes data on organisations' outputs and inputs, and measures the efficiency of a particular organisation by its distance from the 'outer envelope' of the data. This outer envelope is shown in Figure 7.6 by the dashed line for the case where there are assumed to be variable returns to scale. With this technique, all deviations from the efficient frontier are classed entirely as inefficiency. In the figure, the solid arrow represents a measure of organisation D's inefficiency. Organisations A, B and E are measured as efficient and organisations C, D, and F as inefficient. It is worth noting that this procedure (and this variable-returns-to-scale version of it in particular) can designate an organisation as completely efficient simply because it produces more of a particular output than other organisations. In this single-output example, the organisation that produces the most will find itself on the efficient frontier simply because there is no larger organization with which to compare it.

Issues common to both SFA and DEA

Degrees of freedom

Both SFA and DEA are restricted by the amount of data available. The number of organizational units less the number of parameters to be estimated is known as the 'degrees of freedom' – the larger this number is the better. To understand why, consider the very simple linear regression in Figure 7.2, it has two parameters, the slope of the regression line and the point at which it intersects the vertical axis. Together these define the regression line.

With seven data points it is a relatively straightforward matter to estimate these two parameters. As the number of data points is reduced there is progressively less information upon which to estimate this line. In the extreme, with only one data point, it is impossible to define the regression line (It might seem that, with only two data points, the regression line could be determined exactly (since the definition of a straight line is a construction which connects two points). However, we can see from Figure 7.3 that any such line would not correctly model the actual relationship between the variables.

Issues differentiating OLS, SFA and DEA

SFA recognizes the ***presence of errors*** and aims in principle to separate these error components from the measures of inefficiency. In practice, this effort is not always successful as, typically, the estimated inefficiency component represents a small fraction

of the overall residual variation. This practical touch may cause many problems in the analysis. For example, it can make SFA vulnerable to outliers – that is, to observations that lie well above or below the main cluster of points. The presence of outliers (that is, the presence of large residual variation) in the sample can cause the stochastic frontier model to perceive that there is too much noise in the data and therefore may find little or no inefficiency in the sample, even in cases where there is some. As a result, all DMUs may appear to be almost 100 per cent efficient. In this way, the main potential advantage of SFA of decomposing the residual into noise and inefficiency has turned to be a great disadvantage as it fails to differentiate between DMUs' efficiency.

The deterministic nature of DEA can cause significant problems in the measurement of efficiency when there are outliers in the industry because the method envelops the outermost observations without inquiring whether these observations are genuine or the result of an error. Even a single outlier can result in finding huge inefficiencies for most comparators without this being necessarily true. To remedy this problem and find "sensible" scores of inefficiency, one could take these outliers out of the analysis and proceed without them, although there is no clear way of deciding which firms should be regarded as outliers and which not.

Therefore, we can see that outliers can cause problems in both SFA and DEA but for completely different reasons: while SFA can fail to find any inefficiency at all, DEA is likely to find too much inefficiency in the sample.

SFA has the advantage – compared to non-parametric techniques, such as DEA that it can provide some ***statistical inference*** as to the functional form of the frontier and the significance of individual explanatory factors upon the shape of the frontier. However, it can also be vulnerable to statistical problems of the nature discussed at the end of section earlier. In addition, since the method uses maximum likelihood estimation, there is no guarantee that the final estimators will hold any desirable statistical properties (unbiasedness, efficiency, consistency) in small samples. Unfortunately, it is difficult to define a clear-cut sample size below which inferences become problematic as this will ultimately depend on the quality and nature of the data, the number of explanatory variables and the estimation procedure being followed.

Finally, SFA is also subject to theoretical objections. In particular, the stochastic frontier model is an attempt to describe the true world within a sample of comparators by recognizing the presence of both statistical errors and inefficiency in the data. To cope with this, it makes an assumption as to the functional form of the inefficiency effect. The most commonly used distributions are the half-normal and the exponential distribution. These distributions implicitly assume that there is a large number of relatively efficient DMUs and only few DMUs in the sample are relatively inefficient. In this way the shape of the frontier is almost equally affected by all data observations. In practice, however, most of the DMUs might be relatively inefficient. In this case, both distributions would be inappropriate, as they would attribute equal importance on efficient and inefficient companies in shaping the frontier. This has led to the development of more general — but also more complicated — distributions, such as the truncated-normal and the gamma distributions, for which the algebraic analysis is more complex but still practicable.

The main criticism against using these distributions for decomposing the residual is that there is often no *a priori* theoretical justification for selecting any of these distributions. The estimates of inefficiency may be sensitive to these alternative specifications, although the degree of sensitivity can vary from case to case. Furthermore, the issue of selecting between different distributions according to which one fits best the data is not trivial, as the likelihood function to be maximized in each case is often significantly different.

According to Sarafidis, (2002), compared to OLS and SFA, DEA has the advantage that it does not need to employ an assumption for the functional form of the frontier other than the minimum piecewise and linear condition. As a result, there is no danger of mis-specifying the frontier in this way. On the other hand, this lack of parameterization is also a disadvantage, as it is very difficult to use the data to guide mode choice – for example, there is no proper definition of goodness of fit that would enable comparison of different models during the modeling procedure.

DEA is computationally less intensive than SFA (at least in its basic form) and for this reason the method has been more widely used, especially in operations research. Moreover, compared to regression analysis and partly SFA, DEA has the advantage that it takes into account only the most efficient DMUs in shaping the frontier. DEA adopts the weights for each firm that maximize each firm's relative performance. One of the main shortcomings of DEA for relative efficiency analysis therefore is that rather too many of the firms may appear to be efficient, even if this is not truly the case. This problem can be intensified when the sample of comparators is small and the number of outputs large. This is because the dimensions in which a particular firm can be unique increase and therefore its potential peer group is narrower.

In practice, weight restrictions can be used to ensure that neither exceptionally high weights are placed on a number of relatively unimportant outputs, nor that a relatively important output plays only a minor role in the determination of the efficiency measure. However, there is no single way of selecting weight restrictions and each of them has its own limitations when being applied (Sarafidis, 2002).

A major drawback of DEA is that it attributes all deviations from the frontier to inefficiency. Yet, as with regression analysis, deviations from the frontier may be due to a number of factors other than inefficiency such as omitted cost drivers and measurement errors (Sarafidis, 2002). These factors are not testable. As a result, interpreting DEA scores as measures of efficiency requires a high degree of "blind" faith in the model. In fact, the most that one can argue objectively is that DEA scores show the amount of allowable costs that the model has justified. The remaining gap between the observation and the frontier remains unexplained.

A fundamental difference between SFA and DEA is that, whereas DEA allows the input and output weights to vary freely, the equivalent regression coefficients in SFA are fixed. Related to this, and equally important, is the fact that DEA makes no allowance for data error (although there are techniques that can help to judge whether any DMU is an

outlier). Whilst the parametric approach is guided by economic theory, data envelopment analysis (DEA) is a data-driven approach. The location (and to a lesser extent, the shape) of the efficiency frontier is determined by the data. DEA is based on the notion that an organization that employs less input than another to produce the same amount of output can be considered more efficient.

Summary Comparison of Techniques

Table 7.1 provides a summary of efficiency measurement techniques along with type of analysis as well as the kind of data each respective techniques employs. It compares statistical techniques and mathematical programming. Broadly, ordinary least squares, stochastic frontier analysis and data envelopment analysis are amenable to both cross-sectional, time series as well as panel data although they differ in their assumption with regard to the measurement error.

Table 7.1 Summary of Efficiency Measurement Techniques

Type of Analysis	**Statistical Techniques** Ordinary Least Squares (OLS) and Stochastic Frontier Analysis (SFA)	**Mathematical Programming** Data Envelopment Analysis
Measurement of productivity change through time *Example* Measuring TFP growth/decline for a single entity for a period of two or more years.	***OLS*** • Can be applied to the measurement of productivity change ***SFA combined with Malmquist Index*** • Typically uses panel data; • TFP change can be decomposed into changes in technical efficiency, scale and technological; • Allows for measurement error.	***DEA combined with Malmquist Index*** • Typically uses panel data; • TFP change can be decomposed into changes in technical efficiency, scale and technological; • Assumes no measurement error.
Measurement of relative *technical efficiency* levels at a point in time ***Example*** Benchmarking the technical efficiency of a group of service delivery units of an entity for a given year	***OLS*** • Uses cross-sectional data; • Entities compared with average industry/sector performance; • Assumes no measurement error – residual is attributed to inefficiency. ***SFA*** • Uses cross-sectional data; • Comparison against best performing entity; • Residual decomposed into random error (measurement error) and inefficiency parts.	***DEA*** • Uses cross-sectional data; • Entities compared with best performers in the sample.

Source: Hughes, A (2003

The foregoing methodological and empirical review points to the fact that each broad category of efficiency measurement techniques has particular merits and demerits besides potentially measuring different aspects of efficiency. Given the relative strengths and weaknesses of ratio analysis, parametric and nonparametric techniques as well as the data limitations on inputs and outputs in the local government service provision; this study employs nonparametric techniques to examine the technical efficiency.

7.4 Justification for Using Data Envelopment Analysis in Our Study

DEA has grown in popularity recently such that it has become the dominant approach to performance measurement in many sectors of the economy (refer to Chang et al., 1992; Kittelsen and Forsund, 1992; Kooreman, 1994; Hollingsworth et al., 1999, amongst others). The main attraction of DEA is that it can handle multiple inputs and multiple outputs easily. Additionally, being a non-parametric technique, gives it the added merit of requiring no assumptions with regard to the functional form of the production, cost or profit frontier. This reduces the need for a theoretical exposition of model specification, with the main points of contention focusing on what variables should be classified and included as inputs to and/or outputs of the production process.

DEA employs flexible, nonparametric methods to construct the best-practice frontier and so allows the data to 'speak for themselves' (Bates et al., 1996). The other advantage of DEA over other techniques is that each input and output can be measured in its natural physical unit without the need to apply a weighting system to collapse the different units in money or other single unit measure. The instrument is useful in the identification of differences in efficiency over time and between service providers.

By providing the observed efficiencies of individual organisations, DEA may help identify possible benchmarks towards which performance can be targeted. The weighted combinations of peers, and the peers themselves may provide benchmarks for relatively less efficient organizations. The actual levels of input use or output production of efficient organisations (or a combination of efficient organisations) can serve as specific targets for less efficient organisations, while the processes of benchmark organisations can be promulgated for the information of managers of organisations aiming to improve performance.

Measuring efficiency in this manner is consistent with both literature associated with the efficiency analysis of government service providers in general, such as Kittelison (1992) and Carrington et al (1997), and with past empirical approaches to efficiency measurement in local public sector notably Charnes et al (1989); Grosskopf (1990); De Borger (1996) and Dollery (2001).

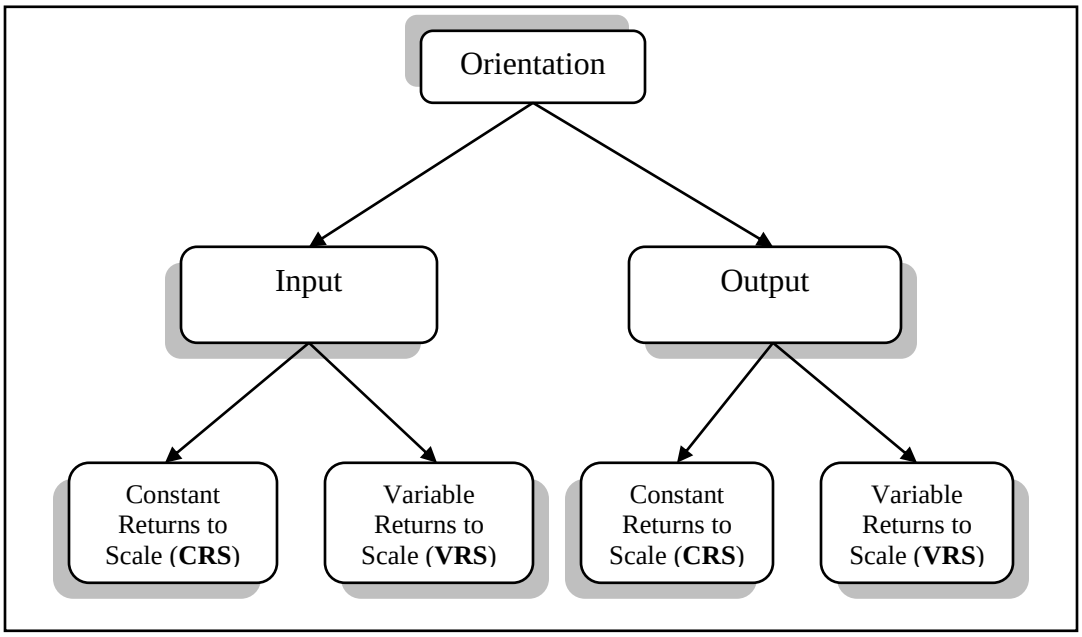
The ability of DEA to identify possible peers or role models as well as simple efficiency scores gives it an edge over other measures. Hence, DEA fits in well with our study goal namely, comparing the efficiency level of public and private service providers.

7.5 DEA Orientations

There are various types of DEA models which may be utilized depending on the conditions of the problem on hand. Types of DEA models regarding a situation can be identified based on orientation and scale. For instance, if one assumes that scale economies remain fixed even when the size of service facility increases, then constant returns to scale (CRS) type DEA models is an appropriate choice.

Technical efficiency (TE) as measured by the DEA can be identified by using an input or output orientation. From Figure 7.7, we note that the difference in orientation is derived from assumptions that reflect whether scale economies change or do not change as size of service facility increases. The initial model was developed by Charnes et al. (1978), known as the CCR model, using the initials of the developers. This DEA model assumes constant returns to scale (CRS) and is considered a sensitive model for measuring technical efficiency. Following the work of Banker, Charnes, and Cooper (1984), a second DEA model (BCC model), which assumes variable returns to scale (VRS), was developed to separate pure technical efficiency from scale efficiency.

Figure: 7.7 Basic Models Based on Orientation and Scale



7.5.1 Input orientation

When using an input orientation, technical efficiency is measured as proportional reduction in input usage, with the output level held constant. Input-oriented technical efficiency refers to a firm's ability to minimize inputs from a given amount of output.

In Figure 7.8, the firm is producing a given level of output y^* using an input combination defined by point A. The same level of output could have been produced by radially contracting the use of both inputs back to point B, which lies on the isoquant associated with the minimum level of inputs required to produce y^* (i.e. Iso (y^*). The input-oriented level of technical efficiency (TE_I (y, x)) is defined by 0B/0A. However, the least-cost combination of inputs that produces (y^*) is given by point C (i.e. the point where the marginal rate of technical substitution is equal to the input price ratio w_2/w_1). To achieve the same level of cost (i.e. expenditure on inputs), the inputs would need to be further contracted to point D. The cost efficiency (CE(y, x, w)) is therefore defined by 0D/0A. The input allocative efficiency (AE_I (y, w, w)) is subsequently given by CE(y, x, w)/TE_I (y, x), or 0D/0B in Figure 7.8 (Kumbhaker and Lovell, 2000).

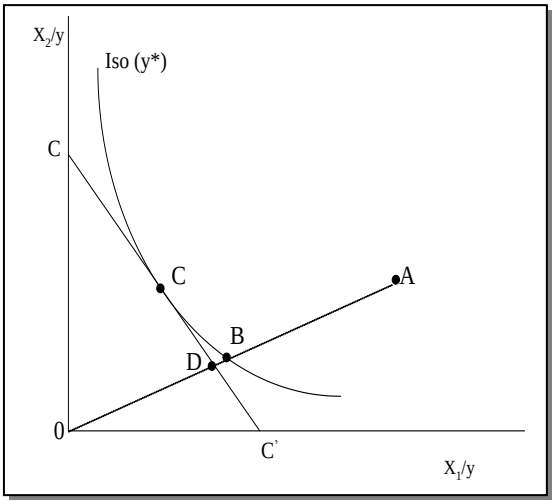


Figure 7.8 Input-Oriented Efficiency Measure

7.5.2 Output orientation

Technical efficiency in the output orientation is measured as a proportional increase in outputs, with inputs held constant. It refers to a firm's ability to obtain maximum output from a given amount of inputs. Formally, the level of technical efficiency is measured by the distance a particular firm is from the production frontier. Thus, a firm that sits on the production frontier is said to be technically efficient. This concept is important to firms because their profits depend highly upon their value of technical efficiency. Two firms with identical technologies and inputs but different levels of technical efficiency; will have different levels of output. This will create higher revenue for one firm although both have the same costs, obviously generating a larger surplus for the more efficient firm.

The production possibility frontier for a given set of inputs is illustrated in Figure 7.9 (i.e. an output-orientation). If the inputs employed by the firm were used efficiently, the output of the firm, producing at point A, can be expanded radially to point B. Hence, the output oriented measure of technical efficiency (TE_O (y, x)), can be given by 0A/0B. This is only equivalent to the input-oriented measure of technical efficiency under conditions of constant returns to scale. While point B is technically efficient, in the sense that it lies on the production possibility frontier, a higher revenue could be achieved by producing at point C (the point where the marginal rate of transformation is equal to the price ratio p_2/p_1, given by the line RR'). In this case, more of y_1 should be produced and less of y_2 in order to maximize revenue. To achieve the same level of revenue as at point C while maintaining the same input and output combination, output of the firm would need to be expanded to point D. Hence, the revenue efficiency (RE (y, x, p)) is given by 0A/0D. Output allocative efficiency (AE_O (y, w, w)) is given by RE(y, x, w)/TE_I (y, x), or 0B/0D in Figure 7.9 (Kumbhaker and Lovell, 2000).

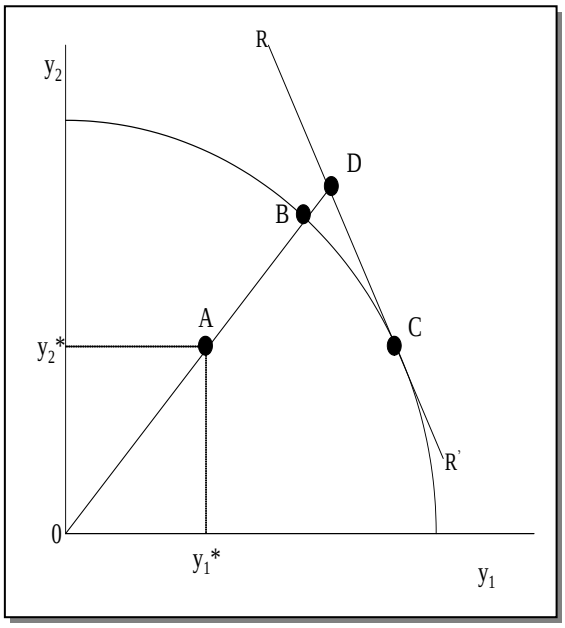


Figure 7.9 Input-Oriented Efficiency Measure

7.5.3 The choice of orientation

Most studies use input-oriented specifications, whereby the focus is on the minimum input usage for given output levels. Any local service provider utilizing more inputs to produce the same amount of outputs as compared to its peers would be deemed inefficient. Alternatively, an output-based model is used to demonstrate possible increases in outputs given fixed levels of inputs.

The choice of model depends on the objective in question. Our study adopted the input orientation considering that the initial emphasis in government policy is usually on the input dimension, and inputs are more amenable to scrutiny whereas outputs are often disputed (Ganley and Cubbin, 1992). Furthermore the control over utilization of inputs lies with the service providers and therefore they can change them in order to become more efficient. Besides service providers (be they public or private) cannot influence the demand for local government services they provide but rather the supply of the services.

7.5.4 Input DEA Models

Constant Returns to Scale

Under input orientation, firms produce the same output with fewer inputs. Consider *N* Service Providers each producing *M* different outputs using *K* different inputs. The *envelopment* form of the input-orientated DEA linear programming problem is specified as follows:

Let y_i be a vector of m outputs and x_i a vector of K inputs for the i_{th} Service Provider. If we have data for *N* Service Providers, then *X* is a $K \times N$ matrix of input data for all Service

Providers and *Y* is a *M×N* matrix of output data. The *envelope*, or efficiency frontier, is derived by solving the following constant returns to scale problem:

$$\min \theta, \lambda \ \theta,$$

$$\text{st} \quad -y_i + Y\lambda \geq 0,$$

$$\theta x_i - X\lambda \geq 0,$$

$$\lambda \geq 0 \qquad (7.3)$$

where θ is a scalar, λ is a *Nx1* vector of constants. The value of θ will be the efficiency score for a particular Service Provider. It will satisfy θ less than or equal to 1, with a value of 1 indicating a point on the frontier and hence a technically efficient Service Provider.

The above DEA LP has become known as the constant returns to scale (CRS) DEA model because the resulting technology will be a CRS technology. Thus, the efficiency scores obtained from this DEA model will be influenced by scale effects, if they exist. This may not be desirable in some cases, since firms cannot always influence scale in the short run.

7.5.5 Variable Return to Scale

The CRS assumption is only appropriate when all firms are operating at an optimal scale (Coelli 1998). Imperfect competition, constraints on finance etc may cause a firm not to operate at optimal scale. The above CRS DEA LP can be adjusted in order to allow a variable returns to scale (VRS) DEA technology. This is done by adding a convexity constraint to the original problem; the Banker, Charnes and Cooper (BCC) formulation of DEA therefore can be expressed by the following linear programming problem (Banker et al., 1984):

$$\min \theta, \lambda \ \theta,$$

$$\text{st} \quad -y_i + Y\lambda \geq 0,$$

$$\theta x_i - X\lambda \geq 0,$$

$$N1'\lambda = 1.$$

$$\lambda \geq 0 \qquad (7.4)$$

where N1 is an N x 1 vector of ones. This approach forms a convex hull of intersecting planes which envelop the data points more tightly than the CRS conical hull and thus provides technical efficiency score which are greater than or equal to those of the CRS model. The convexity constraint ensures that an inefficient Service Provider is compared

against providers of a similar size. This means that the VRS specification gives "pure" technical efficiency scores, which are free of scale efficiency effects.

7.5.6 Choice of Input Model Orientation

Under the assumption of CRS, both the input and output orientation measures will generate equal value while with an assumption of VRS, the results will differ. We observe that the LGs vary in terms of service operations and with such variations in size, it would be inappropriate to assume constant returns to scale. DEA under CRS option when all units are not operating at optimal scale may result to efficiency scores confounded by scale efficiency (Banker, 1984). Using the variable returns to scale (VRS) specification, it is possible to calculate the technical efficiency measures devoid of scale efficiency (Banker, 1984) and to observe its influence over the OPEX. We therefore opt to use the VRS input model orientation.

7.6 Pertinent issues in DEA

As we opt for the DEA methodology we are aware of the following pertinent issues (covered in Bowlin 2002) which influence its operation.

Positivity Property – Generally, the DEA formulation requires that the input and output variables be positive (greater than zero). If a variable is not positive, there are two possible treatments. First, Ali and Seiford (1990) and Pastor (1996) have shown that an affine displacement does not alter the efficient frontier, and hence, certain DEA formulations (e.g., the additive model for both inputs and outputs and the BCC model for outputs) are translation invariant. Consequently, absolute constants can be added to any input and output in the additive model and any output in the BCC model in order to solve the non-positivity problem.

A second approach that might be considered is to substitute a very small positive value for the negative value if the variable is an output. This approach is suggested based on the characteristic that the DEA model puts each DMU in the best light possible and therefore, emphasizes (weights highest) those outputs on which the DMU performs best. Because of this characteristic, an output variable with a very small value would not be expected to contribute to a high efficiency rating which would also be true of a negative net income value. Thus, the theta value would generally not be inappropriately affected by this type of translation.

Isotonicity Property – As shown in Charnes *et al*. (1985), it is required that the functions relating inputs to outputs have the mathematical property called *isotonicity*, this means that an increase in any input should result in some output increase and not a decrease in any output.

Some analysts have used correlation analysis to determine if this isotonicity property exists between the selected input and output variables. If the input variable coefficient obtained from the correlation analysis is positive and significant, then there is support

that the isotonicity assumption is not violated. However, there is the danger that a correlation analysis will not indicate the presence of the isotonicity property because of inefficiencies reflected in the data. Consequently, others have relied on the assumption that this relationship logically *should* exist between the inputs and outputs. If it is apparent that the isotonicity property is violated, the isotonicity requirement may be accommodated by using reciprocals, complements, etc. For example, a particular output, such as the number of defective items, may be expected to decrease with an increase in inputs. The isotonicity property would be violated because it is desirable and expected that an increase in an input would result in an increase in an output. This would not be the case with the defective items since an increase in output would be expected to result in a decrease in the number of defective items. In this case, an analyst might want to use the reciprocal of the number of defective items as the output measure with the resulting relationship being one where the output value would be expected to increase as the inputs increased **(**Bowlin 2002).

Model Specification

It should be noted that DEA performance could be sensitive to the number of variables included in the model and the extent to which they correlate (Pedraj-Chaparro et al, 1999). According to the literature, the danger of model misspecification is most serious when relevant variables are omitted rather than when irrelevant ones are included (Smith, 1997; Ruggerio, 1997). Banker et al. (1989) highlights the issue of degrees of freedom vis-à-vis the sample size. The relative nature of DEA makes it, as in every empirically oriented methodology, vulnerable to problems with the degrees of freedom. Hence Banker et al. (1989) suggest a rough rule of thumb. Let m be the number of inputs and s be the number of outputs used in the analysis, then the sample size n should satisfy $n \geq \max\{m \times s; 3(m + s)\}$; in our case we have one input and two outputs $n \geq 9$

Specification of Input and Output Measures **-** is a key consideration in using DEA. Choosing correct inputs and outputs is important for the effective interpretation, use, and acceptance of the results of the DEA analysis by management or other affected parties. The input–output variable selection is usually guided by expert opinion, past experience, economic theory, and degrees of freedom constraints encountered when using a small sample size (Banker, 1989). Furthermore, the following guidelines might be useful in identifying appropriate input and output variables.

As observed in DEA's positivity and isotonicity conditions, there should be some basis for believing that relationships exist between inputs and outputs such that an increase in an input can reasonably be expected to increase one or more of the outputs.

Another consideration is whether the variables should be based on currently available data or new measures developed. It is generally desirable to stay close to the kinds of input and output measures currently used by management for performance evaluation. Management is already familiar with these measures and has accepted them as being informative. The omission of pertinent variables can limit the managerial usefulness of the DEA analysis. According to the literature, the danger of model misspecification is most serious when relevant variables are omitted rather than when irrelevant ones are

included (Smith 1997; Ruggerio 1997). Inputs and outputs do not have to be reduced to a common unit of measure.

Furthermore, the inputs and outputs should be comprehensive. That is, they should fully measure the activities of the organization under evaluation and should also be operationally meaningful in the sense that they should be commonly used, and hence, familiar to officials concerned with the evaluation and control of these activities.

Finally, the values of the variables should be controlled (e.g., by audit and review processes) so that they cannot be easily manipulated or carelessly reported without some significant chance of detection and correction. DEA results and the interpretation of these results can be significantly affected by missing data or misreported data.

7.7 Interpreting DEA Results

By mathematical programming, DEA finds a weighting system (in the absence of prices) that allows inputs and outputs each to be aggregated and efficiency scores to be calculated. No single set of weights is required. Rather, DEA, by repeated solutions, finds a set of weights for each DMU. The weights are those that are most favourable to the unit; that is, give it the highest efficiency score subject to no weights being negative and that the weights, when applied to any unit, do not result in any one having an efficiency score exceeding 1.0 (on a scale of zero to one with 1.0 indicating an efficient DMU). If the efficiency score of a DMU is less than 1.0, the unit is inefficient. In the simplest case, an efficiency score of 0.9, for example, indicates that the unit could (by following the practices of selected efficient DMUs) reduce each of its inputs by 10 percent and maintain output at its current level; when the input orientation is implied. Accomplishing this change would result in that DMU becoming efficient according to the Debreu-Farrell efficiency measure.

7.8 Explaining DEA Results

Coelli et al 2005 use the term “environment” to describe factors which could influence the efficiency of a firm, where such factors are not traditional inputs and are assumed not under the control of the manager. Examples of environmental variables include ownership differences, location characteristics and government regulations. One of the methods suggested used to accommodate the environmental factors in DEA is the two-stage approach which involves solving a DEA problem in the a first stage analysis and the second stage, the efficiency scores from the first stage are regressed upon the environmental variables.

7.8.1 The Tobit Regression

The Tobit model (Tobin, 1958) was suggested as an appropriate multivariate statistical model in the second stage to consider the characteristics of the distribution of efficiency measure (Grosskopf, 1996). It is suitable for studying these effects, because the

dependent variable, consisting of efficiency scores, is characterized by censored data which cannot be higher than unity. It can also account for truncated data McCarty (1993). The two-stage method accommodates both continuous and categorical variables.

This technique has been employed by authors such as De Borger et al. (1994), Martin and Page (1983) and Rhodes and Southwick (1989), amongst others. We further note that in recent years, many DEA applications have employed a two-stage procedure. For example, Worthington (2001), Bosch (2000) and Garcia (2008) apply DEA with Tobit models in waste collection services; and Studies by Coelli (2005), Kirkpatrick (2006), Garcia (2006) and Ozuna (2002) use a similar approach to measure efficiency in water utilities. All these studies used a two-stage procedure, first to determine the efficiencies and then for policy purposes, utilized Tobit model to explain the efficiency distributions.

In the first stage, technical efficiency is assessed on a reference technology whilst in the second stage, the DEA efficiency scores are explained by relevant variables not directly included in the DEA analysis. As earlier defined in equation 7.4 the DEA score falls between the interval 0 and 1 making the dependent variable a limited dependent variable. Several LGs within the sample reach this value and consequently the dependent variable in a model to explain the efficiency is at its limit equal to 1. As Wooldridge (2000) noted, traditional methods of regression are not suitable for censored data, since the variable to be explained is partly continuous and partly discrete. In this situation, ordinary least squares (OLS) analysis generates biased and inconsistent estimates of model parameters.

The general tobit model formulation with limited dependent variable, as proposed by Greene (2003), is given by

$$y_i^* = X_i \beta + \varepsilon_i \qquad (7.5)$$

Where y_i^* is the latent variable; X_i represents a vector of explanatory variables; and β are the parameters to be estimated. It is assumed that the errors are normally distributed, with mean zero and variance σ^2, $\varepsilon_i \sim N(0,\sigma^2)$.

Considering that in our study the efficiency scores were defined by DEA, where the limit for a unit to be efficient is 1, the observed variables (y_i) were defined as follows:

$$y_i = \begin{cases} y_i^* \ \text{if} \ y_i^* > 0, \\ 0 \quad \text{if} \ y_i^* \leq 0 . \end{cases} \qquad (7.6)$$

The standard interpretation of Tobit coefficients focuses either on the magnitude, direction, and significance of the coefficients or on an undecomposed first-order effect. Such interpretations can verify theory, confirm prior research, or provide information on

the effect of an independent variable across all dependent variables (LeClere 1994). It is important to note that the dependent variable in the model is the DEA efficiency score.

The sign of the coefficients of the environmental variables indicate the direction of the influence, and standard hypothesis tests can be used to assess the strength of the relationship.

7.8.2 Brockett and Golany (1996)Procedure

The non-parametric method proposed by Brockett and Golany (1996) consists of comparing two frontiers: one frontier is made of the LGs with private providers and the other one of LGs using in-house or public provision. Note that by focusing exclusively on the efficient points on each frontier (those that benefit from the most favorable operating conditions) the suggested approach implicitly controls for exogenous variables. When applying the Brockett–Golany method it is therefore not necessary to include the operating conditions explicitly.

In practical terms the two frontiers are constructed by running DEA separately for the two sets of firms and adjusting their input levels to the fully efficient level. A 'joint frontier' is then built by pooling the data from the two separate frontiers. Finally, the ranking of the LGs utilizing private providers and public provision with respect to the pooled frontier is compared. A test statistic is used to established whether the frontier of the private providers is clearly above or below the frontier of the public provision, that is whether the private provision had a positive or negative effect on efficiency.

The null hypothesis of the test is that there is no difference between the two frontiers, in which case all the pooled final efficiency values should be equal to '1'. The observed distribution of efficiency ratings is therefore compared with a distribution of '1s' by using the Mann–Whitney rank test.

Hence this procedure includes four steps and ultimately tests whether there is a difference in efficiency scores between two chosen groups.

a) Split the group of all LGs ($j = 1,\ldots, n$) into two programs consisting of n_1 and n_2 LGs ($n_1 + n_2$). Run DEA separately for the two groups.
b) In each of the two groups separately, adjust inefficient DMUs to their "level if efficient" value by projecting each DMU onto the efficiency frontier of its group.
c) Run a pooled (or "inter-envelop") DEA with all n DMUs at their adjusted efficient levels.
d) Apply a statistical test to the results of c) to determine if the two groups have the same distribution of efficiency within the pooled DEA set.

7.8.3 Simple average

The efficiency score obtained are compared using simple descriptive statistics.

7.9 Chapter Summary

This chapter has clearly highlighted the various techniques available for measuring efficiency ultimately opting for DEA because of its suitability for the study context. DEA's theoretical foundations were explored revealing that it can be used to determine efficiency levels of service providers. Using regressions and other test the efficiency levels can be explained.

CHAPTER EIGHT: RESEARCH DESIGN

8.1 Introduction

In the previous chapters, we have explored the study concepts including the public-private sector divide, public services, local government as the units of analysis and efficiency as the indicator for performance management. We have also delved into the efficiency measurement tools and opted to use DEA. In this chapter we detail the approach we followed, putting together the study concepts including data collection, analysis and deriving conclusions.

8.2 Research Approach

Stages of the research

In order to affirm our proposition and also to respond to the research questions, our study blended both qualitative and quantitative techniques which involved several stages in which a step-by-step move towards data collection, data analysis and discussion of results took place as depicted in Figure 1.1 and explained in Section 1.6.

8.3 Study areas – choice of local governments

The geographical scope was limited to Uganda, a country with 102 urban local government categorized as shown in Table 8.1[5]. Decentralization and private sector involvement were regarded crucial in Uganda's transformation. ULG at both municipal and town council level were targeted units of analysis because they were at the forefront of implementing private participation arrangements in their traditional services. The Table below presents the number of ULG as of June 2007, and the sample picked.

Table 8.1 Levels of Local Governments

Level	Population	Number	Total Sample		Percent Sample	
			Waste	Water	Waste	Water
City	> 500,000	1	-	-	-	-
City Division = MC Level	> 50,000	5	2	-	40	-
Municipal Councils (MC)	> 50,000	13	10	11	77	85
Town Councils (TC)	> 5,000, <50,000	83	16	21	19	23
Total ULG		**102**	**28**	**32**	**27**	**31**

[5] Figures as of June 2007 (www.molg.go.ug)

As can be seen in Table 8.1, categorization of towns is based on population. However, we observe that in Uganda 60% of the ULGs are rural towns without the need for services such as street lighting, street parking, waste collection etc; for instance most small town household dispose waste into their backyard plantations, while others do not have any streetlights to talk of since they do not have electricity anyway! This state of affairs influenced our choice of ULG to include in the sample. Accordingly, in order to assess the relative efficiency, it was imperative that we incorporate in our sample ULGs that guarantee the comparison of performance among public service providers; hence ULG without particular common services were dropped, especially those within the rural towns. In addition to the basic factor of common services, availability of required data on variables influenced the final total sample; some ULGs did not provide the requisite input and output data due to inadequate record keeping and/or such data was not regarded vital to the LG and therefore not being kept.

The present study therefore has evaluated data for the financial year 2006/2007 from 28, 32 and 16 urban local governments in waste collection, water supply and street lighting services respectively (refer to Table 8.2). A questionnaire was sent to 50 LGs. We initially got data from 45 local governments but the unavailability of the required information restricted us to end up in analyzing the efficiency of urban local governments as above.

Table 8.2 List of Local Governments and Corresponding Service Covered

Local Government	Waste Collection	Water Supply	Street Lighting
Adjumani TC		✓	
Arua MC	✓	✓	
Bombo TC		✓	
Bugiri TC	✓	✓	✓
Bushenyi/Ishaka TC	✓	✓	
Busia TC	✓	✓	✓
Central Division	✓		
Entebbe MC	✓	✓	✓
Fort Portal MC	✓	✓	✓
Gulu MC		✓	
Hoima TC	✓	✓	✓
Iganga TC	✓		
Jinja MC	✓		✓
Kabale MC	✓	✓	
Kakiri TC	✓		
Kalisizo TC	✓	✓	✓
Kamuli TC		✓	
Kasese TC	✓	✓	✓
Katakwi TC		✓	
Kayunga TC		✓	

Local Government	Waste Collection	Water Supply	Street Lighting
Kisoro TC		✓	
Kitgum TC		✓	
Kumi TC		✓	
Lira MC		✓	
Lubaga Division	✓		
Lugazi TC	✓		✓
Lukaya TC	✓		
Luwero TC		✓	
Lyantonde TC	✓	✓	
Masaka MC	✓	✓	✓
Masindi TC		✓	
Mbale MC	✓	✓	
Mbarara MC	✓	✓	
Mityana TC	✓		✓
Mpigi TC	✓		✓
Mubende TC	✓	✓	✓
Mukono TC	✓		✓
Ngora TC		✓	
Ntungumo TC		✓	
Rukungiri TC		✓	
Soroti MC	✓	✓	✓
Tororo MC	✓	✓	✓
Wakiso TC	✓		
Total (43 LGs Covered)	**28**	**32**	**16**

8.4 Study areas – choice of public services

The local government reforms in Uganda culminated in the enactment of the Local Government Act 1997. The Act gave urban local governments autonomy over the financial and planning matters. In the second schedule of the Act, functions and services of local government are detailed and include among others provision of public street lighting, street maintenance and repairs, waste collection and street cleaning services, water supply, municipal markets, recreation and park maintenance, public transport terminal management, and other decentralized services. The local governments are obliged to establish, prescribe, control and administer the form in connection with these services; they can provide such services directly (in-house), or utilize the private sector or share responsibility with the private sector. We observe that in the 1990s government insisted that all LGs put services out to compulsory competitive tendering (allowing private provision).

We did a data search on five services: waste collection, water supply, street lighting, street parking, and recreation and parks services. For each of these services, we earmarked specific and general data that we would like to collect to be able to conduct our study (refer to Table 8.3).

Table 8.3 List of data collected

Specific data		
Service	**Inputs**	**Outputs**
Waste collection services (based on Worthington 2001; Bosch 2001)	Operational expenditure for waste collection	▪ Population; ▪ Amount of waste collected per week (in tons); ▪ number of collection points; ▪ collection frequency in a week
Street Cleaning (Based on Moore 2005, Anfonso 2007)	Operational expenditure for street cleaning	▪ Kilometers of streets cleaned
Street lighting (Based on Moore 2005, Anfonso 2007, Lorenzo 2007)	Operational expenditure for street lighting	▪ Number of lighting points ▪ Kilometers of street light
Street maintenance (Based on Moore 2005, Anfonso 2007)	Operational expenditure for street maintenance	▪ Kilometers of street maintained
Recreation and parks	Budget for parks operations	▪ Population ▪ Acres of park space available
Water provision Based on Kirkpatrick 2006	Operational expenditure for water operations	▪ Population; ▪ Volume of water produced per annum (in cubic meters); ▪ Volume of water distributed per annum (in cubic meters); ▪ Volume of unaccounted for water ▪ User fees ▪ Number of hours of piped water available per day

General data included:

The general data were; modality of service provision – public-private; operational responsibilities; asset ownership; duration of contracts and constraints the service providers were meeting in executing their roles.

Focus

Waste collection and water supply services were noticeable in terms of meaningful data availability across LGs and for this reason were chosen as major study area for the local services; detailed analysis on the two services was done and our conclusions are largely derived from this analysis (refer to Chapters nine and ten). Street lighting service was used as a complimentary study area to enhance the findings and conclusions (Chapter eleven). The other services i.e. street parking, recreation, street maintenance were dropped.

8.5 Study areas – choice of Performance Measure

In chapter 6 we discussed the various performance measures that could be used and finally settled for using efficiency as our main performance measure. The notion that, on average and over time, private firms are more efficient than publicly owned enterprises motivated a worldwide shift of activities from the public to the private sector. Local government reforms were motivated by the need to manage resources more efficiently with the aim of reducing public expenditure without affecting the standard of services they provide. The decentralization of responsibilities together with the transfer of public service delivery to the private sector generated debate on the operational efficiency in local government. Private sector involvement was expected to deal with the inefficiency constraints related to provision of public services by combining the potential of both public and private sectors. Although there is considerable literature on the potential benefits of private sector involvement in public service delivery, little concrete evidence has so far been produced. Figures on efficiency are often accepted without challenge, more advantages than disadvantages are cited, and anecdotal evidence is used only to illustrate successful but not unsuccessful applications of the concept (Finbar and Allen, 2001,in Awortwi 2004). Criticism of the efficiency argument is often based more on an ideological antipathy to state involvement than on hard evidence of the superior capabilities of the private sector delivering services (Awortwi 2004).

The question of relative efficiency of service providers in local governments therefore becomes important. We therefore zero in on using efficiency as the benchmark measure to further contribute to the debate on public-private sector provision.

8.6 Data collection

We initially reviewed literature on public and private provision which allowed us to formulate study areas and concepts. Preliminary interviews with technical officers in seven pilot LGs allowed us to identify services that were common to most LGs and establish input and output parameters used in measuring efficiency.

A comprehensive questionnaire incorporating the variables above was designed and sent to 50 ULGs that were purposively selected based on size, geographical region and availability of common services and also the modality of service provision. At this stage most services including waste collection, street cleaning, street parking, street lighting, recreation, water supply etc were a target of research and therefore covered in the

questionnaire. The questionnaire was personally delivered and administered. Face to face interviews were made as a follow up activity where the responses were not clear.

8.7 Data analysis

We initially got data relating to the financial year 2006/2007 from 45 ULGs. On scrutinizing the returned questionnaires only two services were noticeable; waste collection and water supply had data across several LGs and therefore necessitated detailed analysis. Unavailability of relevant data across services and LGs restricted us to assessing the efficiency of only 28 LGs for waste collection services and 32 LGs for water supply services (refer to Table 8.2). Street lighting whose data was slightly exploitable was used to enhance the validation of results from the detailed analysis.

To evaluate the relative efficiency of public and private service provision, we use a well established nonparametric efficiency measurement technique known as Data Envelopment Analysis (DEA) approach (detailed discussion in Chapter 9). We used *Frontier Analyst Banxia software*, to indentify the most efficient service providers based on our chosen relevant multiple inputs and outputs. Regression analysis was performed on the efficiency levels to determine the possible variables which may explain the efficiency of the service delivery arrangement.

8.8 Deriving conclusions

In deriving conclusions we looked at the results obtained from the most robust tests on the benchmark study areas of waste collection and water supply services, that is the DEA results explained by Tobit regressions. Secondly we utilized the DEA results explained by the Brocket and Golany procedure. Thirdly we used simple averages to derive meanings and lastly we used information got from interviews and from related literature to attach possible explanations and conclusions. The conclusions derived from analysis of the major study areas were further collaborated with those got from street lighting.

8.9 Chapter Summary

This chapter has provided our design for research from our initial conceptualization of the research study areas and gaps via literature review through field visits for data collection, to how we did analysis and derivation of conclusions. It is now in order that the proceeding chapters discern our actual findings, analysis and the conclusions on the research gaps.

PART FOUR: EMPIRICAL RESULTS, AND ANALYSIS

CHAPTER NINE: WASTE COLLECTION SERVICE

9.1 Introduction

We reiterate the major objective of our study as "…to determine the relative efficiency of public and private service providers and the sources of their efficiency". Achieving this objective meant that we identify services that represent study areas. This chapter presents one of such services – the Waste Collection Service. We discuss the intricacies of waste collection, including our choice of measurement variables, findings, analysis and the conclusions derived.

9.2 Stylized Facts On Waste Collection Service Provision

Historically, solid waste management services have primarily been provided by municipalities and/or local governments. Cointreau (1994) observed that within local governments of developing countries, expenditure for municipal solid waste service is usually from 20 percent to 50 percent of total municipal expenditure and that even at such a high level of expenditure, the degree of solid waste service is low, as only 50 percent to 70 percent of the solid waste is collected. In Uganda it is estimated that less than 50 per cent of the solid waste generated is actually collected and disposed of in both ungazetted and gazetted dump sites (NEMA 2008). Private involvement in solid waste management has been sought to compliment the public sector besides the belief that the private sector might be more *efficient* than the public sector in providing services. Private sector efficiency is said to derive from management flexibility, freedom of action, greater financial discipline, and accountability to market forces Cointreau (1994).

What is Waste?

The European Topic Centre on Sustainable Consumption and Production (ETC/SCP) defines waste as comprising all items that people no longer have any use for, which they either intend to get rid of or have already discarded. Several items can be considered as waste e.g., household rubbish, sewage sludge, wastes from manufacturing activities, packaging items, discarded cars, old televisions, garden waste, old paint containers etc. Thus all our daily activities can give rise to a large variety of different wastes arising from different sources.

Bassis (2009) observes that waste can be divided into many different types and that classification is usually by either their physical or chemical and biological characteristics. Another important classification is by their composition, for instance solid wastes are waste materials that contain less than 70% water. This class includes such materials as household garbage, some industrial wastes, some mining wastes, and oilfield wastes such as drill cuttings (Bassis 2009). Liquid wastes are usually wastewater's that contain less

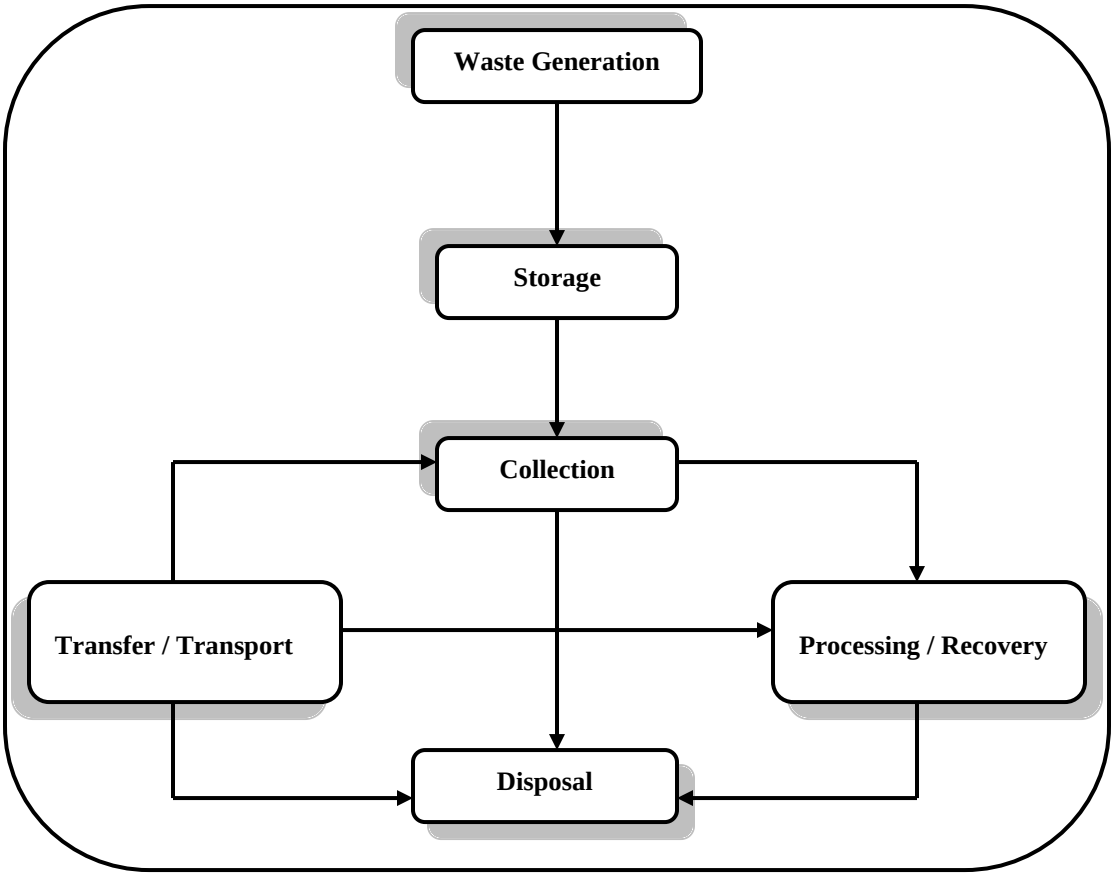
than 1% solids. Such wastes may contain high concentrations of dissolved salts and metals. Sludge is a class of waste between liquid and solid. They usually contain between 3% and 25% solids, while the rest of the material is water dissolved materials (Bassis 2009).

9.3 Solid Waste Collection Services in Uganda

According to NEMA 2007, the term solid waste (SW) may be used to refer to municipal waste and can be categorized in seven groups including residential (or household or domestic waste), commercial, institutional, street sweepings, construction and demolition debris, sanitation and industrial wastes. Solid waste also refers to organic and inorganic waste materials produced by households, commercial, institutional and industrial activities that have lost value in the sight of the initial user.

Municipal waste is generated by households, commercial activities and other sources whose activities are similar to those of households and commercial enterprises. It may contain small quantities of hazardous substances dispersed within it, e.g. batteries, insecticide and other pesticide residues in containers and medical waste discarded on domestic and commercial premises. A large quantity of municipal waste is in the solid waste type which is why our study concentrates on solid waste.

Figure 9.1 Solid Waste Management System



Solid waste management (SWM) encompasses generation, storage, collection, transportation and disposal of urban waste as described in Figure 9.1. Our study concentrates on the collection and transportation activities where private involvement is most utilized.

In Uganda, the responsibility for SWM lies with local governments as specified in the Public Health Act 1964 and the Local Government Act 1997 as amended. In most of Uganda's urban areas, solid waste management is ultimately the responsibility of municipal / town councils, while among most of the rural populations the wastes are handled at the household level; each home having some sort of backyard dumb-site. Waste services which are the responsibility of municipalities include wastes from house – household / domestic, streets, shops, offices, hospitals, and public places like municipal markets and recreation parks.

It is observed that there has been a significant increase in SW generation in Uganda in the last few decades and SWM has become a major environmental issue (NEMA 2007). Although, there is no national level data for SW generation, increase in SW generation, over the years, can be studied for a few urban centres such as Kampala City Council. For instance, since 1969, there has been a great increase in the volume of municipal solid waste generated due to the increase in population as shown in Table 9.1;

Table 9.1 Estimated daily solid waste generation rate for Kampala City 1969-2004

Year	Generation in metric tons/day
1969	198
1980	275
1991	360
2000	900
2004	12,000

Source: NEMA 2007.

NEMA (2008) observes that KCC with the participation of private solid waste collection firms collect and disposes only 41 per cent of the solid waste per day. The remaining 59 per cent per day is left uncollected and ends up dumped in storm water drainage channels, natural watercourses, manholes, undeveloped plots and roadsides. Heaps of rotting waste then provide fertile breeding grounds for flies, mosquitoes and rodents which are a growing menace in the city

In Jinja municipality, the waste collection records indicate that 40-60 per cent of the waste generated is collected (i.e. 70 – 90 tonnes) and taken to the landfill. The variation is due to deficiencies in availability of fuel and the mechanical status of the waste transport vehicles. The vehicles are old and rate of breakdown is high leading to reduced efficiency in waste collection (ILO, 2006).

From a national perspective, the large concentration of people in many of the other urban centres, coupled with lack of requisite waste management infrastructure creates a serious waste management problem (NEMA, 2008). Accordingly it is estimated that less than 50

per cent of the solid waste generated is actually collected and disposed of in both ungazetted and gazetted dump-sites.

Hence, despite the drastic increase in solid waste generation, there has not been a proportional improvement in solid waste management and therefore leaving a lot of refuse indiscriminately disposed. Solid waste as a result has become one of the most pressing and challenging environmental problem in the country (NEMA, 2008), requiring the use of alternative delivery arrangements and making a study on efficiency vital.

Waste collections systems under use

SWM in Uganda is based on either the Central Collection Center (CCC) system where trash bins (known as skips) that are emptied periodically are used or the House-to-House (HtH) collection system; both of which are either run by the public sector or by private operators.

Central Collection Center (CCC) system

The CCC system had been the only approach for a long time and is predominantly applied in general public areas such as streets, markets, bus terminals etc and therefore is what municipal budgets reflect.

Under this system, waste is collected from households and commercial places by means of skips. The skips (large containers) are placed in vantage positions and when filled they are regularly taken and emptied into some designated dumping sites or landfill e.g. Kitezi for KCC and Masese for Jinja. The CCC system requires that the households carry their own trash to the nearest skip. Usually individuals (households) bring the accumulated waste to the central point, a conveniently placed skip, or a concrete bunker or on bare ground. This system also takes care of waste arising from street cleaning, municipal markets and bus terminals hence why street cleaning and waste collection are reflected as an aggregated cost within the municipal budgets.

However we note that placing of waste into public skips by householders themselves can prove problematic and is not a favoured option even though it is the simplest and cheapest option. If the public skip is too far away, not emptied regularly, or if people especially children cannot reach to put waste into it, the collection point becomes littered and unhygienic. Measuring efficiency in such a service therefore requires that one looks at the volume of waste collected, the number of collection points and the frequency of the collection.

House-to-House (HtH) system

The HtH system is a relatively new approach in Uganda (started in the late 1990s). It is a system where collection vehicles move from one household to another picking waste. Waste is left outside a household usually at the gate in a bag or bin and is picked up by a passing vehicle. Collection is usually done at pre-agreed periodic intervals, (once or twice a week) and taken directly to dumping sites or landfills. This system is suitable for areas where the collection vehicle is able to have access to individual houses via well-maintained roads; hence HtH system is more prominent in the medium to high income suburbs most of which are relatively well planned with wide road networks that can

easily accommodate the collecting vehicles. In the HtH system, residents are obliged to register with a licensed service provider and required to pay a user fee that varies between Uganda shillings 5, 000 (US $ 2.6) and Uganda shillings 20, 000 (US $10.7) per month depending on the amount of garbage generated and/or the frequency of collection (NEMA, 2007). In Kampala, about 10 private waste collection firms provide services to their clients mostly in affluent residential areas at a fee.

The HtH system is said to be convenient and does not necessitate permanent public storage. On the other hand waste that is left out may be scattered by wind, animals, children or waste pickers if collection service is delayed causing considerable nuisance.

Being new, not all LGs have introduced HtH system and in terms of relative importance, the CCC and HtH systems cover 70% and 30% of the areas actually receiving SWM services, respectively. We also observe that some LG run these CCC and HtH systems services concurrently.

The focus our study is the CCC system

The main focus of our study is the CCC system since as earlier observed it is widely used by most urban areas and appears in the LG budgets as part of the cost for public health; and besides it allows for comparison amongst modalities of service provision of LGs.

Challenges of waste collection service provision

According to NEMA (2008), solid waste management is a re-emerging issue in many of the urban centres in Uganda. The main driving forces include the increasing size of the population; inadequate and poor waste management infrastructure (like land-fills or incinerators); lack of personnel and resources to carry out routine collection and disposal of waste; rampant littering partly due to lack of garbage skips or other forms of containment and trucks for transporting the garbage. Poor practices of waste disposal are also evident including, littering rather than disposing of waste in gazetted areas for collection by the municipalities. NEMA further observes that inadequate monitoring and enforcement has created difficulties in disposing of solid waste in urban centres; partly because the town and municipal councils generally lack funds to facilitate procurement and setting up of waste disposal facilities including landfills; and, lack of financial resources to manage the waste from point of generation through to disposal. Also simple requirements such as waste disposal skips are lacking in many urban centres, thereby encouraging littering besides some of the settlements are inaccessible especially the unplanned squalor settlements where there is lack of space to put the garbage skips. Corruption and political interference are other factors that hinder the efficient and effective collection of waste in many urban centres (NEMA, 2008); Financial and logistical resources meant for garbage collection are sometimes diverted leaving very old vehicles and equipment that cannot efficiently transport garbage. Weak government policies and laws also make the management of municipal solid waste difficult. Given these challenges, waste collection is a service worthy studying.

9.4 Provision and Execution of waste collection service

As earlier observed, it is the responsibility of the different LGs to manage all waste generated within their areas of jurisdiction. There has been a shift in the recent years towards the involvement of private sector in waste collection services at all levels in order to increase both the efficiency and effective delivery of waste management services (NEMA, 2007). Government liberalized the management of solid waste in the country and various urban LGs involve private firms in waste collection services.

The sourcing of private service providers ideally goes through competitive bidding process where request for tenders are advertised in the media and a number of firms respond. LGs enter into formal contractual arrangements with successful service providers whereby the latter provide waste collection services for which they are paid from LG revenue sources (in the case of the CCC system. For the HtH system, LGs give license to service providers that allow the firms to supply services directly to consumers who are willing to pay for services; in this case periodic fees is charged and collected by the service provider directly.

9.5 Huddles Of Initial Transfer From Public To Private Service Provision

Goloba (2004) got interesting findings when studying Kampala City Council's (KCC) waste collection services which our study and conclusions benchmark. Their study found out that all the firms contracted by KCC were established hurriedly in response to the new opportunities presented by private participation. For example, Owino Nabugabo Shauri Yako joint venture was created in 1999 in reaction to the news of the impending outsourcing of garbage collection in Makindye Division. Its membership comprised petty traders in Owino and Shauri Yako markets. This scenario is observed in other LGs considering that waste collection service was previously a preserve of government.

Goloba's study further notes that unlike other municipal services, solid waste management did not attract foreign firms or even large local firms (as was the case in road construction) and that with the exception of Bisons Consult International, none of the local contractors had well-established offices. The other firms were located in some of the city's most deprived areas. They did not have the capacity to employ large numbers of people; instead, they depended on casual labourers. In terms of financial resources, they did not make significant investment in specialized equipment nor did they invest in personnel training considering that they were exploring new areas of business; and why their efficiency and effectiveness was suspect.

In order to stand a chance of winning a contract, firms had to fulfill or agree to the following conditions (Goloba, 2004):

- ✓ have experience of managing contracts worth US$400,000 and above;
- ✓ possess solid waste management experience;
- ✓ possess the necessary equipment or have the ability to rent it;
- ✓ have the ability to provide insurance cover for all their equipment and employees;

- ✓ have experience with mobilising communities and facilitating community participation in solid waste management;
- ✓ have income tax clearance, a trading licence and certificate of incorporation;
- ✓ produce work plans before commencement of the assignment with KCC;
- ✓ advance of no more than US$100,000 prior to the commencement of a contract;
- ✓ payment was to be made on a monthly basis based on technical approval and certificate of completion signed by the KCC Division Medical Officer; and
- ✓ on every payment, KCC would charge a retention fee.

However it is noted that some of these terms were way beyond the reach of local firms especially small/medium scale enterprises (SMEs) who are the majority in Uganda. The terms and conditions of work defined in the contracts were a replica of the general World Bank Guidelines on 'Procurement of works—smaller contracts'; with no regard to local conditions. Ultimately some conditions attached to contracts were unrealistic (Goloba, 2004). For example, the condition that companies ought to have executed contracts worth US$400,000 before bidding for contracts eliminated many potential SMEs bidders. Furthermore, prospective service providers were required to possess experience in waste management, which was not tenable in the Ugandan context considering that solid waste management had for a long time been a preserve of the public sector.

Goloba (2004) further observes that contracts did not adequately protect service providers from abrupt changes in policy and direction by KCC. For example, KCC often required contractors to send their workers to work in areas outside those stipulated in the contracts, moreover at short notice, thereby disrupting pre-planned work schedules and plans. Significantly, thereafter, contractors would be blamed for shortcomings in performance that ensued from such disruption.

Contracts required KCC to pay the contractors on a monthly basis. However, according to Goloba (2004) this had never been fulfilled. Verification and audit exercises took long, with the Permanent Secretary of the Ministry of Local Government sometimes doing the monitoring and inspection himself before issuing cheques to service providers. These delays had created cash flow problems for service and often disrupted their operations.

The findings by Goloba (2004) are useful in highlighting the prevailing situation in Uganda and the haphazard nature that private involvement was introduced in the waste collection sector.

9.6 DEA Specification

Specifying Input and Output Indicators

In order to derive efficiency measures, we need data on waste collection inputs and outputs. The input–output variable selection, as noted in section …, is usually guided by expert opinion, past experience, economic theory, and degrees of freedom constraints encountered when using a small sample size (Banker, 1989) and there are no diagnostic checks for model misspecification resulting from the wrong choice of variables (Kontodimopoulos, 2006), thus in selecting the inputs and outputs we capitalize on the combined mix of the above guidance. Previous efficiency measurements studies with

regard to waste collection in the context of Uganda are scarce. However Domberger et al (1986); Bosch (2001); Worthington (2001) and Moore (2005) as shown in(Table 9.2) provide some initial benchmark guidance with respect to the choice of inputs and outputs in terms of the DEA approach to waste collection. Hence the selection of inputs and outputs for estimation is based on the knowledge gained from literature survey as well as the availability of data.

Furthermore, selection is based upon some general arguments implied within the analysis, for instance, local governments with similar demand for homogeneous services should also have similar performance (see Eeckaut et al, 1993; Athanassopoulos, 1995); that performance of local governments can be measured in terms of the improvement of observable factors directly controlled by LGs during the time period under consideration and that variables chosen provide an indirect measure to quantify the local public services delivery in each LG since often times a direct measure cannot be derived, hence some observable indicators are chosen in order to give as close as possible approximation for the waste collection service provision.

Specifying Inputs

Many municipalities in developing countries spend a large proportion of their budgets on the collection, transportation and disposal of solid waste. Their solid waste management is a costly service that consumes between 20 and 50 percent of available operational budgets for municipal services, yet serves no more than 70 percent of the urban inhabitants (Cointreau, 1994).

Like any other production environment, the production process of the waste collection service relies on the supply of labour and capital. Labour usually represented by drivers, cleaners, and loaders who in the context of Uganda can either be hired on fulltime or part-time basis; a situation that creates difficulty in defining the physical units of labour at LG level. Capital includes trucks, containers (skips), and usable (loose) tools. Studies by Bosch (2001) and Garcia (2008), have utilized physical units of labour and capital as inputs to determine relative efficiency of LG in the waste collection service. However in the context of Uganda, we found this line inadequate due to the difficulty in obtaining information on labour especially part-time (casual) labour – a major component of the production process.

Table 9.2 Selected DEA studies in Waste Collection

Author	Sample	Methodology	Input	Output
Bosch (2001)	75 municipalities in Catalonia, Spain	DEA	Controllable • Number of containers in litres • Number of hours worked by drivers and loaders per year • Number of vehicles used expressed in terms of capacity Non-controllable • Distance to disposable site • Seasonal population	• Number of tons collected per year (Qty) • Weekly collection frequency of waste (Qlty)
Worthington (2001)	103 local governments in New South Wales Australia	DEA	Discretionary • Collection spending Non-discretionary • Properties receiving • Occupancy rate • Population density • Population distribution • Cost of disposal index	• Total garbage collected • Total recyclables collected • Implied recycling rate
Garcia (2008)	35 municipalities in Spain	DEA	• Staff • Vehicles • Containers	• Tonnage • Collection Points • Density Points • Washing
Moore et al (2005)	46 cities in the USA	DEA	• Number of Full Time Equivalent staff; • Solid waste budget	• Number of citizens served

Hence **Operating expense (OPEX)** was preferred as a single composite input measure since it encompasses the compensation to labour whether fulltime or part-time and other costs such as fuel, vehicle repairs and maintenance, loose tools besides covering the depreciation of vehicles and skips used in the production process. It Sums up all variable resources expended in producing and delivering the service for the public client and thus provides a clear picture of what resources are being used and what is being achieved by expending them. Further, all local governments included in the study have a budget for waste collection under the CCC system whether the service is delivered in-house or by the private firms.

Specifying Outputs

We acknowledge that given the difficulty of quantifying public sector output, it is often essential to look for proxy variables. Garcia (2008) observes that the *tonnage* and *collection points* variables are the most frequently used indicators for identifying the final product of waste collection activity. They are said to represent the mass of solid waste generated, and the number of places, but not homes, in streets where it is collected, respectively. They provide two reasons for their joint consideration in their analysis (1) the exclusive inclusion of tonnage would not reflect the effort made to attend to the population that deposits its solid waste in established places; and (2) the exclusive inclusion of collection points would omit the need to use more resources to cover similar routes owing to the volume of solid waste generated. Furthermore *Tonnage* symbolizes a quantitative indicator for waste collection, while from the perspective of the public clients and/or citizens, *collection points* signify quality. It has been observed by Garvin (1988) that customers among other factors rate accessibility and convenience of service when evaluating the quality of a service delivery system, hence the more the collection points the less the distance from homes and therefore the better in terms of accessibility and convenience of service.

Whereas we appreciate the use of both variables as output measures especially the use of tonnage, our opinion is that number of collection points taken in isolation does not clearly bring out the level of operation that significantly induces OPEX; for instance the number of collection points could be available but without being visited for collection and therefore redundant which leads to accumulation of waste that becomes a health hazard to the citizens besides it leaves out another important quality dimension – reliability.

It has also been observed that the *size of garbage containers, frequency of collection, and distance to disposal facility* will all influence waste collection OPEX. However our study does not find it worthwhile using the variable *size of garbage containers* since almost all garbage containers were of similar tonnage (i.e. 4 tons), besides it is reflected in tonnage. We also could not use the variable *distance to disposal facility* due to unavailability of data.

We however recognize that *Frequency of collection per collection point per week* will have a major impact on OPEX since the more frequently you collect the more the cost of operation. But we prefer to combine it with number *of collection points* in order to derive the *number of collections made per week.* We believe *number of collections made per week* captures the level of the *transporting* activity including distances since the

frequency of collection implies moving to collection points. Furthermore it acts as a proxy for the quality as seen by the citizen, that is, the number of collection points implies that the citizens will access the service conveniently while the frequency of collection from those points makes the service reliable and reduces the possibility of health hazards arising from stockpiles of waste at collection points.

Like in other studies, we also considered using the *number of collections made per week and Frequency of collection per collection point per week* in isolation, but the individual DEA results were not significantly different i.e. the most efficient LGs remained unchanged.

In summary, the waste collection service production has two identifiable transformation processes namely *collection* and *transportation*, and our DEA output measures preferred reflect the two activities; which ideally influence our chosen input - OPEX. The two activities also manifest quantitative and qualitative effects respectively. Consequently the outputs we consider essential in defining the transformation process of waste collection and capture the level of activity with a significant influence on OPEX include the following:

1. ***number of tons of waste collected per a week***; which apart from representing the *collection* activity acts as a quantitative measure in the model and
2. ***the total number of collections done per week*** – derived from combining number of collection points and the average frequency of collection per week. This represents the *transporting* activity and provides a qualitative measure in our model.

9.7 Model Specification

It should be noted that DEA performance could be sensitive to the number of variables included in the model and the extent to which they correlate (Pedraj-Chaparro et al, 1999). According to the literature, the danger of model misspecification is most serious when relevant variables are omitted rather than when irrelevant ones are included (Smith, 1997; Ruggerio, 1997). Banker et al. (1989) highlights the issue of degrees of freedom vis-à-vis the sample size. The relative nature of DEA makes it, as in every empirically oriented methodology, vulnerable to problems with the degrees of freedom. The number of degrees of freedom will increase with the number of DMUs in the data set, and decrease with the number of input and output variables. Hence Banker et al (1989) suggest a rough rule of thumb. Let m be the number of inputs and s be the number of outputs used in the analysis, then the sample size n should satisfy $n \geq \max\{m \times s; 3(m + s)\}$; in our case since we have one input and two outputs $n \geq 9$. We therefore believe the three variables chosen are the relevant ones based on the arguments highlighted earlier (section 8.4) and maximum of three variables used in our analysis satisfies the rule of thumb suggested by Banker et al (1989).

Table 9.3 Selected Variables for Waste Collection DEA Model

MODEL	
Inputs	
Operating Expenses per week	X
Outputs	
Waste collected per week in tons	X
Total number of collections per week	X

Statistical Validation of the Selected Inputs and Outputs

When selecting the variables, we considered it worthwhile to analyze the relationship between the different variables proposed. Using Pearson's coefficient, we tested the bi-variate correlation of the possible variables relating to inputs and outputs with the objective of detecting factors with the same significance. In this way, we could determine variables that do not fulfill the isotonic property, which requires that there should be no negative correlation between inputs and outputs, and that variables be perfectly defined as to their role in the analysis Banker (1992).

Table 9.4 Descriptive Statistics for the potential waste collection variables

	N	Minimum	Maximum	Mean	Std. Deviation
Operational Expenditure	28	250000	3600000	990792.12	923742.307
Waste collected Per Week (tons)	28	2	948	222.43	236.190
Total Number of Collections per Week	28	2	236	57.64	56.077
Number of Collection Points	28	2	165	29.68	36.187
Frequency of Collection per Point	28	1	6	2.21	1.166
Valid N (listwise)	28				

Table 9.5 Correlation Matrix for Possible input and output variables for Waste Collection

VARIABLES	**INPUT**	**OUTPUTS**			
	Operational Expenditure	Waste collected Per Week (tons)	Number of Collection Points	Frequency of Collection per collection point	Total Number of Collections per Week
Operational Expenditure	1.000				
Waste collected Per Week (tons)	.815**	1.000			
Number of Collection Points	.371	.103	1.000		
Frequency of Collection per collection point	.615**	.792**	.210	1.000	
Total Number of Collections per Week	.456*	.178	.876**	.150	1.000

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
a. Listwise N=28

As observed from the correlation matrix Table 9.5 our preferred inputs and outputs fulfill the isotonic property of non negative correlation between the input and outputs. Furthermore, the two output variables we propose to use are not highly correlated hence they can be analyzed within the same DEA model.

9.8 Choice of DEA Model Orientation

As observed in section … There are two possibilities for formulating the DEA models. One puts the emphasis on input reduction (input orientation) and the other on output enhancement (output orientation). Both formulations yield identical results in the constant returns to scale situation, which is not the case with the variable returns to scale. We adopted the input orientation considering that the initial emphasis in government policy is usually on the input dimension, and inputs are more amenable to scrutiny whereas outputs are often disputed Ganley and Cubbin (1992). Furthermore the control over utilization of inputs lies with the LGs and therefore they can change them in order to become more efficient.

In terms of Charnes, Cooper and Rhodes (CCR) and Banker, Charnes and Cooper (BCC) DEA options, we observe that the LGs vary in terms of waste collection service operations and with such variations in size, it would be inappropriate to assume constant returns to scale. DEA under CRS option when all units are not operating at optimal scale may result to efficiency scores confounded by scale efficiency. Using the variable returns to scale (VRS) specification, it is possible to calculate the technical efficiency measures devoid of scale efficiency (Banker 1984) and to observe its influence over the OPEX.

9.9 Analysis of Data and Explaining the Efficiency Scores

In analyzing the data, we first run the DEA model on the data comprising of all LGs in our sample, categorized according to the level of administrative unit and modality of service. This was done to determine the separate group's performance as well as individual performance within the group and establish efficiency scores that would later be used to compare consistency and validate LG performance. Secondly DEA model was run on the data comprising of all the LGs in our sample, irrespective of the level of administrative unit and modality of service to determine individual and group performance within the combined lot.

We acknowledge that DEA is only an exploratory tool for efficiency measurement, and indicates directions for further investigations into how to improve/enhance efficiency. Having measured the relative efficiencies, it is also of considerable interest to explain the DEA efficiency scores by investigating the determinants of efficiency when the results are expected to guide policies aimed at improving performance. Hence, after identifying the most efficient service agencies with LGs acting as surrogates we determine the sources of their efficiency. In our case the investigation considers various possibilities that could analyze the sources of efficiency based upon a) the administrative level of LG and b) modality of service provision.

Two methods were used to determine whether administrative level and modality of service provision has a positive effect on efficiency: (i) the Brockett–Golany (1996) procedure, and (ii) a second-step econometric analysis – *tobit*, which regresses the efficiency measures obtained from DEA against dummy variables for administrative level and modality of service.

(i) Brockett and Golany (1996) *include fours steps:*

a. Split the group of all LGs (j = 1,…., n) into two programs consisting of n_1 and n_2 LGs ($n_1 + n_2$). Run DEA separately for the two groups. In our case the grouping was done based on Administrative level of LGs (i.e. n_1 = Municipal level and $n2$ = Town level) and also for Modality of service (i.e. n_1 = LG in-house service provision and $n2$ = Private service provision). .
b. In each of the two groups separately, adjust inefficient LGs to their "level if efficient" value by projecting each LG onto the efficiency frontier of its group.
c. Run a pooled (or "inter-envelop") DEA with all n LGs at their adjusted efficient levels.
d. Apply a statistical test to the results of c) to determine if the two groups have the same distribution of efficiency within the pooled DEA set.

(ii) Tobit Regression Analysis

We applied the Tobit model as described in section 7.8.1 to determine the influence our selected variables had on efficiency. As noted the standard interpretation of Tobit coefficients focuses either on the magnitude, direction, and significance of the coefficients or on an undecomposed first-order effect. Such interpretations can verify theory, confirm prior research, or provide information on the effect of an independent variable across all dependent variables (LeClere 1994). However it is important to highlight the fact that our sample size is small and therefore there is a possibility effect on the tobit results.

The dependent variable in the model is the DEA efficiency score. Hence in our case, a positive coefficient implied an efficiency increase whereas a negative coefficient meant an association with an efficiency decline. The results of the regression are significant at 95% level or higher. The computations were conducted by Stata 8.

The vector of explanatory variables considered in our regression included dummy variables for modality of service provision *LG = 1*, if private service provision and *LG = 0*, if not; for the administrative level *LG = 1* if Town Council, LG = 0 if Municipal Council) and selected private sector involvement characteristics; *LG = 1* if ownership of assets used is private and *LG = 0* if not; *LG = 1* if operations are shared and *LG = 0* if not shared; duration of contract LG = 1 if less than one year, *LG = 0* if not and LG = 1 if house to house (HtH) collection is available and *LG = 0* if not available. This may not be an exhaustive set to explain technical inefficiency, however it is enough to test our main assumptions and we believe technical efficiency departure from the frontier can be systematically explained in terms of the above set of variables.

The Explanatory Variables in Tobit

Modality of Service Provision

As earlier noted in chapter four, public choice theory cast the choice of public service delivery in terms of two polar extremes and based on their extent of mix, performance can be assessed. Public choice, agency and regulation theories suggest that type of ownership – public or private influences performance because different owners pursue different goals and possess different incentives. In private organizations, owners and shareholders have a direct monetary incentive to monitor and control the behaviour of managers. Similarly, managers themselves are likely to benefit from better performance, either because they own company shares or because their pay is linked to financial success. By contrast, property rights in the public sector are diffuse and vague. Monitoring is a 'public good' – individual citizens have little to gain from increasing effort on this activity. Moreover, managers do not usually obtain direct financial benefits from enhancing organizational efficiency. Hence property rights theorists contend that private ownership is inherently superior to state ownership (De Alessi, 1983). The private sector is thought to be creative and dynamic, bringing access to finance, knowledge of technology, managerial efficiency and entrepreneurial spirit (UNDP, 1998).

The issue of the type of ownerships and its implications for the performance of waste collection services has been a classic issue of debate and the empirical results are mixed in nature. Whereas Cubbin et al (1986); Burgat et al (1990) found private operators relatively more efficient than their public counterparts, studies by Bosch et al (2001); Awortwi (2004) and Garcia (2008) found no difference in the efficiency levels of the two types of service delivery.

To provide an initial explanation of the difference in efficiency scores and therefore the possible sources of efficiency we classify the LGs according to their modality of service provision that is Delivery in-house by the LG (public procurement) and Delivery of service by a private service provider (public private partnerships).

The current options being used in practice for CCC waste collection service provision in the local government include:

i) LG provides the service in-house that is, employs staff, uses own equipment and generally meets all costs pertaining to the service delivery;
ii) Private firm provides the service on behalf of LG, with the LG paying a lump sum to private firm for the service; the trucks and labour are all the responsibility of private firm.
iii) LG and Private contribute resources towards the daily operations of the service provision or agree to share operational roles; e.g. LG contributes trucks and private firm contributes labour and daily operation. LG pays private firm lumpsum.

In our study only LGs in i) were classified public while those in ii) and iii) were categorized "*private*".

We sought to explain efficiency in a context where the waste collection service was transferred to a private sector that lacked experience in the operations and management of waste collection and did not have the requisite financing muscle but largely depended on the contractual fees from the client LG to sustain operations. Furthermore, the policy guide enabling and enforcing private sector involvement in waste collection was not in place. Given such context, we expected that the public sector will be more efficient and that involvement of the private sector in waste collection services will negatively influence efficiency.

Administrative Level Setup

The different ULG administrative setups have different mandates with respect to procuring private service providers for instance, whereas the municipal councils were autonomous and executed the whole procurement process the town councils' procurement process was handled by their parent district; that is, town councils only came in at contract signing stage and contract management. Hence a comparison was appropriate and we expected the administrative setup to influence efficiency results.

Private Sector involvement characteristics

Kumar (2004) and Jamali (2007) identified *asset ownership, operation/management, capital investment, and duration of contracts* as elements which define private involvement and therefore could influence performance. Under the private involvement schemes, the government specifies the services it wants the private sector to deliver, and then the private partner designs and builds a dedicated asset for that purpose, finances its construction, and subsequently operates the asset and provides the services deriving from it. It is anticipated that giving the private sector combined responsibilities for designing, building, financing, and operating an asset is a source of increased efficiency in service delivery (IMF, 2004). Hence it is imperative to determine the trend of influence parameters such as *asset ownership, operation/management, financing, and duration of contracts* have on efficiency.

In similar vein, arguing that no organization is wholly public or private, Bozeman (1987) synthesized; *ownership, funding and control* – into a "dimensional" model of a construct denominated "*publicness*". He then located public and private firms on these three dimensions. We note that the publicness elements reflect components of private sector involvement and that the relative importance of the components will vary from one contract to another depending on the purposes for which it was constituted and the needs and nature of the partners involved. Relating the publicness construct to private involvement elements, *Ownership* could be operationalised by ownership of assets, funding by capital investment and control by the partner in charge of operations or whether the operations are shared or not. Based on these dimensions each contract is more public in one dimension and less public in another. However, research has so far not modeled the complementary elements that form private involvement. Hence it is crucial to determine the trend of influence parameters such as *asset ownership, operation/management, financing, and duration of contracts* have on efficiency.

Asset ownership

There are two possibilities of ownership of assets that are used in delivering the waste collection service: a) the LG ownership of the assets or b) private firm ownership. In the former case, the trucks and equipment would be owned by the respective LG and given, lent or leased to the private operator for the duration of the contract. The LG retains full control over the assets, which could create problems with respect to maintenance and renewal. The private operator has little incentive to maintain the vehicles to a level that extends their economic life beyond the contract term (Domberger et al, 1997). Therefore, whether ownership of assets remains in the public sector or is transferred to the service provider can be a vital influence to efficiency. Hart (1995) has shown that ownership of assets matters because it confers power to control ex-post contractual outcomes when contracts cannot completely specify the rights and obligations of the parties. We therefore expected that private ownership of the assets would positively influence efficiency.

Operation/management

Private participation in waste collection service involves the allocation of responsibilities for operations/management of the service delivery. The two prevalent options include a) a situation where the LG shares operational responsibilities with the private operator, for instance the private operator cleans the streets, collects and loads waste and the LG transports to the dumping site and/or vice versa. On the other hand, b) the private operator could be responsible for all the operational activities that is collection and transportation. The former arrangement could create inefficiency especially where one of the parties does not play their part. Hence whether the operational responsibilities' are shared or not is a vital aspect in the waste collection service and could influence efficiency.

Duration of contracts

Determining contract length involves a balancing act between the desirability of periodic competition to ensure cost-containment and the need to ensure adequate contract length to permit capital-cost recovery (Scarlett, 1996). It could be argued that in a well developed market in which considerable competition and private sector involvement is prevalent, the issue of duration of contract is less important. This is because the private firm can easily dispose of the collection trucks and equipment to other firms if the contract is not renewed. But in the case of Uganda, where private involvement in waste collection was a new phenomenon, duration of contract is an important issue. It is argued that contracts should be short in order to increase the opportunity for competition. Short-term contracts are said to be sufficient to attract qualified bidders and to maximize the benefits of competitive contracting by going out to bid as often as possible. However, contracts of short duration may deter competition during the bidding process if private firms calculate that they will be unable to recoup equipment investment costs. Short-term contracts could reduce the level of competition and increase the cost of service to the public client for two primary reasons: the high cost of modern refuse trucks and other equipment; and the smaller number of potential bidders for short-term contracts. The cost of waste trucks requires a large financial commitment and the high cost of equipment makes it practically impossible for many qualified contractors to submit a competitive bid on a short-term contract. On the other hand incentives to perform better could be expected when shorter period contracts are given to the private providers considering that

they will be expected to compete and secure continuity at shorter intervals. But such incentive is only possible if the LG honours their part of bargain in terms of timely payments and other contractual obligations. If payments are delayed, the motivation for efficiency is negatively affected since the private providers will just be looking to see out their contract. The longer the duration of contracts the more likely private operators are to invest in appropriate (cost-saving) equipment as time allows for the depreciation of their capital expenditures. Hence the length of contract is likely to influence efficiency.

House to House (HtH) collection
Two alternative methods of waste collection favoured were the HtH and Central Collection Center (CCC). The HtH was mainly preferred by the private providers because payment of collection fees was made directly to the providers by the public clients and besides it targeted affluent areas within the ULG hence there were no hassles of delayed and/or non payment of fees, however as earlier noted, not all ULG had introduced the HtH method. We expected HtH to have a positive influence on efficiency since presence of HtH could reduce the operational workload that is, where it was absent, a larger proportion of the waste would be taken to the collection center increasing the workload of CCC service provider.

9.10 DEA Analysis Results

The efficiency measures obtained by DEA can be interpreted to show how much each LG could reduce its input usage without reducing output if it were as productive as the best practice peer LG. In our case, since we estimated input usage by OPEX, efficiency measures can also be interpreted to indicate the cost saving potential of different LGs. In order to grade the efficient units, we have used a method that has frequently been applied in the DEA literature. We refer to the number of times that an efficient unit appears in the reference group of the inefficient units. So, when the number is higher the unit being evaluated is genuinely efficient in respect to a good number of units.

Results according to Modality of Service Provision
Efficiency results for modality of service provision are presented in Table 9.6. Comparing the two categories, we note that the average efficiency score achieved by the LGs using public service delivery is higher than that achieved by those utilizing private providers at 84% and 78% respectively. We also observe that 55% of the of the LGs using public service delivery were at the efficient frontier compared to only 35% of the LGs using private firms. Furthermore 64% of the LGs using public service delivery were above their group's average compared to only 59% for those utilizing private service providers. The descriptive statistics generally showed a better performance by the LG using public sector means.

Table 9.6 Individual Group Performance Based on Modality of Service Categories in Waste Collection

Public			Private	
Unit Name	**Score**		**Unit Name**	**Score**
Iganga TC	100		Bugiri TC	100
Lubaga Division	100		Central Division	100

Public			Private	
Unit Name	**Score**		**Unit Name**	**Score**
Mbarara MC	100		Jinja MC	100
Mubende TC	100		Kasese TC	100
Mukono TC	100		Lugazi TC	100
Soroti MC	100		Mbale MC	100
Tororo MC	89.17		Kakiri TC	92.59
Masaka MC	79.13		Lukaya TC	86.9
Mityana TC	62.5		Wakiso TC	83.33
Kabale MC	56.31		Mpigi TC	80.7
Busia TC	40.91		Hoima TC	62.5
			Lyantonde TC	61.99
			Fort Portal MC	56.35
			Kalisizo TC	54.23
			Bushenyi-Ishaka TC	52.3
			Entebbe MC	48.24
			Arua MC	42.53

Table 9.7 Descriptive Statistics – Results for Modality of Service Data in Waste Collection

Statistic	Public	Private
Mean	84	78
Standard Dev	22	22
Maximum	100	100
Minimum	41	43
No. of Effic LGs	6	6
%ge of Effic LGs	55	35
No. of LGs above Mean	6	10
%ge of LGs above Mean	64	59
Total Number of LGs	11	17

Results of combined group

The results from the analysis combining all LGs in one group irrespective of administration level and modality of service provision imply considerable variation in the waste collection productive efficiency of LGs, as shown by the distribution of efficiency scores presented Figure 9.2 and Table 9.8. We observe that 32% of the LGs (Mubende TC, Kasese TC, Jinja MC, Central Division, Mukono TC, Mbarara MC, Bugiri TC, Lubaga Division, and Soroti MC) were technically efficient since they had a relative efficiency score of 100%. The remaining 68% were identified as potentially under-performing to some extent compared to the 9 best practice benchmarks.

Figure 9.2 Distribution of Efficiency Scores for Waste collection

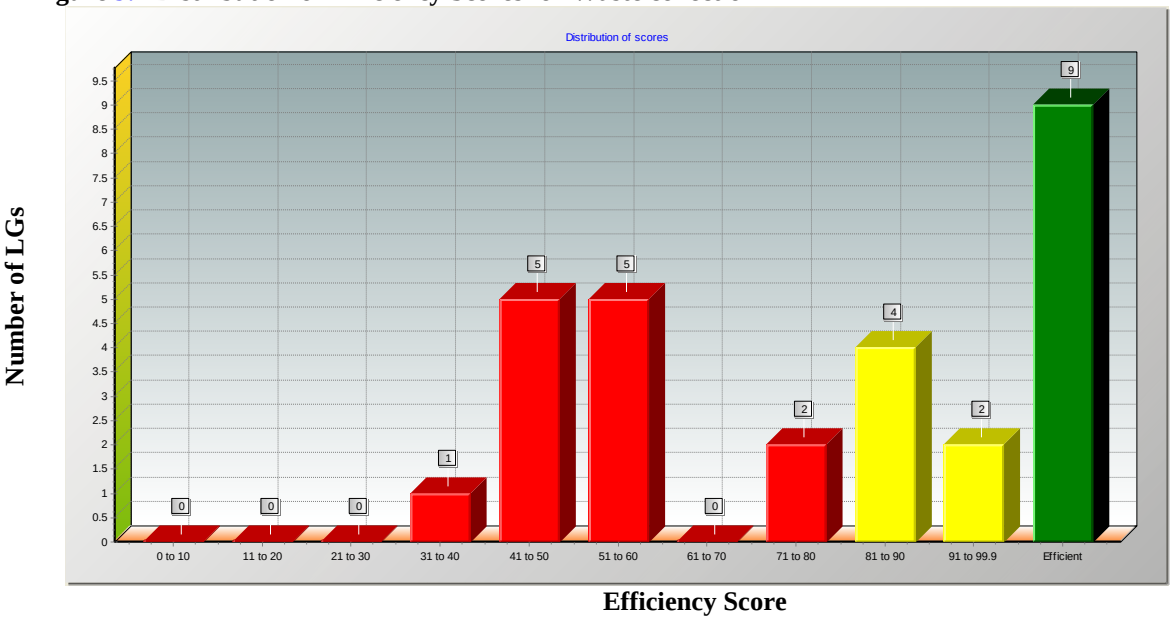


Table 9.8 Efficiency Scores for Waste collection 2006/2007

Unit name	Scores Based on Combined Original Data
Bugiri TC	100
Central Division	100
Jinja MC	100
Kasese TC	100
Lubaga Division	100
Mbarara MC	100
Mubende TC	100
Mukono TC	100
Soroti MC	100
Mbale MC	97.29
Kakiri TC	92.59
Tororo MC	85.69
Lukaya TC	84.52
Wakiso TC	83.33
Iganga TC	81.16
Mpigi TC	78.49
Lugazi TC	75
Mityana TC	57.11
Kabale MC	55.64
Lyantonde TC	55.64
Masaka MC	53.18
Fort Portal MC	51.51
Kalisizo TC	48.94
Entebbe MC	47.85
Bushenyi-Ishaka TC	47.19

Unit name	Scores Based on Combined Original Data
Hoima TC	46.87
Arua MC	42.13
Busia TC	39.33
Descriptive Statistic	
Mean	76
Standard Dev	23
Maximum	100
Minimum	39
No. of Effic LGs	9
%ge of Effic LGs	32
No. of LGs above Mean	16
%ge of LGs above Mean	57
Total Number of LGs	28
%ge Municipals above Mean	58
%ge Towns above Mean	56
%ge Public above Mean	64
%ge Private above Mean	53

The descriptive statistics reflected in Table 9.8 show an overall mean efficiency of 76%. Thus, on average, if the waste collection service operations had followed those of the 9 benchmarks identified, all else being equal, current production levels could have been achieved with a 24% mean reduction of resources utilized, that is, technical inefficiency accounts for 24%. Furthermore, 57% of the LGs are above the average efficiency score of 76%. The TE score among the inefficient LGs ranged from 97% for Mbale MC and 39% for Busia TC implying that Mbale MC and Busia TC could potentially reduce their current OPEX by 3% and 61% respectively while leaving their output levels unchanged. The average TE score among the inefficient LGs was 64%, which means that these LGs could, on average, produce their current levels of output with 36% less OPEX than they were currently using based upon the observable best practice.

Results according to Category of LG Administrative Level

Table 9.9 provides DEA results of LGs based on administrative grouping. We note that 58% of the MCs lie on their group's efficient frontier with a score of 100% whereas for the TCs only 31% do. In terms of average performance, the MCs had a significantly higher mean score of 92% compared to TC's 74%. Furthermore 67% of MCs were above their individual group's mean while for the TCs only 56% were above their individual group's mean. It is worth mentioning the remarkable differences in dispersion observed in the efficiency scores obtained by the individual groups. For instance whereas the municipal council's efficiency scores show a narrow concentration lying between 71% and 100%; the town councils are widely dispersed at 39% and 100%. Looking at averages the municipal councils were more efficient than the town councils probably due to the fact that they are autonomous in many respects.

Table 9.9 Individual Group Performance Based on Administrative Level Categories for Waste Collection

Municipal Councils			Town Councils	
Unit Name	**Score**		**Unit Name**	**Score**
Central Division	100		Bugiri TC	100
Jinja MC	100		Iganga TC	100
Lubaga Division	100		Kasese TC	100
Masaka MC	100		Mubende TC	100
Mbarara MC	100		Mukono TC	100
Soroti MC	100		Kakiri TC	92.59
Tororo MC	100		Lukaya TC	84.52
Mbale MC	99.54		Wakiso TC	83.33
Entebbe MC	86.59		Mpigi TC	78.49
Kabale MC	75.03		Lugazi TC	75
Fort Portal MC	72.44		Mityana TC	57.11
Arua MC	71.38		Lyantonde TC	55.64
			Kalisizo TC	48.94
			Bushenyi-Ishaka TC	47.19
			Hoima TC	46.87
			Busia TC	39.33

Table 9.10 Descriptive Statistics – Administrative Level Data

Statistic	Municipal	Towns
Mean	92	74
Standard Dev	12	23
Maximum	100	100
Minimum	71	39
No. of Efficient LGs	7	5
%ge of Efficient LGs	58	31
%ge of LGs above Mean	67	56
Total Number of LGs	12	16

Explaining the results using simple averages

We sought to explain efficiency levels by analyzing *modality of service, the administrative level, Ownership of assets, sharing operational responsibility and duration of contracts* via simple averages; that is whether using public or private means to deliver waste collection service had an effect on efficiency; whether being a town or municipal council influenced efficiency; whether who owned the trucks, equipments that were being used in the waste collection service influenced efficiency. Whether the sharing of responsibilities between the private and the public partners in delivering the service had an influence on efficiency; and whether the duration of contract had an effect on efficiency levels. We summarize the analysis in the table below:

Table 9.11 Explaining efficiency results for Waste Collection using simple averages

	Total Number	Average efficiency (%)	Percentage of Efficient LGs (%)	Percentage of LG above mean efficient score (%)
Modality of service provision				
Private	17	78	24	53
Public	11	84	45	64
Administrative set-up				
Town	16	74	25	42
Municipal	12	92	56	58
Ownership of Assets				
Private	6		33	67
Public	11		36	55
Operational Responsibilities				
Shared	14		43	57
Not shared	3		0	67
Duration of contract				
One year and above	12		42	58
Less than one year	5		20	40
House to house service				
Available	8		63	75
Not available	9		11	44

In terms of modality of service provision, 45% of LGs utilizing in-house were found to be efficient compared to only 24% of the LGs using private means. 64% of the LGs using public means had an efficiency score above the mean compared to only 53% of LGs using private means. It is worth noting that within the combined group, the MCs performed slightly well compared to the TCs with 42% of MCs attaining maximum efficiency and 58% of MCs having an efficiency score above the mean compared to25% and 56% of TCs respectively.

From the table we also note that 33% of the LGs where assets were owned by a private provider were efficient since they obtained an efficiency score of 100 while for the LGs where assets were owned by the public sector, 36% of them were found to be efficient, implying a slightly better performance for LG with public ownership. However, when assessed with regard to overall mean, LGs with private ownership of assets performed better with 67% of LGs scoring above the mean efficiency compared to 55% of LGs with public ownership of assets.

With respect to operational responsibilities, 43% of LGs that shared operational responsibilities were efficient compared to 0% of the LGs that did not share. However overall 67% of LGs which did not share operational activities obtained an efficiency score that was above the mean efficiency compared to only 57% of LGs that shared responsibilities.

In as far as length of contract is concerned, we note that contracts with duration of one year and above performed better in terms of both percentage of efficient LGs and LGs

above the mean efficiency score. 42% of LGs with one year and above were efficient compared to only 20% of LGs which offered contracts of less than one year. Furthermore, 58% of LGs with longer contracts obtained efficiency scores above the overall mean compared to 40% of the LGs with shorter term contracts. Based on this particular analysis we note that long-term contracts positively influenced efficiency.

For the HtH service, we observed that in LGs where the service was available, the performance was better in both percentage of efficient LGs and overall mean efficiency score. 63% of the LGs where HtH services were available were found to be efficient compared to 11% of LGs where the service were absent and 75% of LGs with the HtH service obtained efficiency scores above the mean compared to only 44% for LGs where the service was absent.

Explaining the efficiency results using Brockett and Golany

After adjusting the inefficient LGs in the different groups to their input – output resources' level if they were efficient and we run DEA on the pooled data (to be consistent with Brockett and Golany). In order to shed some more light on the issue of whether the modality of service provision implies a significant difference in efficiency levels, we performed a Mann-Whitney test with a null hypothesis that there was no difference between the efficiency levels obtained by modality of service provision that is public or private.

TEST	
Mann-Whitney Statistics U	80.000
W	233.000
P-Value	.497

Significance can be verified by using the computed test statistic (e.g., U) and comparing this statistic to the criterion (i.e., table) value. It is often much easier, however, to use the output file (table above) to verify interpretation of significance:

The results show that there is sufficient information to accept the Null Hypothesis and to declare that there is no significant difference between modality of service delivery groups in terms efficiency levels. By interpretation of the *p* (probability) value, it is observed that p = .5, which exceeds the Null Hypothesis declaration that $p <= .05$.

Explaining the efficiency results using Tobit Regression

As earlier indicated, the standard interpretation of Tobit coefficients focuses either on the magnitude, direction, and significance of the coefficients or on an undecomposed first-order effect. Such interpretations can verify theory, confirm prior research, or provide information on the effect of an independent variable across all dependent variables (LeClere 1994.). It is important to note that the dependent variable in our tobit model is the DEA efficiency score. Hence a positive coefficient implied an efficiency increase whereas a negative coefficient meant an association with an efficiency decline. The results of the regression are significant at 95% level and therefore a coefficient is interpreted significant at $t > 1.96$. The computations were conducted by Stata 8.

The results from the tobit estimation showed that only *HtH* had a statistically significant positive effect on efficiency; implying that the presence of *HtH* services in a LG was vital in achieving higher levels of efficiency. The results further showed that variables *modality of service* and *administration level setup* had no significant effect on efficiency; manifesting that these variables did not affect the attainment of higher efficiency in significant way. Nonetheless the negative coefficient on the *modality of service* binary variable could imply that it worsened efficiency. This could be expected in the context of Uganda where the services were transferred to inexperienced and financially weak private providers. We also noted that none of the three dummy variables representing the public private partnership characteristics was statistically significant.

Tobit regression results

Tobit estimates Number of obs = 28

score	Coef.	Std. Err.	t	P>|t|
ServiceType	-13.4968	24.00512	-0.56	0.580
AdminLevel	8.10195	13.48921	0.60	0.554
AssetOwnshp	18.13623	21.65597	0.84	0.411
SharedRespo	16.87478	25.23908	0.67	0.511
ContrDuratn	-1.642396	13.47157	-0.12	0.904
HtH	**30.64541**	**13.09178**	**2.34**	**0.029**
_cons	53.63921	31.69271	1.69	0.105
_se	27.67705	4.830495	(Ancillary parameter)	

Obs. summary: 19 uncensored observations
9 right-censored observations at score>=100

Multicollinearity test

Before using the explanatory variables in tobit regression it is worthwhile to test for Multicollinearity. Multicollinearity is a problem with being able to separate the effects of two (or more) variables on an outcome variable. If two variables are significantly alike, it becomes impossible to determine which of the variables accounts for variance in the dependent variable. As a rule of thumb, the problem primarily occurs when *x* variables are more highly correlated with each other than they are with the dependent variable (Lynch, 2003). Hence, multicollinearity refers to excessive correlation of the predictor variables. When correlation is excessive (some use the rule of thumb of $r > .90$), standard errors of the *b* and beta coefficients become large, making it difficult or impossible to assess the relative importance and unique role of the predictor variables.

While simple correlations i.e. coefficient correlation tell something about multicollinearity, the preferred method of assessing multicollinearity is to regress each independent on all the other independent variables in the equation (Garson, 2009). Inspection of the correlation matrix reveals only bivariate multicollinearity, with the

typical criterion being bivariate correlations > .90 (Garson, 2009). Note that a corollary is that very high standard error of b coefficients is an indicator of multicollinearity in the data. To assess multivariate multicollinearity, one uses tolerance or Variable Inflation Factor (VIF), which build in the regressing of each independent on all the others. Even when multicollinearity is present, note that estimates of the importance of other variables in the equation (variables which are not collinear with others) are not affected.

The SPSS output for both tolerance and VIF is presented in the table below:

In terms of tolerance, when interpreting results it is imperative to note that the higher the intercorrelation of the independents, the more the tolerance will approach zero and as a rule of thumb, if tolerance is <.20, a problem with multicollinearity is indicated (Garson, 2009). VIF is the variance inflation factor, which is simply the reciprocal of tolerance. Therefore, when VIF is high there is high multicollinearity and instability of the *b* and beta coefficients. VIF >= 4 is an arbitrary but common cut-off criterion for deciding when a given independent variable displays "too much" multicollinearity: values above 4 suggest a multicollinearity problem. Some researchers use the more lenient cutoff of 5.0 or even 10.0 to signal when multicollinearity is a problem (Garson, 2009).

Coefficients[a]

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	57.270	24.865		2.303	.032		
ServiceType	-1.528	19.802	-.033	-.077	.939	.211	4.748
AdminLevel	5.004	10.593	.110	.472	.642	.717	1.395
AssetOwnshp	6.421	15.970	.139	.402	.692	.324	3.088
SharedRespo	2.907	19.521	.065	.149	.883	.207	4.836
ContrDuratn	1.583	11.205	.052	.141	.889	.288	3.471
HtH	18.612	10.164	.414	1.831	.081	.763	1.311

a. Dependent Variable: EffiScore

There are several ways for dealing with multicollinearity when it is a problem (Lynch, 2003). The first, and most obvious, solution is to eliminate some variables from the model. If two variables are highly collinear, then it means they contain highly redundant information.

Another solution is to transform one of the offending *x* variables. As noted earlier, multicollinearity becomes particularly problematic when two *x* variables have a stronger relationship with each other than they have with the dependent variable. Ideally, if we want to model the relationship between each *x* and *y*, we would like to see a strong relationship between the *x* variables and *y*. Transforming one or both *x* variables may yield a better relationship to *y*, and at the same time, it will eliminate the collinearity problem.

A final approach to remedying multicollinearity is to conduct 'ridge regression.' Ridge regression involves transforming all variables in the model and adding a biasing constant to the new (X^TX) matrix before solving the equation system for *b*.

Tobit estimates Number of obs = 28

score	Coef.	Std. Err.	t	P>|t|
ServiceType	-5.974683	21.11343	-0.28	0.780
AdminLevel	7.129628	13.33387	0.53	0.598
AssetOwnshp	8.760615	16.04383	0.55	0.590
ContrDuratn	-1.699134	13.46438	-0.13	0.901
HtH	**30.9783**	**13.03245**	**2.38**	**0.026**
_cons	63.41567	27.97516	2.27	0.033
_se	27.65812	4.821737	(Ancillary parameter)	

Obs. summary: 19 uncensored observations
9 right-censored observations at score>=100

We opted to drop the variable with the highest VIF if multicollinearity is indicated. From the table it is clear that ServiceType and SharedRespo exhibit some multicollinearity since their VIF >4 the cut-off point; hence it was advisable that they are not used in the same model; SharedRespo. However we observe that the changes in tobit regression results did not warrant variation in conclusions considering that results are not substantially different.

OTHER EXPLANATORY VARIABLES

Competition

It is postulated that for markets to work effectively, there must be robust competition among service providers. The more competitive a market is, the stronger the incentive is to be as efficient as possible. The lack of competition is said to reduce incentives to increase efficiency and innovation. Thus the incidence of competition is shown as a major driver for private provision efficiency. In our study the presence of competition was explored by analyzing the number of firms responding to the request for bids when the contract with the private provider was tendered and those actually eligible for evaluation. Nine out of seventeen LGs returned the following information Table 9.12) with regard to the waste collection service.

Table 9.12 Relating Efficiency scores to competition – Waste collection

Local Government	Number of firms biding	Number of firms eligible for evaluation	Efficiency Score Based Individual Group
Jinja Municipal	4	2	100
Kasese Town	6	4	100
Lugazi Town	2	2	100
Kalisizo	3	1	54
Mbarara	0	0	-
Lukaya	2	1	87
Hoima	1	1	65
Kabale	0	0	-
Kakiri	2	2	93

We liberally defined competition as a situation where more than one firm responding to the bid was eligible. Based on this definition, from the Table 9.12, we observe competition in only four of the nine LGs. Relating competition and efficiency; it is observed that Jinja, Kasese and Lugazi which have some competition, were among the efficient LGs; emphasizing the influence of competition on efficiency. However, we also underline the high prevalence of interested private firms which do not qualify due to eligibility constraints; a symptom of either technical inadequacy in this sector or over specification i.e. specifications not matching the supply market. The lack of eligible firms impairs the competitive environment and absence of real competition in this sector might explain why the private sector does not show any superior efficiency.

Theories supporting private provision show that the introduction of competition, rather than awarding contracts to private firms leads to efficiency; a view supported by studies of Domberger et al, (1996); Domberger et al., (1986); Prager, (1994). This condition is said to hold in countries where the competitive environment is well developed. For example Cointreau (1994), observes that in the United States, a) more than 10,000 private firms are engaged in municipal solid waste service, and b) more than 80 percent of this type of waste is collected by private firms. These numbers indicate a highly competitive environment, although it is not clear whether they are efficient.

We also note that in Mbarara and Kabale, there was no response to the request for bids; through interviews, we established that after the expiry of the previous contract, the service was, as is the practice put to tender but got no response from potential bidders thus provision reverted to the LG during the financial year 2006/07. A poor record of settling supplier claims on time is behind non-response to bids besides the private firms preferring the more lucrative house to house waste collection service where fees are collected directly from the clients on a timely basis.

9.11 Chapter Summary and Conclusion

We sought to determine the efficiency levels of LGs' waste collection service comparing the performance of publicly and privately operated service delivery systems, in the context where delivery was divested to the private providers without prior and post

experience. Efficiency levels were calculated based on OPEX as a composite input and volume of waste collected (quantitative indicator) and total collections made (qualitative indicator) as our outputs.

The more robust tobit regression run to explain the effect on efficiency distribution using various parameters shows that modality of service provision did not have a significant effect on efficiency levels; HtH was only variable with significant effect on efficiency. Furthermore, the Mann-Whitney test also found no significant difference in the efficiency levels of both public and private provision.

The descriptive statistics from DEA efficiency results show that publicly run waste collection services performed better than the privately operated LGs as an individual group and within the combined group. Further, LGs with longer contracts with the private providers and those with HtH services posted high efficiency results than those with shorter contracts and without HtH respectively.

The findings point strongly to the conclusion that there are no systematic inherent gains to private sector operation in terms of efficiency. Equally, there is no support for the notion that a public sector operator is intrinsically less efficient and effective. Instead there are some indications that other factors such as presence of HtH services and supply market competition in an LG influences efficiency.

Such findings provide a starting point for policy makers to base any private sector participation policy strategic decisions; hence in line with Hall et al (2004), policy discussions should therefore be based on a strictly neutral assumptions about relative efficiency, and in particular not regard introduction of private sector operation as a desirable or valuable objective. This result is vital since it ignites further scrutiny of wholesomely introducing private provision without proper analysis and justification. Any policy framework on waste collection services must consider how HtH could be incorporated. Competition is a vital component of private provision policy.

CHAPTER TEN: WATER SUPPLY SERVICE

10.1 Introduction

In this chapter we continue with presentation of the second major service – water supply. Like in the waste collection service, we discuss the complexities of water supply, including our choice of measurement variables, findings, analysis and the conclusions derived.

10.2 Stylized Facts About Water Supply In Uganda

According to the National Water Development Report (NWDR) 2005, Uganda is faced with the challenges of rapid population growth, increased urbanization and industrialization, uncontrolled environmental degradation and pollution which are leading to accelerated depletion and degradation of the available water resources. The country is also faced with the challenge of low safe water coverage (59% rural and 65% urban, as of December 2003). In order to meet the above challenges, the government initiated reforms in the water sector, in 1997, to ensure that water services are provided and managed with increased efficiency and cost effectiveness. The reforms culminated into a comprehensive policy and legal framework for the management of the water sector (NWDR, 2005). The framework encompassed a set of policies and laws the most notable of which include: The National Water Policy (1999); The Water Statute (1995); The National Water and Sewerage Corporation Statute (1995), and the Local Government Act (1997). The framework divides the sector into four subsectors: (i) Rural Water and Sanitation, (ii) Urban Water Supply and Sanitation, (iii) Water for Production, and (iv) Water Resources Management.

The Urban Water Supply and Sanitation subsector which is the main concern of our study embraces gazetted towns and centres with a population of more than 5,000, and is further divided into small and large towns. While large towns are under the jurisdiction of the National Water and Sewerage Corporation (NWSC), the supply of water services in small towns is the responsibility of Local Governments (LGs) with support from the Ministry of Water, Lands and Environment (MWLE) through the Directorate of Water Development (DWD).

Large Towns

National Water And Sewerage Corporation

The National Water and Sewerage Corporation (NWSC) is a utility parastatal 100% owned by The Government of Uganda. It was established in 1972 under decree No: 34. However its current mandate is derived from the National Water and Sewerage Corporation Statute of 1995, where Section 5 (1), authorizes it to operate and provide water and sewerage services in areas entrusted to it, on a sound, commercial and viable basis.

The Statute requires the Minister responsible for the water sector to enter into a performance contract with NWSC in relation to its operations in accordance with the provisions of the Water Statute. The Statute empowers the NWSC to own assets in its areas where it provides services without the need of compensation in respect of the transfer of such assets. The whole arrangement is reminiscent of the corporatization type of ASD as detailed in Section 5.4.

The NWSC operations were initially in the three towns of Kampala, Jinja, and Entebbe, but by the end of the financial year delivered water and sewerage services to twenty two of the larger towns. Water and sanitation services for remaining towns were the responsibility of municipal/town authorities.

Small Towns

According to the Local Government Act (1997), Local Governments, in liaison with the MWLE, plan and implement development interventions based upon identified local priorities including water supply services. In 2003, the water sub sector reforms were approved by Uganda's Cabinet. In the case of small towns, the reforms emphasized the need to improve efficiency and quality of service delivery by:

- Separating asset ownership from system operations
- Commercialization of service delivery for sustainability
- Engagement of appropriate form of Private Sector Participation

For over 60 small towns, the responsibility for service delivery rests with the respective local authorities, with support of DWD. In order to address the common problem of shortage of appropriate staff within local authorities, and also ensure autonomy, each council is designated as Water Authority (WA) for a given town or cluster of towns. Improved facilities are then transferred by DWD to the WA under a Performance Contract. The main functions and obligations of the WA are to provide, maintain and charge for these services; and to manage, control, renew and extend the assets as agreed with MWLE. The activities of the WA are overseen by a 5-member Water Board (WB), composed of at least two women, as follows: the Town Clerk, the water portfolio Council member and three others representing various water user groups.

The WA is in turn required to enter into a Management Contract with a Private Operator (PO) for service delivery. The PO is responsible for day-to-day management of the facilities to agreed standards, charges and collects revenue, manages routine and urgent repairs, and undertakes system extensions. PO remuneration consists of: a base fee which covers fixed costs like energy and consumables; a water sales fee which is directly proportional to the volume of water sold; a billing fee which relates to bills preparation and revenue collection; a pipe maintenance fee which corresponds to the length of transmission and distribution piping maintained; a new connection fee which relates to administration and installation of new service pipes; and an unaccounted for water (UfW) fee which encourages the PO to keep water losses as low as possible. Both WA and PO operate a joint escrow account for the service related revenue and expenditures. The WA sets tariffs and fees (subject to DWD approval), has the accounts audited, monitors and evaluates the PO's activities/performance and pays the management fee.

Responsibilities allocated to the government and private parties in the contracts for local private sector providers in water and sanitation can generally be classified as financial or management responsibilities:

- *Financial responsibilities for capital investments.* Investments may be entirely financed by the government or the private party, or partially financed by each.
- *Management responsibilities in water supply.* Management responsibilities include managerial functions exercised by the public or private partner during conception, design and planning, construction, and operations and maintenance. These managerial functions include (a) bill-collect-operate; (b) operate-maintain; (c) build-operate-maintain; (d) design-build-operate-maintain; and (e) design-build-own-operate-maintain. All private have similar contractual responsibilities.

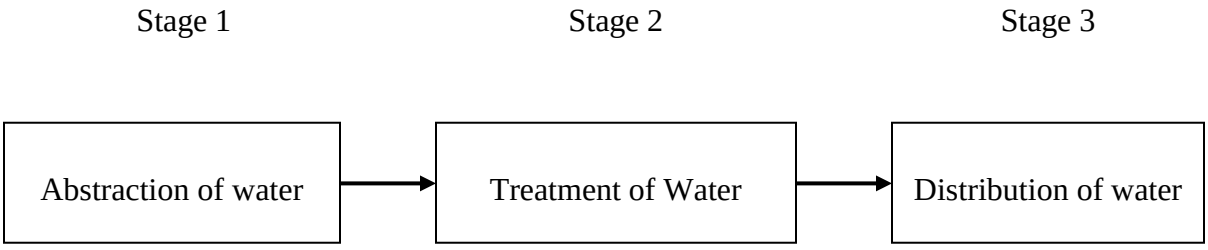
We observe that our study regards LG where NWSC operates as public sector provision while private operators are equated to private provision.

10.3 Delivering The Water

The production process used to supply water to urban areas in Uganda is fairly straight forward. The service, as it has been defined in Thanassoulis (2000), identifies three clearly separate activities: abstraction, water treatment and its distribution Figure 10.1.
The first stage involves the abstraction of water from surface water sources such as rivers, lakes, and ground water services such as boreholes, springs or purpose built dams.

The second stage involves the treatment of water abstracted to make it usable. This includes all the chemical and mechanical processes carried out with the water for the purpose of making it suitable for consumption; as well as the different analyses performed for the verification of the parameters of quality prior to passing it to the distribution network.

Figure 10.1 The three stages from abstraction to delivery of water



Source: Thanassoulis (2000)

Water distribution is the third and final stage. It entails the impulsion of the water stored in tanks for its circulation through the network of pipes to the domestic, commercial, and/or industrial customers.

Hence urban areas require reliable water supplies that can provide adequate quantities of water all year round, as well as infrastructure for abstraction, treatment, pumping, transmission, storage, and distribution. However as noted earlier, constraints such as rapid population growth, increased urbanization and industrialization, uncontrolled

environmental degradation and pollution seriously erode efforts at service delivery. A comparison of the relative efficiency of urban water supply service providers in Uganda is a difficult exercise, because these firms operate in a wide variety of environments.

10.4 Specifying Inputs And Outputs

Previous performance measurements studies with regard to water supply services in the context of Uganda have concentrated on the traditional approach to performance evaluation and benchmarking where a single-measure gap analysis is utilized. That is, simple ratio measures, such as water delivered per employee and operating costs per connection, are used as performance measures; refer to Section 7.2 for detailed discussion. The popularity of these ratio measures, commonly referred to as "partial productivity measures", stems from the fact that they are easy to construct and also easy to interpret. However, in many cases these ratio measures are unreliable indicators of the "true productivity" of the firm (Coelli, 2005). This is because a particular firm could have high operating costs per connection because it is poorly managed and wasteful, or it alternatively it could be due to factors not under the immediate control of the managers. Hence such "partial productivity measures" are not substitutes for frontier analysis, which recognize the complex nature of interactions between inputs and outputs.

A fundamental stage in any assessment is the identification of a set of input and a set of corresponding output variables. The inputs reflect the resources used in the course of obtaining the outputs by the units being assessed. We acknowledge that the input–output variable selection is usually guided by expert opinion, past experience, economic theory, and degrees of freedom constraints encountered when using a small sample size (Baker 1989) and there are no diagnostic checks for model misspecification resulting from the wrong choice of variables (Kontodimopoulos, 2006), thus in selecting the inputs and outputs we capitalize on this guidance.

Therefore, for purposes of specifying inputs and outputs for use in our DEA models for water supply services in Uganda, (Mugisha 2007); Kirkpatrick et al (2006); Garcia-Sanchez (2006); Coelli (2005); Estache (2002); Thanassoulis (2000); Lambert (1993) and Byrnes et al (1986) as summarized Table 10.1 provide some initial benchmark guidance.

A Review of studies that provide benchmarking information

Byrnes et al. (1986) also conducted a comparative analysis of private public settings, using DEA techniques. They assessed estimates of levels of firm technical efficiencies in each sample. They specified a production function with one output variable, *volume of water delivered* and seven input variables namely: *ground water, surface water, purchased water, part-time labour, full-time labour, pipeline length* and *storage capacity*.

Table 10.1 List of Water Supply Studies

Author	Sample	Model (and Method of estimation)	Input	Output
Kirkpatrick et al. (2006)	66 water utilities in Africa in 2000	DEA – input orientation with VRS	• Personnel cost per employee • Material cost per unit of water distributed • Number of water treatment works	• Volume of water distributed per year in (cubic meters) – [Qty] • Number of hours of piped water available per day [Qlty]
Byrnes et al (1986)	127 US water utilities (1978)	DEA – input orientation	• Ground water • Surface water • Purchased water • Part-time labour • Full-time labour • Length of pipeline • Storage capacity	• Volume of water distributed
Lambert and Dichev (1993)	270 US water utilities	DEA	• Annual Labour hours used • Energy used • Value of materials used	• Volume of water distributed
Garcia-Sanchez (2006)	24 Spanish utilities	DEA – input orientation with CRS	• Number of staff, • Treatment plants, • Network Kilometers, • Total cost	• Water delivered • Number of connections • Analyses performed
Mugisha (2007)	15 Sub-Utilities (Branches of NWSC)	SFA	• Labour, • Length of Network (proxy for capital) • Operations expense	• Total connections • Water billed as a percentage of water
Estache and Kouassi (2002)	21 Water utilities in Africa 1995-1997	Cobb-Douglas production function	• Labour costs, • Material costs, • Hours worked, • Energy costs, • Number of connections	• Water production
Thanassoulis (2000),		DEA	• Operating expenditure	• Number of connections • Length of mains • Volume of water delivered • Pipe bursts
Coelli 2005	18 Water utility firms	DEA	• Operation Expense • Capital	• Number of properties connected

On face value, the Byrnes et al (1986) study could be criticized for not including more output indicators and especially those measuring quality. However, as they point out, the input variables used are likely to control for a number of these differences in output characteristics. For example, the use of the three water source variables will ensure that firms with similar water source mixes will be benchmarked with each other, while the use of two capital proxies (storage capacity and length of pipelines) should mean that firms with similar network densities will generally be benchmarked with each other.

Lambert and Dichev (1993) conducted a comparative analysis of private versus publicly owned water utilities. They used data from 1989 survey conducted by the American Water Works Association (AWWA) and measured technical, allocative and scale efficiency using DEA. The single output variable used was *total water delivered*, while the four input variables were *annual labour, energy used, materials input* and *value of capital*. This study correctly picked the ingredients of input and output indicators however, we note that it did not include any qualitative measure within the variables chosen.

Thanassoulis (2000a and 2000b) undertook a DEA of water distribution in the UK using data obtained from OFWAT. He included the input of *operating expenditure*, and argued for the exclusion of capital costs from the input(s) because OFWAT saw no convincing evidence that operating expenditure and capital expenditure were inversely related. Output measures used included *number of connections, length of mains, volume of water delivered* and *pipe bursts*. The choice of length of mains and pipe bursts as output variables are arguably controversial (Coelli, 2005). The mains variable was included to attempt to capture the effects of network density. However, given that mains are a capital input, the use of mains as an output variable could perhaps signal to firms that more input is better. Mains bursts were included to attempt to reflect the fact that certain networks are more susceptible to bursts and hence require more reactive maintenance. However, one could alternatively argue that one would normally require a water utility to institute measures that attempt to minimise pipe bursts (through better maintenance) rather than maximise them. Once again, this output variable could send rather unusual incentive signals to the firm being assessed, in the medium term (Coelli, 2005). However the alternative option would be to treat such bursts as undesirable outputs.

Estache and Kouassi, (2002) attempted to figure out the determinants of efficiency levels achieved by 21 African water utilities. The inputs specified include *labour cost, material cost, hours worked, energy costs and number of connections* and a single output *water production.* Again this particular study lacked a measure of quality among its variables.

Kirkpatrick et al. (2006) also addressed the issue of ownership and its effect on performance of the sector. Their study examined the effects of privatization on the performance of the sector using data of African water utilities. Both the SFA and DEA techniques were used for the analysis. In the DEA model, the inputs specified included *Personnel cost per employee, Material cost per unit of water distributed* and *Number of water treatment works* and the outputs were *Volume of water distributed and Number of hours of piped water available per day.* Whereas the inputs and some outputs utilized are

acceptable, we have reservations on the output *Number of hours of piped water available per day* as this, in most cases, is outside the control of the utility firms, more especially in Africa where energy / electricity is rationed via prolonged load-shedding practices targeting some perceived less important locations.

The above studies provide us with some benchmarks on the possible variables to utilize given the Ugandan context. We notice though, the diverse input and outputs used but identify the ones common in most studies and these form our primary benchmark.

Specifying the Inputs

The production process of the water supply service relies on the stock of capital comprising of the plants, reservoir tanks, and the network of pipes without detracting the importance of labour as well as the usable materials such as chemical, energy and etc. We observe from the studies above that the input variables were proxies of the factors of production reflected by the elements of the cost structure comprising of labour, materials, energy, and capital costs; hence operating expense (OPEX) was itemized. In our case such detailed breakdown is not possible due to data availability constraints and also given our sample size, degrees of freedom would not allow us have such disaggregated inputs.

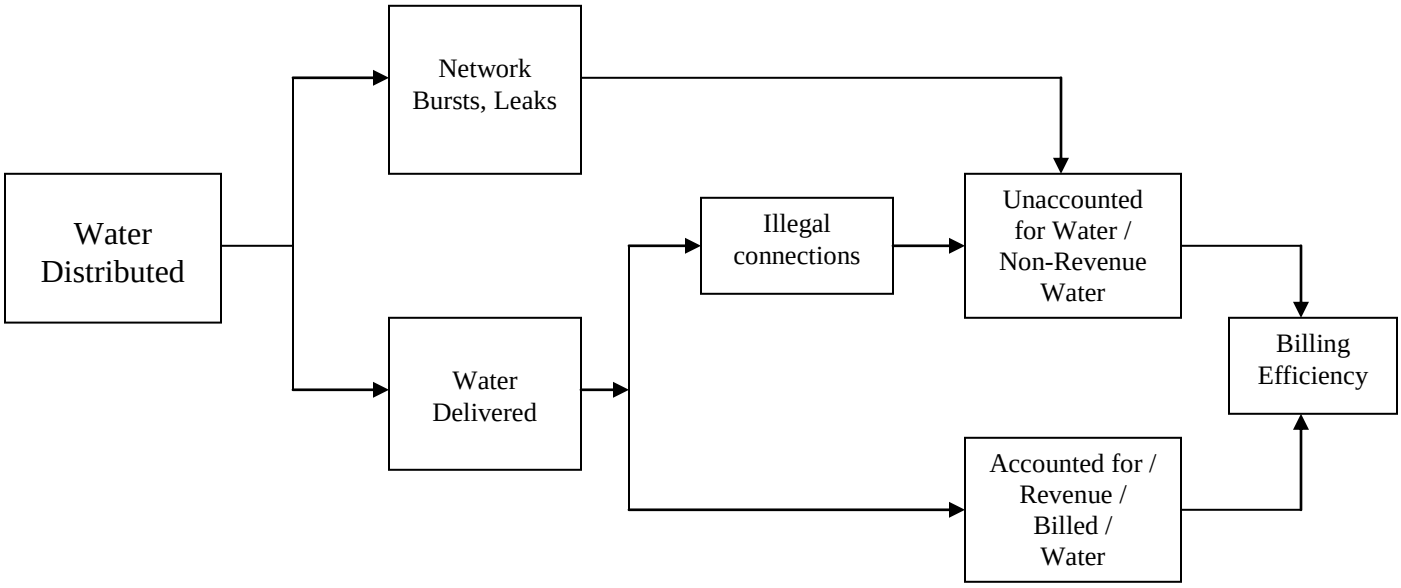
Hence, *Operating expense (OPEX)* is preferred as a single input measure since it encompasses the compensation to labour, energy, chemicals, maintenance, and depreciation as a proxy for capital used in the production process. OPEX Sums up all variable resources expended in producing and delivering the service for the public client and thus provides a clear picture of what resources are being used and what is being achieved by expending them.

Length of Network - We observe from the above benchmark studies that the use of network length as either an input or output was not certain. Whereas Mugisha (2007), Garcia (2006) and Byrnes considered network length as an input that represents capital, Thanassoulis (2000) regarded it as an output variable that captures network density. For our study we decided against using network length as input variable because we believe it is reflected in OPEX, that is, if the length of the network is longer then the utility firm spends more on maintenance, repairs, energy, leaks etc and besides depreciation costs represent the period's capital costs within OPEX.

Specifying the Output

The outputs must reflect the main activities from the water service providers, that is, they have to deliver water to clients. Figure 10.2 depicts a typical water utility in the Ugandan situation. As described in the figure, when water is distributed, a certain proportion is delivered to units connected to the network grid (*water delivered*) while the other proportion is lost via bursts and leaks arising from defective pipelines and inadequacy in maintenance and repairs of the ageing networks. Furthermore while some of the water delivered reaches its anticipated destination that is clients legally connected on the grid and therefore are billed another proportion is lost via illegal connections. The water that reaches the legally connected clients represents water sold and clients are billed for it while the water that is lost via network bursts, leaks and illegal connections represents unaccounted for water or non revenue water.

Figure 10.2 Typical Water Supply System in Uganda



Volume of Water Sold (Billed) as a Proxy for Water Delivered
As observed from the studies above, *volume of water delivered (VoWD)* is the most commonly used single output variable in the water efficiency measurement. To some extent we concur with its use because we also believe that the *total amount of water delivered*, is an estimate of work done in conveying the water to the clients and therefore will have an enormous influence on the level of OPEX. However quite often in developing countries and particularly in the context of Uganda the total amount of water delivered is not actually known since it includes *unaccounted for water (UfW)* arising from water lost due to *illegal connections and non metered water*. The better option would be to use the *amount of water sold* (*VoWS)* which is implied in bills, as it best represents the actual amount of water delivered to the client. Hence, considering that *VoWD* and *VoWS* are highly correlated we were inclined to use *VoWS* as our quantitative measure in the DEA model.

Unaccounted for water [leakage, losses and illegal connections]
As observed earlier, Figure 10.2, , the production and distribution of water supply technology results into both accounted for (water sold) and unaccounted for water (water loss) as outputs.

Coelli et al. (2003) regard water loss (*Unaccounted for water)* as an indicator of the technical quality of service, which has been ignored by many studies. Tynan and Kingdom (2002) point out, that the *Unaccounted for water* (*UfW*) ratio captures commercial losses attributable to inefficient billing or illegal connections, as well as physical losses. Thus high levels of unaccounted-for water (or low levels of accounted-for water) indicate poor system management and/or poor commercial practice as well as inadequate pipeline maintenance. Garcia and Thomas (2001) utilized *UfW* as an output that is "produced" jointly with water delivered to customers. They argued that the occurrence of network leaks, losses and illegal connections as part of the production and

distribution can be considered as part of the overall inefficiency of the system. Hence, analyzing the water production process by incorporating water network losses generates essential and positive indications for water utility and public policy managers. Furthermore, their view was that overlooking water losses in the analysis may produce unreliable results if water utility manager's decisions regarding production are not independent from network water losses; a situation prevalent in Uganda.

Given the production technology, utilities use different levels of inputs and outputs, and a utility appears to be inefficient if it uses more resources to supply water than the 'best practice' utility does. Usually, in the water performance measurement, total water produced or water delivered is considered a function of available resources and the efforts of utilities made towards reducing *UfW* are ignored (Kumar, 2008). Such initiatives involve identifying strategies that address the issue of *UfW* via intensified leak detection, reduction of illegal use, repairs and replacement of defective networks in addition to reactivation of inactive accounts. Implementing these strategies impacts on OPEX and often times diverts resources from producing accounted for water to reducing unaccounted for water. When resources are directed at reducing *UfW*, rather than producing water, the output/input ratios of the utility are lower and the efficiency of the utility appears lower. An output efficiency measure, which is the amount by which outputs can be increased while maintaining the level of inputs, will label the utility as less inefficient than it would be in the absence of this diversion of resources. But reducing UfW is a vital performance objective and a quality issue.

It was mentioned in the seminal work of Koopmans (1951) that the production process may generate undesirable outputs like smoke or waste. Like any other production process; water supply also generates both desirable (accounted for water) and undesirable (UfW) outputs. However, we note that DEA usually assumes that providing more outputs relative to less input resources is a criterion for efficiency, that is, inputs have to be minimized and outputs maximized. However it would not be sensible to aim at increasing inputs in order to increase UfW (an undesirable output); instead it was logical to increase inputs in order to reduce UfW levels, hence the need to incorporate UfW, as an undesirable output measuring quality within our DEA model. Including *UfW* allowed us to recognize the reduction of an undesirable output *UfW* while simultaneously crediting the increase in a desirable output – *accounted for water*.

Other Possible Output Variables Not Incorporated in our DEA Model

Days in a week when water is available (Service Continuity)

As observed in the study by Kirkpatrick (2006), *hours in a day when water is available*, was utilized as a proxy for quality of service – *service continuity*. Whereas this indicator is worthwhile, we regard it not so relevant in the Ugandan perspective where erratic supply of power (electricity) and Fuel are beyond the control of utility managers. There are fluctuations in power supply and frequent electricity load-shedding, beyond the control of the Private Operators, which disrupt water supply as a result of which users resort to alternative sources. The rationing of these inputs via prolonged load-shedding in some perceived less important locations often times are the cause of unreliable water supply.

Water Coverage

Water coverage is defined as *population with access to water services (either with direct service connection or within reach of a public water point) as a percentage of the total population under the utility's nominal responsibility (*IB-NET*)*. Picazo-Tadeo (2008) correctly observes that in some developing countries, where low coverage rates and near-to-the-ground service quality characterise the water industry, *service coverage, service continuity or the percentage of water receiving chemical treatment* are adequate variables to measure water quality. In contrast, in industrialised countries where water services cover nearly all the population and water quality reaches higher standards, alternative measures of quality are required. Lin (2005), used coverage as an indicator of service quality because it is a direct measure of water availability to citizens in municipalities. Hence, in the case of Uganda where safe water coverage stands at 59% in rural areas and 65% in urban centers, (Water Report, 2005), increasing coverage is a key performance and development indicator. However, all coverage indicators are impacted by whether the data on population and household size is up to date and accurate (Uganda's Census figures were for 2002). The need to estimate the population served by public water points and/or the number of households per connection may affect the confidence that can be placed in the water coverage measure. Hence we opt not to use water coverage.

Total connections

Garcia and Thomas (2001); Stone and Webster (2004) have emphasized that significant modeling improvements result if both the physical volume of water services and the number of connections are considered as outputs. Saal and Parker (2006) also pointed out that such a specification is appropriate because the characteristics of outputs associated with the physical volume of services provided to existing customers are rather different from those required for the provision of new connections and besides, both outputs have substantially different marginal costs. Hence the total connections variable represents customers and will reflect the difference in production characteristic of the area of service, since it includes the number of domestic, public and industrial units supplied with water Garcia and Thomas (2001). It captures the size of water distribution network and also influences operating expenses. Whereas we appreciate the above arguments we are constrained from using total connections since it is highly correlated with volume of water sold (refer to Correlation matrix 10.3) hence it is not worthwhile using both in the same DEA model.

Statistical Validation of Inputs and Outputs

When selecting the variables, we considered it worthwhile to analyze the relationship between the different variables proposed. Using Pearson's coefficient, we tested the bi-variate correlation of the possible variables relating to inputs and outputs with the objective of detecting factors with the same significance. In this way, we can determine variables that do not fulfill the isotonic property, which requires that there should be no negative correlation between inputs and outputs, and that variables be perfectly defined as to their role in the analysis Banker (1992).

Table 10.2 Descriptive Statistics of Potential Water Supply Variables

	N	Minimum	Maximum	Mean	Std. Deviation
Operational Expenditure Shs "000"	32	22,152	2,506,485	550,578	643,257
Volume of Water Sold per annum (in cubic meters)	32	17,069	1,975,782	386,851	496,776
Unaccounted for Water	32	5%	39%	17%	8%
Total No. of Connections	32	128	11,038	2,186	2,443
Pipe Network (Kms)	32	7	169	67	52
Valid N (listwise)	32				

Table 10.3 Correlation Matrix of Potential Water Supply Variables

	INPUT	**POTENTIAL OUTPUTS**			
	Operational Expenditure Shs "000"	Volume of Water Sold per annum (in cubic meters)	Unaccounted for Water	Total No. of Connections	Pipe Network (Kms)
Operational Expenditure Shs "000"	1.000				
Volume of Water Sold per annum (in cubic meters)	.921**	1.000			
Unaccounted for Water	-.040	-.114	1.000		
Total No. of Connections	.888**	.983**	-.036	1.000	
Pipe Network (Kms)	.847**	.805**	-.061	.828**	1.000
N =	32	32	32	32	32

**. Correlation is significant at the 0.01 level (2-tailed).

10.5 Model Specification

According to the literature, the danger of model misspecification is most serious when relevant variables are omitted rather than when irrelevant ones are included Smith (1997). The model chosen should, as much as possible, reflect the consumed resources and the produced outputs.

However it should also be noted that DEA performance could be sensitive to the number of variables included in the model and the extent to which they correlate Pedraja-Chaparro et al (1999). Banker et al (1989) highlights the issue of degrees of freedom vis-à-vis the sample size and as earlier noted (in section 7.4), the general rule of thumb is that three DMUs are needed for each input and output variables used in the model in order to ensure sufficient degrees of freedom for meaningful analysis. If less than three DMUs per

input and output variable are included in the data set, there is a danger that an excessive number of DMUs will be considered efficient because of inadequate number of degrees of freedom.

We therefore believe the three variables chosen are the relevant ones based on the arguments highlighted earlier (section 10.4) and maximum of three variables used in our analysis satisfies the rule of thumb suggested by Banker et al (1989).

Table 10.4 Description of Selected DEA Model

MODEL	
Inputs	
Operating Expenses	X
Outputs	
Volume of water Sold	X
Unaccounted For Water	X

Choice of DEA Model Orientation

There are two possibilities for formulating the DEA models. One puts the emphasis on input reduction (input orientation) and the other on output enhancement (output orientation). Both formulations yield identical results in the constant returns to scale situation, which is not the case with the variable returns to scale. We adopted the input orientation considering that the initial emphasis in government policy is usually on the input dimension, and inputs are more amenable to scrutiny whereas outputs are often disputed Ganley and Cubbin (1992). Furthermore the control over utilization of inputs lies with the LGs and therefore they can change them in order to become more efficient. It is also common practice to use an input orientation in analyses of network utilities because the firms are generally required to supply services to a fixed geographical area, and hence the output vector is essentially fixed.

In terms of Charnes, Cooper and Rhodes (CCR) and Banker, Charnes and Cooper (BCC) DEA options, we observe that the service providers vary in terms of service operations and with such variations in size, it would be inappropriate to assume constant returns to scale. DEA under CRS option when all units are not operating at optimal scale may result to efficiency scores confounded by scale efficiency. Using the variable returns to scale (VRS) specification, it is possible to calculate the technical efficiency measures devoid of scale efficiency (Banker, 1984) and to observe its influence over the OPEX.

10.6 Analysis Of Data And Explaining The Efficiency Scores

In analyzing the data, we first run the DEA model on the data comprising of all the LGs in our sample, irrespective of the level of administrative unit and modality of service. This was done to determine individual performance within the group and establish

efficiency scores that would later be used to compare consistence and validate LG performance.

We acknowledge that DEA is only an exploratory tool for efficiency measurement, and indicates directions for further investigations into how to improve/enhance efficiency. Having measured the relative efficiencies, it is also of considerable interest to explain the DEA efficiency scores by investigating the determinants of efficiency when the results are expected to guide policies aimed at improving performance. Hence, after identifying the most efficient service agencies with LGs acting as surrogates we determine the sources of their efficiency. In our case the investigation considers various possibilities that could analyze the sources of efficiency based upon *a) modality of service provision, b) source of water and c) pipe network length*. The explanatory variables we choose are not directly included in the DEA analysis; they are factors we believe are beyond the control of the service providers.

Two methods were used to determine whether administrative level and modality of service provision has a positive effect on efficiency: (i) the Brockett–Golany (1996) procedure, and (ii) a second-step econometric analysis – *tobit*, which regresses the efficiency measures obtained from DEA against dummy variables for modality of service.

(i) Brockett and Golany (1996) includes four steps:

a) Split the group of all LGs ($j = 1,\ldots, n$) into two programs consisting of n_1 and n_2 LGs ($n_1 + n_2$). Run DEA separately for the two groups. In our case the grouping was done based on Modality of service (i.e. n_1 = Public Service provision and $n2$ = Private Service provision). .
b) In each of the two groups separately, adjust inefficient LGs to their "level if efficient" value by projecting each LG onto the efficiency frontier of its group.
c) Run a pooled (or "inter-envelop") DEA with all n LGs at their adjusted efficient levels.
d) Apply a statistical test to the results of iii) to determine if the two groups have the same distribution of efficiency within the pooled DEA set.

(ii) Tobit Regression Analysis

In order to analyse whether the explanation for the differences in efficiency scores between the LGs was to be found in modality of service, source of water and pipe network length, we applied the Tobit model.

The standard interpretation of Tobit coefficients focuses either on the magnitude, direction, and significance of the coefficients or on an undecomposed first-order effect. Such interpretations can verify theory, confirm prior research, or provide information on the effect of an independent variable across all dependent variables (LeClere, 1994). It is important to note that the dependent variable in the model is the DEA efficiency score. A positive coefficient implies an efficiency increase whereas a negative coefficient means an association with an efficiency decline. The results of the regression are significant at 95% level or higher. The computations were conducted by Stata 8.

The vector of explanatory variables considered in our regression included *modality of service provision* (LG = 1, if Private Service provision and LG = 0 if not; *source of water* (LG = 1 if Ground and LG = 0 if not and pipe network length as a continuous variable. We could not use administrative setup as a variable due to co-linearity constraints. We also considered using other variables that define private sector involvement characteristics including *ownership of assets, shared operations* and *duration of contract*, but all these were similar and standard for all the LGs using private provision. Hence the three variables selected may not be an exhaustive set to explain technical inefficiency, however it is enough to test our main assumptions and we believe technical efficiency departure from the frontier can be systematically explained in terms of the above set of variables.

Classification of Modality of Service Provision

To provide an initial explanation of the difference in efficiency scores and therefore the possible sources of efficiency we classify the LGs according to their modality of service provision that is Delivery by a Public entity (public procurement) and Delivery of service by a private service provider (public private partnerships).

The current options being used in practice for water supply service provision in the local government include:

a. Public entity (NWSC) provides the water supply service;
b. LG contracts the water supply service to a private operator

In our study only LGs in i) were classified *public* while those in ii) were categorized as "*private*".

The issue of the type of ownerships and its implications for the performance of water utilities continue to be a subject of debate. Empirical results are mixed in nature: Crain and Zardkoohi, (1978); Estache and Kouassi, (2002); Kirkpatrick et al. (2006) established that privately owned utilities tended to be more efficient than public owned utilities while Byrnes et al (1986), Lambert and Dichev (1993) and Garcia-Sanchez (2006) found no significant differences between efficiency levels of public and private water service providers.

In the context of Uganda; originally the water service providers had inadequate experience in water supply, however, in the three years preceding this study there had been a deliberate effort to enhance their capabilities in operating and managing the service. Furthermore, the policy guideline was clear on the responsibilities of the different stakeholders and allowed the private providers to deposit revenue collections to a joint bank account which somehow reduced delayed and/or non payment. Given this context, we expected (hypothesized) private involvement to positively influence efficiency.

Sources of Water

The water delivery cost and technology is linked to the source of water (Bhattacharyya et al., 1995). In some cases, especially in mountain areas, water delivery cost from high altitude sources is low and little maintenance is required. On the other hand, groundwater requires not only require lumpy investments to pump out water and carry it to any

destination but also requires frequent maintenance (Battacharyya et al, 1995). Underground water sources generally require greater pumping costs, but above ground water sources will require greater treatment costs. Just over 15% of the total surface area of Uganda is covered by open water and there is an annual water supply of 66 Km3 in the form of rain and inflows. The open water sources are mainly in the form of rivers and lakes. Despite Uganda's significant water resources, their spatial and temporal variability often renders many parts of the country water stressed over long periods of the year. Groundwater is the major source of water supply in the rural, semi-arid and arid areas in Uganda. There has been an increase in groundwater development for town water supply since early 1990s due to the need to have water supply systems that can easily be operated and managed by the users. In addition, groundwater normally has good quality and requires little or no treatment unlike surface water. The potential of groundwater in various areas of the country is exhibited by presence of deep boreholes, shallow wells and springs. Therefore, it is proposed that the utilities depending more on surface water will be having higher technical efficiency.

Network Length

Technical efficiency of a water utility may depend on the size of its operation and available resources. Length of distribution network can be used as a measure of size of operation (Bhattacharyya et al., 1995). Network length also determines operating costs of a utility. Utilities having larger network are supposed to bear higher operating costs and depreciations. UFW are supposed to be higher for the utilities having larger networks since leakages and energy costs depend on distance for pumping (Lin and Berg, 2008). We consider using network length as an explanatory variable with the hypothesis that the level of efficiency would be lower in the utilities having larger distribution networks.

Results according to Modality of Service Provision

Efficiency results for modality of service provision are presented in Table 10.5. Comparing the two categories, we note that the average group efficiency score achieved by the LGs using public service delivery is slightly higher than that of LGs utilizing private providers at 85% and 80% respectively. We also observe that 50% of the of the LGs using public service delivery were at their group's efficient frontier compared to only 44% of the LGs using private firms. Furthermore 56% of the LGs using public means were above their individual group's average efficiency compared to only 50% of the LGs using private means. Hence for individual group's assessment parameters, the public mode of service delivery was more efficient than the private mode of service delivery.

Table 10.5 Individual Group Performance Based on Modality of Service Categories in Water Supply

Public			Private	
Unit name	**Score**		**Unit name**	**Score**
Arua MC	100		Busia TC	100
Bushenyi/Ishaka TC	100		Kalisizo TC	100
Entebbe MC	100		Katakwi TC	100
Gulu MC	100		Kayunga TC	100
Hoima TC	100		Kisoro TC	100
Kasese TC	100		Kumi TC	100
Masindi TC	100		Bugiri TC	95.33

Public			Private	
Unit name	**Score**		**Unit name**	**Score**
Mbale MC	100		Adjumani TC	84.97
Tororo MC	94.49		Bombo TC	79.84
Lira MC	82.92		Luwero TC	76.47
Fort Portal MC	77.02		Kamuli TC	68.73
Mubende TC	76.13		Ntungumo TC	63.97
Mbarara MC	64.93		Rukungiri TC	59.26
Kabale MC	60.18		Kitgum TC	53.71
Soroti MC	56.67		Lyantonde TC	53.23
Masaka MC	50.31		Ngora	52.33
Descriptive Statistics				
Mean	85.17		Mean	80.49
Standard Dev	18.37		Standard Dev	19.42
Maximum	100		Maximum	100
Minimum	50.31		Minimum	52.33
No. of Effic LGs	8		No. of Effic LGs	6
%ge of Effic LGs	50%		%ge of Effic LGs	38%
No. of LGs above Mean	9		No. of LGs above Mean	8
%ge of LGs above Mean	56%		%ge of LGs above Mean	50%
Number of LGs	16		Number of LGs	16

Results of combined group

The results from the analysis combining all LGs in one group irrespective of modality of service provision imply considerable variation in the water supply productive efficiency of LGs. As shown by the distribution of efficiency scores presented in Figure 10.3 and Table 10.6 we observe that 25% of the LGs were technically efficient since they had a relative efficiency score of 100%. The remaining 75% were identified as potentially under-performing to some extent compared to the 8 best practice benchmarks.

Figure 10.3 Distribution of Efficiency Scores in Water Supply

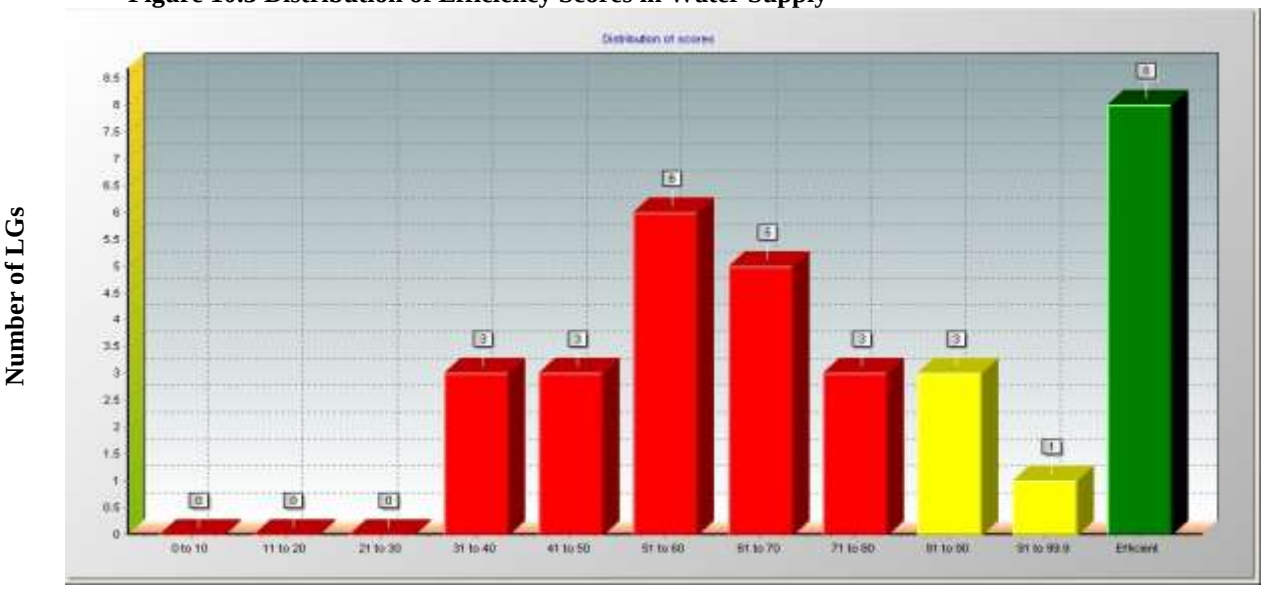


Table 10.6 Water Supply Service Providers Efficiency Scores

Unit name	Score
Busia TC	100
Entebbe MC	100
Gulu MC	100
Kalisizo TC	100
Katakwi TC	100
Kayunga TC	100
Kumi TC	100
Mbale MC	100
Bugiri TC	94.64
Adjumani TC	84.97
Tororo MC	84.32
Lira MC	81.36
Arua MC	79.55
Bombo TC	78.05
Masindi	75.29
Luwero TC	70.81
Kamuli TC	68.73
Kasese TC	68.67
Mbarara MC	64.93
Ntungumo TC	63.97
Rukungiri TC	59.26
Fort Portal MC	58.33
Kitgum TC	53.71
Bushenyi/Ishaka TC	53.49
Lyantonde TC	53.13
Ngora	52.33
Kisoro TC	47.9
Kabale MC	46.9
Masaka MC	44.44
Soroti MC	39.11
Mubende TC	34.48
Hoima TC	34.07
Descriptive Statistics	
Mean	71.64
Standard Dev	22.07
Maximum	100
Minimum	34.07
No. of Effic LGs	8
%ge of Effic LGs	25%
No. of LGs above Mean	17
%ge of LGs above Mean	53%
Number of LGs	32
%ge of Public that are Efficient	44%
%ge of Private that are Efficient	50%
%ge of Public above Mean	19%
%ge of Private above Mean	31%

The descriptive statistics reflected in Table 10.6 show an overall mean efficiency of 71%. Thus, on average, if the water supply service operations had followed those of the 8 benchmarks identified, all else being equal, current production levels could have been achieved with a 29% mean reduction of resources utilized, that is, technical inefficiency accounts for 29%. Furthermore, 53% of the LGs are above the average efficiency score of 71%. The TE score among the inefficient LGs ranged from 94% for Bugiri TC and 34% for Hoima TC implying that Adjumani TC and Luwero TC could potentially reduce their current OPEX by 6% and 66% respectively while leaving their output levels unchanged.

Explaining the efficiency using simple averages

It is interesting to note that, when assessed within the combined group, 31% of LGs using private means were found to be efficient while only 19% of in-house were efficient. 50% of LGs using private service had an efficient score above the average while only 44% of LGs using public means were above average implying a slightly better performance from the LGs using private provision. It is also worthwhile mentioning that the water sector unlike the waste collection service had a relevant policy framework guiding private involvement and there was a deliberate effort to develop private sector firms through enhancing there capacity in operation and management of water supply services.

With respect to sources of water, 45% of LGs using ground water were efficient compared to 40% of those using surface water. 64% of ground posted efficiency levels above the average while only 40% for the surface.

Explaining the efficiency results using Brockett and Golany

In order to shed some more light on the issue of whether the modality of service provision implies a significant difference in efficiency levels, we performed a Mann-Whitney test. The test returned a critical z score for large samples and the asymptotic sign is therefore more appropriate (Corder, 2009). Hence results of the test shows that there was a statistically significant difference in the distribution of efficiency levels for LGs using public provision and the ones with private service providers since P <0.05 at 95%.

Test Statistics[b]

	EffScore
Mann-Whitney U	54.000
Wilcoxon W	190.000
Z	-2.944
Asymp. Sig. (2-tailed)	.003
Exact Sig. [2*(1-tailed Sig.)]	.004[a]

a. Not corrected for ties.

b. Grouping Variable: ServiceType

Explaining the efficiency results using Tobit Regression

The standard interpretation of Tobit coefficients focuses either on the magnitude, direction, and significance of the coefficients or on an undecomposed first-order effect. Such interpretations can verify theory, confirm prior research, or provide information on the effect of an independent variable across all dependent variables (LeClere, 1994.). It is important to note that the dependent variable in the model is the DEA efficiency score. A positive coefficient implies an efficiency increase whereas a negative coefficient means an association with an efficiency decline. The results of the regression are significant at 95% level and therefore a coefficient is interpreted significant t > 1.96. The computations were conducted by Stata 8.

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Tobit Results

Tobit estimates Number of obs = 32

EffScore	Coef.	Std. Err.	t	P>|t|
ServiceType	22.04243	18.68378	1.18	0.248
WaterSource	-10.58013	12.49387	-0.85	0.404
PipeNetwork	.1769059	.194615	0.91	0.371
_cons	58.80601	21.76373	2.70	0.011
_se	26.50397	4.098376	(Ancillary parameter)	

Obs. summary: 24 uncensored observations
8 right-censored observations at EffScore>=100

The results from the tobit estimation show that none of the explanatory variables has a significant effect on efficiency. However two had positive coefficients an indication of positive influence on efficiency, which confirmed our expectations. Modality of service provision had a positive coefficient probably because of the efforts being done to enhance private firms.

10.7 Chapter Summary and Conclusion

We sought to determine the efficiency levels of LGs comparing the performance of publicly and privately operated service delivery systems in the water supply sector. The more robust tobit regression results established that the three explanatory variables including modality of service delivery did not have a significant influence on efficiency. However, the Mann-Whitney test found a significant difference in efficiency levels between the two types of modality of service. The descriptive statistics show no remarkable differences in the individual groups but when analysed within a combined data set, the privately run utilities have slightly higher efficiency levels. We believe that the slightly higher performance can be explained by the presence of regulatory framework and effort by the sector to create conducive environments.

CHAPTER ELEVEN: FURTHER ANALYSIS USING STREET LIGHTING

Introduction

The preceding two chapters have presented a detailed analysis of the findings based on our two major service study areas, using our major analysis techniques and derived vital conclusions. This chapter presents further analysis which is meant to reinforce the conclusions derived in the preceding chapters. The analysis is based on a minor service study area – street lighting.

Street Lighting

Introduction

Street lighting is deemed to be an essential service for urban local governments in Uganda. Like any other local service, its delivery had been the preserve of the public sector, however with the privatization trend; it was also earmarked for private sector participation. Hence for some LGs the private sector is involved in the construction, installation and maintenance of street lights.

Data Collection

We experienced data constraints with this service. Some of the towns visited did not have street lighting, while others the lights were not functioning and yet others did not have the relevant data. Only 18 LGs responded to the questionnaire. Moreover not all the 18 provided complete data hence we ultimately used data from 16 LGs. Due to data availability and sample size constraints, we could not use DEA (refer to *degrees of freedom requirements*). We instead settled for ratio analysis in assessing performance indicators.

Ratio Analysis

As observed in Section 7.2, ratio analysis typically involves the use of various performance indicators that is, the ratio of out to inputs or inputs to outputs. It has traditionally been the preferred method of assessing performance in situations where multiple inputs and multiple outputs are not involved (Thanassoulis, 1996), hence more meaningful in single input single output contexts. Similarly Bitran, 1992 observed that the measurement of productive efficiency by means of ratio analysis generally entails computing and comparing one or both of the following two types of ratios, namely, input to output ratios as well as cost of inputs to output ratios. The input to output ratio approximates technical efficiency, whereas the cost of inputs to output ratio approximates economic efficiency.

Ratio analysis has several advantages, including its conceptual simplicity, ease of computation, low cost, and being amenable to small samples. However, a major

shortcoming of this method is its inability to handle multiple inputs versus multiple output production. Contingent upon the circumstances, the advantages of ratio analysis may prevail over its demerits and its use, therefore, warranted in our street lighting situation.

Selection of variables

Lorenzo (2007) observes that the degree of lighting used by a street lighting beneficiary is impossible to estimate, which is why they find it necessary to use variables such as number of square meters lighted or number of lighting hours in an attempt to represent the activity of supplying electric energy. In their DEA based study, they opted to use as inputs *number of staff, number of lamps, power consumed* and *total cost* and for the outputs, they selected *square meters of street light, hours lamps are on* and *the inverse of hours lamps remain un repaired*.

Given that we are using ratio analysis, it is not possible to consider multiple inputs and outputs; however it is in order to comment on the variables used by the Lorenzo study as they give us a starting point. With respect to the inputs used, we find the use of staff, lamps, power consumed and total cost in the same DEA model not feasible since the first two are clearly represented in total cost.

The performance of street lighting service has two main tasks: providing new lighting points by extending street coverage and maintenance of the existing light points. Hence performance is assessed by indicators such as total number of lighting points (columns or Poles) added in a year and the lighting points maintained and functioning.

Table 11.1 Descriptive Statistics of selected variables for Street Lighting

	Weekly Operational Expenditure	Number of lighting points	Total Street Network Covered with Lighting (KM)	Total Street Network (KM)
Mean	219,861	138	13	67
Standard deviation	301,806	263	16	49
Maximum	1,000,000	1110	60	165
Minimum	27,000	8	1	9

We noted a sizeable disparity between the total street network length for an LG and the actual street network length that is covered by lighting points. For instance from the descriptive statistics, on average there were 67 KM of street network but only 13KM was covered by lighting points. We thought of using the street network covered with lighting points to capture quality issues (i.e. exposure to crime), but discarded the idea since it may not follow that the more lighting points per KM the better the service; it could just be an indicator of a densely populated area which in itself may imply cost savings.

We therefore opt to use the following commonly used performance indicator

1. Average weekly cost of maintaining a lighting point
   OPEX / Number of Lighting points
   This will provide us a measure for economic efficiency as well as quantity. We interpret the LG with low cost a better performer.

We observed from the data collected that a number of lighting points were not functional for a long time, for example in Soroti, although the municipality had 350 lighting points only 51 were functional and in Hoima and Mukono, up to 75% of the lighting points were not functioning during the year 2006/2007 due to various reasons including lack of maintenance of poles, non replacement of cables, bulbs etc. We therefore opted to use the lighting points that were functional during that year in our calculation.

Results of the Ratio Analysis

Table 11.2 Efficiency Ratio Results for Street Lighting

Local Government	Weekly Operating Cost Per Lighting Point	Service Type	Administrative Setup
Lugazi TC	732	Private	Town
Busia TC	769	Public	Town
Jinja MC	901	Public	Municipal
Kasese TC	1152	Private	Town
Mityana TC	1202	Private	Town
Mukono TC	1458	Public	Town
Entebbe MC	1493	Private	Municipal
Tororo MC	1548	Public	Municipal
Mubende TC	1566	Public	Town
Fort Portal MC	1603	Private	Municipal
Mpigi TC	1980	Private	Town
Hoima TC	2500	Public	Town
Soroti MC	3000	Public	Municipal
Bugiri TC	3375	Public	Town
Masaka MC	4966	Private	Municipal
Kalisizo TC	5390	Private	Town
Descriptive Statistics			
Mean	2102		
Standard deviation	1415		
Maximum	5390		
Minimum	732		
Number of Private		8	
Number of Public		8	
Number of Municipal			6
Number of Towns			10

Table 11.3 Descriptive Analysis for performance results of Street Lighting

Cost of operation/Number of lighting points	
No. Private Below mean	6
%ge Private Below mean	75%
No. Public Below mean	5
%ge Public Below mean	63%
No. Municipal Below mean	4
%ge Municipal Below mean	67%
No. Town Below mean	7
%ge Town Below mean	70%

Interpreting Ratio Analysis Results

When interpreting ratio analysis results, it is common to read them against a pre-determined yardstick. In our case, we did not find pre-determined standard yardstick performance indicators in Uganda; hence in the circumstances we utilized the means of the performance indicators as the benchmarks.

From the descriptive statistics we observe only slight differences in performance between the LGs utilizing in-house and the utilizing private means. **75%** of LGs utilizing private means posted a cost below the mean weekly cost per lighting point while the LGs using in-house had 63% of LGs below the mean average weekly cost.

Also when we look at the administrative setup, there are hardly any differences, with 67% of municipalities being below the mean weekly cost per lighting point compared to 70% of towns. With respect to duration of contract we noted no difference in the cost performance indicator as both groups were equally represented in rank however we noted that LGs with shorter contracts ranked better in the second performance indicator.

Conclusion

In totality the performance indictor for street lighting does not squarely bestow supremacy on private sector provision over public sector provision.

Chapter Summary and Conclusion

Further analysis particularly street lighting service has shown support for the conclusion derived from the preceding chapters i.e. public sector provision is not less efficient than private provision.

CHAPTER TWELVE: JOINT ANALYSIS OF SERVICES

12.1 Introduction

The preceding three chapters have discerned assessments and results of the relative efficiency of providers of the waste collection service (Chapter 9), water supply service (Chapter 10) and street lighting (Chapter 11). The results show interesting commonality in interpretation of certain aspects of the assessments as well as differences in others which provide the basis for further explanation. The possible explanations to the commonality and differences might provide us with lessons that will enable essential improvement in policy and strategies for efficient public service delivery. We observe from the onset that the context of the two services – *waste collection* and *water supply* in terms of conditions that make private provision succeed is not similar. In this chapter we present an analysis of the commonality and difference in results.

12.2 Triangulating Results and Conclusions

There is a tendency to assume that the private sector is naturally efficient and that the public sector is naturally bureaucratic and inefficient, hence various theories (reviewed in Section 3.4) expect that the private sector is more efficient than the public sector in providing public services. However, our study does not support this expectation. Both in the waste collection, water supply, and street lighting services, there is no statistically significant difference in the relative efficiency of the public and private service providers. Based on the more robust tobit regression, the Brockett and Golany procedure (Mann Whitney test), and the simple averages, the results do not squarely support the superiority of private sector provision over public sector provision (refer to summary Table 12.1).

The tobit regression showed that modality of service provision had no significant effect on efficiency in both the waste collection and water supply services.

The Brockett and Golany (1996) procedure on the waste collection service indicated that there were no significant differences in efficiency levels between the public and private providers; although the water supply services showed significant differences in efficiency levels.

Using simple averages, in the waste collection service, efficiency levels of LGs using the public sector were slightly higher than those of LGs utilizing private providers both when assessed and compared as individual groups and/or in a combined group. But for the water supply service, although on average the efficiency levels of LGs utilizing the public sector are higher when assessed and compared as individual groups, within a combined group they exhibit lower efficiency scores than LGs utilizing private means. Street lighting also exhibit mixed results with no particular type of service provision prevailing over the other.

Table 12.1 Summary of Joint Results and Conclusions from the empirics

Result based on issue	Waste Collection Service	Water Supply Service	Street Lighting Service
Public or Private Service Provision?	The more robust tests showed that there were no significant differences in efficiency levels. Simple averages however, indicated slightly better performance for public provision over private provision.	The more robust test showed that there were no significant differences in efficiency levels. However, simple averages showed a mixed result with one test the public performing better and not in the other.	Indicators used did not highlight any major differences in performance.
Administrative set-up: Municipal or Town?	Tests mixed. The more robust showed no significant differences. But simple averages showed some differences	Not relevant to test since all municipalities were using similar provision.	Towns performed better on all the indicators
Competition	Where there was competition at the time of procuring the service provider; the LGs exhibited more efficiency		
Contract Duration	No significant influence on efficiency. But simple averages show that LGs with contracts of more than one year exhibited higher efficiency.	Not relevant to test as all private provision contracts were for 3-year duration	No difference in one indicator but contracts with shorter duration better in another.
Ownership of Assets	No significant effect on efficiency. Although private providers who at the same time owned the assets exhibited higher efficiency.		

In a broader perspective, the results highlight the need for an analysis of possible explanations. We observed earlier (Section 1.2) that the conditions that make private provision work include competition, regulation – in the absence of competition and the capacity of the private and the public sector. It is imperative that we revisit these conditions vis-à-vis the Ugandan context to further scrutinize and obtain explanations to the efficiency results and performance in general.

12.3 Capacity of Private Sector

Waste Collection Service

The economic benefits assumed to derive from private involvement in service provision are grounded in the belief that private providers manage more efficiently, are more technically advanced, and to this end make substantial investments (Katko 2001). We analyzed private provider's capabilities of the waste collection service via the trucks owned since these require some substantial investment and the number of staff employed.

Only three private firms owned trucks of their own. The rest were using trucks belonging to the LG implying that private involvement did not introduce new capital in the form of trucks.

Local government	Trucks Owned	Staff
Kasese	3	18
Hoima	1	10
Kalisizo	1	6

A number of factors affected the efficiency with which private providers executed their work for instance, in most LGs using private sector, some operational roles were shared, accordingly LG pledged to provide trucks and skips. Such trucks were old and constantly breaking down which caused delays in waste collection and transportation. Some of the skips were so old as to render them unsuitable for use and, when used, difficult to remove, let alone empty. Besides, failure to repair defective vehicles and skips on time often led to complete break down in the service. In such circumstances delays to remove skips that had filled up resulted in environmental hazards.

Private providers relied on LG payments for services to finance the operational activities that is, instead of financing the service provision from own sources, they expected to be financed; of course most were small-scale firms. But delayed payment affected the quality of services rendered by the often cash-strapped private providers. They failed to settle operational obligations such as salaries, fuel, interest etc on time. Non response to RFPs was largely due to failure to settle payment claims. In the Hoima case, non payment of claims had resulted into a court case against the town council.

Water Sector

We noted that in the water supply service a deliberate effort was made to enhance competition via enticing and building the capacity of potential providers / suppliers. The

Association of Private Water Operators (APWO) is pool of over 15 private firms who are in the water supply business. This pool was the target of capacity (supplier) development by the directorate of water development (DWD) and the donor agencies. On average there are over three firms responding to bids and usually no technical eligibility constraints as the private providers are already prequalified. In effect the water supply service was being professionally handled and competition in this sector is reasonable.

Katko (2001), has observed that private provision does not as such make public services any more efficient if the private sector does not bring additional professional competence to compliment that of the public agency. The waste collection service was totally in disregard of this while the water supply service appreciated the need to enhance private sector capacities and of course some indicators were favourable.

12.4 Capacity of the public sector

The LGs equally lacked capacity to execute their new roles of regulation and monitoring besides settling of payment claims in a timely manner. Although the amount of money and terms of payment to private providers were specified, and payment was to be effected on a monthly basis (in line with the procurement regulations), in reality, it rarely happened (refer to Table 12.2). The unpredictability of revenue collection and poor planning by LGs delayed payment. Also the highly bureaucratic processing of payment and rent seeking at every level where documents had to be 'processed' was another factor (Goloba 2004).

Table 12.2 Payment time for selected towns

Local Government	Payment
Kasese	Within 2 months
Hoima	After 12 months
Kalisizo	After 3 months
Lugazi	After 3 months

In the water supply service, the issue of delayed payment was initially a major constraint but was later solved by creating a joint escrow account operated by both the LG representative and the private operator. All revenue and costs related to water supply service was done through this account. In effect transfer of water revenue was no longer possible and the private operators' claims were being settled on time.

In summary, whereas the water supply service took care of the issue of capacity of stakeholders; working out programs to enhance them the waste collection service assumed adequate capacity for the private sector and of government. Governments have performed poorly as owners and regulators (especially in developing and transition economies) partly due to a lack of experience and partly due to improper incentives and corruption (Katiko 2001)

12.5 Competition in the Supply Market

We have observed that competition was generally lacking in the waste collection service with some LGs not getting response to their request for bids. But where the private providers competed, the efficiency levels were higher (Table 9.11). In the water sector, a deliberate effort was made to create competition and a slight better performance by the private sector in some indicators are observed.

It is postulated that for markets to work effectively, there must be robust competition among service providers. The more competitive a market is, the stronger the incentive is to be as efficient as possible. The lack of competition is said to reduce incentives to increase efficiency and innovation. Leland and Smirnova (2009), have observed that lack of competition may keep the costs similar to in house provision or even lead to an increase in costs if the government becomes dependent on one particular provider. Thus the incidence of competition is shown as a major driver for private provision efficiency, accordingly in the circumstance regulation is necessary (Katko 2001). Theories supporting private provision show that the introduction of competition, rather than awarding contracts to private firms leads to efficiency; a view supported by studies of Domberger et al, 1996; Domberger et al., 1986; Prager, 1994. However, competition may not thrive in completely unregulated markets; if there is no competition, regulation is said to be necessary.

12.6 Regulation and creating an enabling environment

Waste Collection Service

The Local Government Act 1997 places waste collection service under the direct management of local governments. Under section 39 and 41, the LGs have legislative powers to make bye-laws and ordinances to support their work in providing services where national laws are not explicit on some issues; and such laws must be consistent with the national laws. Based on these powers, different LGs have made bye-laws that provide for control, collection, transportation, treatment and disposal of solid waste. Such bye-laws spell out the roles and responsibilities of all stakeholders in waste management for the respective LG. The waste collection service did not have a uniform and comprehensive policy on private provision; each LG introduced private involvement largely in a haphazard manner without assessing capacity related issues of both private providers and the public sectors. The transfer of service to the private sector did not consider the changed roles of LGs from being purchasers to being monitors. Besides private involvement was introduced not because the private sector was seen as efficient but as a directive that any service expenditure above a certain threshold be contracted out to the private sector. Clearly there were problems of implementation in the waste collection sector. Case study below highlights a salient problem of not having a specific office that is in control.

Case Study 3: No clarity on roles and responsibilities

Allow more city garbage collectors

Friday, 23rd September, 2005

KAMPALA RESIDENT District Commissioner Stanley Kinyatta has terminated the services of a private garbage collection firm.

Bin-it, the pioneer private firm in the industry, is one of the bigger players, but it has been asked to stop working in the Central Division. The RDC cited insecurity as the reason for stopping the company. This very reason is a red herring. Bin-it did indeed get involved in a scuffle recently, but that was a physical manifestation of the frustration that has been encountered in the business rivalry.

Bin-it has been involved in a turf war with Nabugabo Updeal Joint Venture, a rival to whom Kampala City Council awarded the main contract to collect garbage. The contract bidding process itself is shrouded in controversy, which needs to be ironed out. The wrangles between Bin-it and Nabugabo seem to be over the control of the richer city suburbs, where clients are sure to pay.

The problem now is that the public is suffering. Garbage collection is so inefficient that the city is looking like one big rubbish dump. Kampala churns out about 1,200 tonnes of solid waste daily, the equivalent of a high rise like Uganda House! But only 60% of this is collected. For efficient services to be established for Kampala's 2m daytime population and 1m residents, we need many collectors now that KCC no longer does, it directly.

So stopping any one company, for reasons other than efficiency, is self-defeating. After all these are small firms, with limited resources and facilities, which would struggle to manage all our waste efficiently as monopolies.

KCC still needs to play a regulatory role. Alongside having a strategic plan for management of garbage, the City Council needs to provide guidance and regular reviews of the industry. They could start off by equitably splitting the various zones (rich, lower middle-class and slums) between all companies, which would be just.

KCC must know that competition creates efficiency, price competition and innovation, which would benefit the industry, the City Council, and Kampala's suffering citizens.

Source: The New Vision Newspaper

Water

Since 1997, reforms were initiated in the water sector to ensure that water services are provided and managed with increased efficiency and cost effectiveness, and to decrease the government's burden while maintaining its commitment to sustainable and equitable development (UNESCO 2006). As earlier noted in Section 10.2, in 2003 private involvement in water supply was approved and the enabling policy, regulation, monitoring and generally modalities of how the private sector would participate were clearly defined. The ultimate goal was to improve efficiency and quality of service delivery. Moreover, the water sector recognized the apparent capacity related weaknesses of the stakeholders (the local authorities, water boards, and private providers) and a deliberate effort and/or programme to enhance their ability to operate and manage was and continue to be implemented by Directorate of Water Development (DWD).

Discussion

Theory suggests that the private sector has little incentive to function efficiently without competition; accordingly private providers will undersupply public goods and services in the absence of regulation. It is postulated that when competition is not possible, governments must regulate the monopoly holder to ensure adequate delivery. Considering that there was insufficient competition in the Uganda context especially in the waste collection service, some effort towards regulation was expected. But like any other developing country Uganda did not have the experience in regulation let alone creating the regulatory environment yet the capacity of governments to perform supervision and

regulatory roles and to manage new relationships with the private sector is an important policy issue (Batley, 1994).

Bartley 1996 identified three levels of private involvement in service provision comprising of:

1. *Programmed* – where governments make policy decisions to sell assets, to franchise the whole operation or to contract-out particular aspects of it.
2. *Pragmatic* – where an initial decision to involve the private sector is made due to necessity or to management convenience and leads to a growing commitment.
3. *Informal or unintended* – where the failure of public services leads private firms, communities or households to step in to make up the deficiency.

We observe that whereas private involvement in the water sector had progressed to level one – where a clear policy had been put in place and was taking shape, the waste collection service was at level two and three, that is, where an initial decision to involve the private sector was made due to necessity or to management convenience and the private firms, communities or households stepped in to make up the deficiency derived from the failure of public services.

An enabling regulatory, legal and political environment is the cornerstone of sustainable private sector participation in public service delivery (Psoghari 2002). It is suggested that in advance, the public sector must establish appropriate and coherent policy guidelines and criteria for private sector involvement. The policy framework must clarify private sector involvement in public service delivery at national, local, public agency as well as sectoral level. The public sector needs to define a clear allocation of responsibilities between the national and municipal governments, and a clear statement of its role as a provider and regulator.

We note that the two services differed with respect to this fundamental. Whereas the water supply service sector appreciated the importance of changed roles and started a continuous improvement program geared at empowering the stakeholders (the local authorities, water board, private providers and local communities) on how best to execute their new roles, the waste collection service did not. Hence we argue that the slight better efficiency levels by the private firms in the water supply service can be attributed to the presence of an enabling policy that streamlined participation and supported enhancement of the partners, ensuring that private involvement is coupled with strong and competent regulation (Summerton 1998).

12.7 Exploring Partial Least Squares (PLS) Path Modeling as a predictive tool for private sector performance in local government service provision

Using PLS-Path Modelling, we attempted to provide theoretical predictions of the effect of "institutional arrangement" (comprising of modality of service, house to house availability and administrative setup) and "publicness" (consisting of duration of contract, ownership

of assets, and shared responsibility) on local public service performance. Our results from this exploration did not get any new information (i.e. was in line with the other tests); so we decided to leave it out of this thesis, however it is available in an internal report.

12.8 Concluding Remarks

We started out with the public private divide with the view of establishing the influence of modality of service provision on efficiency. But it turned out that modality of service provision is not sufficient in explaining efficiency. We find that other factors such as competition, capacity and regulation might play a prominent role in explaining efficiency levels.

This leads to a tentative conclusion that as a matter of policy, instead of focusing on the modality of service provision (public-private divide); focus should be on strengthening grounds for competition, capacity of the public and private sectors and regulation.

CHAPTER THIRTEEN: CONCLUSION, STUDY UNDERPINNINGS AND ISSUES FOR FURTHER RESEARCH

Since the 1980's private provision of public services has become increasingly popular in both the developed and developing countries. The motivation for this trend has among others been the anticipation for efficiency in service delivery.

In this thesis we studied the efficiency of public and private providers aiming to determine the superiority of either sector in delivering public services.

To facilitate the reader we revisit the research questions and highlight chapters that respond to them. Next, we draw conclusions, study underpinnings, limitations and issues for further research.

13.1 Reiterating the Research Questions

1. To what extent are private providers comparable to the public providers in achieving higher efficiency levels in public service provision (Chapters 9, 10 and 11)
    a. Why is it worthwhile to measure the efficiency of service providers? (Chapters 6).
    b. How can the efficiency of service providers be measured? (Chapter 7).
    c. What are the relative efficiency levels of public and private providers of the waste collection and water supply services in Uganda? And is there a difference between the efficiency levels of the public and private service providers? (Chapters 9 and 10).
    d. Does modality of service provision (Public or Private) explain efficiency levels of service providers (Chapter 9 and 10).
    e. What are the other factors that explain the efficiency levels of service providers (based on public and/or private modalities) (Chapters 9, 10 and 11).
    f. What support is there for the policy of private involvement in public services and how has this affected efficiency (Chapters 12).

Other supporting research questions

2. What is the nature of private and public sectors? How is the nature of the individual sectors relevant to service provision? (Chapter 2).
3. What are the various modality of public service provision? How can they be utilised in practice? (Chapter 3, 4 and 5).
4. What are the pre-conditions for private provision of public services (Chapter 4).
5. What are the challenges of private and public provision? (Chapter 4).
6. How can private and public provision be enhanced to realize their potential? (Chapter 5 and 12).

13.2 Restating the Major Objective and Conclusion

We positioned our study against the milieu of the increasing occurrence of private sector provision of public services in developing countries even though such countries exhibit inadequacies in conditions that make private provision thrive. We were motivated by the inconclusive debate on which sector manifests superior efficiency in service provision; the private sector or the public sector? Aware that the main incentive for opting for private provision is the expectation of efficiency improvements!

Hence as the major objective, we sought to determine the extent to which private providers are comparable to the public providers in achieving higher efficiency levels in public service provision. Accordingly we established from various analyses that contrary to theory, private involvement in local service delivery does not imply the attainment of higher levels of efficiency; perhaps owing to, in the context of a developing country like Uganda, the absence of strong public and private institutions and an enabling environment reminiscent of conditions that make markets work.

Using our choice of efficiency measurement techniques (detailed in chapter seven), we ascertain in the empirical chapters (nine, ten, eleven), that there are no systematic inherent gains to private sector provision in terms of efficiency. Equally, there is no support for the notion that a public sector provider is intrinsically less efficient (consistent with Hall, 2006). We instead find that other factors such as competition, capacity and regulation may better explain efficiency levels.

The conclusion reinforces the ideas submitted by Ancarani 2003, where they propagate the need for exercising caution in extending private sector provision to situations where both markets and government regulatory capacity are weak.

Our results are also consistent with Leland and Smirnova (2009), who have established that 25 years later, privately owned and managed transit systems are no longer more efficient than government owned agencies due to the lack of competition in the industry. That without serious competition, transit services remain a monopoly under the same conditions as the public sector.

13.3 Study underpinnings

The study has applied the market phenomena on a developing country and highlighted the flaws that need to be addressed. That applying the concept of private provision wholesale does not yield anticipated positive results. Introducing a one-size-fits-all policy, from one context will normally not work if the basic conditions justifying it are not dealt with. Conditions for enabling private provision must be available!

When private providers operate under similar conditions and constraints as public providers, relevant potential private providers will opt out particularly if service provision is no longer financially beneficial to them. The non-response to the RFPs provides this indication. Private provision is enhanced and is likely to be better than public provision if there is enough competition among potential service providers

While private provision is complex and entail risks, LGs can benefit from experience if they build proper capacity (Van Slyke et al 2006). Private sector provision entails changed roles for the LGs; they become purchasers and supervisors of service providers and therefore their capacity in these areas must be enhanced. Similarly the private providers' capacity in service delivery including the financial and skills base should be continuously improved.

As a matter of policy, instead of focusing on the modality of service provision (public-private divide); focus should be on underpinning grounds for competition, capacity of the public and private sectors and regulation. There should be a strengthening of efforts to utilize private involvement correctly: by better tailoring private involvement to local conditions (the size and capacity of the LGs and the private sector firms), deepening efforts to promote competition and regulatory frameworks that enable and enhance decision-making.

Public procurement practitioners should consider establishing prevalence of conditions that favour private provision before transferring a service to the private sector. Policy discussions should be based on a strictly neutral assumption about relative efficiency, and in particular not regard introduction of private sector involvement as a desirable or valuable objective (Hall 2006); otherwise the anticipated solution to the problem ends up creating a much bigger problem!

The study being the first of its kind in Uganda provides the foundation for rethinking of the local government service performance measurement and benchmarking studies to enhance service provision. We underscore the constraints related to data availability. Relevant data was not being kept because towns did not provide for benchmarking performance evaluation; for instance it was surprising to note that towns did not have data on items like street number of street lights, Kilo Metres of streets etc. Our study did provide a starting point as to which data to keep for future benchmark studies that necessitate using multiple variables over a number of years.

13.4 Limitations and Further Research

Our study utilizes two major services and one minor service as study objects to derive conclusions even though we are mindful that LGs have quite a number of local services that they offer. We envisage that further research can be extended to cover more services.

Data availability limited our sample. We covered only 20% of LGs: an extension can be made that covers more LGs so that even issues of degrees of freedom constraints are

substantially reduced. A similar remark can be made about using only one financial year. With improvement in record keeping especially on possible data for measuring performance, this study can be extended to cover more years so that analysis involving techniques that handle panel data i.e. DEA with Malmquist Productivity Index can be utilized.

Our study also concentrated on efficiency measurement. Future studies could also extend the study to incorporate effectiveness so that more of service quality and client satisfaction is recognized.

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Appendix one: List of Respondents and Interviews by office title

Kabale MC	Assistant Town Clerk Town Treasurer
Masaka MC	Municipal Treasurer Director, Social and Medical Services
Mbale MC	Assistant Town Clerk
Entebbe MC	Senior Assistant Town Clerk
Mbarara MC	Senior Assistant Town Clerk Municipal Treasurer Divisional Health Inspectors
Tororo MC	Senior Assistant Treasurer
Jinja MC	Chief Finance Officer
Soroti MC	Deputy Town Clerk
Fort Portal MC	Assistant Town Clerk
Kawempe DivC	Finance Officer
Nakawa DivC	Assistant Finance Officer
Lubaga DivC	Finance Officer Town Engineer
Mityana TC	Town Clerk
Mukono TC	Chief Finance Officer
Kaseses TC	Town Treasurer
Iganga TC	Town Treasurer
Mubende TC	Town Clerk
Kakiri TC	Health Inspector
Lukaya TC	Town Clerk
Hoima TC	Town Clerk
Arua MC	Municipal Treasurer
Kalisizo TC	Town Clerk
Busia TC	Town Clerk
Directorate of Water Development	Head of IT Services
National Water and Sewerage Corporation	Monitoring and Evaluation

Appendix two: Sample Questionnaire for Preliminary Data Collection

INTRODUCTION

I am a Ugandan PhD Student at the University of Twente in the Netherlands conducting a study on Partnerships between the Local Authorities and Private Sector Firms (Private Providers).

The objective of the study is to understand more fully how Local Authorities can utilize appropriate Public-Private Partnerships **(PPP)** mechanisms to improve the delivery of services and infrastructure to their public clients.

As part of the study, I am conducting a survey in selected Local Authority officials. I kindly request you to set respond to this questionnaire. You do not have to indicate your name, be assured that your responses shall be treated with strict confidentiality.

Definition of terms

Public Private Partnerships – contractual arrangements between the local authority and private sector entities for the purpose of delivering a public infrastructure, facility or service traditionally provided by the local authority. (Involvement of private providers in building and delivering public services) Examples: garbage collection, street repairs, street lighting, local markets, public transport, recreation parks.

Private providers – firms contracted to deliver and/or manage public infrastructure, facility, or service to the citizens (public clients) on behalf of the local authority.

Traditional Public Procurement – the local authority builds or purchases a physical asset, retains ownership, uses public sector employees to deliver the required service. Assets are input-specified; the local authority carries out design prior to procurement.

Local Authority – includes municipal council, town council

SECTION A: BACKGROUND

Please fill in; and where there is a box please use a tick (√) to indicate your response				
A1.	Local Authority			
A2.	Position (Title) in the Local Authority			
A3.	Highest Education Qualification	Master's Degree ☐ Bachelor's degree ☐ Diploma ☐ Secondary school ☐ Primary School ☐ Other (specify) ☐ ----------		
A4.	Profession training (e.g. CIPS, CPA, CPS, ACCA, NEVI)			
A5.	How long have you worked with current Local Authority?			
A6.	Local Authority's Population size			
A7.	Local Authority's Total Annual Revenue generated	2003	2004	2005
A8.	Local Authority's Total Annual Expenditure	2003	2004	2005

SECTION B: PUBLIC SERVICES

Indicate which sector provides, operates and/or manages the following services for your Local Authority Public **(Pu)** = local authority does it; Private **(Pr)** = Private providers do it; and Both **(Bo)** a combination of local authority and private providers.

	Service	Private **(Pr)** or Public **(Pu)** or Both **(Bo)**	**If there is Private involvement**		
			*Year in which **Pr** allowed*	*Current Number of providers*	*Average length of contracts*
B1.	Waste collection				
B2.	Waste management				
B3.	Water				
B4.	Sanitation				
B5.	Local markets				
B6.	Public transport – Taxi park				
B7.	Street parking				
B8.	Street lighting				
B9.	Street repairs				
B10.	Recreation				
B11.	Education				
B12.	Health				
B13.	Others (Specify)				

SECTION C: RELATIONSHIPS

C1.The Local Authority has a formal written agreement (like a memorandum of understanding) with the Private Providers

☐ No ☐ I do not know ☐ Yes

C2. The Local Authority drafts the terms of the agreement together and in consultation with the Private Providers

☐ No ☐ I do not know ☐ Yes

C3. The Local Authority has written guidelines of criteria for choosing a service to be contracted to Private Providers

☐ No ☐ I do not know ☐ Yes

C4. The Local Authority has written guidelines of criteria for choosing a Private Provider

☐ No ☐ I do not know ☐ Yes

Please indicate (tick √) appropriately your view with respect to the statement below:

1 = Strongly disagree, **2** = Disagree, **3** = Not sure, **4** = Agree, **5** = Strongly Agree

CODE	STATEMENT	1	2	3	4	5
C35	The role to be played by each party (local authority and private providers) is clearly highlighted in the agreement					
C6	When dealing with the Local Authority, the Private Providers demonstrate: ▪ honesty					
C7	▪ faithfulness					
C8	▪ openness					
C9	The Private Providers have the necessary financial resources required to accomplish contractual obligations					
C10	The Private Providers have the necessary Facilities / Equipment resources required to accomplish contractual obligations					
C11	The Private Providers have the necessary Managerial skills required to accomplish contractual obligations					

Please indicate (tick √) appropriately your view with respect to the statement below:

1 = Strongly disagree, **2** = Disagree, **3** = Not sure, **4** = Agree, **5** = Strongly Agree

C12	The Private Providers value their relationship with the Local Authority					
C13	The Local Authority discusses with the Private Providers its objectives for entering the contractual relationship					
C14	The Local Authority ensures compatibility of objectives for entering the contactual relationship (Private Providers and Local Authority objectives)					
C15	The Local Authority ensures that the Private Providers are aware of the expected service outcomes					
C16	The Private Provider participates at "equal terms" in the decision making process in the relationship					
C17	The Local Authority respects the input of the Private Providers in decision making					
C18	Relevant information required by the private providers is easily accessed					
C19	The Local Authority can easily access relevant information from the Private Providers					
C20	The Local Authority regularly consults the Private Providers on issues concerning the relationship					
C21	In entering the relationship with the Private Providers the Local Authority relieves itself of some risk					
	Please provide an indication of contribution as a percentage of total, that the Local Authority commits towards the contractual relationship with private providers on average:	**0% (Nil)**	**1% - 25%**	**26% - 50%**	**51% - 75%**	**76% - 100%**
C23	▪ Funds					
C24	▪ Time					
C25	▪ Facilities/equipment					
C26	▪ Labour/people					
	▪ Training					
	▪ Technical advice					
	Others (Specify)					
	▪					

C27	If you agree with C22, please list the risks tranfered to the Private Provider
C28	Please indicate any issues that you consider very important in the relationship between the Local Authority and the Private Provider

SECTION D: CHARACTERISTICS OF PARTNERSHIPS

Code	**Tick √ against the responsibilities taken by private providers? Provide examples of facility or services under such arrangement.**	√
D1	Private Provider operates and manages infrastructure and related services. The Local Authority remains the primary provider and is responsible for funding any capital investment needed to expand or improve the infrastructure or service. **Examples**	
D2	Private providers design and build an infrastructure or facility that conforms to the standards and performance requirements of the Local Authority. Once the facility has been built, the local government takes ownership and is responsible for the operation of the facility. **Examples**	
D3	Private providers design, build, operate and finance a facility for a defined period, after which the facility is handed back to the Local Authority. **Examples**	
D4	The private provider pays a rental to government and agrees to renovate the facility. In exchange, the provider is granted a concession to operate the facility for a fixed period of time and to charge a fee for the service. **Examples**	
D5	An infrastructure or facility is typically designed, financed, and constructed by the private provider and is then leased back to government for some predetermined period of time at a pre-agreed rental. **Examples**	

SECTION E: REASONS FOR USING PRIVATE PROVIDERS TO DELIVER PUBLIC SERVICE

Indicate whether you agree or disagree that the reason your Local Authority considers using Private Providers to deliver infrastructure and related services instead of doing it self (in-house): **Tick** √ against a factor.

1 = Strongly disagree, **2** = Disagree, **3** = Not sure, **4** = Agree, **5** = Strongly Agree

CODE	REASON	1	2	3	4	5
E1	To increase revenue generation					
E2	To give opportunity to citizens to do business					
E3	The desire to tap into private sector management skills					
E4	The desire to tap into private sector innovative skills					
E5	To enhance transparency					
E6	To enhance accountability					
E7	To expand infrastructure access					
E8	To improve the in quality of infrastructure					
E9	To improve service delivery					
E10	To achieve better value for money					
E11	To access private sector financing					
E12	To stimulate competition which ultimately reduces costs					
	Please list any other reason that motivates Local Authorities into using Private Providers					

SECTION F: CRITERIA FOR CHOOSING SERVICE TO BE TRANSFERRED TO PRIVATE PROVIDERS

Indicate whether you agree or disagree that your Local Authority uses the following criteria when choosing an infrastructure and related services to be contracted to private providers instead of using in house local authority resources:

1 = Strongly disagree, **2** = Disagree, **3** = Not sure, **4** = Agree, **5** = Strongly

CODE	CRITERIA	1	2	3	4	5
F1	Complexity of service					
F2	Technical challenge					
F3	Relative capabilities within Local Authority					
F4	Stakeholder and public interest					
F5	Innovation requirements					
F6	Relative cost					
	Please list any other criteria for choosing service to transfer to private providers					

SECTION G: CRITERIA FOR CHOOSING PRIVATE PROVIDERS

Indicate whether you agree or disagree that your Local Authority uses the following criteria when choosing Private Providers for delivery of infrastructure and related services: **Tick** √ against a factor.

1 = Strongly disagree, **2** = Disagree, **3** = Not sure, **4** = Agree, **5** = Strongly

CODE	CRITERIA	1	2	3	4	5
G1	Priority of service compared to other services budgeted for					
G2	Value for money					
G3	Affordability of Local Authority to meet contractual obligation					
G4	Risk allocated to party best suited manage it					
G5	Service outcome					
G6	Managerial skills of the private provider					
G7	Financial ability of the private provider					
	Please list any other criteria for choosing private provider					

Please indicate (Tick √) appropriately your view with respect to the statement:

1 = Strongly disagree, **2** = Disagree, **3** = Not sure, **4** = Agree, **5** = Strongly Agree

Gg1	The Local Authority considers urgency of the service or infrastructure to the public before contracting to private providers					
Gg2	The Local Authority assess the commercial viability of contracting to private providers					
Gg3	The Local Authority has a mechanism in place that compares the cost of operation / providing the service in-house with that of the private providers before contracting					
Gg4	The Local Authority has a mechanism in place for assessing the capabilities of private providers					
Gg5	Where payment to private providers is required, the Local Authority considers her ability to pay in the long term before contracting					

Please indicate (tick √) appropriately your view with respect to the statement: **1** = Strongly disagree, **2** = Disagree, **3** = Not sure, **4** = Agree, **5** = Strongly Agree						
Gg5	The Local Authority has a mechanism in place for assessing the risk involved in the transaction with private providers					
Gg6	The Local Authority is well aware of the different categories of risk transferred to the private providers					
Gg7	The Local Authority defines service outcomes before contracting					

SECTION H: OPERATIONS OF PARTNERSHIPS

Please indicate (tick √) appropriately your view with respect to the statement: **1** = Strongly disagree, **2** = Disagree, **3** = Not sure, **4** = Agree, **5** = Strongly Agree						
CODE	**STATEMENT**	**1**	**2**	**3**	**4**	**5**
H1	The Local Authority has clear guidelines (rules of the game) on how to relate with private providers					
H2	The Local Authority ensures that these guidelines are publicly known					
H3	In my view these guidelines are relevant and adequate					
H4	The Local Authority has in place a mechanism for involving stakeholders including the public clients in decisions concerning the service to be contracted to private providers					
H5	The Locality Authority prepares a service specification					
H6	The Local Authority ties payments to private providers to achieving specified performance standards					
H7	The Local Authority structures payments to provide incentives to private providers					
H8	The Local Authority has in place mechanisms that allow variations in contract implementation					
H9	There is a healthy competition for contracts involving Private Providers					
H10	The current process of initiating private provision contracts can be described as adequate					
H11	The Local Authority utilizes a legal framework that is dedicated (special) to contracts for private provision					
H12	The Local Authority has in place a mechanism for monitoring performance of Private Providers					

Please indicate (tick √) appropriately your view with respect to the statement: **1** = Strongly disagree, **2** = Disagree, **3** = Not sure, **4** = Agree, **5** = Strongly Agree						
H13	The Local Authority agrees on performance indicators with the Private Providers					
H14	The Local Authority has a common tool for assessing performance of Private Providers					
H15	The Local Authority links Private Provider's returns to service outcomes					
H16	The Local Authority is clear on who is to enforce the contract					
H17	Often times there are directives from different officials to the private providers (e.g. RDC, CAO, Mayor etc)					

SECTION I: BENEFITS FOR USING PRIVATE PROVIDERS

Please indicate (tick √) appropriately your view with respect to the statement: **1** = Strongly disagree, **2** = Disagree, **3** = Not sure, **4** = Agree, **5** = Strongly Agree						
CODE	**STATEMENT**	**1**	**2**	**3**	**4**	**5**
I1	On average the procurement process involving the use of Private providers takes a shorter time than the traditional procurement of an infrastructure or service					
I2	On average Private Providers are more likely to deliver their targets on time compared to traditional procurement of an infrastructure or service					
I3	On average the Private Providers have been delivering infrastructure and/or service within the specified contract period					
I4	On average the Private Providers deliver infrastructure and/or service at a lower cost compared to traditional procurement					
I5	On average the private providers have been delivering infrastructure and/or service within the specified contract budget					
I6	On average the Private Providers have been delivering infrastructure and/or service that meet the Local Authority expectation					
I7	On average the Private Providers have been delivering infrastructure and/or service of better quality than when the Local Authority was providing					
I8	On average the Private Providers have been delivering infrastructure and/or service to new geographical areas of the Local Authority					
I9	On average the Private Providers have been complying with service levels set					
I10	On average the number of Private Providers participating in competing for procurements has increased compared to traditional procurement					

SECTION J: CHALLENGES OF USING PRIVATE PROVIDERS

Please indicate (tick √) appropriately your view with respect to the statement:

1 = Strongly disagree, **2** = Disagree, **3** = Not sure, **4** = Agree, **5** = Strongly Agree

CODE	STATEMENT	1	2	3	4	5
J1	There exists sufficient private sector expertise to warrant using Private Providers in the Local Authority					
J2	The private sector skills' base is rated better than the Local Authority's in-house skills' base					
J3	The private sector financial resources' base is rated better than the Local Authority's in-house resources' base					
J4	The Local Authority has sufficient capacity and skills to adopt the public private partnership approach					

Provide a rating as to the ***influence*** of the following barriers to public private partnership attractiveness. **Tick** √ accordingly.

1 = Not influential at all, **2** = Less influential, **3** = Don't know, **4** = Influential, **5** = Extremely influential

CODE	STATEMENT	1	2	3	4	5
K1	Attitude of senior management					
K2	Lack of regulatory framework					
K3	Lack of documentation					
K4	Lack of awareness					
K5	Likely cost					
K6	Timescale involved in concluding a deal with private provider					
K7	Political interference					
K8	Corruption					
K9	Loss of authority and responsibility					
K10	Incompetence of private providers					
K11	Shortage of private firms					

K12	Poor revenue base					
	Please list any other Barrier					
K13	How is the Local Authority addressing these barriers?					

SECTION L: GENERAL

L1	On average how many private firms bid for contracts of PPP nature	
L2	Describe the decision-making process that your organization employs to determine whether the delivery of services should be kept in-house or contracted out?	
L3	What can the different levels of government do to encourage and facilitate the public private partnership?	

The Ministry of Local Government has a Training Module on Public Private Partnership. Has your Local Authority carried out training in the PPP module

☐ No ☐ I do not know ☐ Yes

If no explain why?

Appendix three: Sample Questionnaire for Data Collection

Input and outputs to be used in DEA Calculations for each service

Municipal / Town Council		
Name Service Provider		
Waste collection services		
Inputs	**Outputs**	**Fill-in**
Operational expenditure for waste collection per week Ushs:	Population	
	Population served	
	Amount of waste collected per week (in tons)	
	Number of collection points	
	Amount of uncollected waste per week (in tons);	
	Collection frequency in a week	
	Number of collection points visited per week	
	Rate service quality (Good, Average, Poor)	
	Complaints from LG / or clients	

Municipal / Town Council	
Waste collection services	
Financing Aspects	
Sources of Funding {amount where possible}	Proportion of financing contributed by private party {<25%; >25%<50%; >50%<75%; >75%}
Risk division	Types of risk transferred to the private party o Construction o Operation o Political
Revenue sharing	Proportion of revenue collected is taken by private party {<25%; >25%<50%; >50%<75%; >75%}
Organizational aspects	
Tasks and responsibilities	Tasks and responsibilities transferred to private party
Formal decision making	Who takes the final decision on operational issues e.g. determining user fees
Modality of service provision	i.e. Public, or Private sector
Legal aspects	
Ownership	Who owns the facilities
Contract duration	Length of contract
Contract commencement Date	
Stakeholder involvement	Involvement of stakeholders in managing service provision
Competitive biding	Method of procuring service provider e.g. open bidding, single sourcing, RFP

Municipal / Town Council		
Name Service Provider		
Water provision		
Inputs	**Outputs**	**Fill-in**
Operational expenditure for water operations per annum Ushs:	Population;	
	Target population	
	Population that has access to piped water	
	Volume of water produced per annum (in cubic meters);	
	Volume of water distributed per annum (in cubic meters);	
	Unaccounted for water (in cubic meters)	
	Amount (shillings) billed per annum	
	Amount (shilling) collected per annum	
	Number of days of piped water available in a week	
	Price of water per cubic meter	
	Total pipe network [in Kilometers]	
	Network added during the year [Kms]	
	Rate service quality (Good, Average, Poor)	
	Complaints from LG / or clients	

Municipal / Town Council	
Water provision	
Financing Aspects	
Sources of Funding {amount where possible}	Proportion of financing contributed by private party {<25%; >25%<50%; >50%<75%; >75%}
Risk division	Types of risk transferred to the private party o Construction o Operation o Political
Revenue sharing	Proportion of revenue collected is taken by private party {<25%; >25%<50%; >50%<75%; >75%}
Organizational aspects	
Tasks and responsibilities	Tasks and responsibilities transferred to private party
Formal decision making	Who takes the final decision on operational issues e.g. determining user fees
Modality of service provision	i.e. Public, or Private sector
Legal aspects	
Ownership	Who owns the facilities
Contract duration	Length of contract
Contract commencement Date	
Stakeholder involvement	Involvement of stakeholders in managing service provision
Competitive biding	Method of procuring service provider e.g. open bidding, single sourcing, RFP

Municipal / Town Council		
Name Service Provider		
Street Cleaning		
Inputs	**Outputs**	**Remarks**
Operational expenditure for street cleaning per week Ushs:	Total of street network in Kilometers	
	Total street targeted for cleaning	
	Frequency of street cleaning in a week	
	Number of days the when streets are clean in a week	
	Rate service quality (Good, Average, Poor)	
	Complaints from LG	

Municipal / Town Council	
Street Cleaning	
Financing Aspects	
Sources of Funding {amount where possible}	Proportion of financing contributed by private party {<25%; >25%<50%; >50%<75%; >75%}
Risk division	Types of risk transferred to the private party ○ Construction ○ Operation ○ Political
Revenue sharing	Proportion of revenue collected is taken by private party {<25%; >25%<50%; >50%<75%; >75%}
Organizational aspects	
Tasks and responsibilities	Tasks and responsibilities transferred to private party

Municipal / Town Council	
Street Cleaning	
Formal decision making	Who takes the final decision on operational issues e.g. determining user fees
Modality of service provision	i.e. Public, or Private sector
Legal aspects	
Ownership	Who owns the facilities
Contract duration	Length of contract
Contract commencement Date	
Stakeholder involvement	Involvement of stakeholders in managing service provision
Competitive biding	Method of procuring service provider e.g. open bidding, single sourcing, RFP

Municipal / Town Council		
Name Service Provider		
Street lighting		
Inputs	**Outputs**	**Fill-in**
Operational expenditure for street lighting per week Ushs:	Total of street network in Kilometers	
	Total street network covered with lighting in Kilometers	
	Number of lighting points	
	Number of days the lights are working in a week	
	Rate service quality (Good, Average, Poor)	
	Complaints from LG	

Municipal / Town Council	
Street lighting	
Financing Aspects	
Sources of Funding {amount where possible}	Proportion of financing contributed by private party {<25%; >25%<50%; >50%<75%; >75%}
Risk division	Types of risk transferred to the private party o Construction o Operation o Political
Revenue sharing	Proportion of revenue collected is taken by private party {<25%; >25%<50%; >50%<75%; >75%}
Organizational aspects	
Tasks and responsibilities	Tasks and responsibilities transferred to private party
Formal decision making	Who takes the final decision on operational issues e.g. determining user fees
Modality of service provision	i.e. Public, or Private sector
Legal aspects	
Ownership	Who owns the facilities
Contract duration	Length of contract
Contract commencement Date	
Stakeholder involvement	Involvement of stakeholders in managing service provision
Competitive biding	Method of procuring service provider e.g. open bidding, single sourcing, RFP

Municipal / Town Council
Name Service Provider

Street repair and maintenance		
Inputs	**Outputs**	**Remarks**
Operational expenditure for street repair and maintenance Ushs:	Total of street network in Kilometers	
	Kilometers of street maintained in a year	
	Number of times a street is reworked in a year	
	Rate service quality (Good, Average, Poor)	
	Complaints from LG	

Municipal / Town Council	
Street repair and maintenance	
Financing Aspects	
Sources of Funding {amount where possible}	Proportion of financing contributed by private party {<25%; >25%<50%; >50%<75%; >75%}
Risk division	Types of risk transferred to the private party o Construction o Operation o Political
Revenue sharing	Proportion of revenue collected is taken by private party {<25%; >25%<50%; >50%<75%; >75%}
Organizational aspects	
Tasks and responsibilities	Tasks and responsibilities transferred to private party
Formal decision making	Who takes the final decision on operational issues e.g. determining user fees
Modality of service provision	i.e. Public, or Private sector
Legal aspects	
Ownership	Who owns the facilities
Contract duration	Length of contract

Municipal / Town Council	
Street repair and maintenance	
▪ Contract commencement Date	
Stakeholder involvement	Involvement of stakeholders in managing service provision
Competitive biding	Method of procuring service provider e.g. open bidding, single sourcing, RFP

Municipal / Town Council		
Name Service Provider		
Recreation and parks		
Inputs	**Outputs**	**Remarks**
Operational expenditure for recreation parks per week Ushs:	Population	
	Acres of park space available	
	Number of visitors using the park in a week	
	Rate service quality (Good, Average, Poor)	
	Complaints from LG	

Municipal / Town Council	
Recreation and parks	
Financing Aspects	
Sources of Funding {amount where possible}	Proportion of financing contributed by private party {<25%; >25%<50%; >50%<75%; >75%}
Risk division	Types of risk transferred to the private party ○ Construction ○ Operation ○ Political
Revenue sharing	Proportion of revenue collected is taken by private party {<25%; >25%<50%; >50%<75%; >75%}
Organizational aspects	
Tasks and responsibilities	Tasks and responsibilities transferred to private party
Formal decision making	Who takes the final decision on operational issues e.g. determining user fees
Modality of service provision	i.e. Public, or Private sector
Legal aspects	
Ownership	Who owns the facilities

Municipal / Town Council	
Recreation and parks	
Contract duration	Length of contract
Contract commencement Date	
Stakeholder involvement	Involvement of stakeholders in managing service provision
Competitive biding	Method of procuring service provider e.g. open bidding, single sourcing, RFP

Curriculum Vitae

Charles Ndandiko has over 15 years experience of training, consulting and researching in procurement, purchasing and supply chain, service operations management, auditing, accounting and financial management. He lectures at post graduate level (MBA) in major Ugandan universities including Kyambogo University School of Management, Makerere University Faculty of Economics and Management and Uganda Martyrs University. He is involved in training public procurement practitioners in Rwanda; on the Maastricht School of Management (MSM)-Executive MBA program of the School of Finance and Banking (SFB) and at the International Management Academy (IMA) a Rwanda Public Procurement Authority (RPPA) and Chartered Institute of Purchasing and Supply (CIPS) UK accredited training institution.

As a former Senior Consultant with the American Procurement Company, Inc (AMPROC INC), Africa Regional Office in Kampala, Uganda, Charles led project teams that carried out procurement audit of the Basket (Donor) Funding for Ministry of Health and Prime Minister's Office, Regional Government and Local Administration, on behalf of the National Audit Office in Tanzania. He also led procurement audit project teams in Malawi; auditing 60 procuring entities on behalf of the Office of the Director of Public Procurement (ODPP) and Donor funded projects in Ministry of Health and the National Aids Commission. He was involved in facilitating coordination workshops for oversight and/or governance institutions in Malawi to enable them synchronize their roles in public procurement. In Uganda, Charles has been involved variously in procurement audits, developing procurement manuals and training programs. Involvement in these assignments introduced and exposed him to the dynamics of consulting at regional and international level.

In the past six years, Charles has steadily developed research and consulting competence in public private partnerships (PPPs). He has attended various PPP course modules with the Institute of Public Private Partnership (IP3) in Washington DC and obtained Certification as a PPP Specialist and in that capacity, he was involved in a IFC funded PPP project for Contract Administration Training in Uganda. He has presented and published his research work on PPPs at the International Purchasing and Supply Education and Research Association (IPSERA) Conferences at University of San Diego, California, USA (2006) and the European Business School in Germany (2009) and at the International Public Procurement conference (IPPC) at the University of Rome, Italy in 2006 and at Hotel Lotte Seoul, South Korea (2010) respectively.

Charles obtained a Masters of Philosophy [Distinction], with a focus on public procurement policy, from the Maastricht School of Management, Netherlands, an **MBA** in Financial and International Business Management from the prestigious University of Bradford School of Management, UK, an Undergraduate Degree in Business Administration and Management from Uganda Martyrs University, a Diploma in Education from Kyambogo University, and Certificates in Project Management (ESAMI) and Business Computing (UMI). In 2006, he commenced PhD research at the University of Twente that culminated to this thesis.