Pricing Cadastral Products under Different Cost Recovery Regimes

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by

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Abstract

The relationship between cost recovery in the provision of cadastral products and pricing options as practiced by cadastral organisations is yet to be studied intensively. This research examines the implications of imposing different cost recovery regimes on pricing options for cadastral products. It identifies different products and organisational attributes defining the interrelationship between cost recovery regimes and pricing options and factors shaping the two in relation to the provision of cadastral products. It is presumed that the relationship is influenced by factors internal as well as external to the cadastral organisation. The approach is qualitative, where documentary research, was used to define four variables i.e. 'cost recovery regimes' 'pricing options', 'organisational models' and cadastral products', and establish a theoretical relationship between them. Primary and secondary data were collected based on these variables using key informant e-surveys from 35 cadastral organisations across the globe. Patterns and strengths of relationships between variables were analysed using SPSS software. Comparative critical methodologies were augmented with interpretative research methods in data analysis and interpretation. The results revealed that, there was a significant association between 'pricing options' and cost recovery regimes which mean that cadastral organisations operating under different cost recovery regimes are likely to implement different pricing options. These differences can be explained by the legal requirements that are associated with the imposition of cost recovery regimes, which were implicit in the organisational model. 'Cadastral products' was related to 'pricing options' but not to 'cost recovery regimes'. The central position of 'cadastral organisational model' was traced through its relationship with internal and external factors considered in pricing cadastral products. By altering the 'cadastral organisational model', governments are able to influence prices for 'cadastral products', 'cost recovery regimes', pricing options and the ultimate revenue discharge mechanism. Therefore, the impositions of cost-recovery regimes necessitated the adoption of different prices through the organisational models rather than through 'cadastral products', which means, there was no internalisation of the attributes associated with 'cost recovery regimes'. Failure to link 'cost recovery regimes' and 'cadastral products' makes operating under cost-recovery regimes a major challenge for cadastral organisations.

Keywords: *Cadastral products, pricing options for cadastral products, cost recovery regimes and cadastral organisational model*

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List of Acronyms

AC	Average Cost
BEV	Bundesministerium für Eich-Und Vermessungswessen
CEC	Commission of European Communities
CHRI	Commonwealth Human Right Initiatives
CUZK	Český úřad zeměměřický a katastrální
DFT	Department of Treasury and Finance
EC	European Commission
ECE	Economic Commission for Europe
GDP	Gross Domestic Product
GINIE	Geographic Information Network in Europe
HDI	Human Development Index
HHD	High Human Development
ISO	International Standard Organisation
LAS	Land Administration Sytems
LHD	Low Human Development
LINZ	Land Information New Zealand
LIS	Land Information Systems
LRMC	Long Run Marginal Cost
LRNI	Land Registers of Northern Ireland
MHD	Medium Human Development
NE	Norsk Eiendoinformasjos
NMCA	National Mapping and Cadaster Authority
OFT	Office of Fair Trading
PPP	Public-Private Partnership
PRA	Property Registration Authority
PSI	Public Sector Information
PSMA	Public Sector Mapping Authority
QDA	Qualitative Data Analysis
RPI	Real Property Information
RPR	Real Property Registers
RPS	Real Property Surveys
SPSS	Statistical Package for Social Science
UN	United Nations
UNDP	United Nation Development Program
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organization
VHHD	Very High Human Development

1. Introduction to the Research

1.1. Introduction

The establishment of a Land Administration System (LAS) is linked to the need to provide tenure security which in turn improves the welfare of the poor, enhances the asset base of those whose rights are often neglected (i.e. women), creates the incentive needed for investments, facilitates the land market and the collection of land taxation (Deininger, 2003). Williamson (2001b) and Robertson (2002) provide that the economy will greatly be improved with the use of fully automated land information systems (LIS). This is because digital information offers more flexibility for perfect reproduction and fast, inexpensive and easy distribution of information products (Van Oosterom Peter, Lemmen et al., 2002). Therefore, the sustainable development of humankind must be supported by a complete LAS (Kaufmann, 1999). A part from that, the well functioning of LAS is determined by the ability of the delegated organisations to efficiently collect, maintain and disseminate land related information (Dale, 2003). These responsibilities are often vested upon a cadastral organisation whose main functions are to record, maintain and make available information that creates security of tenure and support the land market (UN, 2004, 2005). To effectively execute these functions cadastral organisations requires a substantial amount of funding which may be directly obtained through government budget or cost recovery mechanism (UN, 1996; Dale, 2003). Under cost recovery the organisation's functions are transformed into products (Demir, Uzun *et al.*, 2004), such as 'extracts from cadastres', and 'cadastral maps', and prices are set for each product offered (CEC, 2000; OFT, 2006). However there are limited researches linking pricing options for cadastral products with different forms and levels of cost recovery.

1.2. Background to the research problem

One of the challenges in pricing cadastral products is the determination of an appropriate price (Dale, 2003; Donker and Zevenbergen, 2007). This is attributed to a number of reasons. The first is that, cadastral products fall within the category of Public Sector Information (PSI) for which charging has been considered inappropriate (Gompel and Steyaert, 2002) and secondly there is a significant variations in pricing options adopted by different countries for charging PSI (Craglia and Masser, 2003). For pricing geo-based products, the Ordinance Survey (2008) identifies two extremes. The first is pure market based approaches such as the one adopted by the UK Ordinance Survey (OS) and PSMA Australia Limited and the second is "free" information providers commonly implemented by mapping organisations in the USA. The market based approaches to pricing information products uses Average Cost (AC) and Marginal Cost (MC) as a price determination mechanism (Donker and Zevenbergen, 2007) and some organisations adopts Long Run MC (LRMC) (see Walsh and Woods, 2001).

Cadastral organisations also provide non-geo information products such as legal information products on land ownership and statistical data on the land markets (UN, 1996). Dale (2003) identifies four possible options on how cadastral products may be charged. The first is complete subsidization by

the government which is related to a situation of 'no cost recovery', the second is when users pay for the cost of making the data available but not for the cost of their collection and updating, this is related to partial cost recovery, the third is when users pay for all costs involved in the provision of cadastral products which is related to full cost recovery and lastly charging at full cost with profit which is related to full cost recovery with profit. Each of the pricing options identified is associated with a different level of cost recovery (see also UN, 1996; Dale, 2003; UN, 2005). Therefore from these scholars' point of view there is a relationship between different levels of cost recovery and pricing options adopted (table 1.2.1).

Cost recovery may be defined as generating finances that wholly or partly recover the costs of providing a products or service. Cost recovery ambitions must be backed up by rules, regulations and guidelines, which attempts to define the appropriate cost recovery strategies and provide guidance to implementing organisations (Craglia and Masser, 2003). However the government often impose these legal requirements to recover costs upon cadastral organisations forcing them to operate under predefined cost recovery requirements which are referred in this research as 'cost recovery regimes'. Operating under any cost recovery regime requires linking cost-recovery ambitions with appropriate pricing option for cadastral product. However the major concern for most public organisations like cadastres, is how to define appropriate pricing options that fits their ambitions in a particular cost recovery regime (see OFT, 2006).

Table 1.1 Pricing options that may be adopted under cost recovery regimes

Characteristics	**Cost recovery regimes**			
	Budget Based (no cost recovery)	Partial cost recovery	Full cost recovery	Cost recovery with Profit
Degree of financial Cost Recovery	0% or not known	1% - 100% depends on obligations	at least 100%	at least above 100%
Possibility of competitors	No	Unlikely	Likely	Likely
Cadastral duties and responsibilities	Statutory	Statutory	Statutory and market	Statutory, market and innovative
Possible Cadastral independence level	budget-based	partially self-financing	budget-based or self-financing	budget-based, or self-financing, or Private
Primary focus Variable	Subsidy	subsidy and AC	AC	AC and profit
Possible price determination mechanism	Political decisions	$P < MC$ $P = MC(1-s)$	$P = MC$ $P = AC$	$P > MC$
Objectives	Service Delivery	Service delivery	Self finance	Self finance and sustainability

Where, *P= Price, AC= Average Cost, MC = Marginal Cost, s = subsidy as a proportion of unit cost, TR = Total revenues, TC = Total Cost.*

The difficulties in matching intended results under a particular cost recovery regime with pricing options for cadastral products are limited by the nature and type of costs that need to be recovered (Productivity Commission, 2001; Gompel and Steyaert, 2002). These costs are often categorised differently depending on the financial management system adopted by an organisation (Van der Molen, 2001). UNESCO (2008), classifies costs into three categories; the first is direct costs which are costs traceable on a particular output of activities (a product or service), the second is indirect variable costs which are support costs and are in a functional relationship to the output thus not directly traceable and the last is indirect fixed costs which occurs regardless of the level of output and are not traceable. Strategies under a particular cost recovery regime may be intended towards the

recovery of any, some or all of these costs using different pricing options. But the relationship between the intended outcome of a particular cost recovery regime and pricing options for cadastral products is yet to be extensively investigated.

Failure to appropriately define policies and strategies under a particular cost recovery regime in relation to pricing options may lead to undesired economic consequences. Cadastral organisations operating under full cost recovery may face difficulties in meeting their financial obligations during an economic crisis due to a decline in the volume of land transactions submitted for registration (Barnasconi and Van der Molen, 2009). Therefore, under the obligation to recover all the costs, a high reliance on the land market may be risky. Cadastral organisations are devising different methods to deal with the uncertainties in the land market which include maintaining a financial flexibility through the equity account i.e. the Netherland Kadaster (Van der Molen, 2001). This involves keeping a certain proportion of revenues in the equity account especially when revenues exceed total costs. During a deficit i.e. due to a financial crisis or other problems, the financial reserves in equity are depleted to finance the deficit (Van der Molen, 2003b). With a prolonged financial crisis this approach will not work and the 'Kadaster' will have to seek alternatives or go out of business (if possible). This is because once the equity is depleted to zero there would be no means to sustain the last resource for cadastral production.

An alternative approach to dealing with market uncertainties is linking to the information market. Given the enormous volume of data cadastral organisations collects and maintain (CEC, 1989), different type of cadastral products may be designed. The cadastral organisation may participate in the information market directly or indirectly. Since direct participation of a monopoly public organisation in the information market leads to market distortions due to its sole control of certain datasets (Groot, 2001b), Private-Public Partnership (PPP) may be utilised to reach the user community (Dale, 2003). The current global trends for public cadastral organisations, supports this orientation which have been observed to be destined towards business operation (Olalla, 2000).

1.3. The research problem and objectives

This research addresses the relationship between pricing options for cadastral products and the intended levels of cost-recovery as imposed through cost recovery regimes. The approach in the existing literature is to directly link pricing options for cadastral products to cost-recovery (see UN, 1996; Steudler, Williamson *et al.*, 1997; UN, 2007). However, the imposition of a particular cost recovery regime may be associated with the imposition of multiple pricing options. Therefore the presumed direct relationship between cost-recovery and pricing options may not be realised in practice. In additional to that, the desire of cadastral organisations to attain cost-recovery while coping-up with socioeconomic conditions may lead to multiplicity in the implemented pricing options which attracts attention for a scientific study on adverse effect of such multiplicity of pricing options.

Given the possibility to charge cadastral products and the intention to reduce the dependence of cadastral organisations on the government budget (UN, 2007), The imposition of cost recovery regimes is often opted for regardless of the adverse impact that may ensue thereof. Some of these adverse impacts may include declining legitimacy of the state itself, as customers are not satisfied by receiving value for money (Van der Molen, 2003c). The value for most cadastral products depends on legal attributes identified as rights, restriction and responsibilities (see ISO, 2008). These

attributes are abstract in nature and rely on the legal enforcement by the government. Therefore in defining appropriate pricing options for cadastral products the central role of the state cannot be ignored (CEC, 1989; Mitchell, Clarke et al., 2008).

Given the central role of the government in the provision of cadastral product, Different scholars have observed the following: -

i) Political and legal relations influence price setting for cadastral products more than economic circumstances (see Cimander, Kubicek *et al.*, 2006; Pollock, 2008).
ii) Market distortionary effects may prevent direct participation of cadastral organisation in the information market because of its legal monopoly of some basic dataset and the need to ensure a level playing field in a competitive environment (Groot, 2001b; Donker and Zevenbergen, 2007; Cobin, 2009).
iii) Cadastral organisations are devising means of protecting themselves against the adverse effect of financial crises especially when operating under 'full cost recovery'(Cimander *et al.*, 2006; Barnasconi and Van der Molen, 2009).
iv) Long-term initiative for most cadastral organisations under cost recovery regimes, across the globe, is establishing closer ties through contractual arrangements with the private information providers (see Van der Molen, 2002; Dale, 2003).

The above observations show that while on one hand there is remarkable influence of the government on the undertakings of cadastral organisations, on the other the imposition of cost recovery regimes allow a cadastral organisation to operate under a competitive or partnership environment. Appropriate pricing option may provide a means to balance competing interests emerging from these relationships. These complexities in market relationships for cadastral products are often overlooked when imposing cost recovery regimes. This is because cost recovery is currently recognised as having a significant impact on land administration (Williamson, 2001a). The UN (2009), in support of cost recovery stated as follows: -

> *"Cost management and cost recovery are fundamental aspects of […] land administration services. Fees and charges are […] linked to the cost recovery and cost management objectives; they constitute important means by which the operating costs of land administration can be recovered […]. This holds true in particular in countries with low-income levels".*

This statement links pricing options (fees and charges) to cost recovery objectives, which are in, turn linked to the economic status of countries.

1.3.1. The problem statement

Cost recovery regimes are advocated and imposed upon cadastral organisations regardless of socio-economic conditions prevailing on a particular country. The implementation of cost recovery regimes requires adoption of pricing options for each cadastral product. However the relationship between the imposed cost recovery regimes and the implemented pricing options for cadastral products has not been extensively investigated.

1.3.2. Objective

To examines the implications of imposing different cost recovery regimes on pricing options for cadastral products.

1.3.3. Research questions

1) What are the different forms of cost recovery regimes implemented by cadastral organisations?
2) What are the anticipated pricing options for cadastral products under different forms of cost recovery regimes?
3) What are the major forces driving cadastral organisations into implementing some form of cost recovery regimes?

1.3.4. Hypothesis:

H1: Pricing options for cadastral products differ between different cadastral organisations depending on the cost recovery regime imposed.

1.3.5. Rationale

This study is an attempt to link cost recovery regimes to actual pricing practices at product level. Chimhamhiwa, *et al.* (2009) identifies cost-recovery as one of the performance criteria in benchmarking cadastral systems across countries. However diverse pricing options for cadastral products leads to different cost recovery regimes, which further complicates the effective and wider use of the magnitude of cost recovery for benchmarking cadastral systems (see Steudler *et al.*, 1997). In addition to that the notions and concepts embedded within both cost recovery and pricing options are either different or unspecified (see Barnes, 2003). Understanding pricing options for cadastral products may facilitate comparison of the magnitude of cost recovery within a particular cost recovery regime and not across cost recovery regimes specifically when pricing options are related to cost recovery regimes.

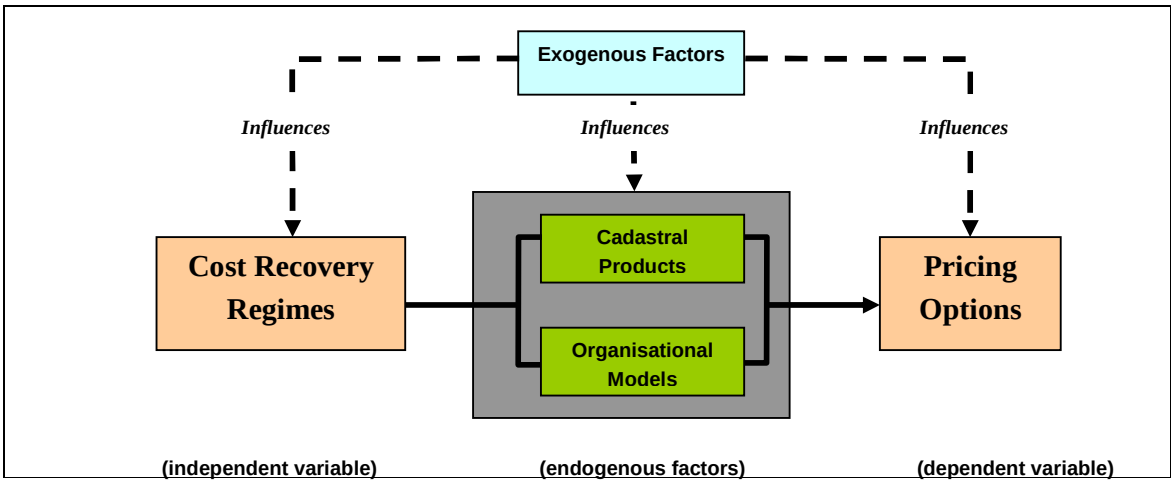


Figure 1.1 The basic conceptual framework

1.4. Conceptual framework

This research examines pricing options for cadastral products as determined by different forms of cost recovery regimes imposed upon cadastral organisation. Figure 1.1 shows the basic conceptual

framework where the relationship between cost recovery regimes and pricing options is viewed through cadastral products (which conceptually include 'profit-per-product', 'costs-per-products', and 'legally fixed price', and discounts) and cadastral organisational models as endogenous variables, given the influence of exogenous variables that were defined as availability of a 'fixed budget' from the central government, 'availability of competitors' in the provision of cadastral products, perception on the granted 'price setting autonomy', level of country's social economic development and 'processes in registering properties', which may also be considered internal. For a detailed research design see figure 1.2 and table 1.3.

1.5. Research methods

1.5.1. Data collection methods

Literature review; was used to establish the existing/current state of knowledge in relation to cost recovery regimes and pricing option and build a conceptual frameworks for data collection. Key informants electronic surveys (e-surveys), was used to collect empirical data from cadastral organisations across the globe. E-surveys was useful because study cases were spread across the globe and the method offered a cheaper and quicker data collection approach (see Frankfort-Nachmias and Nachmias, 1994). Email and telephone contacts; was adopted when it was necessary to verify or send a copy of the questionnaire for some cadastral organisations that had problem with the electronic survey.

1.5.2. Data analysis and interpretation methods

Two qualitative approaches form the basis for data analysis and interpretation. The first is critical research, where critical research methodological framework developed by Cecez-Kecmanovic (2007), was adopted. The framework defines four basic steps. The first is intensive or in-depth examination, where it was assumed that pricing options can appropriately be assigned to cadastral products if local socioeconomic conditions are considered. The second step is critical explanation and comparative structural generalization, where different explanations of an observation were assessed based on my previous knowledge and experience/education. The third step is open discourse and transformative redefinition or actions, where non-distorted communication obtained through the survey were examined, compared and redefined. The last step is reflexive-dialectic orientation, which form an integral component of each of the above components. The second method employed in this research was interpretative research, which complemented the critical methodology in interpreting the survey results. In this approach the emphasis was to understand and interpret the data based on my personal expectations, experience and knowledge as obtained through literature review and previous studies.

1.6. The structure of the research report

This report comprises the following chapters: -

Chapter One: Introduction to the Research; this chapter introduces the main theme of the study; it describes the objectives, problem and design of the research. It also identifies the basic questions that were answered in the study. It introduces the methodology adopted for data collection, data analysis and results interpretation. Lastly the chapter explains the reasons/motivations for choosing this particular topic.

Chapter Two: Options in Pricing Cadastral Products under Cost Recovery Regimes in the Global Context; this chapter provides an overview of the theoretical bases for the relationship between pricing options for cadastral products and cost recovery regimes. It also provides a thorough explanation of challenges when organisations are operating under cost recovery regimes.

Chapter Three: Research Methodology; this chapter explains the relevancy of research methods employed in this study. The theoretical bases and practices in qualitative research is described and the extent to which those practices fits the realm of this study. The chapter also provide shortcomings in the methodologies.

Chapter Four: Characterising Cost Recovery Regimes; this chapter examines patterns in the collected data and derives common characteristics based on major trends and uniqueness of observations. These characteristics are based on both endogenous and exogenous factors that influence choices of pricing options for cadastral products.

Chapter Five: Justifying Pricing Options for Cadastral Products under Cost Recovery Regimes; this chapter evaluates the relationship between cost recovery regimes and pricing options based on the observations made in chapter four. The chapter employs critical research methodology to explain observed patterns and presents findings of the research using interpretive research methodology.

Chapter Six: Implementing Cost-Recovery Regimes: Scenario, Challenges and Options; possible scenarios and challenges that may be encountered by cadastral organisations when operating under cost recovery regimes are explained. The challenges are drawn methodically from the socio-economic conditions and the complexity in registering properties in the respective countries under which the investigated cadastral organisations operated.

Chapter Seven: Discussion and Conclusions; this chapter provide a summary of answers to the research questions and areas of further research within the context of this study

1.7. Activities and time schedule

A list of activities and dates executed is provided in table 1.7.1.

Table 1.2 Activities and time schedule

	Time / Activity	Jul-Aug 2009	Sept 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb-Mar 2010
1	**Research proposal**							
	-Preparation of the research proposal	√						
	-Proposal Presentation		√					
2	**Data collection/Literature Review**							
	• Design and distribution of the survey		√	√				
	• Contact respective cadastral organisations		√	√				
	• Literature Search and review	√	√	√	√			
	• Conceptual frame for data analysis	√	√	√				
	• Data Analysis and Interpretation preparations	√	√	√				
	• Receipts and preliminary analysis of data			√	√			
3	**Mid Term Presentation**				√			
4	**Analysis**							
	• Analysis of information/data			√	√	√		
	• Preparation of information and findings			√	√	√		
	• Results interpretation and presentation			√	√	√		
5	• Thesis report writing					√	√	
6	**Reporting**							
	• Review and Compilation of final report						√	√
	• Submission							√
	• Defence							●

Table 1.3 Details of the research design

Objectives and Research Questions	No	Research Subquestions	Research Methods and Methodologies	Source	Output
Identify different forms of Cost recovery strategies adopted by Cadastral organisations **Questions one:** What are the different forms of cost recovery regimes implemented by cadastral organisations?	1	How can different forms of cost recovery be classified?	**Content Analysis: - extraction of information from documents, policies, laws, books, articles.** • Extract specific information on Cost recovery implementation, Socio-legal criteria including economic/financial characteristics to classify cost recovery and cadastral organisational models.	Books, articles and official reports and document from Online libraries and journals, ITC Library.	• Classified cost recovery regimes and characteristics. Implementation challenges and, • Classified Cadastral organisational models
	2	What are the different forms of cadastral organisational models?			
	3	How are different forms of cost recovery related to different cadastral organisational models?	**Documentary research and** **Key informant e-survey /email/phone** - Establish a relationship between cost recovery and cadastral organisational models	Data from targeted cadastral organisations (see Appendix VI) across the globe.	Homogeneity and differences in the forms of cost recovery across cadastral organisational models.
Identify Key determinant in setting prices fo cadastral product and pricing options **Questions two:** What are the anticipated pricing options for cadastral products under different forms of cost recovery regimes?	4	How can different forms of pricing cadastral products and services be classified?	**Documentary research;** - Identify different pricing options for cadastral products, Define cadastral products and how it is related to pricing options **Key informant e-survey /email/phone** Pricing options adopted in pricing cadastral products and challenges faced **Statistical tests**	- Books, articles and official reports and document from Online libraries and journals, ITC Library. - Targeted cadastral organisations (see Appendix VI)	Classified cadastral products, Pricing options for cadastral products and the implications of cost recovery on pricing options for cadastral products and its relations to exogenous as well as endogenous factors
	5	What are cadastral products?			
	6	How cadastral organisations determine prices for their products?			
	7	How cost-recovery strategies influence pricing options for cadastral products?			
Provide a detailed theoretical and empirical grounding for cost recovery. **Question three:** What are the major forces driving cadastral organisations into implementing some form of cost recovery regimes?	8	What factors influences the choice of appropriate pricing option for cadastral products?	**Critical research and interpretative research methodologies** • factors determining variations in pricing options for cadastral products	Targeted cadastral organisations across the globe. (see Appendix VI)	Data on pricing options setting, annual reports, Legal rules applied in charging cadastral products, Reasons for Charging, modifying Criteria for charging.
	9	What are the major forces driving cadastral organisations into adopting cost recovery strategies?	Content analysis: - Use market theories/public finance to explain the Cost recovery concept in relation to information products pricing behaviour of public organisations.	Books, articles and official reports and document from Online libraries and journals, ITC Library	Shortcoming of market/public financing of cadastral products, Different approaches to resolving these dilemmas in theory.
	10	What are the major pricing dilemmas that need to be tackled by a cadastral organisation during a shift from public financing to cost recovery?,	**Critical Research and interpretative research methodologies** The dilemma experienced by those organisations such as level of cadastres market participation, dealing with market shocks, resistance from free data advocates. **Statistical tests**	World Bank and UNDP websites, Targeted cadastral organisations across the globe. (see Appendix VI)	A description of economic distortions caused by cost recovery in the market, Detailed explanation of the challenges experienced during the shift to cost recovery, Possible ways to deal with challenges and reason for such actions/decision.
	11	How to tackle these challenges?			
	12	Why choose a particular option for dealing with a particular challenge?			

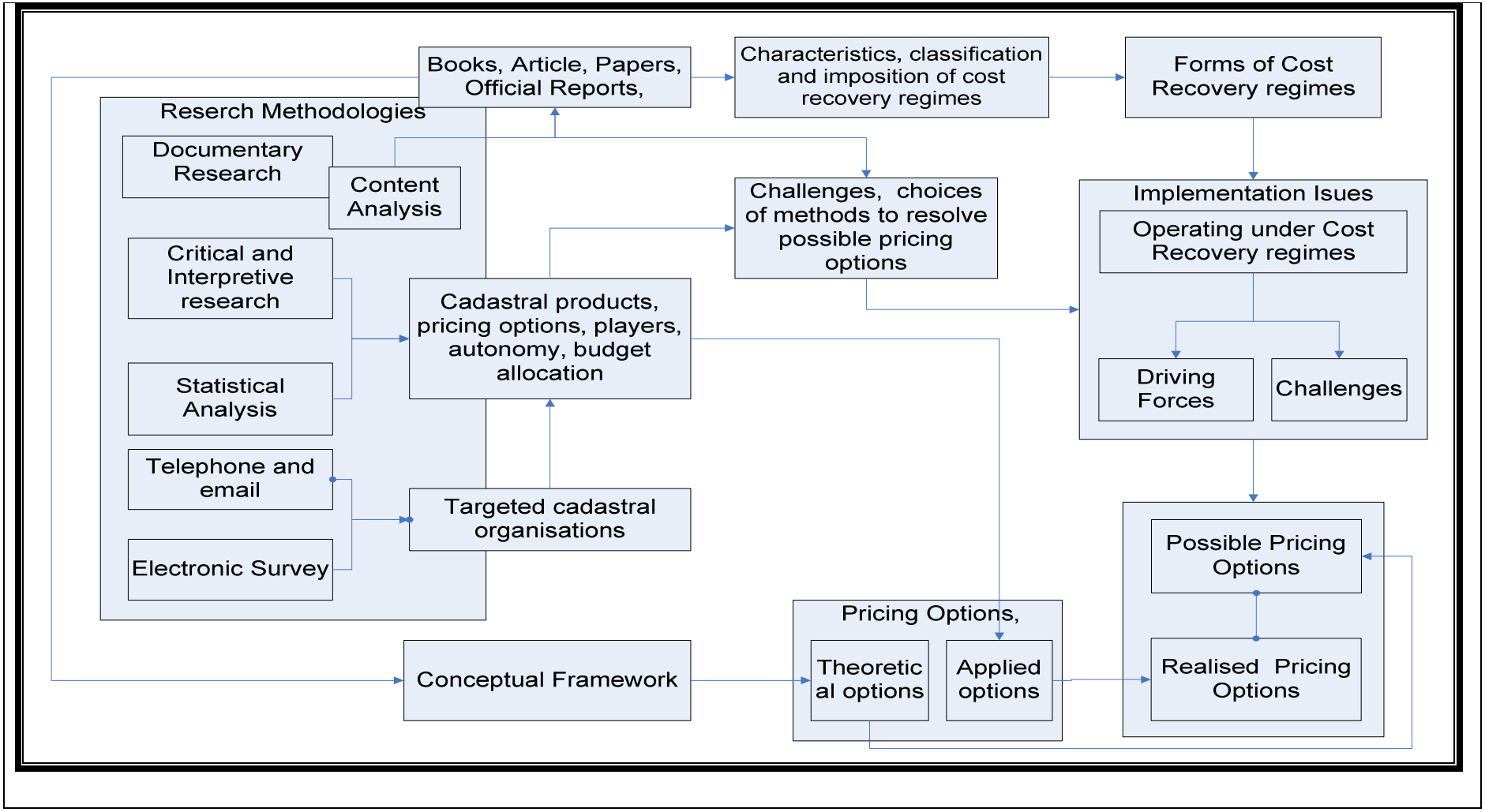


Figure 1.2 Summary of research design

2. Options in Pricing Cadastral Products under Cost Recovery Regimes in the Global Context

2.1. Introduction

This chapter addresses a number of research questions. Under research question one, the chapter addresses research sub-questions one and two where cost recovery regimes and cadastral organisation models were defined and classified. Under research question number two, it addresses research sub-questions five and six where pricing options and cadastral products were defined. Under research question number three, it addresses research sub-questions number nine and ten where forces that may influence the imposition of a particular cost recovery regime were reviewed and the challenges that may need to be tackled in a shift from a 'no cost recovery' regime to 'partial cost recovery' or 'full cost recovery' regimes are explained. (For a full list of questions see table 1.2). The chapter is divided into four sections. Section (2.2) explores the existing literature on the issue of cadastral products. The second section (2.3) addresses different cadastral organisational models. The third section (2.4) identifies and classifies different pricing options for cadastral products and the last section (2.5) addresses the issue of cost recovery regimes, classifies it and details out the theoretical challenges and limitation of 'partial cost recovery' and 'full cost recovery' regimes.

2.2. Cadastral information as products

Qualifying cadastral information products requires; first, a recognition by the society that such information are useful resource in producing other economic or social products, second the possibility to aggregate or disaggregate information into identifiable objects, and lastly the possibility to identify potential consumers, charge them and exclude free riders from the consumption of a product (Vickery and Wunsch-Vincent, 2006). A number of scholars have addressed these issues. The first group of scholars recognises land and information as an input or a resource in other productive activities (CEC, 2000; UN, 2007). The UN (1996) identifies cadastral information as an economic resource. De Vries and Beerens (2002) note that information is the raw material of the economy. Hendrix (1995) provide that information products such as 'certificate of titles' as proof of ownership add value of land, hence a resource in producing the value of land. In the Industrial sector, Hitts and Snir (1999) observe that innovations in utilizing information products for supply chain management have substantially reduced raw materials and finished goods inventories. When people accept cadastral information as a product like any other economic products, it is possible to provide cadastral information through the open market (Dale, 2003). However this situation can only be possible if people have enough awareness that such information products and services have a price regardless of the provider (Kaufmann, 1999).

A second group of scholars associate cadastral products to the attribute of a parcel regardless of whether cadastral products are parcel or non parcel based (Österberg, 2001). If cadastral products are parcel based then they should comply with the existing technical specifications necessary to define

them as cadastral products (Van der Molen, 2003a). If not parcel based, there should be some means of objectifying them into cadastral products (Cockshott and Cottrell, 1997).

Table 2.1 Characteristics of cadastral products

Cadastral Products	Characteristics	Charging and cost recovery Potentialities*
Certificate of Title **RPR**	• Similar terminologies such as portfolio of ownership, certificate of title, certificate of occupancy. • In some cases it is quoted at a general level no details provided. • It can be offered in both digital and paper format dully signed • Details if provided tend to differ across jurisdictions. • Can be used as evidence in court	• Can be provided by both self-financing and budget based cadastral organisations most likely under 'full cost recovery' • Can be charged and prices are fixed or approved by the government • Revenues likely to go to the state • Is likely to be offered at 'completely free of charge' to the public sector with many limitations
Cadastral Maps **RPS**	• Common product in many jurisdiction • Terminologies differ among countries i.e. Index map, Map printouts. • Levels of detail differ.	• The organisation itself is likely set • Revenues mostly remains with the provider • Fairly difficult to achieve 'full cost recovery' • Possible to be provided in the competitive market • Charges may be flexible and reflect market condition
General information on Real Property **RPI**	• Provided with detailed contents • no authentication or guarantee • It cannot be used as evidence in court. • Terminologies tend to differ across cadastral jurisdiction	• Can be charged and the government is likely to fix or set prices. • Revenue mostly remains with the organisation • Most likely to be provided free to both the public and the private sector
Extract from cadastre **RPS**	• Common product in many jurisdiction • It can be Authenticated • Other terminologies include, views of registers and Cadastral information	• The organisation itself is likely to set Charges • Revenues remains with the provider • Fairly difficult to achieve full cost recovery • Possible to be provided in the competitive market
Statistical data on land market **RPI**	• Prepared in different format • Content tend to differ	• The government set or approve prices • Revenue remains with the organisation • Most likely to be provided free to both the public and the private sector
Extracts from mortgages and encumbrances **RPR**	• Detailed information content-wise. • Other terminologies include 'extracts from mortgages and encumbrances', 'mortgage certificate', • Can be Authenticated.	• The government set or approve prices • Revenue goes to the organisation • Full cost recovery more likely • Products are likely to be freely provided to the public sector with may limitations
General Mortgage information **RPR**	• Generally accessible Information on mortgages • No authentication • May be certified.	• The government set or approve prices • Revenue goes to the organisation • Full cost recovery more likely • Products are likely to be freely provided to the public sector with many limitations.

NB: * Charging and cost recovery potentialities are based on a survey conducted by UNECE (UN, 2007).
RPR = Real Property Registers, RPI = Real Property Information, RPS = Real Property Survey

Appendix III shows examples of cadastral products provided by different cadastral organisations across Europe. Bennett, Wallace et al. (2008), provide that the core function of a cadastral organisation is to deal with cadastral products that are marketable, dynamic, easily defined spatially and held by private owners. Katambi (2009) argue that cadastral system should not only be aimed at legal cadastral products, but also valuation and tax assessment information products should be added to the cadastral product list. Lastly the UN (1996) stipulate that a good LAS will, among other things produce statistical products.

One noticeable difference in the definition of cadastral products in Appendix III, is the level of generalization. Some products are offered at a high level of generalization while in many other cases products are defined in relation to specific information or data offered. The second difference is products authentications where some cadastral organisations offer their product with explicit authentication while others do not. One similarity for cadastral products is objectification of cadastral information that is aggregation of different data into identifiable and meaningful objects.

For the purpose of this study a cadastral product is defined to be any cadastral information offered by a cadastral organisation at a price to the user community (Demir *et al.*, 2004). The price may be evidenced through price lists, charging regulations and price quotes on the web pages or other notice from the cadastral organisation (Appendix V). A cadastral products list may comprise many products with diverse terminologies. However in this research seven cadastral products were investigated. These products were chosen because they exhibit considerable similarities in terminologies, contents and conditions of offer across cadastral jurisdictions (table 2.2.1).

2.3. Pricing options for cadastral products

2.3.1. Rationale for pricing cadastral products

Cadastral products are considered public product because the consumption by one may not reduce its availability to any other person i.e. non-rivalriness, and it is non excludable in consumption (Productivity Commission, 2001). Though technically it may be possible to exclude others and set a price, it will be neither socially nor economically desirable if that price is likely to unduly deter potential users (Commonwealth of Australian, 2005). One important characteristic of public products is that they are enjoyed but not consumed (Rossi and James, 1975). Therefore, cadastral products may be regarded, in economic terms, as 'public products' (Walsh and Woods, 2001).

Pricing cadastral products may be less controversial if they have substantial private products characteristics, where it is physically and economically feasible to identify and charge consumers and to exclude non-purchasers (see Longhorn and Blakemore, 2008). That means, a private market will develop depending on the profitability of such market dealings (Productivity Commission, 2001; Walsh and Woods, 2001). Such markets will involves a systems of dissemination which include mechanisms to monitor the use of cadastral products, or exclude consumption; such as through access controls or licences in on-line systems (Walsh and Woods, 2001). Since these market do exist, cadastral products are classified as semi public products because they exhibit both characteristics of public products and private products (Poe, Bishop et al., 1992).

Krek (2006) argues that price is an important element of trade. By pricing cadastral products, cadastral organisations receive some signals about which cadastral products are in demand and which are not. This complements other non-financial indicators and help organisations adjust their mix of outputs (Productivity Commission, 2001). However, pricing cadastral products raises the question whether public cadastral organisations have a right to charge for the provision of information? (EC, 1998). In addition to that, even if a price is set, the nature of cadastral products allows someone who possesses it to sell, give it to another and still retain it for future use (UN, 1996). Likewise, pricing cadastral products is highly controlled by rules and regulations including both local and international directives impeding price setting autonomy and incentives to reduce costs (ECE, 2007; Pollock,

2008). Despite these constraints, a number of pricing options are being imposed and implemented by cadastral organisations as part of a wider PSI initiatives, each has a different implications for the economy as a whole and for who pays for, and who benefits from, the provision of such products (OFT, 2006).

2.3.2. Policies adopted in pricing cadastral products

Funding the provision of cadastral products is based on pricing policies which are part of the wider PSI policies in many countries (see Craglia and Masser, 2003) (figure 2.3.1). These policies are either based on the nature of use for which a cadastral product is demanded or on the nature of the cadastral product and the provider (CEC, 1989; Gompel and Steyaert, 2002; Craglia and Masser, 2003). Pollock (2008) identifies three types of pricing policies, based on the nature of use for which products are demanded. The first are policies based on availability of public funding, which involves seeking either full or partial subsidy from general government revenues, the second are those relating to the possibility of updater funding where a charge applies only to those who make changes to those products and the last are those policies based on the possibility of user funding where a charge applies to anyone using cadastral products.

The Productivity Commission (2001), classifies pricing policies based on the nature of cadastral products into two broad categories: the first is taxpayer funded 'basic products' comprising collection and compilation of data and some (but not necessarily all) analysis and the second is dissemination and 'cost recovered additional products' which are further categorised into three groups, the first is Commercial products, which the private sector could provide, the second is Incremental products, that only the public sector organisation can provide, and the last is marginally costed products, which only the public sector organisation can provide (see also Craglia and Masser, 2003). 'Basic products' are indirectly charged to all citizens through tax while additional products are charged through a price setting mechanism.

Pollock (2008) identifies three pricing policy goals which can be used for charging cadastral products:- the first is profit-maximization goals: this is defined by the market demand for cadastral products provided by a particular cadastral organisation. The second is AC or Cost-recovery policy goals: this requires prices to be set at a level equal to long-run AC. The last is MC policy goals (Zero-cost) where prices are set to equal the short-run marginal cost that is the cost of supplying data to an extra user. Cadastral organisations opting for this last policy goal will ultimately seek funding from the government. These pricing policy goals were combined with pricing policy options for funding cadastral products leading to four pricing options (figure 2.3.1). The term 'pricing options' as used in this research, refers to alternative ways of assigning prices to cadastral products. The four pricing options are discussed below.

2.3.3. Pricing options

'Completely free of charge' pricing option

One option provided for pricing cadastral products is to offer them at a zero price which is referred to as "completely free of charge" in this research. This option requires an alternative means to finance the provision of cadastral products other than sale of cadastral products i.e. through full government subsidy or donor funds, whereas the final consumers get the product at 'completely free of charge'.

This option is favoured by some consumers who see charging as undemocratic, they contend that, it forces exclusions in the society and forces behaviour that focuses on the ability to pay, not on the need (Longhorn and Blakemore, 2008). Another argument favouring this option is that since taxpayers have already paid for the collection of data, and so should not have to pay again to use it (Van der Molen, 2001; Longhorn and Blakemore, 2008). Van der Molen (2001) also give the argument that commoditisation and commercialisation are not necessary to produce excellent cadastral products. Free cadastral products may also stimulate economic growth due to increased businesses which will employ more people and ultimately generate more taxes (Longhorn and Blakemore, 2008). CEC (2000) provide that charging for information products may not only impede the development of new products but also operate against the financial interests of the governments.

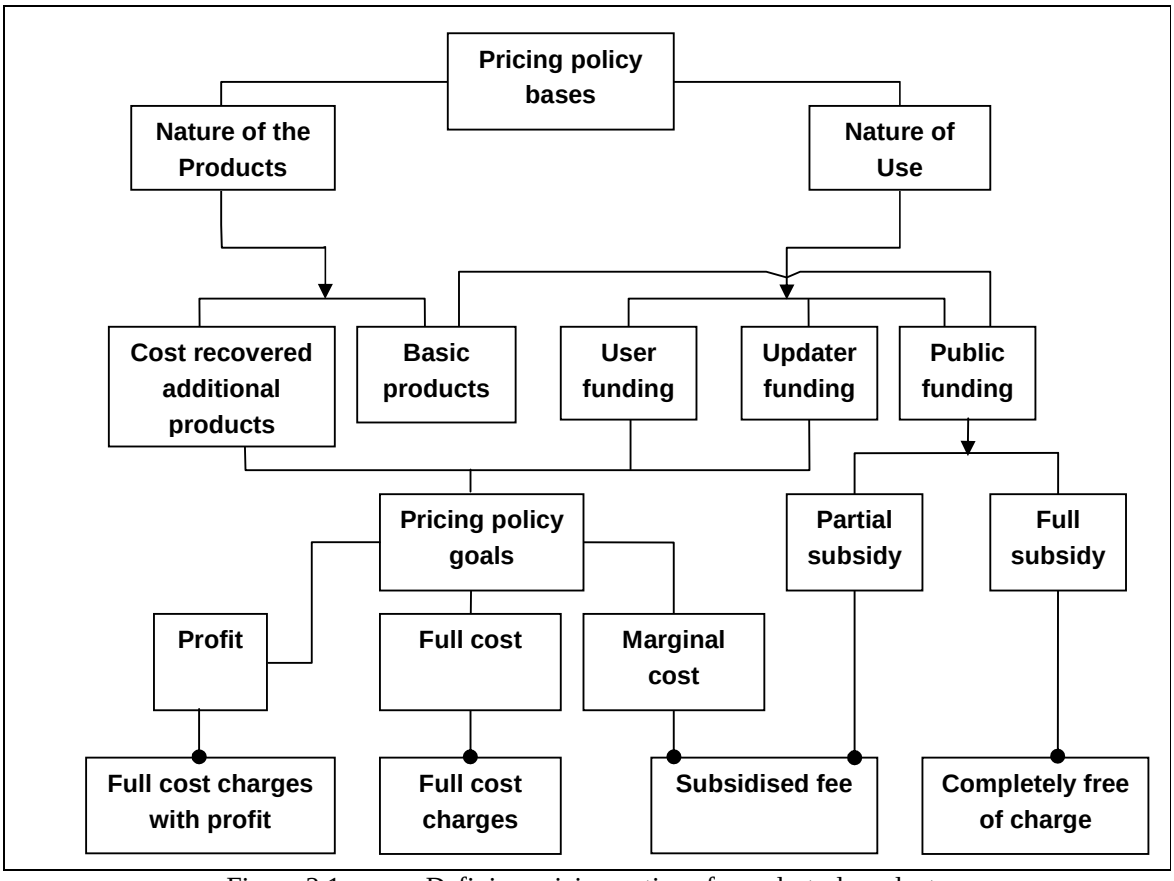


Figure 2.1 Defining pricing options for cadastral products

Producing cadastral products incurs real reproduction cost involving infrastructure, machinery and skills. If information products are offered at 'completely free of charge' pricing option, users are likely to demand more than they would otherwise (Productivity Commission, 2001). Also models advocating free provision of information products have failed in most countries (GINIE, 2000). Longhorn and Blakemore (2008) provide that there is no automatic, direct and immutable link between free of cost (to the end user) access to geo-information and increased usage or societal impact. The term free does not mean free in any user-demanded format. "free" often tends to relate to "raw" or basically formatted data (Blakemore and Sutherland, 2005). Whatever the meaning of "free" the provision of cadastral product at 'completely free of charge' pricing option may in itself generate unpredictable outcome (OFT, 2006). Longhorn and Blakemore (2008) add that even an

information product set at a zero price, has no definitive stability of supply unless the funding/income stream is stable and assured for a medium to long term.

'Subsidised fee' pricing option

The second option for pricing cadastral products is marginal charges or a fees that is in no way related to the true costs (see Kironde, 2009) or Subsidy costing-flat rate payment (Cheng, Dogan et al., 2006). This is referred in this research as 'subsidised fee' pricing option. It is closely related to dedicated taxes where a tax is fixed to a current or future provision of a products (Auerbach, 2009). One way of applying this option for cadastral product is by linking the proceeds from its source which requires a clear separation between fees and taxes as advocated in Cadastre 2014 (Kaufmann and Steudler, 1998). In practice some cadastral organisations do not have a clear link between spending and sources of revenues and often the revenues generated are submitted to a pool of common government revenues (Dale, 2003). This pricing option may be related to zero degree price discrimination in pricing of public geo-information products where prices are set through a public subsidy that allows the organization to disseminate the data largely free of charge (Longhorn and Blakemore, 2008). The 'subsidised fee' pricing option is evident in many cadastral jurisdictions signified by a ministerial role in price setting for cadastral products (see Bruker, 2003; Pollock, 2008). Although some scholars advocates the 'subsidised fee' pricing options specifically a MC approach for information products (see Craglia and Masser, 2003; OFT, 2006), the provision of information products at a highly subsidised fees is so problematic at present because most governments have moved away from direct taxation to indirect taxation and user charges (Longhorn and Blakemore, 2008).

Apart from MC, a 'subsidised fee' pricing options for cadastral product may entail a clear separation of government finances from user charges in the provision of cadastral products. This is referred to as Contribution costing (Cheng *et al.*, 2006). It entails a fixed subsidy and a fixed revenues generation obligation as proportions of total cost of providing cadastral products. The major problem of this pricing approach is when a subsidy is also used to finance products for which the cadastral organisation is required to raise its own revenues (cross-subsidization) in line with private information providers (Groot, 2001b; Walsh and Woods, 2001). The Productivity Commission (2001) observes that cross-subsidies between different processes or different users may permanently disadvantage one group relative to another. That is, those who pay the subsidy may restrict their use of cadastral product, reducing desirable consumption that would have taken place if products were appropriately priced (GINIE, 2000). Conversely, those who receive a subsidy may be encouraged to use too much of the product. Subsidised fee pricing option may be accepted as a cost recovery enhancement mechanism when the level of cost recovery is too low. That means there must be cross-subsidies from other parts of the organization which, in the case of government activities, means the general taxpayer (UN, 1996).

'Full cost charges' pricing option

Under this option there is no subsidy, the cadastral organisation should be able to recover the full costs of producing products through sale of those products. From the economic point of view two technical pricing issues need to be resolved with this pricing option. The first is what price to charge? and the other is how to charge? (Cheng *et al.*, 2006). The answer to the first question is either MC or AC. However the use of either approach may lead to some shortcomings. The MC pricing is often seen as inappropriate when an organisation is required to recover all the costs. Holland (1995) states

that, providing information for commercial purposes at MC unfairly subsidizes private profit at taxpayer's expenses. In a two sided market (where the buying and selling takes place at a platform i.e. internet), Bolt and Tieman (2005) proves that setting prices equal to MC (without a fixed costs component), will induce losses for the monopoly platform. Rossi and James (1975) argue that, Setting price equal to MC will be consistent with full cost-recovery only if, MC is greater or equal to AC. If MC is less than AC, subsidisation will be necessary. Practically MC pricing is difficult or almost impossible to determine, since there may be additional benefits that are internal to the cadastral organisation (UN, 2005).

Rossi and James (1975) provide that full cost-recovery implies setting prices equal to the AC. This price setting mechanism entails using any strategy with a goal to recover all the costs involved in producing a unit of a cadastral product. This has resulted into the development of a number of pricing strategies such as royalties, licenses and copyright fee (Cobin, 2009). However such payments may be considered revenues of the cadastral organisation once a specific cadastral product has been demanded and provided.

'Full cost charges with profit' pricing option

The last pricing option that may be adapted for charging cadastral products is 'full cost charges with profit' where prices are set not only to reflect the full costs of producing a product but also includes a profit for reinvestment or for meeting some other future obligations (Absorption Costing-all cost or AC plus mark-up) (Cheng *et al*., 2006). From a business perspective, most government information providers have a monopoly advantage in the provision of their products (Groot, 2001b). Under monopoly structure different pricing strategies may be adopted such as personalised pricing: sell to each user at a different price, versioning: offer a product line and let the user choose the version of the product most appropriate for them and group pricing: set different prices for different groups of consumers (Shapiro and Varian, 1998). These strategies are referred to as product or customer differentiation and leads to price discrimination. However cadastral organisation do not apply these strategies due to legal limitations on price discrimination (see Bodenkamp, 2002), but few exception exists where price differentiation is practiced but not based on customers rather products (see Van Oosterom Peter *et al.*, 2002).

Van Oosterom Peter, Lemmen et al. (2002) identifies ways for cadastral organisations to implement product differentiation. These include differentiation of access to cadastral products by time, place and duration, differentiation of actuality, completeness or extent of details of a product. Also differentiation in the possibility for the user to download and store the product, multiply it, print or edit. Differentiation could also be in terms of speed of delivery, user friendliness and support. However making profit is seen as unfair for government agencies like cadastral organisations (EC, 1998; Gompel and Steyaert, 2002; ECE, 2007; Cobin, 2009), therefore most of these pricing strategies are not well advocated in land administration literature.

2.4. Cadastral organisational models

2.4.1. The objectives of cadastral organisations

The main objective of cadastral organisations is to provide cadastral products, which involves the collection and dissemination of cadastral data. Cimander, et al (2006) observes that the provision of

cadastral products may also be performed by other sectors of the economy including the private sector. This forces cadastral organisations into restructuring their organisation and operational structures in order to serve customers better (Van der Molen, 2002). Although the main objective of cadastral organisations is to provide cadastral products, competition induces a customer focus among cadastral organisations (Cimander *et al*., 2006). Therefore, the assumption in this research is that cadastral organisation adopts commercial pricing for its products in order to enhance customer satisfaction with regard to the enjoyment or use of such products (see Pollock, 2008).

2.4.2. Organisational models

Cadastral organisations may be categorised into two organisational models. The first is budget-based model and the second is a self-financing model. Both models are discussed below.

Budget-based cadastral organisational model

The 'budget-based model is directly tied to the ministerial structure of the government and cadastral operations are considered routine by the public as well as officials. Sustainability of funding through government budget or user fee is not recognised (see Wessely, 2002). One shortcomings of 'budget-based' model is that cadastral responsibilities are interwoven into a government system making a cadastral organisation dependent hence no efforts to control processes and make them transparent and participatory (Österberg, 2001). This results into poor maintenance of cadastral products, which include non-up-datedness, obsoleteness, disaggregation, poor quality, inefficiency and access to which involves high transaction costs (Ratan, 2006; NMCA, 2007). The 'budget-based' model includes all forms of mixed financing arrangements where the organisation may obtain a limited reimbursement for the costs of delivering its products, based on the principle that the end user pays, without making profit out of it (Gompel and Steyaert, 2002).

Self-financed cadastral organisational model

In the case of self-financing (semi/autonomous public bodies), running a cadastral organisation is like running a business (Van der Molen, 2001). Van der Molen (2003b) provide that a form that could suit organizations for cadastre is that of a public independent agency (self-financing) with responsibilities sufficient for the goals they wish to achieve. Caulfield (2002) observes that the advantages of a self-financing (agency) model include quality management by distancing activities from central and often politicised departments, increased transparency and better link goals and means in achieving policy objectives. However, some restrictions may apply such as preventing the organisation's management to borrow monies without the approval of the responsible Ministry (Tanzania, 1997). The self-financing model is criticised on the ground that its origin is from western economies, hence its adoption for some organisations in developing countries where political and administrative capacity is week can lead to adverse outcome (Caulfield, 2002). Another criticism relate to financial and property control where Djankov et al, (2008) argues that those who control a public self-financing organisation, whether managers, controlling shareholders, or both, can use their power to divert corporate wealth to themselves (self-dealing) through executive perquisites, excessive compensation, transfer pricing, appropriation of corporate opportunities, self-serving financial transactions such as directed equity issuance or personal loans to insiders, and outright theft of organisation's assets.

2.5. Cost recovery regimes.

Cost-recovery is a mechanism for pricing access to information in order to recoup all, or some, of the costs incurred by the public organisation in charge of cadastral products (CEC, 2000). The Productivity Commission (2001) defines cost recovery as the recovery of some or all of the costs of a particular activity. According to Van der Molen (2003a), cost-recovery pertains to costs and selling prices, and three issues play a role; firstly, what is the cost price of a product or service?, this relates to cost recovery price. Secondly, what is the selling price of that product or service? This relates to pricing options and lastly, what is the significance of cost recovery within this context? This relates to the rationale for cost recovery pricing. Cost recovery entails a commercial approach in the provision of cadastral products (see Dale, 2003).

2.5.1. Rationale for cost recovery initiatives

Despite organisational disparities among them, conceptually, cadastral organisations are dedicated towards achieving the highest level of customer satisfaction specifically with their products. This is in line with the view of Van der Molen (2003b) who states that;

> *"Since we are of the opinion that the needs and requirements resulting from the adoption of a customer orientation and the achievement of cost recovery are essentially uniform in nature anywhere in the world we therefore also presume that all land organizations are confronted with the same situation"*

Though this presumption may not correspond to reality in certain cases, customer orientation is a fact that may justify the need for cadastral reforms (Omar, Kadir et al., 2006), and the continued existence of cadastral organisations. Kaufmann (1999) states that cadastral systems must obey certain clearly defined principles that are valid world-wide and which can be adapted in detail to accommodate national and cultural peculiarities. One such principle according to both Van der molen (2003a) and Kaufmann (1999) is cost recovery.

Cost recovery is favoured as an important means of improving the efficiency with which products and services are produced and consumed (Productivity Commission, 2001; Commonwealth of Australian, 2005). It can improve agency efficiency by instilling cost consciousness and promoting demand responsiveness charges for goods and services (CEC, 2000; GINIE, 2000; Dale, 2003; UN, 2005). Cost recovery can give an important message to users or customers about the costs of resources involved and improve equity by ensuring that those who use products and services or who create the need for information bear the costs (CEC, 2000; KPMG Consulting and Sears, 2001; Dale, 2003). GINIE (2000) observes that, cost recovery can make possible off setting cuts in taxation or the provision of additional government products. The UN (2005) argue that cost recovery can be an alternative means of allocating budget funding. It can also promote more efficient use of government services by reducing frivolous demand often associated with free services (KPMG Consulting and Sears, 2001; Dale, 2003).

Dale (2003) add that a commercial approach in the provision of cadastral products is necessary because of the need to firstly, reduce waste in material and human resources, secondly to ensure competitive neutrality when cadastral organisations provide products in competition with the private sector by forcing the organisation to charge prices that do not unfairly undercut commercial suppliers

and Lastly, to help cadastral organisation to conform to international agreements especially those relating to the protection of other people's intellectual property rights, specifically copyright. Generally cost recovery can facilitate improvements in the delivery of public products and services by introducing more business-like and client-oriented practices (KPMG Consulting and Sears, 2001; Dale, 2003). Despite all these benefits associated with cost recovery, it is not clear whether cadastral organisations implement cost recovery because of these benefits or otherwise.

2.5.2. Assigning costs-per-product

The basic question in relation to costs for cadastral products is how costs can be assigned to specific products? (Gompel and Steyaert, 2002). This question has raised concern whenever cost recovery is introduced in the provision public products and services (see Ronald J. Vogel, 1988; Easter and Liu, 2005). The solution to this question depends on how costs are classified. UNESCO (2008), classifies costs into three categories: the first is direct costs which are costs traceable on a particular output of activities (a product or service), the second is indirect variable costs which are support costs and are in a functional relationship to the output thus not directly traceable and the last is indirect fixed costs or capital cost which occurs regardless of the level of output and are not traceable. The Productivity Commission (2001) provide that these costs may be assigned to information products using a fully distributed cost approach, where the total costs (direct, indirect and capital costs) are allocated across all outputs. Direct costs are allocated to their respective output, while indirect and capital costs are spread across all outputs. Alternatively, Cadastral organisation can use the MC or AC approaches. MC excludes costs that are fixed in the short run, such as capital costs and is often lower than AC (Varian, 2003). This is of major concern for cadastral agencies with automated information systems, where gathering cadastral information may be costly, but disseminating it to many users has low cost per user (Productivity Commission, 2001).

The concept of cost recovery regimes as adopted in this research exclude the recovery of some costs, which may be presumed irrelevant to cadastral products investigated especially in countries with mature LIS. This approach is in line with cadastre 2014 where cost recovery is considered to exclude initial costs of establishing an LIS and collection of basic cadastral data (Kaufmann and Steudler, 1998). These costs include Once-off establishment costs, made up of costs for establishing the structural elements (policy, regulations, institutional strengthening, physical infrastructure, equipment supply, and training), and the operational procedures, systems, and services and Once-off titling costs which is the actual cost of conducting titling and cover field adjudication, surveying teams, community involvement, management, training, and maintenance (AusAID, 2001). However for cadastral organisation in countries with premature LIS, Once-off establishment costs and Once-off titling costs may be an integral component of cost-recovery initiatives.

For costing purposes, cadastral organisations are presumed capable of assigning costs, and therefore set prices that reflect either a cost-recovery or no cost-recovery regime. Under a 'partial cost recovery' or 'full cost recovery' regimes, it is widely accepted that the public and other users should pay for cadastral products to recover either the full or partial costs of collection, storage, maintenance and dissemination of cadastral products (Karikari, 2006). In some cases cadastral organisations may consider a number of factors in pricing their products, such as profit-per-product and discounts as well as legally fixed prices. These factors were considered in this research as endogenous factors and their

relationship to pricing options and cost recovery regime was examined. Under a 'no cost recovery' regime both costs and prices are considered external to the cadastral organisation.

2.5.3. Relevant cost recovery regimes

Cost recovery regimes are classified into three classes as defined in figure 2.5.1. These are 'no cost recovery' regime, 'partial cost recovery' regime and 'full cost recovery' regimes. The characteristics of each regime are explained below.

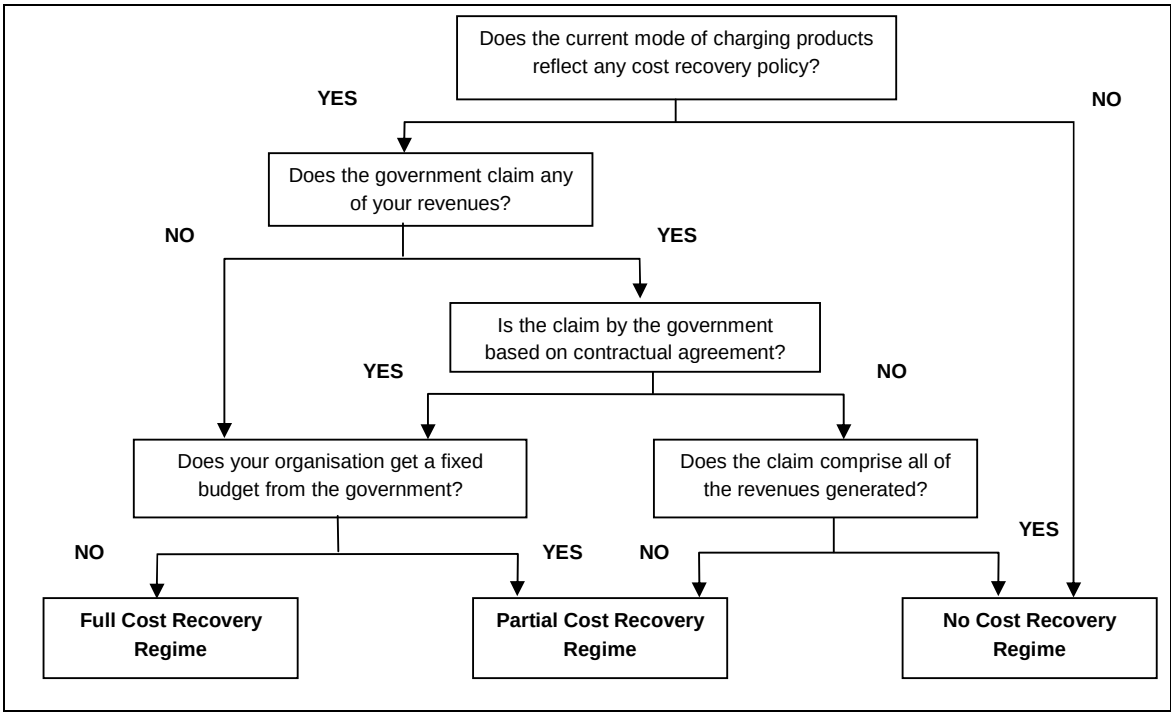


Figure 2.2 Defining cost recovery regimes for cadastral organisations

'No cost recovery' regime

Cadastral organisations under 'no cost recovery' regimes are presumed either unable to estimate costs-per-product or such cost are externally determined. Therefore, prices charged do not reflect any form of cost-recovery policy. The cadastral organisation may have the ability to estimate the costs but they are neither useful in budget allocation nor in charging cadastral products. All the costs of running the cadastral organisations are paid for by the State (UN, 2005). That means, an appropriate cadastral organisational model is 'budget-based' and the relevant costs are the expenses for salaries and material goods during a particular year (De Vries and Beerens, 2002), which are paid for by the government. If under certain legal obligations a cadastral organisation is forced to implement cost-recovery policies, the revenues generated by the organisation are submitted to the pool of general government revenues such as taxes, fines and other user charges. Pricing options that may be adopted depend on the overall government policies (Longhorn and Blakemore, 2008; Pollock, 2008).

'Partial cost recovery' regime

This regime encompasses a more flexible set of characteristics. It accommodates both cadastral organisational models and a cost structure defined by both the organisation and a fixed budget from the government through service level agreement (Dale, 2003). Therefore, the determination of cost

price under 'partial 'cost recovery' regime will depend on how much is to be recovered and should be within 'subsidised fee' pricing option (EC, 1998). It may be applied over all products as a fixed proportion of costs to be recovered or applied only in a general way where some products recovers a greater proportion and others less to attain the overall agency's partial cost-recovery (OFT, 2006). Under this regime a budgetary system of precise and timely cash administration may be sufficient to attain the level of financial obligation assigned to the cadastral organisation (Van der Molen, 2001). It may involve a pricing options at MC where users pay for the cost of making the data available but not for the cost of their collection and updating (UN, 2005).

'Full cost recovery' regime

Under this regime the cadastral organisation requires an appropriate costing method in order to attain the full recovery of costs and in some cases a profit, which can be reinvested in the agency (UN, 2005). The charges applied are often higher than the average costs of a product for reinvestment and research purposes (PSMA, 2009), and may include 'full cost charges' or 'full cost charges with profit'. Cadastral organizations operating under this regime are often privatised to a certain extent (self-financing) (Van der Molen, 2001). The rationale for full cost recovery regime emanate from the view among different experts in information products that, partial cost recovery is inappropriate since the management costs might exceeds the benefits of implementing such a regime (Productivity Commission, 2001; Commonwealth of Australian, 2005). Therefore where cost recovery is justified, a 'full cost recovery' regime may be imposed.

2.5.4. Challenges when operating under cost recovery regimes

A cadastral organisation operating under 'partial cost recovery' or 'full cost recovery' regime may face a number of challenges that were studied in two ways in this study. Firstly, by considering them as factors that can influence the choice of pricing options and secondly as randomly emanating from socioeconomic circumstances under which the cadastral organisation operate.

These two approaches were considered separately. In the first approach, challenges were identified and classified as exogenous factors that influences pricing options for cadastral product and in the second approach, challenges facing cadastral organisations were analysed in the light of socioeconomic constraints facing countries as reflected in the HDI (UNDP, 2009b), and processes involved in registering properties as reflected in the registering property rankings (World Bank, 2009). All these factors are in turn discussed below.

Autonomy in price setting

Autonomy of a cadastral organisation include the ability of the cadastral organisation to operate without interference from the central government (see Caulfield, 2002; Wessely, 2002). This may include a certain degree of price setting autonomy. In some developed countries of Europe, it has been observed that Government departments and public independent organisations are free to charge market prices for value-added information products provided this can be achieved openly with a level playing field among all market participants (Cobin, 2009). Challenges for cadastral organisations having limited autonomy while operating under a particular cost recovery regime include a concentrated focus on customers who use the data and have the potential to recover costs under the existing prices (PSI Platform, 2004). This leads to a smaller number of users who may either have no alternative or are able to tolerate higher prices (see Blakemore and Sutherland, 2005). Another

challenge is the practical difficulty associated with identifying beneficiaries and charging them, and in addressing situations where 'benefits' arise through alleviating negative impacts on others (externalities) (Productivity Commission, 2001). Without price setting autonomy these strategies may not be possible. With 'no autonomy in price' setting, cadastral organisations may also be confronted with the inability to achieve cost flexibility due to high state control on cadastral prices thus unable to respond immediately to changing market conditions (Fjeldstad, 2001; Barnasconi and Van der Molen, 2009).

Availability of a fixed budget

With 'no fixed budget' cost recovery can weaken government scrutiny through normal budgetary processes (Caulfield, 2002). This is because the ability to meet cost-recovery obligations makes it easier for cadastral organisations to justify inefficient practices. Secondly, it may introduce greater say by few customers in the operation of cadastral organisations i.e. a 'user pays, user says' arguments (or 'agency capture') (Productivity Commission, 2001). Lastly with 'no fixed budget' cost recovery may prevent some transaction from taking place. For example it may deter registration of subsequent dealings in properties as a result of perceived high fees and charges for relevant cadastral products (AusAID, 2001; Dale, 2003; Burns, 2006). However, lack of a fixed budget, i.e. higher prices for cadastral products, may not necessarily prevent transaction related to registration of properties. It depends on public confidence with the cadastral organisation (Brits, Grant et al., 2002). For example Brits, Grant et al. (2002) observes that in Thailand, despite relatively high fees, most transactions were registered particularly in urban areas and in dealings outside the family. This was also observed in Karnataka where the registration fee was fairy high but most deeds were registered.

Availability of competitors

With competitors, pricing cadastral products poses a number of challenges. Firstly, cost recovery prices may act as barriers to the market entry of new firms or products (GINIE, 2000; Groot, 2001a; Gompel and Steyaert, 2002). This is the case when cadastral products by a public cadastral organisation are financed to a certain extent by public funding raising concern for a level playing field in the competitive market (Groot, 2001a; PSI Platform, 2004; Cobin, 2009) or, it may occur because of lack of property rights over regulated products, which creates 'free riders' problems(Productivity Commission, 2001). The Productivity Commission (2001) observed that cost recovery with competitors can lead to regulatory creep and cost padding. This is because given the market power a cadastral organisation may have in some markets, overspending can always be addressed by raising prices and increasing revenue (OFT, 2006; Pollock, 2008). Furthermore, cost recovery with competitors may encourage agencies to pay less attention to non-cost recoverable activities and lastly, inappropriate cost recovery regimes under competition can significantly restrict access to information (Productivity Commission, 2001).

Socioeconomic development

In terms of socioeconomic development, it is presumed that failure to integrate cadastral products into the mainstream economy is associated with low socioeconomic development (see Adeniyi, 2005). The socio-economic ranking of countries is based on the Human Development Index (HDI) which is an aggregate measure utilising three indicators; Life expectancy index, Education index and GDP (UNDP, 2009a). Life expectancy determines the size of population and healthy status at birth which for cadastral product may be useful in assessing the level of demand for cadastral products. Countries

with good health status are likely to have stable population, which may be linked to stable demand for cadastral products. The education index relates to the literacy rate and gross enrolment in educational institution. This can be linked to the level of awareness on the value of cadastral products which is an important determinant of effective demand for cadastral products (Brits *et al.*, 2002). The last indicator is the GDP, which relate to the ability to pay. Countries with higher GDP per capita are more likely to translate needs for cadastral products into effective demand whereas in countries where the majority are living in abject poverty affordability concern tend to arise (Barnes, 2003). However income alone may not increase the demand for cadastral products, it requires awareness which can be obtained through education (see Brits *et al.*, 2002). Therefore HDI, which aggregates the three indicators, provide a useful reference frame to understand cost recovery challenges facing cadastral organisations in different countries. A country with 'High' constraints in social economic development as used in this research refers to those countries for which on average the majority have lower income, high illiteracy level and higher infant mortality rate (higher HDI rankings). While 'Low' constraint in socioeconomic development refers to countries with higher income, high literacy levels and healthy population (lower HDI rankings).

Processes in registering property rankings

The ranking of countries in relation to processes in registering properties reflect the steps, time, and cost involved in registering properties (World Bank, 2009). The costs included in calculating the average ranking in registering properties includes fees, transfer taxes, stamp duties, and any other payment to the cadastral organisation, notaries, public agencies or lawyers. For cost recovery purposes the rankings may be related to the ease of access to cadastral products. With 'complex' processes, it means registering properties involves on average higher costs, longer time and many steps, this may curtail access to cadastral products where as simple processes entails less costs, shorter time and fewer steps in registering properties whence access to cadastral products may be enhanced. However, access to cadastral products as reflected in the processes involved in registering properties may not be useful in understanding cost recovery challenges because effective demand for cadastral products depends on the willingness and ability to pay (EC, 1998). Rankings of countries in registering properties need to be combined with rankings of countries in terms of socioeconomic development. With a combined effect it was possible for example to define challenges in relation to both 'access to cadastral products' and affordability issues. A general framework for this analysis is given in figure 2.3. The expectations for each quadrant are summarised below: -

Quadrant A: depicts countries with low ranking in socioeconomic development and simple processes in registering properties. The combination of Low constraints in socioeconomic development and simple processes in registering properties may lead to a number of challenges when cost recovery regimes are imposed upon cadastral organisations. These include an increasing pressure on the right of free access to cadastral products (Dale, 1999; CHRI, 2004) and the desire for quality products which may prevent the attainment of cost recovery goals (Ronald J. Vogel, 1988). Cadastral organisations may charge flexible and high prices depending on the competition policy existing. Also most organisations can operate under the self-financing model.

Quadrant B: depicts countries with low ranking in socioeconomic development but with complex processes in registering properties. The majority of the people in these countries are unlikely to be affected by the imposition of cost recovery regime for cadastral products. However, due to complexity in processes in registering properties, prices are likely to be rigid or percentage based and

statutorily fixed. Varieties of cadastral products can be expected due to technological advancement. The organisational model is likely to be budget-based, monopolistic and with a ministerial structure.

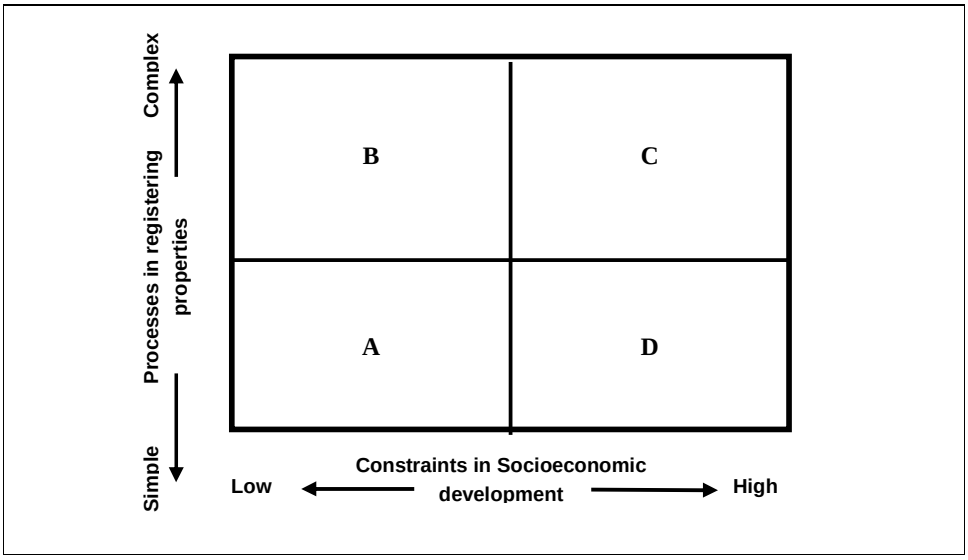


Figure 2.3 A conceptual framework for analysing challenges facing cadastral organisations in different countries.

Quadrant C: depicts countries with higher ranking in socioeconomic development and complex processes in registering properties. The higher ranking in socioeconomic development is translated to mean lower ability to pay for cadastral products due to lower per capital income for the majority, lower awareness on the value of cadastral products due to poor investment in education in these countries and lower demand for cadastral product due to lower population level. These conditions make the imposition of any cost recovery regime difficult or impossible. If such regime is imposed, prices are likely to be too high for the majority and rigid. Varieties of cadastral products are not expected due to technological limitations and the organisational model that is most likely for cadastral organisations in these countries is a budget-based with monopolistic and ministerial structure.

Quadrant D: depicts countries with higher ranking in socioeconomic development but simple processes in registering properties**.** Higher ranking in socioeconomic development makes it difficult for cadastral organisations in these countries to implement cost recovery. However, because of simple processes in registering properties, the imposition of 'partial cost recovery' regime may be possible due to the motivation that people have in registering properties. Prices for cadastral products are likely to be lower and fixed. Varieties of cadastral product may be difficult to realise due to technological limitation. The cadastral organisational model that may be adopted is budget-based monopolistic organisations.

2.6. Concluding remarks

The literature review provides definitions and establishes the theoretical relationship between cost recovery regimes and pricing options given the influence of cadastral organisational model, cadastral products and other exogenous factors. Figure 2.4 summarises these relationship and forms the basis upon which data were collected. Cost recovery regimes are associated with pricing option for cadastral product offered under each of those regimes. Such pricing options will not be efficient and cost effective if it is difficult to establish and charge a price that accurately links the cost of a product

to the users of that product; or when the charge is costly to collect because it is difficult to identify and bill each user of the product (Productivity Commission, 2001). However there is limited literature on whether certain pricing options for cadastral products are associated with certain cost recovery regimes. Also the available literature does not include a description of a clear relationship between cadastral organisational models and cost recovery regimes. Another area relates to empirical challenges that cadastral organisations face when operating under cost recovery regimes. Theoretically there are a lot of benefits that are associated with cost-recovery as identified in this chapter; however, whether these benefits are the actual force driving government to impose cost recovery regimes upon cadastral organisations is not clear. Therefore this study addresses these issues.

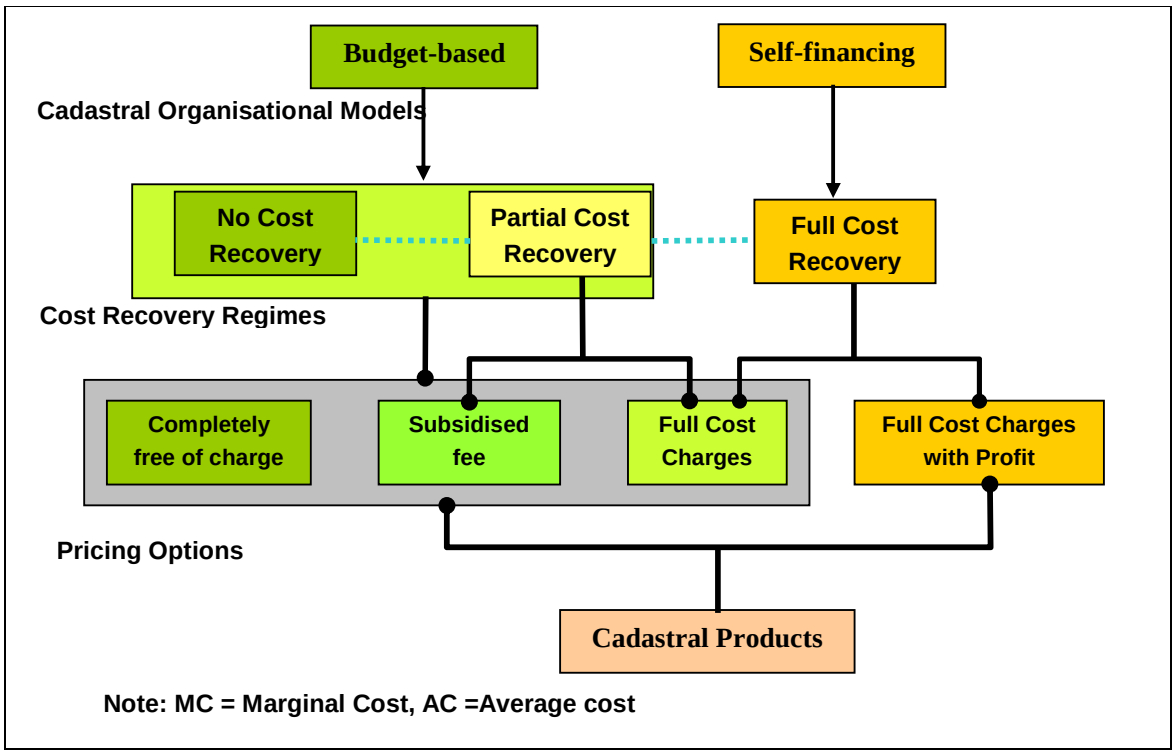


Figure 2.4 A Conceptual framework for data collection and analysis

3. Research Methodology

3.1. Introduction

This research analyses the relationship between pricing options for cadastral products and cost recovery regimes. This was done through an understanding of pricing decision undertaken and challenges faced by cadastral organisations operating under cost recovery regimes. The empirical data collection method relied on key informants (decision makers) of 35 targeted cadastral organisations across the globe. It involved differentiating the understanding and perception behind discretionary decisions and decisions imposed by government organisations external to the cadastral organisation. The empirical data collected intended to examine similarities and differences among cadastral organisation in processes involved in pricing cadastral products and factors that influence the process. To accomplish these objectives I used qualitative research methodologies, which included an intensive literature review. In this chapter, the relevancy of these research methods is explained. The chapter is divided into four sections. Under section 3.2, the basic tenets of qualitative research methodology and its relevancy for this research are explained. Under section 3.3, specific aspects of qualitative research adopted in data collection are described. Under section 3.4, the structure and nature of data collected is presented. Under section 3.5, the appropriate methods that were used in analysing and interpreting the data are explained and justified.

3.2. Using qualitative research methodology

The main purpose of a qualitative researcher is to gather an in-depth understanding of human behaviour and the reasons that govern such behaviour (Glynda, 1997). Qualitative data which are central in qualitative research are collected and analyzed to discover the perceptions and experiences of the participants so that the researcher can then extract themes (Levy, 2003). These themes are then grouped using codes which is defined by Cooper (2009) as a *"word or short phrases that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data"*. Qualitative approach is best suited when seeking to understand meaning or when the question involves uncovering factors related to a particular relationship or phenomena (Levy, 2003). Therefore qualitative approaches are relevant for this research because the main interest is to uncover or establish factors that may be the cause for the differences in pricing options implemented by cadastral organisation under different cost recovery regimes. Also for land related researches, Levy, (2003), argues that researchers should not embrace researches that produce only empirical (quantitative) descriptions of property markets relationships but also generate understanding of real property relationships.

In chapter two it was established that cost recovery regimes represents policies, strategies and practices geared towards minimising the financial dependence of the cadastral organisation to the government. This requires identification, commoditisation and qualification of cadastral information into products. An important managerial decision in relation to cadastral products is setting prices that may not only determine the current and future provision of cadastral products rather meet legal

specification relevant within a particular cadastral jurisdiction. Cost recovery regimes provide a perspective, which brings together diverse cadastral financing strategies and pricing policies across the globe into relevant and meaningful classification. It is an aggregate concept formulated for analytical purposes. Qualitative approaches allow the use of such preconception, and beliefs of the researcher in explaining and interpreting observed patterns and behaviour (Cecez-Kecmanovic, 2007).

On the other hand, this study presumes a crucial difference between cost recovery regimes based on pricing options adopted, cadastral organisational models and the challenges and limitation faced under each regime. These differences may be conceptual i.e. depending on how each cadastral organisation or cadastral manager perceives these concepts, or they can be empirical as measured from the physical outcome of operating under or adopting them. Understanding the relationship between these concepts requires an in-depth study that does not only look into the realised level of cost-recovery (physical outcome) as understood in positive research rather going beyond the economic dimensions into the legal and social-political context of pricing cadastral products.

3.3. Data collection

Hoepfl (1997) provides that, in qualitative data collection, study cases can be selected purposefully, according to whether or not they typify certain characteristics or contextual locations. This is specifically relevant for this study as all respondents were purposefully selected based on previous contacts with targeted cadastral organisations. In collecting the data I used electronic survey, which does not involve the physical integration of the researcher in the studied population. One advantage of this approach is the elimination of the researcher's bias in interpreting respondent's feelings and expressions (Frankfort-Nachmias and Nachmias, 1994). However that may be a disadvantage especially in qualitative research where the researcher's role in the studied population can be more explicit (Cecez-Kecmanovic, 2007).

3.1.1. Selecting respondent organisations

Cadastral organisations in developed as well as developing countries were targeted to enable comparison. The assumption being that, cadastral organisations in developed countries are more likely to operate under 'partial cost recovery' or 'full cost recovery' regimes in the provision of cadastral products. This is due to high level of privatisation of most public services and higher affordability due to higher per capita income. Cadastral organisations in developing countries are more likely to be under 'no cost recovery regimes' due to lower affordability as explained under section 2.5.3 (see Brits *et al.*, 2002). Therefore the following multiple selection criteria were used to target countries from which cadastral organisations were contacted:-

1. Countries were mapped onto the x-y plane depending on their rankings in registering properties as provided in the World Bank doing business website (World Bank, 2009) and the level of socio-economic development -HDI ranking as provided by UNDP (UNDP, 2009b).
2. The x-y plane was further divided into eight quadrants basing on the UNDP categorisation of countries (x-axis- four categories), which are 'Very High Human Development' (VHHD), 'High Human Development' (HHD), 'Medium Human Development' (MHD) and 'Low Human Development' (LHD) and the arbitrary

categorisation of registering properties (y-axis-two categories) into 'Simple' and 'Complex' processes in registering properties (fig. 3.1).

3. The 8 quadrants were compressed into four from which a minimum of 14 countries were selected to be included in this study. This was done in order to ensure that the responses and data obtained cuts across socio-economic spectrum.
4. Since in qualitative research cases can be selected using predefined criteria, a careful selection of countries within each cluster was based upon anticipated ease of getting data (access to information) depending on existing contacts with the cadastral management through email and telephone, political stability and the possibility of getting online documentation in terms of scholarly articles and papers about cadastral activities in that country.

Using the above approach, a total of 79 countries were earmarked for this study (see figure 3.1 and Appendix VI). The assumption in ranking countries was that countries with higher HDI ranking (MHD) are likely to have complex processes in registering properties while those with lower HDI rankings (VHHD), were expected to have simple processes in registering properties. Statistically that correlation is positive but low, ($r^2 = 0.2$). However, that relationship can be useful for qualitative studies where other evidence suggests that registering properties rankings are related to prices adapted for cadastral products (see World Bank, 2008). Figure 3.1 shows the earmarked countries mapped according to their HDI and registering property rankings. Countries falling in different quadrants were expected to exhibit different socio-economic characteristics (figure 2.3). These characteristics will presumably shape the form of cost recovery regime imposed including pricing option for cadastral products (see section 2.5.4)

3.1.2. Data collection techniques

Data collection techniques commonly adapted in qualitative researches include observations, interview, focus groups, document studies, key informants, performance assessments and case studies (Westat, Frierson et al., 2002). Two approaches form the backbone of this research. The first is content analysis deployed in literature review where the data were used to develop a conceptual framework upon which empirical data collection was based. The second approach is the use of key informants through e-surveys which was used for empirical data collection. This entailed the combination of key informants methodology with survey data collection technique (see Westat *et al.*, 2002). The advantages of key informants e-surveys include completeness of answers and a possibility for higher response rate (Elmendorf and Luloff, 2001). This was done through a familiarisation strategy with the then prospective respondents prior to the data collection process. At this stage, I requested personal contact details of people who may be knowledgeable on the specific issues under investigation. I searched for email addresses of cadastral organisations using websites especially the Cadastral template website and specific cadastral organisation's website. I also Contacted Prof. Vandermolen an internationally renowned land administration expert, who gave me a number of email contacts lists. He also provided me with a link to *Euris* and *Eurogeographics* websites where most of the email addresses were active especially for cadastral organisations within Europe.

In selecting key informants I targeted specific personnel within cadastral organisations who had access to relevant information relating to policies and laws applicable in pricing cadastral products

and the general performance of the organisation. This was done through identifying their respective roles in the organisations and their educational background or experience in the provision of cadastral products. Under these circumstances it was possible to use an online survey as well as email questionnaire to collect both primary and secondary data.

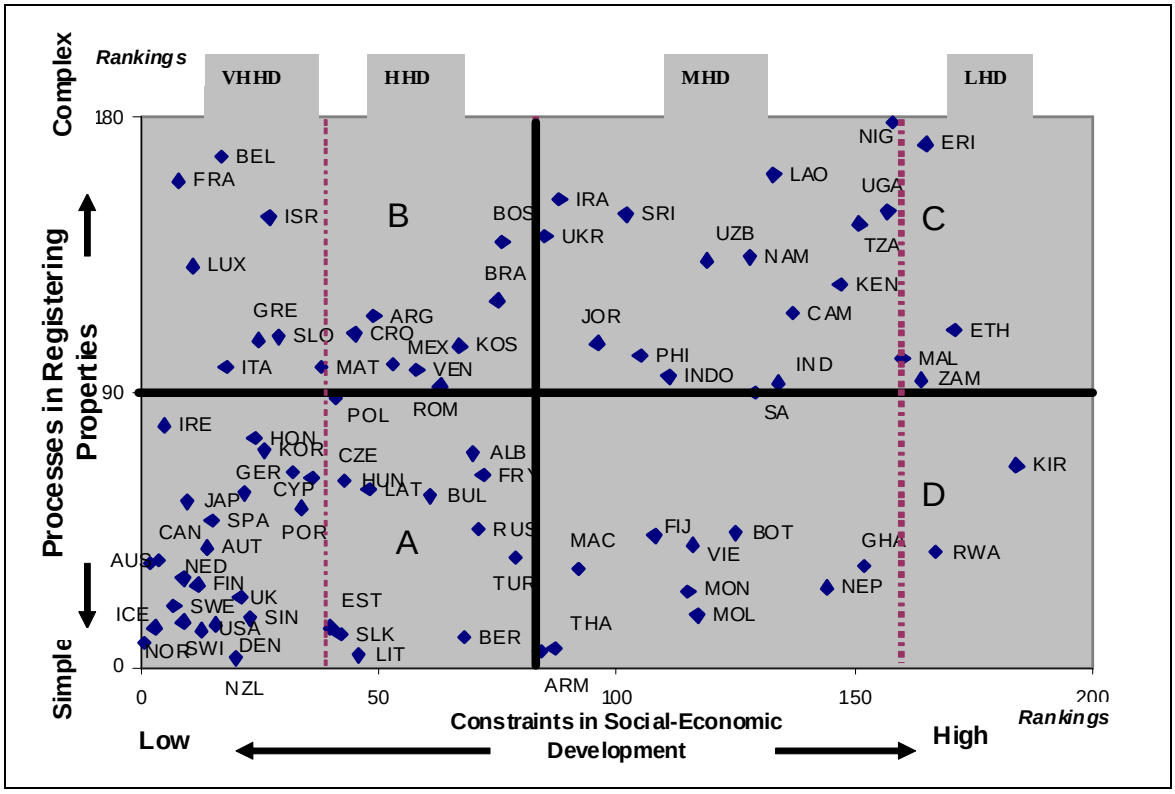


Figure 3.1 Processes in property registration versus constraints in socio-economic development; earmarked countries

Design and distribution of the survey

I designed a survey basing on specific indicators as shown in table 3.1. The technique used in formulating the questions was making use of key concepts or issues that are addressed in this research and after identifying such issues I determined their dimensions and formulated indicators basing on those dimension. It was from these indicators that questions were formulated. A list of questions used in the research is attached as Appendix I. After the design of the survey, a second task was to send it to targeted personnel within targeted cadastral organisations using email addresses obtained as a result of prior contacts with those organisations. The survey was sent using two methods. One is through an internet interface called survey monkey at http://www.surveymonkey.com and the second is sending a word copy of the questionnaire as an email attachment accompanied by an official ITC letter requesting assistance in filling the survey questions and provision of the requested data.

Data collected

Appendix IV shows cadastral organisations that responded and the type of data collected as a result of administering the survey. Several reference documents were provided through electronic links as shown in Appendix IV. Because of language limitations it was impossible to read all information

from these sites. The reference documents included laws, pricing regulations and policy, annual reports, financial statements and notice and guidelines adopted in charging cadastral products.

Table 3.1 Basic issues addressed in the questionnaire with indicators

No.	Issue	Indicators	Sources of Evidence	Research Purpose
1	**Cadastral products**	Presence of a Cadastral organisation	Survey Questionnaire Organisation's website	If an organisation produces/supplies of cadastral products is considered a cadastral organisation.
		Relevancy of cadastral products	Survey Questionnaire Organisation's website	If a cadastral organisation defines cadastral products and how.
2	**Pricing Options**	Choice of pricing options	Survey Questionnaire Documentary Review	If a cadastre offers its products at a quoted price/charge or fee, then she can opt for pricing.
		Factors influencing choices	Survey Questionnaire Documentary Review	If prices are set strategically or politically can be used to infer some of the challenges in pricing cadastral products
3	**Cadastral organisational models**	Availability of a fixed Budget	Survey Questionnaire Documentary Review	If cadastral organisations receive support from the government in producing cadastral products, it can adopts different pricing options compared to those without a fixed budget
		Possibility of government claims in Revenues	Survey Questionnaire	If revenues generated are used by the organisation or taken away. This can help in defining the cost recovery regime under which an organisation operate
		Autonomy in price setting	Survey Questionnaire Documentary Review	If prices are strategically determined by the organisation depending on circumstances they face, may help to infer challenges faced.
4	**Cost Recovery Regimes**	Forms of cost recovery	Survey Questionnaire	Whether the organisation implements cost recovery or no cost recovery
		Limitations and Challenges	Survey Questionnaire Documentary review	If there are possibilities for adopting cost recovery and possible challenges.
		Fee sufficiency	Survey Questionnaire Documentary review	If facing any funding shortage
		Availability of Competitors	Survey Questionnaire	If there is other providers of cadastral products

Data collection; reliability and validity

Reliability addresses how accurate the research methods and techniques produce data (Cano, 1998). The collection of primary data was directly from the respondents in a written format. This approach ensures that other researchers have limited opportunity to sway away responses received. On the other hand, most respondents were senior officials in their respective organisation hence their email contact details were used to verify some answers after preliminary interpretation. Particulars of the respondents, titles and education background ensured that responses and other information are from people well acquainted the researched subject; I also requested some additional documentation and links for comparable data. For example products provided by most cadastral organisations are also advertised on their websites with price lists. All organisations contacted had websites and they also provided additional digital documents on their current financial standings.

Validity measures the appropriateness of research methods in relation to the research questions (Cano, 1998). To increase reliability of the research results an intensive literature review was necessary in which the foundation for data collection was built. This was done through assumptions and expectations derived from literature and through my own understanding and beliefs as a result of previous knowledge in land administration, economics and legal studies (see table 2.1 and section 2.5.4). These assumption and expectations in turn were critically used in data analysis and interpretation.

Data collection, methodological limitations

Mail surveys are considered the easiest, cheapest and quickest method to collect data with a possibility of wider geographical coverage (Frankfort-Nachmias and Nachmias, 1994). In this research I used e-survey (electronic surveys and e-mail questionnaire) for primary and secondary data collection. A common problem encountered by many researchers adopting this method is a low response rate. It has been contended that mail surveys hardly achieve a response rate of 50% (Frankfort-Nachmias and Nachmias, 1994). However in this research several other shortcomings were identified as follows: -

1) There was no opportunity to observe respondent's demeanour when answering questions. Although comments to questions may tell something about the feeling of respondents personally not as an organisation, more can be learnt through direct contact.
2) To obtain quick responses was not be possible as expected.
3) The delay in response was also associated with language problems which, some respondent reported and needed more time.
4) This method provides limited opportunities to remedy misunderstanding of questions identified later during fieldwork.
5) The response rate from developing countries (MHD and LHD) was very poor even in countries where I tried to have contacts through telephone and specific email such as Botswana, Nigeria and Kenya.
6) Although repetitive sending of email reminders solicited responses it also caused some to respond negatively i.e. Denmark.

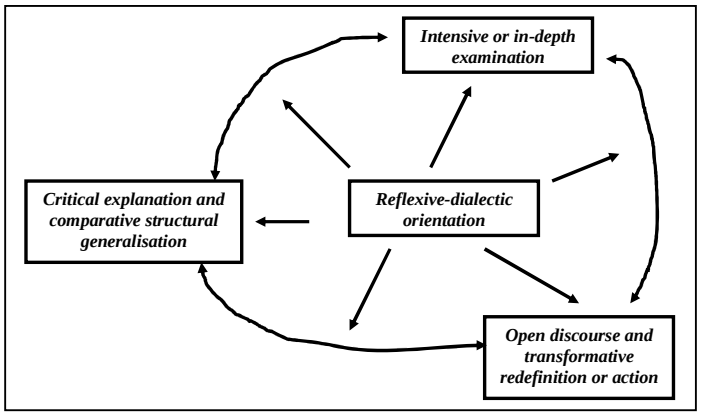
3.4. Data analysis and interpretations

Qualitative Data Analysis (QDA) entails processes and procedures of transforming the collected qualitative data into some form of explanation, understanding or interpretation of the people and situations investigated (Lewins, Taylor et al., 2005). QDA comprises clustering of themes and examination of patterns of consistencies and inconsistencies in the data as explained above. In this research the questions for the survey were based on specific themes formulated during the design of the survey. Therefore it was possible to examine patterns by creating a database in SPSS software basing on these themes. With a database, patterns were examined for individual cadastral products as well as across cadastral products and cost recovery regimes through cross tabulation. The responses from respondents were analysed as 'product related responses' which refers to the responses on different aspects (variables) for each product provided by a particular organisation. Therefore, each respondent had a least one 'product related response' and at most seven 'product related responses' depending on the number of products provided by that organisation. The resulting count of 'product related responses' reflected the relationship between variables in the provision of cadastral product whether direct or indirect. However the reasoning behind QDA and interpretation were based on two research methodologies that is critical and Interpretative research methodology.

3.4.1. Critical research methodology

Critical research methodology is understood as an overall strategy of conceptualising and conducting an inquiry, engaging with studied phenomena and subjects (participants) in their contexts, as well as constructing valid and socially relevant knowledge claims (Cecez-Kecmanovic, 2007). The

advantages of critical research in this study include its ability to expose and deconstruct the dominant views and declared roles of cost recovery regimes for cadastral organizations and offer alternatives, critical interpretations of cost-recovery practices and the way the imposition of cost-recovery obligations impacts on and transform cadastral organisations. Therefore in data analysis and interpretation (chapter four and five) a critical research methodological framework developed by Cecez-Kecmanovic (2007) was adopted (figure 3.2). Originally the approach was developed for studying human interaction within an information system but its components were modified to suit the purpose of this study. Each of the components is explained below: -



Source: Cecez-Kecmanovic (2007)

Figure 3.2 A critical research methodology framework

The first component was 'intensive or in-depth examination' which was done through in-depth studies of different approaches to charging cadastral products using both primary and secondary data collected through the survey. The second was 'Critical Explanation and Comparative Structural Generalization' which was done through constructing different explanations of observations basing on personal knowledge obtained through experience and literature (see also Szmigin, 2002). My own subjective assumptions and those derived from the literature were critically examined. Comparative structural generalization aimed at identifying patterns, structures and mechanisms underlying the observed relationships between cost recovery, pricing options and its determinants across the investigated cases (see also Thorne, 2000). The third was 'open discourse and transformative redefinition or Action' which involved the examinations of non-distorted communication with the respondents allowing questioning, criticizing and problematizing, taken-for-granted meanings and assumptions. The last was reflexive-dialectic orientation which was dominant throughout each of the above components. It involved self-conscious criticism where the assumptions and preferences were assessed.

3.4.2. Interpretative research methodology

In interpreting the results of data analysis (chapter five), the critical research methodology was augmented with interpretative research methodology. According to Berntsen, Sampson et al (2000) Interpretative research methodology involves using qualitative methods to understand the data collected and analysed during the research process. Interpretative research does not predefine dependent and independent variables, but focuses on the full capacity of human sense making as the situation emerges (Levy, 2003). Interpretative research methodology was considered appropriate for this research because of two main reasons. One the study aimed at developing a conceptual model for

the purpose of establishing a relationship between cost recovery regimes and pricing options for cadastral products. Secondly the study aimed at providing an understanding and explanation of the behaviour of various players involved in cadastral production such as competitors and the central government in pricing decision for cadastral products. This knowledge can be obtained through eliciting revelation of perception by individuals involved and through extraction of meanings and identifying possible distortions in the text or responses (see Kabanda, 2009).

3.4.3. Statistical tests

The association between variables (factors) presented in tables (chapter 4) was tested using two indicators; the first is the **Contingency coefficient**, which is based on the chi-square for nominal-to-nominal variables and is given as: $C = \sqrt{\frac{\chi^2}{\chi^2 + n}}$ Where C = contingency coefficient, X^2 = Pearson Chi-square coefficient which is given as $\sum \frac{(O-E)^2}{E}$; (O = observed responses and E = expected responses) and n = sample size (total responses). The value of C, ranges between 0%-100%, with 0% indicating no association between the row and column variables and values close to 100% indicating a high degree of association. For ordinal-to-ordinal association, **gamma** (γ) was used. It is a measure of association between two ordinal variables as a value between -100% to 100%. Values close to an absolute value of 100% indicate a strong relationship between the two variables while values close to 0% indicate little or no relationship (see Garson, 2010). The significance of the association between variables was tested using Pearson chi-square test and presented as follows: (two sided test, value = […], df = […], p = […]). Where the value = the Pearson chi-square, df = the degree of freedom given as (number of columns -1) *(number of rows – 1) and p = is the significance value. The test results were only interpreted under the following two assumptions. 1) when each 'product related response' was considered independent of all others (i.e. each organisation has one response per product) and 2) Not more than 20% of the expected counts are less than 5 and all individual expected count are 1 or greater (see Bruce Weaver, 2009). However these test results were useful only for supporting observed patterns on the responses given the fact that most responses were not independent as assumed under this methodology.

3.5. Concluding remarks

In this chapter I have described data collection and data analysis methodologies. The data collection approach consists of steps and methods adopted in selecting cadastral organisations as well as targeted personnel in those organisations as my respondents for both secondary and primary data. The selection was based on pre-specified criteria such as ease of obtaining responses, political stability and possibility of getting online resources such as documents. However some of the earmarked respondents did not respond to the survey especially from developing countries. Although that deters the relevancy of the findings to cadastral organisations in developing countries, still a lot may be learned from the experiences of advanced countries. The methodology had a number of shortcomings; however, the control measures I deployed ensured verification of all responses through a well-established contact list for all respondents (see Appendix II). The conceptual schemas developed in chapter two formed the guide in developing the questionnaires and collecting data and the resulting outcome are presented in chapter four.

4. Characterising Cost Recovery Regimes

4.1. Introduction

This chapter addresses research question number two where pricing options for cadastral products and cost recovery regimes are linked using empirical data. To accomplish this objective I examined whether there were general patterns in the data. Using comparative structural generalisations (constant comparative analysis), the data were examined for patterns and commonalities and general statements were formulated for the observed phenomenon. The chapter is divided into eight sections. Section 4.2; provides a summary of the data in relation to basic issues investigated. Section 4.3; establishes the relationship between responses on pricing options for cadastral products and cost recovery regimes. Section 4.4; introduces the role of endogenous factors in pricing cadastral products considered. Section 4.5; analyses the data collected in terms of the relationship between pricing options and exogenous factors considered in price setting. Section 4.6; presents the responses on factors that forces or influences cadastral organisations to operate under different cost recovery regime. Section 4.7; presents the data on limitations encountered in pricing cadastral products when operating under cost recovery regimes. Section 4.8; provides the results of data validation tests. The chapter concludes with issues that need further interpretation and investigation in chapter five.

4.2. Summary of responses

A total of 157 'product related' responses were received, 63% of which were from 'high income countries', 15% from 'upper middle income countries', 14% from 'lower middle income countries' and 8% from 'low income countries' (VHHD = 58%, HHD = 26%, MHD = 16% and LHD = 0%) (table 4.1). 'Product related' responses are responses for each product in relations to the questions that were asked. For each organisation it shows the number of products produced by that organisation. These 'product related' responses were classified according to the cadastral organisational models of respondent organisations. Data presented in table 4.1 in relation to socio-economic development and registering property rankings will be utilised in chapter six.

4.2.1. Cadastral organisational models

A total of 35 cadastral organisations were investigated (a detailed contact list of respondent's organisations and informants have been annexed as Appendix II). Table 4.1 provide a summary of the responses received under the two cadastral organisational models (see section 2.4), and their respective countries. Column 6 and 7 of table 4.1 provide the number of cadastral organisations that responded to the survey under each organisational model. It shows that, 69% of responses were associated with a budget-based model and 31% were associated with self-financing model.

Table 4.1 Socioeconomic characteristics of respondent's countries, number of cadastral organisations and 'product related' responses from the survey

Country	Country Ranking		Socio-Economic Classifications		Number of organisations		Cadastral 'products related responses'	
	HDI Ranking[1]	Registering Property Ranking[2]	Human Development Category[1]	WB Income Category[2]	Self-financing cadastral organisations	Budget-based cadastral organisations	Self financing cadastral agencies	budget based cadastral organisations
Australia	2	34	VHHD	High Income	0	2	0	5
Austria	14	39	VHHD	High Income	0	1	4	0
Belgium	17	167	VHHD	High Income	0	1	0	5
Bulgaria	61	56	HHD	Upper Middle Income	0	1	3	0
Canada	4	35	VHHD	High Income	0	2	0	11
Czech Republic	36	62	VHHD	High Income	0	1	0	6
Estonia	40	13	VHHD	High Income	0	1	0	3
Finland	12	27	VHHD	HighIncome	0	1	0	5
Ghana	152	33	MHD	Low Income	0	1	0	6
Hong Kong, China	24	75	VHHD	High Income	2	0	1	3
Hungary	43	61	HHD	High Income	1	0	0	6
Indonesia	111	95	MHD	Lower Middle Income	0	1	0	7
Ireland	5	79	VHHD	High Income	0	1	0	2
Israel	27	147	VHHD	High Income	0	1	0	2
Jordan	96	106	MHD	Lower Middle Income	0	1	0	7
Korea, Rep.	26	71	VHHD	High Income	1	0	0	1
Kosovo-Serbia	67	68	HHD	Lower Middle Income	0	1	6	0
Lithuania	46	3	HHD	Upper Middle Income	1	0	7	0
Macao-China	92	32	HHD	Lower Middle Income	1	0	2	0
Nepal	144	26	MHD	Low Income	0	1	0	3
Netherlands	6	29	VHHD	High Income	1	0	7	0
New Zealand	20	2	VHHD	High Income	0	1	4	0
Norway	1	8	VHHD	High Income	1	1	6	7
Romania	63	92	HHD	Upper Middle Income	1	0	6	0
Slovak Republic	42	11	HHD	High Income	0	1	0	4
Slovenia	29	108	VHHD	High Income	0	1	0	3
Sweden	7	20	VHHD	High Income	0	1	6	0
Tanzania	151	145	MHD	Low Income	0	1	0	4
Turkey	79	36	HHD	Upper Middle Income	0	1	0	7
UK-NorthIreland	21	23	VHHD	High Income	1	0	0	4
United Kingdom	21	23	VHHD	High Income	1	0	5	0
Total					***11***	***24***	***48***	***109***

NB: VHHD= Very High Human Development, HHD= High Human Development, MHD = Medium Human Development.

1. Data and Classification based on UNDP Human Development Report 2009 at http://hdr.undp.org/en/statistics/

2. Data and Classification based on the World Bank doing business report 2009 at http://www.doingbusiness.org/economyrankings/

4.2.2. Pricing options for cadastral products

Four pricing options for cadastral products were identified (see chapter 2, section 2.3). The first was 'completely free of charge' pricing option which was observed in 4% of all 'product related' responses. The second is a 'subsidised fee 'pricing option, which was observed in 21% of all' product related response. The third option is "full cost charges" which was observed in 54% of all 'product related' responses. The last is 'full cost charges with profit' which was observed in 20% of all 'product related' responses. The remaining 1% refers to responses from an organisation that was unable to assess its pricing option because the task was completely under the control of another authority. Therefore in any analysis involving pricing options two responses, were excluded leading to 155 total 'product related' responses.

4.2.3. Cost recovery regimes

All respondents were categorised in relation to three cost recovery regimes. A 'Cost recovery regime' is used in this research to mean authoritative, legally binding cadastral financing arrangements or practices adopted by or imposed upon a cadastral organisation in an attempt to meet predefined budgetary obligations (see chapter 2, section 2.3). The first is 'full cost recovery' regime, which constitutes 26% of all cadastral organisations investigated. The second is 'partial cost recovery' regime, which constitutes 34% of all cadastral organisations investigated. The last is a 'no cost recovery' regime, which constitute 40% of all cadastral organisations investigated.

4.2.4. Cadastral products

A total of seven cadastral products were defined and investigated (see chapter two, section 2.2). These products and the percentage of providers among the 35 investigated organisation in brackets are as follows: - 'extracts from cadastres' (86%), 'cadastral maps' (88%), 'extracts from mortgages and encumbrances' (57%), 'general mortgage information' (49%), 'general real property information' (63%), 'statistical data on the land market' (34%) and 'certificates of title' (71%). However some cadastral organisations provided additional products such as topographic address coordinates (1), Map specials i.e. on land structures and spatial planning (1), DTM and orthophotos (3), topographic maps (1), land registers (1), cadastral geodetic and cartographical (1), Acceptance and approval (1), Inspection of Archival data (1), certified copy of deed and Land book (1), triangulation points and field applications (1). These other products were not further investigated.

4.3. Pricing options under cost recovery regimes.

The results displayed in table 4.2 show that under 'full cost recovery' regime a total of 39 'product related' responses were received, 54% of which were associated with 'full cost charges' and the remaining 46% with 'full cost charges with profit'. Under 'partial cost recovery' regime a total of 55 'product related' responses were received, 49% of which were associated with 'full cost charges, and 20% with 'subsidised fee' pricing option, 7% were associated with 'completely free of charge' pricing option and the remaining 24% were associated with 'full cost charges with profit'. Under 'no cost recovery' regime a total of 61 'product related' responses were received, 61% of which were associated with 'full cost charges', 36% were associated with 'Subsidised fee' and 3% were associated with 'completely free of charge' pricing option.

Table 4.2 Responses on pricing options and cost recovery regimes

Pricing Options	Cost recovery regimes			
	No Cost Recovery Regime	Partial Cost Recovery Regime	Full Cost Recovery Regime	***Total***
Completely Free of Charge	02	4	0	***6***
Subsidised fee	22	11	0	***33***
Full Cost Charges	37	27	21	***85***
Full Cost Charges with Profit	0	13	18	***31***
Total	***61***	***55***	***39***	***155***

Under the chi-square test, there was a significant dependence between pricing option and cost recovery regimes at 0.05 significance level (two sided, value = 44.4, df = 6, p = 0.0) with a significant degree of association between the two $(\gamma = 64\%)$. Under 'no cost recovery' regime, cadastral organisations investigated were charging at three pricing options, which were 'completely free of charge', 'subsidised fee' and 'full cost charges'. Under 'partial cost recovery' regime, all four pricing options were observed while under 'full cost recovery' regime, only two pricing options were implemented these were 'full cost charges' and 'full cost charges with profit'. However for each cost recovery regime, there was an overlap for example 'full cost charges' is implemented by some organisations under each cost recovery regime. To investigate the nature of these relationship, 'product related' responses on two factors were considered, that is cadastral products and cadastral organisational models.

4.4. Endogenous factors in pricing cadastral products

The relationship between pricing options and cost recovery regimes may be influenced by endogenous as well as exogenous factors. The endogenous factors examined in this chapter are different type of cadastral products and cadastral organisational models. Under the type of cadastral products related issues investigated include profit-per-product, cost-per-product, discounts and 'legal price fixing', the last of which can be considered exogenous if the cadastral organisation is not involved in price setting processes.

4.4.1. Different types of cadastral products

Each cadastral product investigated was associated with a pricing option as shown in table 4.3. For most products, the majority of responses were concentrated at 'full cost charges' pricing option which can be shown as a percentage of total respondent organisations for product as follows: - 'extracts from cadastres' (55%), 'cadastral maps' (67%), 'extracts from mortgages and encumbrances' (65%), 'general mortgage information' (63%), 'general real property information' (39%), and 'certificates of title' (56%). For 'statistical data on the land market' most responses (33%) were equally associated with 'completely free of charge' and 'full cost charges with profit'. These results show that most responses in respect of pricing options adopted for cadastral products were associated with 'full cost charge' with the exception of 'statistical data on the land market'.

In terms of cost recovery regimes (table 4.4), most 'products related' responses were associated with 'no cost recovery' regime, which are presented as percentage of total respondent organisations for each product as follows. 'Extracts from cadastres' (41%), 'cadastral maps' (43%), 'extracts from mortgages and encumbrances' (35% under 'no cost recovery' and 'partial cost recovery' regimes), 'general mortgage information' (38%), 'general real property information' (39%), and 'certificates of

title' (44%). For 'statistical data on the land market' most responses (50%) were associated with 'partial cost recovery' regime.

Table 4.3 Responses on pricing options and cadastral products

Cadastral Products	Pricing Options				Total
	Completely Free of Charge	Subsidised fee	Full Cost Charges	Full Cost Charges with Profit	
Certificate of Title	0	7	14	4	***25***
Cadastral Map	1	6	20	3	***30***
General Mortgage Information	0	3	10	3	***16***
Extracts from Cadastres	0	7	16	6	***29***
Extracts from Mortgages and Encumbrances	0	4	13	3	***20***
General Real Property Information	1	5	9	8	***23***
Statistical Data on the Land Market	4	1	3	4	***12***
Total	***6***	***33***	***85***	***31***	***155***

Therefore different types of cadastral products provided by cadastral organisations were related to pricing options but not to the imposition of a particular cost recovery regime.

Table 4.4 Responses on cost recovery regimes and cadastral products

Cadastral Products	Cost Recovery Regimes			Total
	No Cost Recovery Regime	Partial Cost Recovery Regime	Full Cost Recovery Regime	
Certificate of Title	14	7	9	***30***
Cadastral Map	16	6	9	***31***
General Mortgage Information	8	5	7	***20***
Extracts from Cadastres	7	5	5	***17***
Extracts from Mortgages and Encumbrances	10	4	8	***22***
General Real Property Information	4	4	4	***12***
Statistical Data on the Land Market	12	6	7	***25***
Total	***71***	***37***	***49***	***157***

Table 4.5 shows 'product related responses' on specific factors, which were considered as pricing-factors in relation to pricing option. 'Legally fixed prices' for cadastral products was associated with 100% of responses from organisations adopting a 'completely free of charge', 89% of those charging at 'subsidised fee', 71% of those charging at 'full cost charges' and 42% of those charging at 'full cost charges with profit'. Although the 'legally fixed price' was observed to be related to all 'pricing options', it comprised a higher proportion of responses from those charging at "completely free of charge' and 'subsidised fee' pricing options.

Another variable investigated was cost-per-product which was associated with 27% of 'product related' responses from organisations charging at 'full cost charges', 6% of those charging at 'subsidised fee' and 9% of those charging at 'full cost charges with profit'. The profit-per-product factor was associated with 48% of responses from those charging at 'full cost charges with profit' and 2% of those charging at full cost charges. Price discount and other factors comprised 3% each for responses associated with subsidised fee pricing options. This analysis suggests that cost-per-product and profit-per-product are associated with specific pricing options contrary to 'legal price fixing',

which cuts across pricing options. Other factors had a limited number of responses hence were considered not important in pricing decision for the majority of cadastral organisations investigated.

Table 4.5 Responses on endogenous factors influencing pricing options

Pricing-Factor	Pricing Option				*Total*
	Completely free of charge	Subsidised fee	Full cost charges	Full cost charges with profit	
Costs per product	0	2	23	3	***28***
Legal price fixing	6	29	60	13	***108***
Other factors in pricing	0	1	0	0	***1***
Price discount	0	1	0	0	***1***
Profit per product	0	0	2	15	***17***
Total	***6***	***33***	***85***	***31***	***155***

Table 4.6 shows the relationship between cost recovery regimes and responses on factors considered in pricing cadastral products. Cadastral organisations under 'full cost recovery' regime were considering three factors in setting prices. 24% of 'product related' responses were associated with costs-per-product, 45% with 'legally fixed prices' and 31% with profit-per-product. Cadastral organisations under 'partial cost recovery' regime were considering two factors. 19% were considering costs-per-product, and the remaining 81% were considering 'legal price fixing'. Under 'no cost recovery' regime, all factors were considered by at least one organisation but the majority, (about 82%), considered 'legal prices fixing'.

Table 4.6 Responses on the factors considered in setting prices for cadastral products under different cost recovery regimes

Pricing factor	Cost recovery regimes			*Total*
	No cost recovery regime	Partial cost recovery regime	Full cost recovery regime	
Costs per product	8	8	12	***28***
Legally fixed prices	51	39	20	***110***
Other factors in pricing	1	0	0	***1***
Price discount	1	0	0	***1***
Profit per product	0	8	9	***17***
Total	***61***	***55***	***41***	***157***

The above analysis shows that in pricing cadastral products, cadastral organisations largely consider prices as legally fixed. Other pricing factors are considered on specific type of pricing options. On the other hand 'profit-per-product' and 'cost-per-product' was mainly considered by organisations under 'full cost recovery regime'.

Table 4.7 shows pricing factors in relation to cadastral products. All products are charged predominantly according to legally fixed prices with cadastral maps having a substantial number of responses in relation to cost-per-product. That means the differences in the types of cadastral products provided by cadastral organisations did not overtly indicate differences in cost recovery regimes under which those organisations were operating.

Table 4.7 Responses on pricing factor for each product

Cadastral Products	Pricing-Factors					
	Legally Fixed Prices	Costs-per-product	Profit-per-product	Price discount	Other factors	***Total***
Certificate of Title	22	2	1	0	0	***25***
Cadastral Map	17	9	4	0	1	***31***
General Mortgage Information	11	3	2	0	0	***16***
Extracts from Cadastres	22	5	3	0	0	***30***
Extracts from Mortages and Encumbrances	13	5	2	0	0	***20***
General Real Property Information	16	2	4	1	0	***23***
Statistical Data on the Land Market	9	2	1	0	0	***12***
Total	***110***	***28***	***17***	***1***	***1***	***157***

4.4.2. Cadastral organisational models

Table 4.8 summarises responses on pricing options adopted in charging cadastral products under each cadastral organisational model. In both organisational models, it was observed that the majority of 'product related' responses were associated with 'full cost charges'. However under the budget-based model some organisations were providing cadastral products at a 'subsidised fee' and a 'completely free of charge' pricing option which was not the case under the self-financing model. The 'full cost charge with profit' pricing option was predominantly implemented by self-financing cadastral organisations.

Table 4.8 Responses on pricing options under different cadastral organizational models

Cadastral organisational model	Pricing options				Total
	Completely Free of Charge	Subsidised fee	Full Cost Charges	Full Cost Charges with Profit	
Budget-Based	6	33	57	13	***109***
Self-Financed	0	0	28	18	***46***
Total	***6***	***33***	***85***	***31***	***155***

Table 4.9, summarises the number of respondent organisations in terms of cadastral organisational models under different cost recovery regimes. Most organisations under 'no cost recovery' and 'partial cost recovery' regimes were operating under the 'budget-based' model whereas those under 'full cost recovery' regime were operating under the 'self-financing' model. Few cadastral organisations under self-financing model were operating under 'partial cost recovery regime'.

Table 4.9 Responses on cadastral organisational models and cost recovery regimes

Cadastral organisational models	Cost recovery regimes			***Total product related responses***
	No cost recovery	Partial Cost Recovery	Full Cost Recovery	
Budget-Based	14	10	0	***24***
Self-Financing	0	2	9	***11***
Total product related responses	***14***	***12***	***9***	***35***

4.5. The role of exogenous factors in pricing cadastral products

4.5.1. Autonomy in price setting

Table 4.10 summarises 'product related' responses on pricing options in relation to 'autonomy' or 'no autonomy' in price setting. The results show that, most responses were related to 'no autonomy' in

price setting. However, under the Pearson chi-square test, autonomy and pricing options are not associated at 0.05 significance level (two sided, value = 6.2, df =3, p = 0.101). That means differences in pricing options implemented did not signify whether a cadastral organisation had autonomy or no autonomy.

Table 4.10 Responses on pricing options and autonomy

Autonomy	Pricing Options				
	Completely Free of Charge	Subsidised fee	Full Cost Charges	Full Cost Charges with Profit	***Total***
Yes	1	9	26	16	***52***
No	5	24	59	15	***103***
Total	***6***	***33***	***85***	***31***	***155***

It was also observed that the majority of responses associated with no autonomy were from organisations under 'no cost recovery' regime while the majority of responses from organisations with autonomy were from cadastral organisations operating under 'partial cost recovery' regime (table 4.11). Under the Pearson chi-square test, cost recovery regimes and autonomy are dependent at 0.05 significance level (two sided, value = 36, df =2, p = 0.0) with a significant degree of association $(C = 43\%)$. Therefore, it can be concluded that autonomy in price setting for cadastral products was significantly associated with cost recovery regimes but not with pricing options.

Table 4.11 Responses on cost recovery regimes and autonomy

Autonomy	Cost recovery regimes			***Total***
	No Cost Recovery Regime	Partial Cost Recovery Regime	Full Cost Recovery Regime	
Yes	6	34	12	***52***
No	55	21	29	***105***
Total	***61***	***55***	***41***	***157***

In terms of cadastral products provided, it was observed that the majority of cadastral organisations provided similar cadastral products whether with autonomy or 'no autonomy' as shown in figure 4.1. Also under the Pearson chi-square test, autonomy in price setting and cadastral products are not dependent at 0.05 significance level (two sided, value = 0.958, df =6, p = 0.987). This suggests that the provision of different type of cadastral products did not depend on the perceived autonomy on the part of a cadastral organisation. In tables 4.3 and 4.4 it was observed that cadastral products are related to pricing options and not cost recovery and under table 4.11 it is shown that autonomy in price setting is associated with cost recovery regimes and not pricing options. Therefore autonomy and different type of cadastral products are on the opposite sides of the investigated relationships.

Table 4.12 Responses in relation to the availability of 'fixed budget' and pricing options

Fixed Budget	Pricing option				
	Completely Free of Charge	Subsidised fee	Full Cost Charges	Full Cost Charges with Profit	***Total***
Yes	6	30	53	11	***100***
No	0	3	32	20	***55***
Total	***6***	***33***	***85***	***31***	***155***

4.5.2. Availability of a fixed budget

In response to the question on receipts of a fixed budget for the provision of cadastral products, the results are displayed in table 4.13. All responses received from cadastral organisations charging at a

'completely free of charge' and the majority of responses from those charging at 'subsidised fee' and at 'full cost charges with profit' pricing options were associated with a 'fixed budget'.

The majority of 'product related' responses from organisations charging at 'full cost charges with profit' had no fixed budget. Under the Pearson chi-square test, 'availability of a fixed budget' and pricing options for cadastral products are dependent at 0.05 significance level (two sided, value = 24.9, df =3, p = 0.0) with a significant degree of association $(C = 37\%)$.

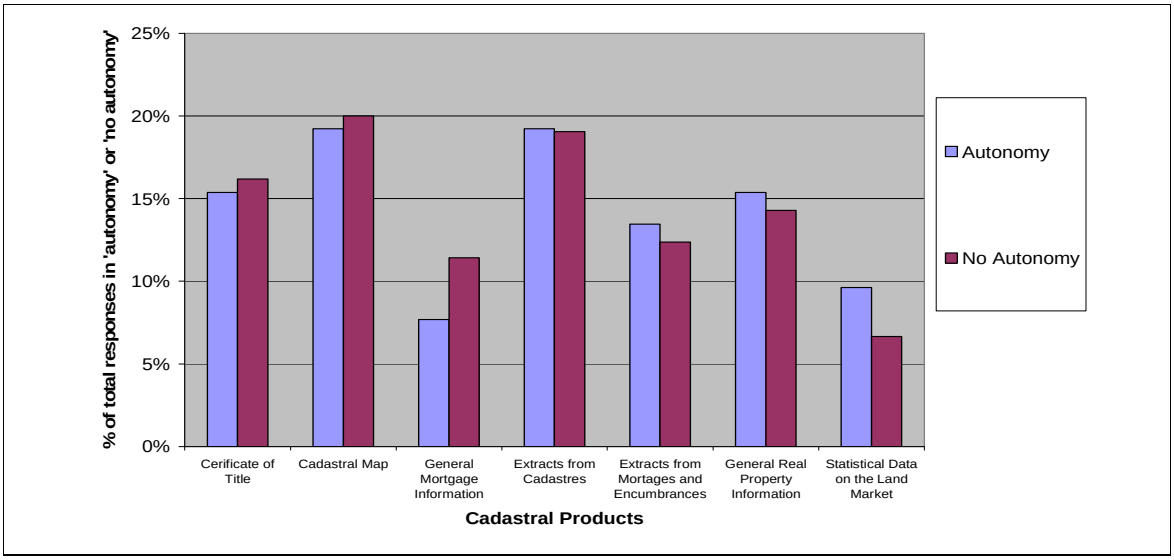


Figure 4.1 Cadastral products in relation to responses on autonomy

It was observed that some responses from cadastral organisations under 'no cost recovery regime' had no 'fixed budget' for some products. For organisations receiving a fixed budget for the provision of cadastral products most responses were associated with 'no cost recovery' regime and 'partial cost recovery' regimes where for organisations without a fixed budget most responses were associated with 'full cost recovery' (table 4.13). Under the Pearson chi-square test, availability of a fixed budget and cost recovery regimes are dependent at 0.05 significance level (two sided, value = $1.017e^2$, df =2, p = 0.0) with a significant degree of association $(C = 63\%)$.

Table 4.13 Responses on cost recovery regimes and availability of a fixed budget

Fixed budget	Cost recovery regimes			*Total*
	No Cost Recovery Regime	Partial Cost Recovery Regime	Full Cost Recovery Regime	
Yes	58	42	0	***100***
No	3	13	41	***57***
Total	***61***	***55***	***41***	***157***

In terms of cadastral products, a fixed budget was dominant in the provision of 'certificate of title', general real property information and statistical data on the land market, while for all other products many responses were associated with cadastral organisations providing them without a fixed budget (figure 4.2). However under the Pearson chi-square test, availability of a fixed budget and cadastral products are not dependent at 0.05 significance level (two sided, value = 2.251, df =6, p = 0.895).

Therefore the allocation of a fixed budget had an influence on both pricing options and cost recovery regimes but that influence is not associated with cadastral products provided.

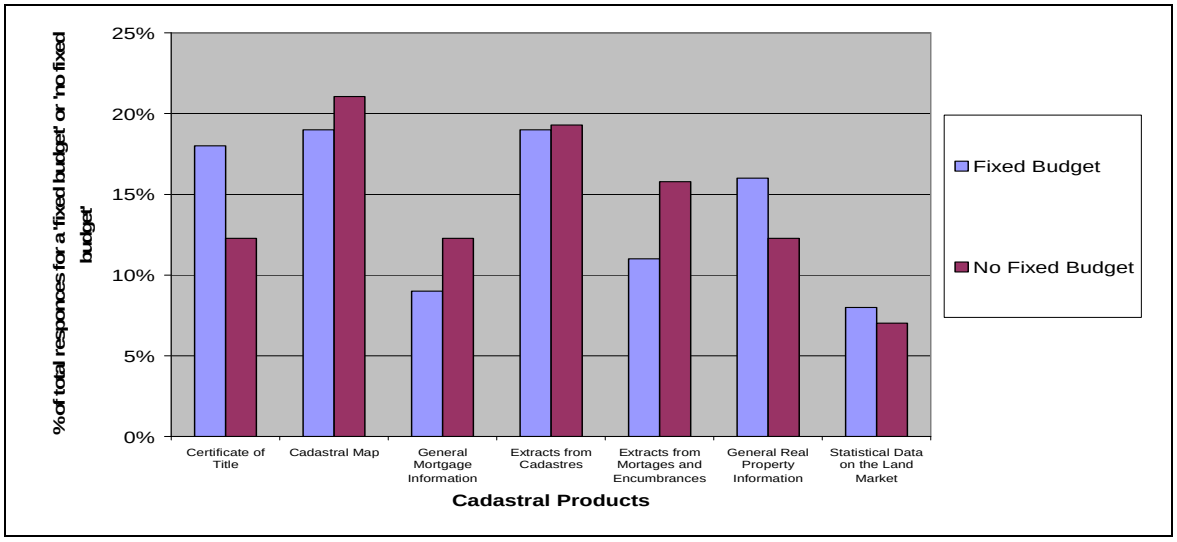


Figure 4.2 Cadastral products in relation to allocation of a fixed budget

4.5.3. The availability of competitors

Table 4.14 displays responses in relation to the question on availability of competitors. The majority of 'product related' responses for all pricing options were related to no competitors except for the 'completely free of charge pricing option where the majority of responses were associated with competitors. That means most pricing options for cadastral products investigated were implemented without competitors. Under the Pearson chi-square test, availability of competitors and pricing options are dependent at 0.05 significance level (two sided, value = 12.110, df =3, p = 0.007) with a significant degree of association $(C = 27\%)$. Table 4.16 show the relationship between responses on availability of competitors and cost recovery regimes. It shows that most responses under 'no competition' were related to 'no cost recovery' regime and all responses from organisations with competitors were associated with 'full cost recovery' regime. Under the Pearson chi-square test, availability of competitors and cost recovery regimes are not dependent at 0.05 significance level (two sided, value = 1.303, df =2, p = 0.521).

Table 4.14 Responses in relation to the availability of 'competitors' and pricing options

Availability of competitors	**Pricing option**				
	Completely Free of Charge	Subsidised fee	Full Cost Charges	Full Cost Charges with Profit	***Total***
Yes	4	8	14	12	***38***
No	2	25	71	19	***117***
Total	***6***	***33***	***85***	***31***	***155***

From the above analysis, I concluded that pricing options adopted for cadastral products might be determined by the availability of competitors. However, there is limited evidence to suggest any dependency between cost recovery regimes and availability of competitors. This suggests that competition may be an important factor in the determination of pricing options but not cost recovery regimes among the investigated cases.

Table 4.15 Responses on the availability of competitors and cost recovery regimes

Availability of competitors	Cost recovery regimes			*Total*
	No Cost Recovery Regime	Partial Cost Recovery Regime	Full Cost Recovery Regime	
Yes	12	14	12	***38***
No	49	41	29	***119***
Total	***61***	***55***	***41***	***157***

In terms of cadastral products, figure 4.3 show that a greater proportion of responses associated with the availability of competitors were from cadastral organisations providing 'extract from cadastres', 'statistical data on the land market' and 'general real property information'. The remaining products were predominantly provided under no competition. Under the Pearson chi-square test, the availability of competitors and cadastral products are dependent at 0.05 significance level (two sided, value = 13, df =6, p = 0.043) with a significant degree of association $(C = 28\%)$. This suggests that availability of competitors is concentrated on certain cadastral product.

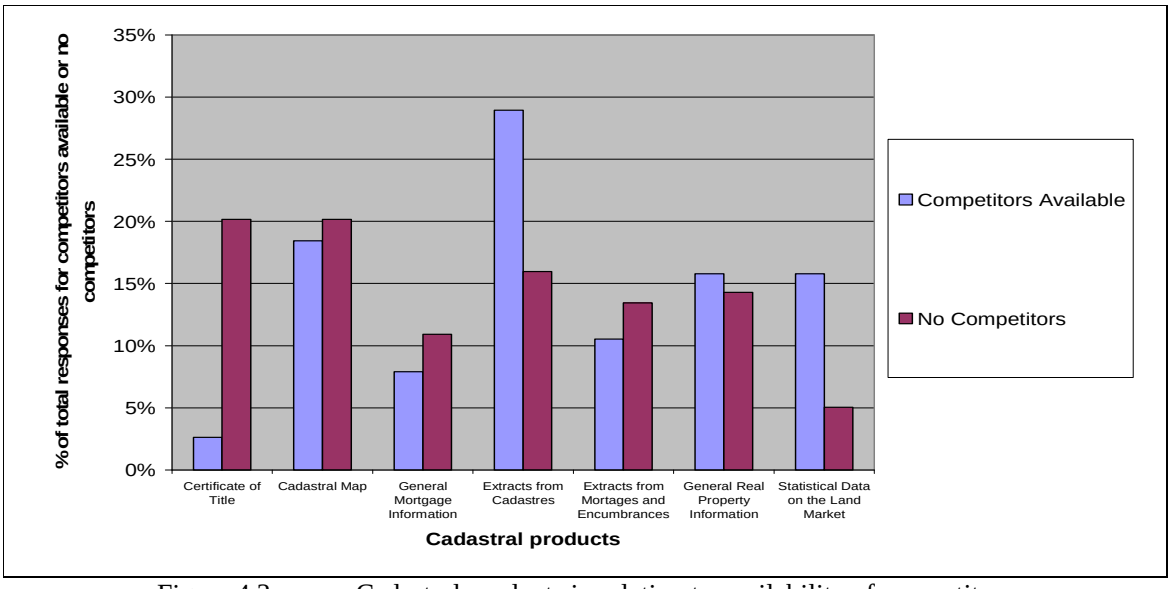


Figure 4.3 Cadastral products in relation to availability of competitors

4.6. Reasons for operating under cost recovery regimes

Concerning the question on motives for adopting cost recovery a total of four organisations provided that, they adopted cost recovery in order to meet current operational costs. One of these organisations provided an additional motive for implementing cost recovery that is to capture the willingness to pay for cadastral product especially costs related to the collection of data during registration. Another main motive was sustainability of cadastral production, which related to four cadastral organisations. Another five organisations asserted that, they adopted cost recovery because it is a general government policy, one organisation provided that cost recovery was adopted because cadastral production needed to reflect fluctuations in the economy. Lastly, one organisation provided that they are likely to adopt cost recovery because the provision of cadastral products is no longer the

responsibility of the government (for all reasons see table 4.17). A detailed discussion on these reasons is given in chapter five using an interpretative approach.

4.7. Limitations in pricing cadastral products under different cost recovery regimes

The limitations examined in this research are associated with autonomy in price setting and fee sufficiency. With respect to autonomy, the majority of responses associated with 'completely free of charge' (83%) and 'subsidised fee' pricing option (73%) were related to 'no autonomy' while 'full cost charges' pricing options, the majority of responses (69%) were associated with 'no autonomy' and for 'full cost charges with profit' the majority of responses were associated with autonomy (52%) (See table 4.11). With respect to constraints in charging cadastral products, one organisation identified longer price review time and the approval requirement as limitations to pricing cadastral products. Four cadastral organisations identified cadastral maps and another two identified 'extract from cadastres' and 'real property information' as products the fee of which is not sufficient. Two other organisations asserted that the fees are insufficient for all products and one organisation identified the fees for 'certificate of title' as insufficient (for limitations see table 4.18). The analysis of the responses in relation to fee sufficiency shows that the majority of responses (66%) associated with 'completely free of charge' and 'subsidised fee' (96%) pricing option were linked to charges being insufficient, whereas the majority of responses under 'full cost charges' (51%) and 'full cost charges with profit' (55%) were linked to fee being sufficient (table 4.16). The responses with respect to limitations when operating under cost recovery regimes were further investigated using interpretative approaches in chapter five.

Table 4.16 Responses on pricing options and fee sufficiency

Charge Sufficiency	**Pricing Options**				
	Completely Free of Charge	Subsidised fee	Full Cost Charges	Full Cost Charges with Profit	***Total***
Charges insufficient to recover costs	4	32	35	14	***85***
Charges sufficient to recover costs	2	1	50	17	***70***
Total	***6***	***33***	***85***	***31***	***155***

4.8. Results of data validation

Internal consistency of responses was checked through coherence of responses in relations to questions posed. Responses were solicited from targeted individuals and requests for particulars of respondents and secondary sources of data were made. These intended to ensure that the respondents had the necessary educational background to understand the questions and the necessary access to information needed to respond to the survey. Also responses were validated through secondary data collected and responses validated through further email contacts during interpretation. All respondents passed these validation checks since the majority of the answers were from respondents having professional qualification in their respective academic fields. 20 out of the 35 respondents had a management post in their respective organisations of which nine were heads/directors of cadastral organisations. In the remaining 10 organisations, the survey was responded through teams of experts in different fields including experts in information technology, public administration, international relations and other technical staffs (Appendix II).

4.9. Concluding Remarks

In this chapter the results of data analysis carried out to identify patterns in responses related to the survey were presented. The main purpose of the examination was to find consistencies as well as inconsistencies in responses and to characterise cost recovery regimes on the basis of pricing characteristics. The following issues need further investigation:-

i) Many cadastral organisations under "no cost recovery" regime were charging their products at 'full cost charges' and/or 'full cost charge with profit' pricing option (table 4.2) contrary to expectations under figure 2.4, the reasons for this were further investigated.
ii) Most cadastral organisations had 'no autonomy in price setting' regardless of the organisational model adopted (table 4.5) contrary to expectation under chapter two, section 2.3. The reason why governments do not grant price setting autonomy to cadastral organisations even when they operate under a self-finance model, was further clarified through secondary data and literature.
iii) With price setting autonomy very few cadastral organisations investigated were offering products at 'completely free of charge' or 'subsidised fee' (table 4.11). How autonomy excludes or prevents cadastral organisations from using some pricing options was subjected to further investigation through the literature and interpretation of secondary data.
iv) The adoption of a 'completely free of charge' pricing option was observed only for products that received a fixed budget from the government (table 4.13). Could this mean those cadastral organisations are unlikely to provide product at this pricing option without a subsidy. This was further investigated through related open responses.
v) The majority of cadastral organisations investigated perceived 'fee insufficiency' (table 4.19). What reasons could explain this observation? To understand this it was necessary to examine the legal rules used in charging cadastral products in different countries.
vi) The provision of different type of cadastral products did not signify differences in cost recovery regimes under which a particular cadastral organisation operate (table 4.4) contrary to expectation under chapter two sections 2.5. In other words the imposition of 'partial cost recovery' or 'full cost recovery' regime was not associated with the provision of varieties or different type of cadastral product as compared to a 'no cost recovery' regime.

Table 4.17 Reasons for operating under cost recovery regimes

No	Cost Recovery Motive	Responses	Supporting evidence
1	To support the operation budget of the organisation.	1) *"Recovery of the costs for reproduction and delivery of the products* 2) *"On an overall level, fees must be set at a level to ensure that the costs of running the PRA are recovered in fees charged.".* 3) *"Prices are set to generate enough revenue to support the operational budget and in some years there is a surplus or profit realized",* 4) *"We have 50% budget from state and 50% from revolving fund (cost recovery), otherwise to implement tasks of the organization will be impossible."*	The charge payable in respect of the service concerned is an amount calculated by the chief executive and comprises— (a) the cost of salaries incurred in respect of the provision of the service; and (b) a reasonable overhead charge; and (c) goods and services tax. (New Zealand, 2003b)
2	To attain sustainability in cadastral production	1) *"Our mode of financing products is to cover development and production cost",* 2) *"… Currently the policy is also motivated by the idea of developing sustainability for any organization operation, particularly land registration",* 3) *"Because we are self financing" ,* 4) *"Cost recovery with retained earnings for further research and development"*	Her Majesty's Land Registry (Land Registry), […], is […] an executive agency and a trading fund that makes no call on monies voted by Parliament. (Land Registry, 2008) Norsk Eiendomsinformasjon (NE) is a wholly state-owned limited liability company under the Ministry of Justice (NE, 2007).
3	It is a general government policy	1) *"Government rules and guides for cost recovery are adhered to by government departments",* 2) *"Government policy",* 3) *"The approach to cost recovery would have been implemented as a result of Government Policy",* 4) *"… In brief the policy states that Agencies should charge the higher of cost recovery or market price for goods and services",.* 5) *"Revenue earned by the Board goes back to the state budget and on at depends Boards next year budget".*	Fees and charges should be set at the higher of full cost recovery or market price (DTF, 2006) The fees […] are payable for (a) Determining […] whether cadastral survey datasets and cadastral surveys comply with standards […] and (b) Auditing compliance with those standards where the standards provide for the production of records or information […] (New Zealand, 2003a)
4	Internationalisation or regionalisation	"Pursuant to the Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information, "Charges should be cost-oriented […].	"[…] Data is never "free". Payment must come from either the user or from taxation. […]" (EU, 2003)
5	Capture individual's willingness to pay	*"…. since the capability of the government to cover the fees is limited, if the land owner is willing to get any land registration services soon, before the government priority come to the area of the land, the owner can apply the service but have to pay the fees …",*	
6	Reduce the adverse impact of economic slumps in cadastral production.	*"… Cost recovery policy is driven by a dependency on economic fluctuations for certain services, especially those related to the real estate market …",*	The continuing unprecedented growth of the local property market offers both continuing opportunities and very real challenges to the Agency (LRNI, 2007) Due to the economic downturn, survey and titles transaction volumes dropped significantly, reducing the revenue received from customers' fees. The survey and titles system is fully funded from customers' fees and receives no Crown funding (LINZ, 2009)
7	Changing perceptions on the role of the state in cadastral products provision	*"Currently my organization is in a process to review all the fees so that it can reflect the actual cost of the product. Previously that was not the case because we assumed that it was the responsibility of the government to serve its citizens without making them contribute to the cost of production. This policy has now changed.",.*	

Table 4.18 Problems encountered when pricing cadastral products under different cost recovery regimes.

No	Cost Recovery Constraints	Responses	Supporting evidence
1	Price fixing is external to the cadastral organisation producing products..	1) *"The PRA has no autonomy in setting fees. The Fees are set by Central Government – by the Minister for Justice with the approval of the Minister for Finance."*	
2	The involvement of more than one organisations in setting prices for cadastral products.	2) *"The prices have to be agreed by two Ministries (Ministry of Economics, Family and Youth and Ministry for Finance)",* 3) *"The price […] is strictly regulated by central government which is responsible for supervision of {the} cadastre (Ministry of Land, Transportation Maritime Affaire)* 4) *The fees are established, modified and updated according to the Order of Minister of Administration and Interior, at the proposal of Management Board of the National Agency".,* 5) *"The Government approves fees for registration and services provided upon proposal prepared by the State Enterprise Centre of Registers.*	
3	Legal restrictions on price setting autonomy	1) *"The Norwegian Public Service Information Act"* 2) *"Legal constraint; Royal or Ministry decrees 20/06/2002, 20/09/2002, 8/12/2006 and 17/05/2007".* 3) *"Fees for products are both regulated and non-regulated and must be reviewed and authorized by government under provincial fees guideline.".* 4) *"The state policy – all data collecting and maintaining should be free of charge. We can charge only material cost* 5) *"most of the prices are fixed by laws."* 6) *"The prices to supply any cadastral products are legally fixed under the land act rules, regulations and government decisions* 7) *"Law and regulation on "Non Tax State Revenue," stated that any fees collected by the public institutions from the people should be regulated in a government regulation."*	A charge of the same size can be made for similar performances by one or more authorities even when the costs of producing the performance differ. When the size of such a fixed charge is set, the average total cost of the performances must (Finland, 2007) The chief executive may authorise the refund or waiver of a fee, or part of a fee (New Zealand, 2003a) Restriction on increases in fees and charges may result from Government direction or from legislative requirements (DTF, 2006)
4	Cadastral price setting depends on cumbersome and time consuming political processes	*The organisation periodically reviews charges and makes adjustment to reflect rises or falls in costs of delivering services. Any change to fees have to follow defined approval path which include a legislative element. The entire process from review to implementation can take 12 months.*	Fees and charges should be formally reviewed at least annually (or more often if required by changes in market or cost parameters) by agencies (DTF, 2006)

5. Justifying Cost Recovery Pricing Options

5.1. Introduction

In Chapter four the data collected were presented and several general observations were made. These form the basis for a critical and interpretative analysis. Under this approach three steps were followed to arrive at a conclusion; first the observations were translated into an argument or a number of arguments. Secondly reasons that may justify such arguments are critically assessed and compared. Lastly the most plausible explanation supported by primary and secondary evidence is suggested. The chapter is divided into eight sections. Section 5.2; provides the general reasons for the observed patterns in responses. Section 5.3; discusses the reasons for the observed relationship between cost recovery regimes and pricing options. Section 5.4; discusses the reasons for the observations in relation to cadastral pricing options and endogenous factors considered in pricing cadastral products. Section 5.5; discusses the observed patterns in pricing options for cadastral product when exogenous factors were considered in the analysis. Section 5.6; provides a critical examination of the reasons given for operating under cost recovery regimes. Section 5.9; provides a critical explanation of constraints in pricing cadastral products when operating under cost recovery regimes. The chapter concludes with a number of shortcomings in the discussion, which requires an alternative approach in chapter six.

5.2. Interpretation of the distribution of respondents

The distribution of responses to the survey across the globe (table 4.1) suggests that there are disparities in awareness among cadastral organisations across the globe on the role of cadastral research in cadastral development. These disparities manifests themselves based on the level of economic development attained by a particular country with the majority of cadastral organisations in developed countries being highly aware and the majority in developing countries being unaware. This was explicit in responses where most respondents from developed countries expressed interests for receiving a feedback on the survey. Despite the fact that most cadastral organisations investigated were from developed countries, most of them operated under the 'budget-based' model where their financial budget was controlled by a parent ministry or department contrary to expectation under chapter 2 section 2.5. This observation may be linked to the traditional views about cadastral products where it is considered a public good hence its provision is one of government's core businesses (Dale, 2003). However, the budget-based models seem to be competing with self-financing model because most organisations are still under budget-based model though charging at prices that are also relevant under the self-finance model. This may be related to the growing demands on the side of the governments to deliver better cadastral products which cannot be met without more money.

Dale (2003) provide that most people would like to maintain the provision of cadastral products within the government domain because first, land administration services are seen as a public good, secondly, there is a need to provide services that cannot or will not be funded by the private sector, thirdly, there is a need to avoid internal payments resulting from the move towards cost recovery in which other government departments are billed for products or services, fourthly, competition that is a consequence of a cost recovery approach can lead to conflict between agencies who in a business climate will give their own needs priority over those of other agencies, lastly a self financing approach can impede property market development. Some of these reasons were also observed in practice from some cadastral organisations. For example one respondent was of the view that due to property market uncertainties in activities it was difficult to match charges with costs. The 'budget-based model ensures financing (though may be minimal) in times of intense fluctuations of cadastral activities, which may be difficult to obtain under the self-financing model. Also it was observed that the budget based model is retained in some developed countries because the market cannot always generate or provide the necessary cadastral products for the economy (LINZ, 2008).

Most responses were associated with 'full cost charges' pricing option (table 4.8), which also mean that most organisations charge at that option regardless of the organisational model adopted (table 4.3). This observation is in conformity to the scholarly view that there is a global agreement that cadastral product should be provided through user fee (Karikari, 2006) and may be associated with the move towards 'partial cost recovery' or 'full cost recovery' regimes. However, given the practical difficulties in establishing production cost for cadastral products (UN, 2005), it may be questionable whether some of the cadastral organisations in developing countries are able to establish cost-per-product as assumed in section 2.4. 'Full cost charges' pricing option is an option that conforms to principles of fairness in that each 'consumer' of cadastral products pays the exact costs of a product (Cobin, 2009). Likewise, 'full cost charges' is in conformity with the requirements by most government that cadastral organisations should not make profit (EC, 1998; Gompel and Steyaert, 2002; ECE, 2007). Since the majority of cadastral organisations investigated had their prices fixed by laws, charging at 'full cost charges' was in conformity to government's legal requirements and did not in any way reflect the exact costs involved in making them available to the final consumer.

5.3. Interpretation of pricing options under cost recovery regimes

This study observed that pricing options for cadastral products had a significant dependence with cost recovery regimes (table 4.2), such dependence is based on factors that are internal to the cadastral organisation as well as external. That could mean either cadastral organisations charge cadastral products at different prices depending on the cost recovery regime under which they operate or the imposition of a particular form of cost recovery regimes predefines certain pricing options which suite the objectives under that regime. The former entails a causal-effect relationship that is certain pricing options will lead to certain cost recovery regimes. However this may not be the case, since pricing is only one element in a particular cost recovery regime. Also it has been observed that the majority of cadastral organisations investigated are able to change neither pricing options nor the cost recovery regimes, both are fixed by law (table 4.5,4.6 and 4.18). The latter explanation entails the impositions of cost recovery regime upon cadastral organisations as a package, predefining, what to sell and at what price, what to offer free and to whom, where to disburse the revenues and how much. This

argument is more plausible since it was observed that most cadastral organisations implemented cost recovery as a matter of law (table 4.17).

The observations in table 4.2 show that some responses under 'partial cost recovery' regime were associated with 'full cost charges with profit' and 'completely free of charge' pricing options. These pricing options were not expected to feature under this cost recovery regime (figure 2.4) since under a 'partial cost recovery' regime prices for cadastral products have a partial relationship with costs of providing cadastral products (UN, 1996). Therefore profit motives are irrelevant from the conceptual point of view. However, the observation could be related to the need to generate revenues for the government and in some cases such revenue generation obligations may be associated with budgetary constraints imposed upon a cadastral organisation for the next fiscal year. Therefore the organisation though under 'partial cost recovery' regime, had an obligation to generate enough revenues to meet current as well as potential production costs. Another reason could be the fact that some of these organisations are under transition to adopting some form of 'full cost recovery' and through the restructuring process they have changed some of their pricing structure (see table 4.17).

In additional to that, the observation in table 4.2 may be linked to the way cost recovery was examined in this research. The traditional approach to research in cost-recovery for cadastral organisations is to directly link the ability to meet financial obligations to cost recovery in the provisional of cadastral products (see Steudler *et al.*, 1997; UNECE, 2000). Cost recovery as a whole has an institutional aspect which can well be understood through cost recovery regimes. Most cadastral organisations charge for products offered to the public but what differs is the aftermath of revenues. That is, whether the revenues are used for further provision of cadastral products or appropriated for other government products and services. Revenues only help in understanding the financial generation capacity of the cadastral organisations but not cost-recovery in the provision of cadastral products. One respondent who stated as follows provides a good example of this: -

> *"Whole income of the organisation is being sent to the state budget. According to the law, up to 75 % of the revenue could be reimbursed in the organisation, but in reality about 18 - 20 % of the sum is refunded."*

A critical examination of the above statement shows that, by failing to return the revenues to the organisation as required by the law the government discourages the realisation of benefits associated with cost-recovery. Pollock (2008) observes that a regulated public organisation lacks the incentives to reduce costs since any such reduction is appropriated by the regulator (government). Cost recovery regimes provide a means to introduce institutional aspects in understanding the role of cost-recovery in the provision of cadastral products. Therefore most cadastral organisations of this type though self-financing, were not under 'full cost recovery' regime and were classified to be under 'partial cost recovery' regime because they were allocated a fixed budget by the central government or had a legal obligation to disburse some of the revenues to a general government fund. Therefore these organisations adopted 'full cost charges with profit' in order to fulfil their revenue generation obligation.

Although the 'completely free of charge' pricing options dominated charging products under 'partial cost recovery' regime, it was relevant only for 'statistical data on the land market' (table 2 and 4.3).

Therefore it was important to investigate the nature of 'statistical data on the land market' rather than the pricing options. Cadastral statistical products as observed in this study, were geared towards providing information on property values, prices and other location attributes (Appendix III). Such information is useful in stimulating property transactions such as sale, renting or leasing and mortgaging. By providing 'statistical data on the land market' free of charge, cadastral organisations reduces transaction costs involved in property transfers and directly encourages other cadastral activities i.e. registration of titles, which are the main source of revenues,. Therefore the provision of statistical data free of charge can be a business strategy in order to encourage the 'consumption' of other cadastral products.

'Statistical data on the land market' may have an additional peculiar characteristic that is, for cadastral organisations; it is cheaper to produce it. These agencies do not collect statistical data independently rather 'statistical data on the land market' can be aggregated from other property transaction registered at the cadastre. Thus using them to facilitate or encourage property transaction at a 'completely free of charge' pricing option, is an appropriate and economically feasible option.

The last reason for free provision of statistical data is linked to a general policy on statistical data that appear to be uniform across cadastral jurisdictions. For example in Australia the Productivity Commission (Productivity Commission, 2001) observed that while on one hand basic statistical products about the economy, which include the land market statistics, may help to create an informed and well prepared community, and therefore contribute to a well functioning economy, on the other, charging for such statistical products may seriously undermine the benefits that may accrue to the community. Therefore free provision of statistical data was preferred in this case. The same policy was adopted in the United Kingdom for the dissemination of statistical products on the labour market, though in this case it was also motivated by technological innovations (Blakemore and Sutherland, 2005). This last explanation seems more plausible since all organisations under partial cost recovery had a 'fixed budget' to produce 'statistical data on the land market'. That means the government finances the production of statistical data for most cadastral organisation investigated.

5.4. Interpretation of the role of endogenous factors in pricing cadastral products

5.4.1. Cadastral products

The majority of the responses in all cost recovery regimes were associated with 'full cost charges' for all products except 'statistical data on the land market' where they were associated with 'completely free of charge' as explained above. Some of these observations are not different from expectations under table 2.1. The 'subsidised fee' pricing option was dominant for 'certificate of title' and 'extracts from cadastres' while the 'full cost charges' were applied in the majority of responses associated with 'cadastral maps'. The 'full cost charges with profit' was predominantly applied for 'general real property information' (see table 4.3). These observations could be explained by the nature of these products.

The expected pricing option for both 'certificate of title' and 'extracts from cadastres' was 'full cost charges' and for 'certificate of title' it was at 'completely free of charge' (table 2.1). However, it was

observed that, the product had a relatively higher possibility of being offered at a 'subsidised fee' pricing option. The reasons justifying a 'subsidised fee' pricing option for these product include the following:- First, all these products are legal cadastral product, ownership of which is a proof to a neutral third party against contested claims on a property between individuals. The third party could be a court or any arbitrating authority. These products do not only inform the consumer about his/her interest or another person's interest on a property but also confers authority over a property and prevents interference by any other uninformed individual. It is important that property owners have access to them regardless of their ability to pay. That is why most government subsidises the provision of 'certificate of title' and to avoid unnecessary conflict in property transactions, cadastral agencies or the government also subsidises 'extracts from cadastres'.

In addition to that, these legal cadastral products are not offered at a 'completely free of charge' pricing option (contrary to expectation in table 2.1), because charging add value to the product (Krek, 2006). The owner, not only values the information contained in a product (use value), but the product itself. For example the consumer who paid for the product whether physical or digital, after enjoying it will keep or save it for future use but if it is possible to get it at a 'completely free of charge' pricing option, he/she may throw it away or delete. Its value is only temporary. Paying makes the value of a 'certificate of title' or 'extracts from cadastres' dynamic. A 'dynamic value' is used here to mean that component of a product's value forcing owners to store their products for future use. It is an integral component of a product's value for products with limited exchange value such as a 'certificate of title'. This is because one can not sell a 'certificate of title' and retain the property. The title is a valuable product as long as it guarantees ownership of a property to the bearer as against any other person (Ratan, 2006). Therefore charging could be one and the simplest way to embed the 'dynamic value' of a legal product with limited or no exchange value.

This same type of reasoning applies to other pricing options applied to different products. For example 'cadastral maps' had a greater potential for cost recovery (figure 4.2), hence can be charged at 'full cost charges' as expected (table 2.1). Also table 4.3 shows that the 'full cost charges' pricing option was predominantly applied for 'general real property information' where some organisation offered it at 'completely free of charge' as expected under table 2.1. This product lacks the legal nature hence its demand depends on individual demand and not aggregate demand (the demand of the whole country). Setting a 'full cost charge' may not affect the majority even in developing countries.

It was observed that there was no strong pattern to substantiate a relationship between cadastral products and cost recovery regimes. This can be linked to the fact that, for most of the investigated organisations, cost recovery was externally imposed upon them (table 4.17). Therefore the nature of cadastral products provided is limitedly related to the mode of cost recovery regime imposed. That could mean that decision makers when imposing a particular cost recovery regime do not necessarily consider differences among cadastral products specifically in relation to cost-per-product or profit-per-product. This was evident in one response where the respondent stated as follows: -

> *"The intention of the Fees Order is to set the fees charged at a level to cover the total cost of running the organization rather than on a cost recovery for each individual type of product or service. As certain services generate fees greater than costs, on an overall basis costs are recovered".*

This response shows that some cadastral organisation do not consider specific attributes of cadastral products as pertinent in pricing cadastral products. Therefore it is concluded that prices for cadastral products are in most cases externally fixed by laws and cadastral organisations do not have the power to alter these prices whenever they desire or whenever circumstances necessitate.

Although most cadastral organisation investigated linked their pricing decision to legally fixed prices, legal fixing of price comprised a greater proportion of responses associated with 'completely free of charge' pricing option and 'subsidised fee' pricing option (table 4.13). A number of literature associates free provisions of cadastral product or subsidisation with political decision making (Holland, 1995; Productivity Commission, 2001; Longhorn and Blakemore, 2008). The options are often criticised for benefiting the few business community, (profit maker), at the expenses of tax payers (UN, 2005). Therefore lack of internalisation of pricing factors for cadastral products, by considering specific attribute of cadastral products, provide an opportunity for decision makers to charge prices that are in no way related to specific attributes of cadastral products.

However 'completely free of charge' pricing option can strategically be used to benefit cadastral organisations and enhance cost-ecovery. This is the case when it is used for some products, having a higher possibility to attract demand for other cadastral product. For example one respondent, when responding to a question on why they offer some of their products for free, stated as follows:-

> *"… 'online maps' is offered free of charge to customers who are registered subscribers to our online services […] this facility is used by the customer to locate relevant folios (documents) which, when inspected, attract a fee. […] The only other free services are information services provided to other Government organizations. This is intended to avoid unnecessary internal payments within government."*

This response shows two things, first 'completely free of charge' here is used to 'attract a fee', that is through the increased consumption of other cadastral products, and secondly it shows that by being public, some cadastral organisations provide free product to some other public organisations to avoid internal payments. This may be valid if such cadastral organisations are not 'self-financing' or operating under 'full cost recovery' regime. Therefore 'completely free of charge' pricing option may not directly be linked to bureaucratic need unless it is tied to a political process.

Most criticisms levelled against 'subsidised fee' pricing options are related to market distortions (see Groot, 2001a; Cobin, 2009). That is if cadastral products are subsidised, they may subdue competitors in the information market. However in countries where cadastral organisations do not have competitors this option may seem plausible especially when linked to the need to provide public products to the poor (Cardone and Fonseca, 2003). Another criticism of this option relates to cross subsidisation where the cadastral organisation uses public funding or revenues from products for which it has monopoly to finance the provision of products offered through the market.

For digital cadastral product it may be difficult to rebut charges of cross subsidisation as long as most products may be generated from the same database (Walsh and Woods, 2001). However, cross subsidisation should be avoided since it is likely to disadvantage one group relative to another, but if

the level of cost-recovery is low and the organisation is contemplating investing in new products and facilities, subsidisation may be necessary (UN, 1996). Despite the criticism associated with cross subsidisation some cadastral organisations investigated adopt the 'subsidised fee' pricing option under competition (table 4.14). This may be linked to the general government policy on revenues, since most cadastral organisations implementing this option were operating under either 'no cost recovery' or 'partial cost recovery' regimes. Under these circumstances concern for market distortions may either be limited or intentionally overlooked.

5.4.2. Cadastral organisational models

In table 4.8, it was observed that all pricing options were predominated by cadastral organisations under the budget-based model except the 'full cost charges with profit' pricing option which was dominated by 'self-financing' cadastral organisations. This observation is consistent with expectation (fig 2.4), since the few self-financing cadastral organisations provided reasons, which were also consistent to expectation under section 2.5, for operating under cost-recovery regimes. These reasons include the requirement to meet some cost recovery threshold and generate enough revenues for cadastral research and development. Therefore despite some criticism on charging cadastral products at 'full cost charges with profit' (Gompel and Steyaert, 2002), understanding on the part of either cadastral management or decision makers of circumstances facing cadastral organisations, such as the need for research and development (PSMA, 2009), necessitate the application of 'full cost charges with profit'. However, some 'budget-based cadastral organisations were charging at 'full cost charges with profit'. This can be linked to the revenue generation requirements by the government because most of cadastral organisations under the budget-based model coincided to be under the direct financial control of their respective parent ministries. One disadvantage of this approach is that it offers little or no incentives to the cadastral organisations and the issue of frequent technological refresh in the provision of cadastral products remains unresolved (Dale, 2003)

The findings in this research may wrongly be interpreted as suggesting that 'partial cost recovery' regime can ensure self-financing for cadastral organisations (table 4.9). This is not the case, since 'partial cost recovery' regime entails either a budgetary allocation specific to certain products or a general subsidy to finance the activities of the organisation. A greater component of these budgetary allocations constitute costs of salaries to employee and other spending geared towards recovery of recurrent costs (non investment) (CUZK, 2007). Therefore the observation is associated with some cadastral organisations whose direct costs are separated from the recurrent costs. That means the payments of employed workers and managements are directly from the government while all direct costs related to products are paid through cost-recovery mechanism. The organisational model is 'self-financing' because of the direct cost of producing cadastral products while under the categorisation of cost recovery regimes such organisation falls under 'partial cost recovery' regime. Good examples of these organisations are found in Australia where the Department of Treasury and Finance (DTF) issued policy directives on cost recovery. These directives stipulates that government agencies should charge the higher of cost recovery or market price' for goods and services (DTF, 2006).

This study suggests that cadastral organizational models define the limits of pricing options that may be adopted by cadastral organisations rather than the type of cadastral products that may be provided.

It was observed that, budget-based provision of cadastral products dominated among the investigated organisations (table 4.8 and 4.9). This may be because the 'self-financing' model is foreign to most cadastral organizations that responded to the questionnaire as it was evidenced by some respondents who clearly stipulated that they are in a process of adopting some form of cost-recovery. A part from that cost recovery regimes defines the pricing options that may be implemented by a cadastral organization rather than the type of products to be provided (table 4.2 and 4.3). However the type of cadastral products has a central role in defining these options. This is because each cost recovery regime is presumed to suit socio-legal settings where financial obligations of a cadastral organization are well defined. Therefore, the provision of cadastral products is not related to cost recovery regimes rather the wider government policies on cadastral information.

The differences between pricing options adopted across cost recovery regimes can not adequately be explained through processes within cadastral organisations without an examination of the political decision-making processes. This is because most cadastral organisations investigated implemented cost recovery as a matter of law. This means some political processes are involved in defining, approving and reviewing prices for cadastral products. To most cadastral organisations cost recovery seem to be a 'black box', within which they are forced to operate without a clear understanding of the reasons, benefits and implications.

5.5. Interpretations of the role of exogenous factors in pricing cadastral products

5.5.1. Autonomy in price setting

Most responses from cadastral organisations under 'partial cost recovery' regime were associated with 'autonomy in price setting' (table 4.11) which was not the case for cadastral organisations under 'full cost recovery' or 'no cost recovery' regime. The major issue is how 'partial cost recovery' regime is related to autonomy in price setting given the fact that most organisations from this regime were operating under the 'budget-based' model. The perception of autonomy in price setting can be related to the fixed financial obligation associated with this regime. This is because the organisation must be allowed to operate in such a way that it can meet that and only that obligation. Since the obligation is well defined, and known, the pricing option to be adopted will be set to fit that objective. Therefore for the purpose of meeting the financial obligation legally binding upon a cadastral organisation under 'partial cost recovery' regime, there is no need for any different pricing option and therefore these organisations are able to declare being autonomous in price setting.

For organisations under the 'self-financing' model, autonomy may be embedded within the organisational model which include operational independency of the cadastral organisation (Van der Molen, 2003b). That could be translated into financial autonomy. With financial autonomy 'self-financing' cadastral organisations may be in a position to adjust prices whenever circumstances necessitate with the aim of attaining full cost-recovery in producing cadastral products. However, this is often not possible without approval by the central government (table 4.18). Since cost-recovery strategies and policies may include the adoption of the 'self-financing' model, 'autonomy in price setting' is implicit in the organisational model adopted and not a result of any cost recovery regime. Therefore, I expected that many organisations under 'full cost recovery' perceived to be autonomous

in price setting. But this was not the case because of the influence of the government in price setting. The fact that most organisations under 'partial cost recovery' regime perceived 'autonomy in price setting' can be associated only to perception relating to the financial obligation rather than less legal restriction in price setting.

Many governments do not grant 'autonomy in price setting' to cadastral organisations or do so to a limited extent from the perspectives of cadastral organisations (table 4.10 and 4.11). There are always legal restrictions to price setting because most cadastral organisations are not private companies (Barnasconi and Van der Molen, 2009), hence the government may need to retain some control over cadastral production. Allowing free cost-recovery pricing may lead to loss of legitimacy of the state since citizens will be turned into typical customers of a public organisation (Van der Molen, 2003b). Under these circumstances the legitimacy of the state is affected by the price that citizens pay for various products and services. One way to enhance the legitimacy of the state may be through price control (legal price fixing). That is why in all the investigated organisations fees and charges need either an approval or review by the parliament or state department/ministry.

Few cadastral organisations with 'autonomy in price setting' were charging at 'completely free of charge' or 'subsidised fee' pricing option (table 4.10). This support the view that these options are often used to support the interest of bureaucratic political systems (Longhorn and Blakemore, 2008), under 'no cost recovery' regime for cadastral organisations. From economic point of view, cadastral organisations with 'price setting autonomy' have limited incentives to offer cadastral products at a 'completely free of charge' pricing option, that behaviour would be considered 'irrational'. This may also explain why governments do not grant 'price setting autonomy to cadastral organisations? The answer could be because the government may be interested in providing some cadastral products at 'completely free of charge' or 'subsidised fee' pricing options under certain circumstances (Dale, 2003). This may be impossible or difficult if cadastral organisations are granted 'price setting autonomy'.

However, cadastral organisations perceiving 'no price setting autonomy' were operating under comparatively stricter price setting restrictions than those who perceived 'autonomy in price setting. The language respondents used to express their opinions about price setting autonomy evidenced this. For example one respondent while responding to the question on price setting autonomy said: -

> *"The price of surveying service fee is strictly regulated by central government which is responsible for supervision of cadastre (Ministry of Land, Transportation and Maritime Affaire)"*

Another respondent who coincided to have 'no price setting autonomy' stated as follows: -

> *"The organisation periodically reviews charges and makes adjustments to reflect rises or fall in cost of delivering services. Any change to fees has to follow defined approval path, which includes a legislative element. The entire process from review to implementation can take 12 months".*

These legal restrictions or requirements to pricing cadastral products were viewed as constraints by the respective cadastral organisations. The underlined sections show how these respondents

perceived price setting 'autonomy' within their jurisdictions. The restrictions also applied to cadastral organisations that perceived 'autonomy' in price setting but in a slightly relaxed way. For example one respondent stated that: -

> *"Fee for Land Registration is set by law in Norway; we are in some degree free to set the prices on the products from the national cadastre."*

Also a similar response was obtained from another respondent on the issue of autonomy in price setting who provided as follows: -

> *"We do have to have all prices for our statutory services approved by the Treasury and our Minister. However we have still been able to change prices where necessary"*

The underlined sections show how these organisations, differently perceived legal restrictions in price setting. One common feature of all these responses is that prices for cadastral products are in most cases regulated by laws and what differs is the extent to which such restrictions is applied to a specific organisation. For organisations with 'price setting autonomy', there is some relaxation of the legal restriction or the perceived restriction. Despite the above discussion on the role of autonomy in pricing cadastral products, this study found limited evidence to suggest that pricing options adopted by cadastral organisation were related to autonomy though it was related to cost recovery regimes. This relationship can be linked to the observation that both cost recovery regimes and autonomy in price setting were external to most cadastral organisations investigated as explained above.

5.5.2. Availability of a 'fixed budget'

The provision of cadastral products at 'completely free of charge' pricing option was possible when cadastral organisations received a 'fixed budget' (table 4.12). The observations is limited only to the investigated products and could be a result of high costs involved in producing these products such that they are not attractive for pricing strategies involving a 'completely free of charge' pricing option. Also the provision of most cadastral product was related to the allocation of a fixed budget (table 4.12-4.13). The availability of a fixed budget was in turn associated to both cost recovery regimes and pricing options signifying a central role of a 'fixed budget' in the provision of cadastral products. Therefore, despite the fact that most of the organisations investigated charged their products at 'full cost charges', such charge was insufficient to provide adequate amount of cadastral products to meet the demand of the citizens and for maintaining the LIS. Subsidisation through a fixed budget was necessary. This had a two fold effect, first it influences the type of prices that are charged as it was observed that a 'fixed budget' was associated with 'completely free of charge' and 'subsidised fee' pricing options (table 4.12). The second is that the allocation of a fixed budget defined the mode of cost recovery under which an organisation operated (table 4.13).

5.5.3. Competition in the provision of cadastral products

Cadastral organisations investigated provided cadastral products mainly with limited competition (table 4.14-4.15). This comprised about 75% of all 'product related' responses received. Therefore despite scholars views that the market provision of cadastral products may lead to distortions (Productivity Commission, 2001; Dale, 2003), evidence collected among the investigated organisations is yet to prove this view. However, availability of competitors was related to pricing

options but not to cost recovery regimes. The reason for this observation could be the fact that a most common competition tool is price (Varian, 2003). Therefore cadastral organisations with competitors may be using pricing options either to hinder or facilitate competition. For example some cadastral organisation with competitors were charging at 'completely free of charge' and subsidised fee' pricing option (table 4.14). The main concern under these circumstances may be how to create a fair play for all organisations providing the same or similar products (Groot, 2001a). Thus it has been advocated that the government should not subsidise the provision of cadastral products that are provided in line with private firms (CEC, 1989, 2000). In some responses cadastral organisations explicitly considered the above scholarly advice as it was observed in one response where the respondent in giving the reasons for the mode of cost recovery they adopted, provided that: -

> *" … By law we have limited possibilities for saving capital and for cross-subsidization between tasks."*

Another evidence for cadastral organisations with competitors is found in the Finish Act on Criteria for Charges Payable to the State where it is stipulated that: -

> *"[…] If an authority produces performances in a dominant market standing, the pricing of the performances shall take into account the provisions on abuse of dominant market standing […]".*

These quotes show that, though most cadastral organisations operated under 'no competition' the few with competitors considered market realities in pricing cadastral products. With commercial realities in the provision of cadastral product several issues need to be resolved such as licensing issues, appropriate pricing, the effects of restrictions and data supply and maintenance (PSMA, 2009). Most of these challenges were yet to be realised by the majority of the investigated organisations. Although there is ample literature on the negative impact of cost-recovery pricing on market competition, evidence among the investigated organisations was lacking.

5.6. Interpretation of the reasons for operating under cost recovery regimes

The imposition of cost recovery regimes for cadastral organisations is associated with advantages that may be realised thereof as described under section 2.5.1 (see alsoProductivity Commission, 2001; Dale, 2003). However it is not clear whether cadastral organisations operates under cost recovery regimes because of the advantages associated with it or because of some forces inflicted upon them. This study suggests that operating under a particular cost recovery regime is linked to coercion from state authorities. This is because some respondents did not associate the adoption of cost recovery to the potentialities associated within it, rather the legal requirements. This observation may be explained by either lack of awareness on the reasons behind the implementation of cost recovery by the respondents or failure to realise the benefits of cost-recovery. The results obtained with respects to reasons for operating under cost recovery regimes are discussed in this section.

From the public management point of view most traditional budget-based cadastral organisations faced serious budgetary problems and user pay policies were opted for as an alternative to government budget finance (Wessely, 2002; Dale, 2003). This mode of financing was expected to resolve many issues pertaining to the provision of cadastral products including financial difficulties to meeting current operational costs (see also Chapter 2, section 2.5). This reason was observed in some

responses specifically the need to recover the distribution and reproduction costs of cadastral products. However from literature perspectives cost-recovery benefits are more than the recovery of operational costs (see Dale, 2003). Also, operational costs comprise only recurrent costs, which are costs for paying variable factors of production. In the long run the organisation may need additional funding to finance capital goods such as computers, vehicles, building and other expenses. Therefore if the objective of adopting cost recovery is only recovery of operational costs, the organisation will continue to be dependent to the government and an appropriate cost recovery regime for this, would be 'partial cost recovery'.

A more plausible reason for imposing a 'full cost recovery' regime is linked to the need to invest in research and development for the sustainability of cadastral production (PSMA, 2009). The issue of sustainability has been crucial for cadastral organisations especially with the advent of science and technology (Proenza, 2006). Sustainability in the provision of cadastral products may be linked to a number of characteristics such as financial sustainability where the operation, maintenance, administrative and replacement costs are covered through user fee and the continued provision of cadastral products over a prolonged period of time (going beyond the lifespan of the original capital investment) (Cardone and Fonseca, 2003). Most cadastral organisations operating under 'full cost recovery' and some under 'partial cost recovery' regime were implementing cost recovery with the sustainability objectives (table 4.16).

Some cadastral organisations associated the adoption of cost-recovery to government policies or laws. That is cost recovery was directly adopted as a result of implementing a general policy of the government. However other forces not necessarily obvious to the implementing organisation, influences the government to introduce a particular cost recovery regime. In this respect implementers may not be in a position to effectively attain the desired policy goals if they are unaware of the objectives associated with a particular cost recovery regime under which they operate. These responses do not show the detail of the government policy rather cost recovery is seen as external to the cadastral organisation and is implemented as some sort of coercion from above. Definitely some policy directives, rules or regulations should guide the operations under cost recovery regimes. However, that alone can not be considered as a motive, rather cost-recovery should be imposed on economic efficiency reasons (Productivity Commission, 2001). That is the expected improvement in the efficiency of the provision of cadastral products.

A part from that, it was observed that cost recovery was in some cases implemented as a result of external influences through international directives issued by international organisations such as the European Union. For example one respondent associated the adoption of cost recovery to directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information. The directive generally requires charges to be cost-oriented over the appropriate accounting period and calculated in line with the accounting principles applicable to the public sector bodies involved (EU, 2003). This reason is related to the previous one since no benefit or advantage can be elicited from it following the adoption of cost-recovery.

One organisation provided that cost recovery was adopted because there were some people willing to pay for cadastral products. This observation can be associated to the need to capture consumer surplus under monopoly production (see Varian, 2003). It is adopted when the cadastral organisation

can easily identify potential customers of cadastral products and adopts some sort of price discrimination. Although in this case customers pay different prices, but the word 'price discrimination' is often not used in land administration domain as it relate to typical business strategies for which most government are not inclined to (Gompel and Steyaert, 2002; ECE, 2007). The cadastral organisation captures the willingness to pay through identifying individuals willingness to pay more than a 'subsidised fee' for a product such as a 'certificate of title' before a subsidised government programme is instituted in a particular locality.

'Self-financing' cadastral organisations under 'full cost recovery' regime often face serious problems during economic fluctuation as a result of rigid price and cost structures (Barnasconi and Van der Molen, 2009). Certain cadastral products such as 'certificate of title', are highly dependent on the economic situations since they are tied to the property market. For example LINZ coincided to have experienced a 25% decline in the demand for survey and 'certificate of title' due to economic downturn. As a result, it sought a contribution from the Government for $30 million over two years to underwrite the costs of survey and certificate of titles (LINZ, 2009). In support to this, one respondent while responding to the question on reasons for adopting cost-recovery pricing stated as follows: -

> *"… Cost recovery policy is driven by a dependency on economic fluctuations for certain services, especially those related to the real estate market …".*

For products highly tied to the land or capital market (such as the financial market) it may be important for cadastral prices to be linked to factor prices. When prices for cadastral products reflect costs in the property market or financial market, market signals are introduced into cadastral price structure. These signals include market fluctuations rate for specific products, which is important for predicting cadastral revenues. Another signal may be factor prices, especially when the cadastres hires labour and other inputs from the common labour or capital market (Productivity Commission, 2001). However, major setbacks are still lingering on this issue of cost and price flexibilities for cadastral products especially for 'self-financing' cadastral organisations operating under 'full cost recovery' regime. Government are clinging on cadastral price control, through legal processes such as review and approval, which often takes a long time. The time it takes for review and approval of fees may exceeds the time period for the economic problem the changes intended to address as observed in a response from one respondent who in response to a question on constraints faced while operating under cost recovery regimes said;

> *"… Any changes to fees have to follow defined approval path, which include a legislative element. The entire process from review to implementation can take 12 months".*

Changing perception in the provision of cadastral products is another reason advanced for the need to operate under cost recovery regimes. Some cadastral organisations under a budget-based model had realised that some public products can be assigned a price. This is associated with the general public awareness that even operations executed by the public sector have a price and that the private and the public sector have to cover their costs (Kaufmann, 1999). In response to the question on the reasons for operating under cost recovery regimes, one respondent said:-

> *"Currently my organization is in a process to review all the fees so that it can reflect the actual cost of the product. Previously that was not the case because we assumed that it was the responsibility of the government to serve its citizens without making them contribute to the cost of production. This policy has now changed".*

The underlined sections in the above quotation show that some cadastral organisations may adopt cost recovery because of changing perception on the relationship between government and citizens. In modern societies citizens are viewed as customers of the government, an approach which has facilitated the efficient provision of public products and services (Wessely, 2002).

5.7. Interpretation of the limitations in pricing cadastral products under cost recovery regimes

With respect to the limitations faced by cadastral organisations under either 'partial cost recovery' or 'full cost recovery' regime, table 4.17, shows that most cadastral organisations were constrained with legal limitations in price setting. It was observed that laws and regulation guide the pricing of cadastral products but, most cadastral organisations viewed that as constraint in pricing cadastral products under cost-recovery regime. Although legal constraints may prevent the attainment of cost recovery objectives, but the primary objectives of such laws and regulations are to facilitate cost-recovery and not impede it. This research suggests that granting autonomy for cadastral organisations can induce the implementation of cost effective prices. Though autonomy had no direct relationship with pricing options, but it can influence pricing options through cost recovery regimes. This is because with autonomy in price setting, cadastral organisation were able to implement different pricing options or consider different pricing factor for different or the same product at the same time. Strategies like these may enhance revenues and hence the level of financial cost-recovery.

A number of organisations also identified rules and regulations related to cadastral prices as one of the obstacles in cost-recovery pricing. This is because they restrict price setting autonomy by either fixing the prises or predefining the conditions to be considered in price setting (see New Zealand, 2003b; Finland, 2007). It is often difficult to foresee all the conditions that may influence cadastral product prices. The actual price is influenced not only by the costs-per-product and profit-per-product but also the intended use such as social or cultural activities or some biological characteristics or research purposes for which fees are waived (Finland, 2007; CUZK, 2008). However, predefining factors that should be considered in price setting or fixing prices can restrict cadastral organisations from adopting prices that reflect the real situations at a material time. To some cadastral organisations legal price fixing was not considered a problem. The problem they face were related on one hand to how cadastral prices are proposed, fixed and modified and on the other what organ/organs are vested with powers to execute each of the pricing related tasks?

The legal requirements that all decisions relating to the design, setting and modifying of prices for cadastral products be vested upon an external agency or government department rather than the cadastral organisation itself, was identified to be another constraints in implementing cost-recovery. The approach can lead to unnecessary delays in the required price changes and eliminates cost consciousness among employees of cadastral organisations. This problem was identified in one response where the respondents said that prices were being set by the Council of Ministers that is a political organ and not part of the cadastral organisation. Another organisation was completely

unaware of the price setting criteria but was required to implement those prices without any budgetary allocation. A related problem that was identified in this research is the involvement of more than one authority to set or approve prices. The involvement of more than one organisation in decision about prices can complicate the price setting process since opinions tend to differ and each organisation may have quite different interests in advocating a particular price. This problem can be eliminated if the organisations involved are only those involved in the provision of cadastral products but if other organisations with different tasks are involved, pricing decisions can become more complicated.

Price setting for cadastral products was constrained by political processes such as parliamentary approval, which depends on voting for decision-making. This was observed in one response where prices depended on the decision by the Ministry of Environment and political decisions. The major problem with political decision is that they are done through sessions, which are fixed per annum with predefined task in each session. This restricts emergent need for price changes in relation to economic circumstances. Related to that is the long time for price review and approval. As observed above, it can take up to 12 months from review to implementation. That means such price change may not be useful in a situation where the cadastral organisation wishes to cope up with a short term financial fluctuations of a lesser than a year time period.

The above observation show that the legal approach to pricing cadastral product is less dynamic compared to the industry it regulates. That is why many cadastral organisations see it as a constraint in pricing cadastral products. Cadastral products are related to the information industry, which is changing very fast (PSMA, 2008). Cadastral Production needs to reflect the changes in the information industry. Therefore productive organizations need to understand the economic dynamics of the information production (Van Oosterom Peter *et al.*, 2002). Contrary to that laws are meant to be used for years before they are amended even when there are efficient political systems, they may lag behind requirements of the market due to predefined sessions. This may be a major obstacle to charging prices that reflect the type of technologies used in cadastral production over time.

5.8. Concluding Remarks

In this chapter I have explained the basis for the observations made in chapter four by critically assessing the observed patterns and using interpretative approach to infer meaning and understanding. Three main issues emerges out of the discussion; the first is the dynamic value of cadastral products which necessitate charging and is aligned in favour of legal cadastral products, internalisation of pricing factors which enhances the organisational control over cost recovery for which most cadastral organisations lack and dynamism of cadastral production which is incompatible with the rigid legal processes in price setting for which most cadastral organisation complained of. However the above explanations provide a narrow approach upon which challenges and limitations to pricing cadastral products can be examined. A more comprehensive discussion may involve several scenarios based on socio-economic characteristics under which these organisations operate. Therefore in the next chapter a detailed discussion of challenges in pricing cadastral products will be provided based on a wider socio-economic context.

6. Implementing Cost Recovery: Scenarios, Challenges and Options

6.1. Introduction

This chapter addresses research question number three where challenges facing cadastral organisation in pricing cadastral products were examined. It provides an explanation of implementation directions, limitations and challenges when a 'partial cost recovery' or 'full cost recovery' regime is imposed upon a cadastral organisations once operating under 'no cost recovery regime'. The limitations and challenges are explained in the light of socioeconomic development and processes in registering properties in the respective countries as explained in chapter two (figure 2.4). The socio-economic categorisation of countries is based on the HDI rankings data from the UNDP Human Development Report, 2009 and data on registering properties rankings were derived from the World Bank Doing Business Report 2009 (table 4.2.1). The chapter is divided into three main sections. Section 6.2, identifies scenarios and categorises the challenges/possible challenges for cadastral organisations when operating under cost recovery regimes in countries with different levels of socioeconomic development. Section 6.3, identifies scenarios and relates processes in registering properties to cost recovery regimes. Section 6.4, identifies possible pricing options under cost recovery regimes as influenced by both socioeconomic constraints and processes in registering properties.

6.2. Cost recovery regimes and socio-economic development

The level of economic development of countries is related to the level or extend to which information products are utilised in that country (Craglia and Masser, 2003; Adeniyi, 2005) Barnasconi and Van der Molen (2009) provide that the negative development of the economy directly casts their shadow on the financial position of cadastral organisations. That means the level of economic development can shape the mode of cost recovery adopted or imposed upon cadastral organisations. Countries with fewer constraints towards achieving socioeconomic development may have less economic problems relating to incomes as well as the easy of changing towards user pay policies (Brits *et al.*, 2002). The UN (2007) coincides that cost recovery may create affordability problems. Countries from which responses were received are mapped according their socioeconomic classes in figure 6.1. This study observed that all cadastral organisations in MHD countries operated under either 'partial; cost recovery' or 'no cost recovery' regimes while cadastral organisations in VHHD or HHD countries were operating under any of the three cost recovery regimes (table 6.1). Under the Pearson chi-square test 0.05 significance values, 'cost recovery regimes' and socioeconomic classes (table 4.1), are dependent (two sided, value = 20.748, df = 4, p = 0) with a significant degree of association $(\gamma = -33\%)$. This means that most responses from cadastral organisations from countries with lower constraints in socioeconomic development were operating under higher level of cost recovery.

In terms of pricing options adopted, the majority of cadastral organisation adopted 'full cost charges' pricing option regardless of the socioeconomic classes. However for other prices there was a clear difference. 'Completely free of charge' and 'subsidised fee', pricing options predominated charging of cadastral products for cadastral organisations in MHD while 'full cost charges with profit' dominated in charging cadastral products in VHHD countries. These observations led to a conclusion that both cost recovery regime and pricing options were related to socioeconomic development in their respective countries.

Table 6.1 Distribution of responses under cost recovery regimes across socioeconomic classes

Socioeconomic class	Cost recovery regimes			Total
	No Cost Recovery Regime	Partial Cost Recovery Regime	Full Cost Recovery Regime	
VHHD	28	35	26	89
HHD	13	13	15	41
MHD	20	7	0	27
Total	61	55	41	157

Since countries differ in terms of socio-economic development, it is possible that these cadastral organisations face unique challenges when operating under cost recovery regimes. In the next sub-sections, challenges that might face a cadastral organisation under different socioeconomic classes are discussed based on two scenarios. The first is when a cadastral organisation operating under 'full cost recovery' is confronted with the adverse effects of a financial crisis and the second is when a 'partial cost recovery' or 'full cost recovery' regime is imposed upon a cadastral organisation, originally operating under 'no cost recovery' regime.

Table 6.2 Responses on pricing options across socioeconomic classes

Socioeconomic class	Pricing options				Total
	Completely Free of Charge	Subsidised fee	Full Cost Charges	Full Cost Charges with Profit	
VHHD	2	13	49	25	***89***
HHD	1	10	22	6	***39***
MHD	3	10	14	0	***27***
Total	***6***	***33***	***85***	***31***	***155***

6.2.1. Scenarios for cadastral organisations in VHHD and MHD countries

The first scenario for implementing cost recovery requirement is when a cadastral organisation in VHHD or HHD operating under a 'full cost recovery' regime has to deal with the adverse impact of a financial crisis. As observed in table 4.2, cadastral organisations operating under 'full cost recovery' regime charge all their products at either 'full cost charges' or 'full cost charges with profit' (table 4.1). However, for most of them prices were legally fixed with only a few organisations considering profit-per-product or cost-per-product (table 4.5). Under these circumstances, a decline in demand for cadastral product as a result of a financial crisis, poses a real challenge to the continued provision of cadastral products (Barnasconi and Van der Molen, 2009). A second scenario is when a 'partial cost recovery' or 'full cost recovery regime is imposed upon a cadastral organisation within VHHD or HHD countries. This is a possible scenario in those countries because this study has observed that some cadastral organisations in these countries were operating under 'no cost recovery' regime. The imposition of 'partial cost recovery' or 'full cost recovery regime may be associated with the need to

eliminate or minimise costs to the central government for the provision of cadastral products (ECE, 2007)

6.2.2. Challenges facing cadastral organisations in VHHD and HHD countries

The major concern for cadastral organisations under 'full cost recovery' regime in VHHD and HHD is dealing with the adverse impact associated with a financial crisis. This is because the property market which is in most cases a major source of revenues to the cadastral organisation, is highly tied to the financial market (mortgages and loans) (Barnasconi and Van der Molen, 2009). In this study, two respondents raised this concern. In one case the respondents admitted the difficulties in setting prices for cadastral products during fluctuations of activities in the property market and he asserted as follows: -

> *[…] with fluctuations in activities in the property market it is extremely difficult to set charges to exactly match the cost of service delivery […]*

This response shows that though 'full cost-recovery' regime may ensure sustainability in the provision of cadastral products, such capability depend on its stability to withstand fluctuations in the property market. That means the success of any cost recovery strategy may not only be determined by the internal efficiency of the cadastral organisation but also efficiency of the wider real estate market. If players in the real estate industry adopt strategies like speculations, or when the mortgage market dwindles as a result of mismanagement in the financial sector, cost recovery strategies can have adverse effects upon the cadastral organisation. Given the fact that most real estate and financial market are outside the direct control of the state, Some VHHD and HHD governments decided to retain their cadastral organisations within a budget-based model to avoid the adverse impact associated with a financial crisis.

The reasons for maintaining cadastral organisations within the budget-based model hence excluding the possibility of 'full cost recovery' regime may also be related to historical reasons. It was observed that 7 out of 10 cadastral organisations from countries in Eastern Europe were operating under a budget-based model. This could be associated to the former socialist political regime practiced by most of these countries. The concept of cost-recovery is not recognised in most of these countries (Wessely, 2002). A possible scenario for these countries is the second one where the cadastral organisation shifts from 'no cost recovery' regime or 'partial cost recovery' regime to 'full cost recovery' regime. Such a move requires a socio-political transformation rather than an economic one. This is because issues of affordability do not raise serious concern for countries under HHD or VHHD due to higher per capita income. One challenges for these organisations may be changing the old enshrined beliefs and perception on the provision of cadastral products such as 'free provision' and 'citizens services' rather than 'customer services' (Wessely, 2002). These conceptions may take long especially for countries that have long been in a socialist political ideology.

Despite the above dilemmas, most respondents did not associate a financial crisis or perceptions on cost-recovery as reasons or challenges in implementing cost recovery. The responses reflected current initiatives in cadastral development where cost recovery seem to define the future of the provision of cadastral products (Kaufmann and Steudler, 1998; Van der Molen, 2003a). They see legal limitations as a major challenge when operating under 'partial cost recovery' or 'full cost recovery' regime.

However in modern democratic societies, the government and legislature cannot force cost-recovery provision of cadastral product unless people are willing to pay for access to these products (Van der Molen, 2003a). Most of the respondents who associated the adoption of a specific cost recovery regime to legal requirements might have overlooked an important element associated with cost recovery, that is an overall ability and willingness to pay for publicly provided products among the population (Cardone and Fonseca, 2003).

Another challenge of implementing cost recovery laws for cadastral organisations in VHHD and HHD countries relates to setting relevant prices for cadastral products. Under 'full cost recovery' regime, appropriate pricing for cadastral products may be a determining factor for the survivor of cadastral management. Under this regime prices for cadastral products are set so as to reflect not only the current costs of production but also future investment in capital goods, research and human capital development. The challenge for cadastral management is what prices would ensure the attainment of these goals? The often-adopted approach to pricing cadastral products is price fixing through legal and political process. Most respondents from VHHD and HHD complained of this practice as it eliminate the necessary price setting flexibility which is crucial in pricing cadastral products (table 4.18). Price setting flexibility entails the ability of the cadastral organisation or provider of cadastral product to set and modify prices so that it reflects the economic situation at a particular time. Legal price fixing requires a legal and/or a political process to approve and/or review the existing prices. The success of this approach depends on how quick these legal and political processes are.

An alternative approach adopted by cadastral organisations in pricing cadastral product is associated with limited flexibility in price setting where the law sets conditions that should be considered in setting prices for cadastral products (see New Zealand, 2003b; Finland, 2007). In this approach the providers of cadastral products determine the actual price to be set basing on those conditions. These conditions may include criteria's such as age and physical or health conditions of the customer (Finland, 2007). Also some countries consider the use to which the products will be put i.e. for research, cultural or economic uses (CUZK, 2008). One challenge under this environment is multiplicity of charging criteria, which complicates the process of pricing cadastral products specifically if some of the criteria are difficult or non-verifiable. These criteria can create additional costs, which will further burden the final consumer of cadastral product especially when further research is conducted to determine the actual price to be charged.

The last approach adopted by cadastral organisation in VHHD and HHD is the market approach where the organisation has full price setting autonomy to charge the higher of the market price (DTF, 2006). This approach requires the existence of private or public cadastral products providers operating in the market. In some VHHD and HHD countries the market for cadastral products exists (figure 6.2). The challenge for this approach is that in countries where there are no competitors in the provision of cadastral products, it may be difficult or impossible to implement this approach. Likewise if the cadastral organisation has limited cost flexibilities relating to hiring or firing some redundant factors of production in times of declining sales, the approach becomes difficult for cadastral organisations having permanent employees (see Barnasconi and Van der Molen, 2009). The approach requires a cost flexibility to a level comparable with private organisation where factors of production (inputs) can be hired or fired depending on their relative profitability as dictated by market conditions. However this was lacking for most cadastral organisations investigated.

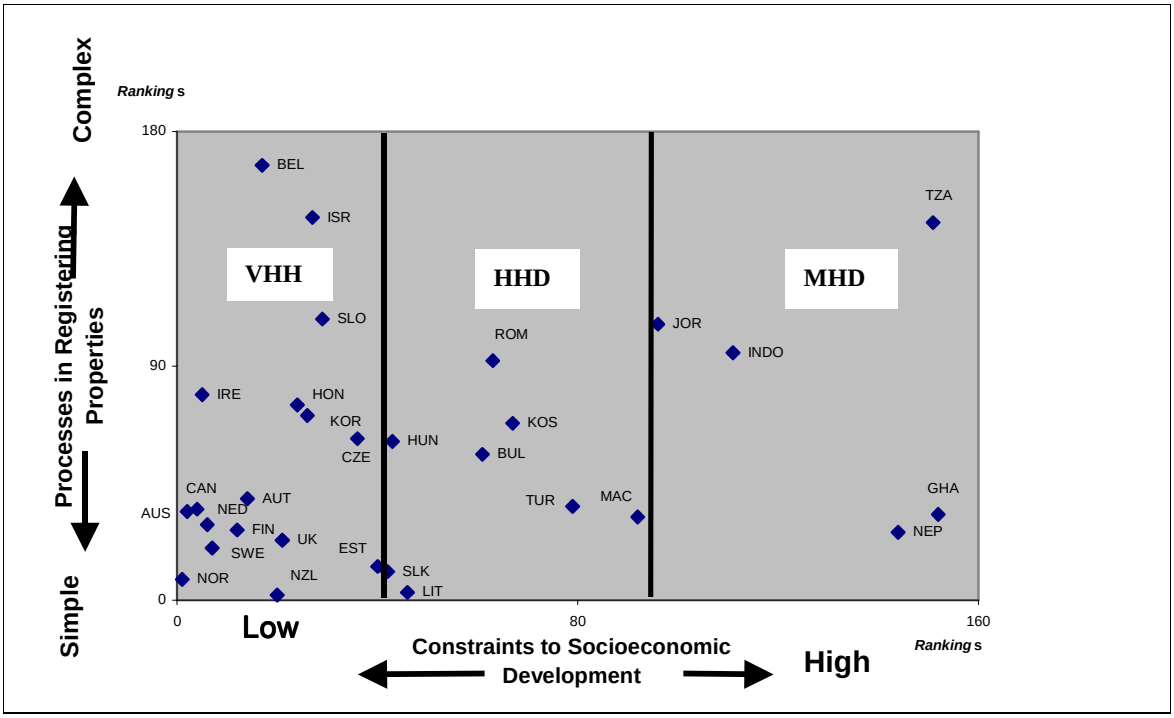


Figure 6.1 Respondent countries in relation to socioeconomic classes and Registering property classes

Within the social and political arena, a different scenario is possible. That is government in VHHD and HHD countries face pressure from individuals who are increasingly demanding freedom of expression and the rights to publicly held information including cadastral products (Dale, 1999). With these pressures from the economy and the society, the governments may find it appropriate to balance the need of the society and the pressures from the economy. This can be done through allowing a cadastral organisation to operate under 'partial cost recovery' regime. This mode of cost recovery allows a limited state control in the provision of cadastral products specifically as dictated by the amount of its financial contribution to the provision of cadastral products as evidenced in one response where the contribution is strictly fixed, 50% budget and 50% cost recovery. Therefore, customers have an important role in the cadastral organisation. Partial cost-recovery gives a sense of ownership to each party involved in cadastral production. However, there are a number of challenges in this regime especially when responsibilities are vested to irresponsible parties who may neglect their duties leading to wastage of resources by one side whereas at the end, no products is provided.

Another challenge under 'partial cost recovery' regime is defaulting by the government. In this research it has been observed that one of the violator of laws relating to cost-recovery is the government since in most cases she fails to meet her obligations. For example in one response the respondents claimed that the revenues collected by the organisation had to be submitted to the government for which according to the law, 75% were to be reimbursed back to the organisation. However it was claimed that the government often returned only 18%-20%. This complicates the sustainable provision of cadastral products under 'partial cost recovery' regime.

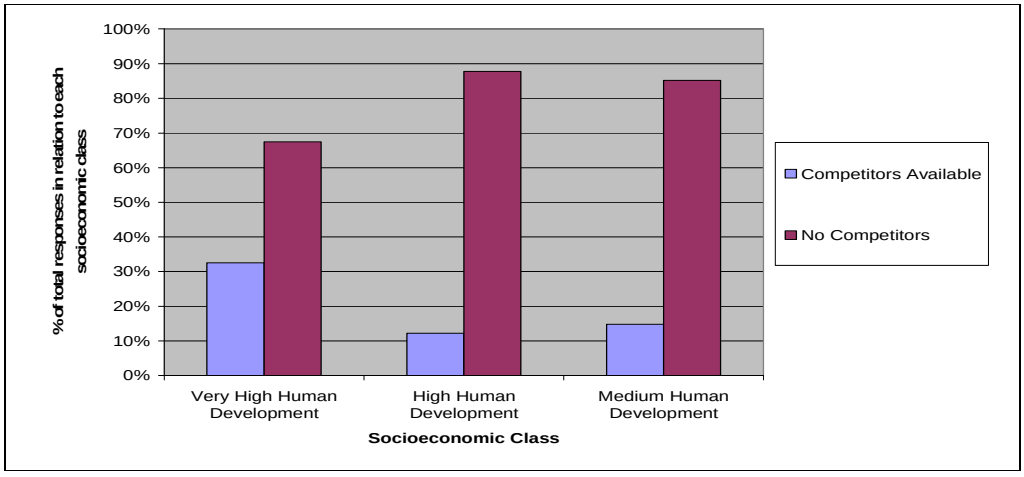


Figure 6.2 Availability of competitors in relation to socioeconomic classes

6.2.3. Challenges for cadastral organisations in MHD countries

On the other extreme of social economic development are countries categorised as MHD. All cadastral organisations investigated from this category operated under 'no cost recovery' regime except one organisation that operated under 'partial cost recovery regime'. In most of these countries the annual per capital income is estimated at $5000 or less (Nation Master, 2009). Lower per capital income raises affordability concern (AusAID, 2001; Brits *et al.*, 2002; Barnes, 2003; UN, 2007). Another reason that explains the inability of these countries to operate under a 'full cost recovery' regime relate to the failure to define cadastral products due to lower technical capacity. This is due to lack of detailed property information (Ratan, 2006; NMCA, 2007), which are key in the design and dissemination of cadastral products. The design of cadastral products depends on the technological as well as commercial conditions (Cockshott and Cottrell, 1997). Technology dictates the need to have skilled personnel and equipment including information systems. Commercial conditions dictate the marketability of products (Bennett *et al.*, 2008). However, this study did not find a significant dependency between cadastral products and socio-economic classes of countries, which means that varieties in cadastral products had limited relationship to the countries level of socioeconomic development. This is because most products investigated were legal products the provision of which does not depend on the level of socioeconomic development. Apart from that all cadastral organisation in MHD countries were financially controlled by the central government. This hinders technological innovations and business oriented initiatives, which if applicable, could solve some of the existing problems in relation to the provision of cadastral products (Dale, 2003).

Since most organisations from MHD countries were operating under 'no cost recovery' regime, they did not face remarkable challenges in pricing cadastral products. Laws and regulations authoritatively established prices for each product for most of the investigated cases (table 4.5). Achieving cost-recovery goals under these environments is difficult or unrealistic. This is because with financial control outside the cadastral organisation, cadastral personnel have limited incentive on the efficient operation of the organisation (see Dale, 2003; Pollock, 2008). It is the responsibility of the state to enhance efficiency through improving salaries or improvement of equipments and processes. These strategies may not be effective, as the realised revenues tend to spill over to the general economy and not necessarily to the cadastral organisation.

6.3. Cost recovery regimes and processes in registering properties

Processes in registering properties determine the level to which customers or citizens have access to cadastral products (NMCA, 2007). Inaccessibility of cadastral products in the process of registering properties may be one of the causes of informality and conflicts (World Bank, 2008). In situations where regulations on the provision of cadastral products are onerous, levels of informality are higher. However an informally obtained cadastral product may lack some attribute of a genuine product. Cadastral products such as 'general mortgage information' and 'general real property information' may be needed when formally transferring a property. Therefore, efficient provision of cadastral products can help to eliminate unnecessary obstacles associated with registering properties.

There is no explicit classification of countries according to the level of processes in registering properties. In this section I have arbitrarily categorised rankings of countries in terms of processes in registering properties into three categories based on rankings of the World Bank, (2009) rankings. The first are countries codenamed as 'very simple', comprising countries ranking from 1 – 60, the second are those countries from 61 – 120 codenamed as 'fairly simple' and the last are those ranking from 121 and above, codenamed as 'complex' (see figure 6.3). This study assumes that cost recovery regimes implemented by countries with different levels of processes in registering properties are different. The results in table 6.3 show that the majority of respondents organisations from countries with 'very simple' processes were operating under 'partial cost recovery' regime while the majority of cadastral organisations from countries with 'fairly simple' processes and those with complex processes were operating under 'no cost recovery' regime. Thus processes involved in registering properties can help in understanding cost recovery regimes imposed upon cadastral organisations. This is supported by a significant dependence between registering properties classes and cost recovery regimes under the Pearson chi-square 2-sided test (value =30.158, df = 4, p = 0.0) with a significant degree of association $(\gamma = -56\%)$. This means that most cadastral organisations in countries with 'simple' processes in registering properties were operating under higher levels of cost recovery and vice versa.

Table 6.3 Distribution of responses across registering properties classes

Registering property class	Cost recovery regimes			Total
	No Cost Recovery Regime	Partial Cost Recovery Regime	Full Cost Recovery Regime	
Very Simple	23	41	31	***95***
Fairly Simple	27	14	10	***51***
Complex	11	0	0	***11***
Total	***61***	***55***	***41***	***157***

In terms of pricing options adopted, results are displayed in table 6.4. Though most responses were associated with 'full cost charges', there was a clear difference in other pricing options. Most responses from cadastral organisations in countries with 'complex' processes were associated with 'subsidised fee', pricing options. Cadastral organisations in countries with 'fairly simple' processes were predominantly charging at 'full cost charges' with other pricing options comprising less than 10% of the total responses for each. However for cadastral organisations in countries with 'very simple processes, it was observed that the 'full cost charges with profit' and 'Subsidised fee' pricing options comprises a greater proportion of responses signifying a key role of these pricing option in these countries. However, under these circumstances it is difficult to say that processes in registering

properties can help understand pricing options for cadastral products. In the following discussion, two extremes in registering properties were considered. These are cadastral organisations in countries with 'very simple' processes and those with 'complex' processes in registering properties.

Table 6.4 Pricing options across socioeconomic classes

Registering property class	Pricing options				*Total*
	Completely Free of Charge	Subsidised fee	Full Cost Charges	Full Cost Charges with Profit	
Very Simple	3	23	39	28	***93***
Fairly Simple	3	5	40	3	***51***
Complex	0	5	6	0	***11***
Total	***6***	***33***	***85***	***31***	***155***

6.3.1. Cost recovery scenarios for cadastral organisations with 'very simple' processes in registering properties

One scenario for cadastral organisations in countries with 'very simple' processes in registering properties would be coping up with increasing demand for cadastral products. That means I consider cadastral organisations operating under 'partial cost recovery' or 'full cost recovery' regime and are confronted with an ever-increasing demand for its products following simplification of the registration procedures. Most cadastral organisations investigated in this research had simple processes in registering properties and most of those with simple processes were operating under 'partial cost recovery' regime (figure 6.4). Simple processes in registering properties may be associated with timely and low prices in the provision of cadastral products.

6.3.2. Cost recovery challenges in relation to 'very simple' processes in registering properties

If a cadastral organisation has simple processes in registering properties, it may fuel the attainment of cost-recovery goals since it may motivate property transfer, eliminate transaction costs and guarantees the success of transactions. This can increase registered transactions and ultimately enhances the revenues of the cadastre. However, this will only be true under specific assumptions such as ability to pay, which can be justified on the ground that prices charged for cadastral product are efficient prices, they reflect the minimum the cadastre can charge. Another assumption is awareness on the availability of products and the use to which they can be put. This can be justified on the ground that processes involved in accessing cadastral products are simple, hence easy to comprehends and understand. However since cadastral products can be put to different alternative uses, it is difficult to justify that everybody in a particular society may be aware of all the alternative use of cadastral products. Therefore not all countries having simple processes in registering properties can operate efficiently under 'full cost recovery' regime or 'partial cost recovery' regimes. Among the investigated organisations it was observed that few operated under 'no cost recovery' regime in countries where property registration was simple. This observation may be explained by economic reasons rather than complexity in registering properties.

6.3.3. Cost recovery scenario for cadastral organisation with 'complex' processes in registering properties

The scenario for cadastral organisations with 'complex' processes is on coping with declining demand for cadastral products. This is because complex processes are associated with low demands for cadastral products as the complexity in registering property deters potential customers from

registering properties (AusAID, 2001), which is the main source of revenues for cadastral organisations. With less registered cadastral information the cadastral organisation cannot design an adequate number of cadastral products hence, unable to meet the demand for cadastral product from its customers. Likewise the potential demand may not be fulfilled because of the inability of the cadastral organisation to collect and store cadastral information. Therefore the revenues to the cadastral organisation will be minimal. Apart from reducing the sources of revenues for the cadastral organisation, inadequate cadastral information may reduce or eliminate the reputation of the cadastral organisation hence jeopardise its' existence as a sole provider of cadastral products within its jurisdiction (Van der Molen, 2003c).

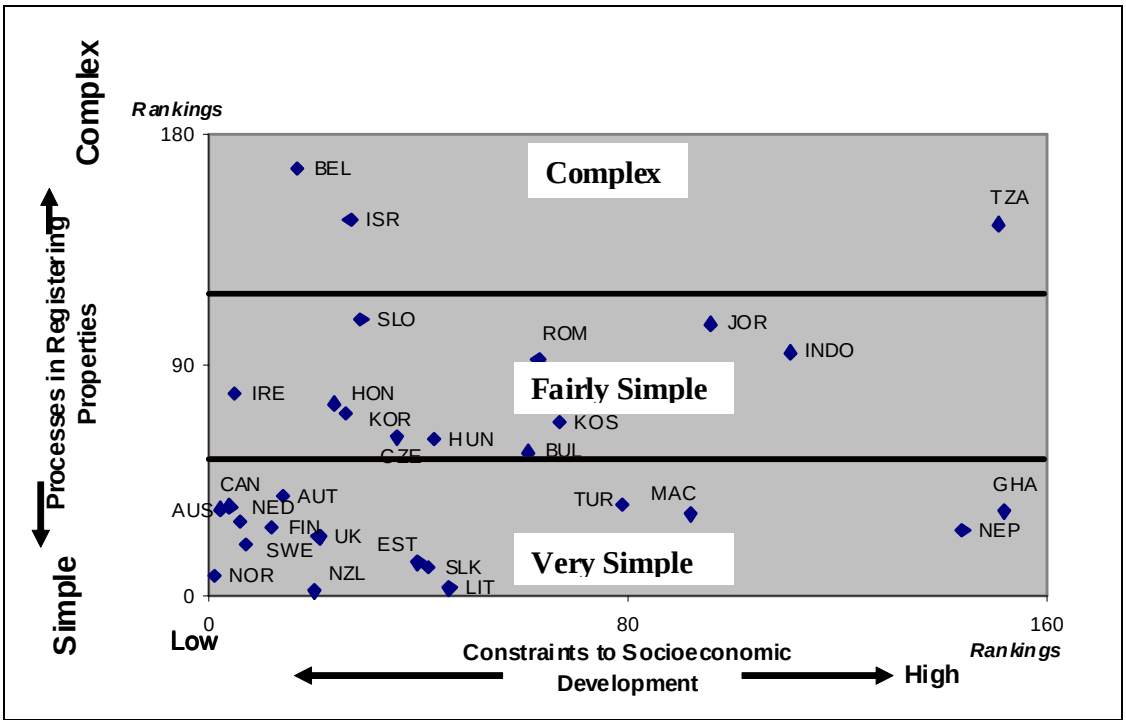


Figure 6.3 Ranking of countries from which responses were received in relation to registering property classes

6.3.4. Cost recovery challenges for cadastral organisations with 'complex' processes in registering properties.

As observed above failure to meet customer expectations in the provision of cadastral products risks the removal of some or all cadastral responsibilities away from the incumbent cadastral organisation (Van der Molen, 2003b; Cimander *et al.*, 2006). This is because politician being dissatisfied with the performance of the cadastral organisation can propose new initiatives in the provision of cadastral product including removal of cadastral responsibilities from the incumbent organisation (Van der Molen, 2003b). Likewise they may decide to introduce competition, which though advantageous to the national economy, have adverse impact to the cadastral organisation operating under 'full cost recovery' regime.

The provision of cadastral product can be facilitated through public-private partnership (PPP) by outsourcing technological as well as managerial capabilities (Van der Molen, 2002). Complex processes in registering properties may discourage potential investment in cadastral related activities

by private or foreign firms, i.e. few private firms are likely to invest in cadastral survey since registration processes that follow after such services will discourage them. With limited players in the provision of services related to cadastral products, the cadastral organisation faces limited alternatives from which to choose the best especially when outsourcing. This leads to high operation costs and under 'full cost recovery' such costs will be reflected in the prices for cadastral product. Therefore, cadastral organisations in these countries when operating under 'full cost recovery' regime are likely to either charge high prices for cadastral products or adopt customers based price discrimination. This was observed in a response from one organisation where charges are applicable to those willing to pay for products that are otherwise fully subsidised by the government.

6.4. Possible options in tackling challenges under cost recovery regimes

In this research possible pricing options in dealing with challenges when operating under cost recovery regimes were a result of combining challenges identified under socioeconomic conditions with those under complexity in registering properties. The result is a combined effect of socioeconomic conditions and processes in registering properties under which a cadastral organisation operates. Figure 6.4 shows the resulting clusters of countries from which cadastral organisations were investigated. Nine clusters were identified and codenamed. Possible options in dealing with the challenges explained above will be linked to these clusters whenever evidence supports that.

'Partial cost recovery' regime comprised the majority of cadastral organisations from 'very simple VHHD, Very simple and fairy simple HHD and fairy simple MHD (figure 6.4). Cadastral organisations under 'partial cost recovery' regime can be challenged by the possibility that some contributors to the provision of cadastral products may neglect their responsibilities while the demand for cadastral products is high and investment in products complementary to cadastral products is increasing. Such irresponsibility may ensue when financial contribution rather than complete provision of products, defines the obligations of parties in the provision of cadastral products. If financial contribution does not lead to a complete provision of a product, it is difficult to identify sources of additional funding. If the contribution is based on products it is possible to solicit additional funding to a respective contributor until a final product is produced.

Under the scenario of a financial crisis, which may only be local (within a cadastral jurisdiction), a cadastral organisation may benefit if it has comparatively simple processes in registering properties than cadastral organisations in neighbouring jurisdiction. The crisis may encourage external investors in the property market and in the provision of products complementary to cadastral products, which may stimulate the demand for some cadastral products. Under these circumstances the strategy by the government could be to confer full price setting autonomy to the cadastral organisation. This will allow the cadastral organisation to charge flexible prices that reflects the economic realities at a particular time. However it was also stated in the proceeding discussion that in certain circumstances during a financial crisis, cadastral organisation may realise that cadastral products are highly needed but the willingness to pay (effective demand) is very low. For HHD or VHHD countries this may be attributed to high prices charged for cadastral products and may be eliminated through lower prices.

Furthermore, cadastral organisations in VHHD and HHD countries may face souring demand for cadastral products during a financial crisis. This is a common phenomenon for countries with complex procedures in registering properties (complex VHHD) or when laws fix prices and it requires a long approval procedure. With flexible prices, cadastral organisations may lower prices hence relaxing the complexity in registering properties, which may stimulate demand for cadastral products. However the willingness to pay (effective demand) for cadastral products depends on the perceived reputation of the cadastral organisation to the public as reflected in the level of customer satisfactions (Brits *et al*., 2002). With complex processes such reputation may be lower such that changes in prices do not stimulate demand. Likewise reputation of the cadastral organisation may highly be influenced by multiple charging conditions and involvement of more than one organisation in setting prices for cadastral products. These were observed in many responses for cadastral organisations especially in very simple and fairly simple cluster (figure 6.5). Therefore simplification of registration procedure other than direct costs or prices may facilitate the provision of cadastral products during a financial crisis.

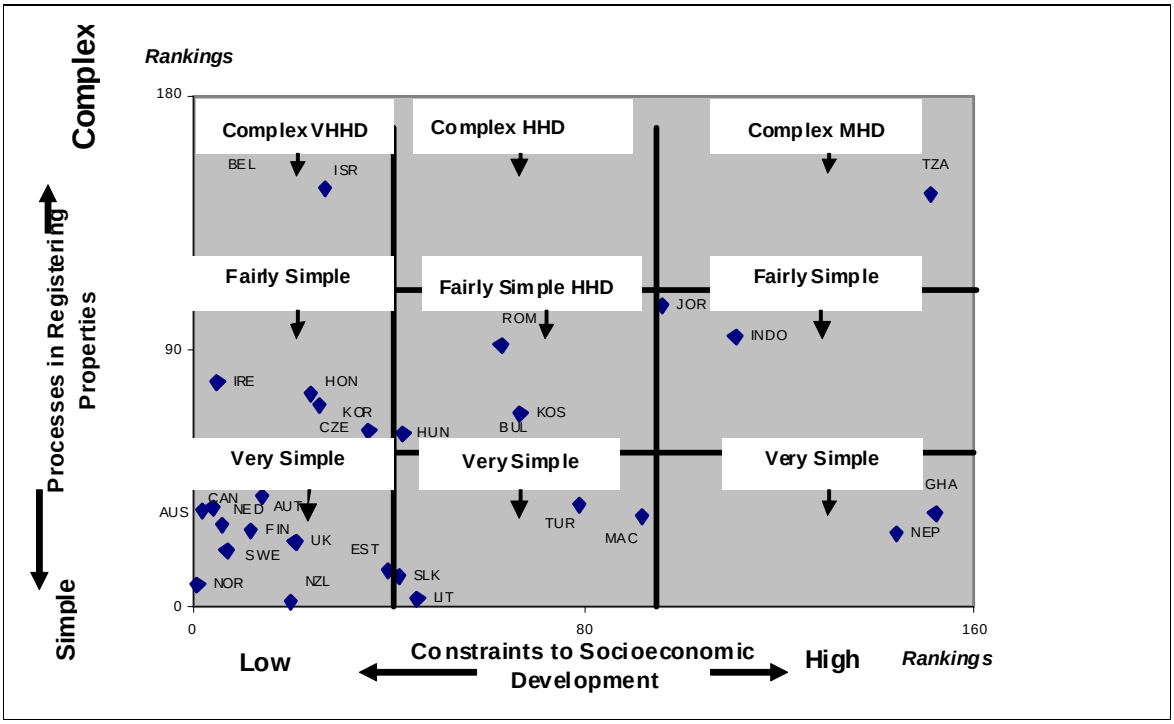


Figure 6.4 HDI and processes in registering properties –clusters for derivation of options for tackling challenges under cost recovery regimes.

In a situation where registration of property is complex, cadastral organisation in VHHD and HHD may face low demand for their products and declining investment in products complementary to cadastral products. Since adopting lower prices may stimulate effective demand, these organisations also need flexibility in their pricing options. This will allow the adoption of appropriate price when the complexity in registering properties is relaxed or strengthened. In order to effectively operate under competition the organisation may need powers to sue if the government fails to meet its obligations. However, if that is not the case, 'partial cost recovery' or 'full cost recovery' regime is not recommended.

In section 6.3, it was observed that cadastral organisations in MHD countries with simple processes in registering properties were facing a number of challenges. The simple processes may motivate the desire to register properties hence a need for cadastral products. However the majority are poor and therefore the high needs are not automatically translated into demands for cadastral product. Cadastral organisations need a pricing strategy that will help translate these high needs or desire for cadastral products into demand. Such pricing schemes may include state subsidisation. This was the case for the investigated organisations where under MHD countries; most cadastral organisations were under no cost recovery regime, with one organisation operating under 'partial cost recovery' regime (table 6.1). These countries also have limited capacity to provide cadastral products while the need may be high especially with simple processes in registering properties. Initiatives to enhance the production capacity must be coupled with appropriate pricing options that will motivate the demand for cadastral products.

In the scenario of a cadastral organisations moving from 'no cost recovery' to 'partial cost recovery' or 'full cost recovery' regimes, it was observed that some cadastral organisations in VHHD and HHD are challenged on one hand by being financially controlled by the state and on the other the intention to encourage investment in products complementary to cadastral products. This may specifically relate to the digital imagery industry where some cadastral products are useful inputs. State control may eliminate the cadastral organisation from the necessary managerial flexibility to meet the growing need of the information industry (see Van Oosterom Peter *et al.*, 2002). To enhance managerial flexibility in the provision of cadastral products legally fixed prices may be useful since it helps managers to make quick and timely decision without compromising state control of the organisation. The World Bank (2008) Doing Business Report, observed that economies with simple processes in registering properties tend to have fixed prices for some cadastral products. This helps a cadastral organisation to cope with the increasing investment in products complementary to cadastral products.

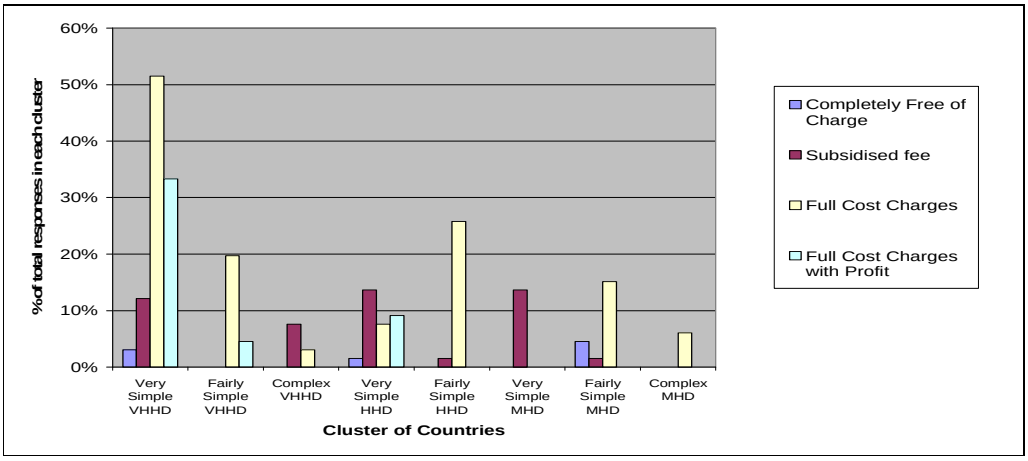


Figure 6.5 Pricing options in relation to clusters of countries

For cadastral organisations in MHD with simple processes, the movement to 'partial cost recovery' or full cost recovery' may be challenged by the low ability to provide cadastral products under increasing demand due to increased investment in the private information industry. Under these circumstances charging market prices for certain customers may be justified (see figure 6.6). This can

be done through price discrimination. This was observed in one case for an organisation under MHD where the organisation charged at 'full cost charges' for customers who were willing to pay for cadastral products and 'subsidised fee' for those unable to pay. Such form of price discrimination (not based on economic criteria) was also observed in a number of countries where different uses of cadastral products are charged differently (see Finland, 2007). For example the demand for cadastral products for research, health or cultural uses was charged at 'completely free of charge' to both individuals and institutions while other commercial uses were charged at 'full cost charges' or 'full cost charges with profit' options (CUZK, 2008).

Cadastral organisations in MHD countries with complex processes in registering properties faces a low ability to pay for the majority of the people coupled with a low demand for cadastral products. This is a typical phenomenon in countries in transition where the majority of the people are poor and they are not aware how useful cadastral products are (Wessely, 2002). Under these circumstances cost recovery initiative and positive pricing will not work. The only solution could be to foster an environment where users of cadastral products are rewarded instead of being charged (negative-price). The cadastral organisation need long term cost recovery ambitions and provide cadastral products through donations, volunteerism and government subsidisation with the hope that over time individuals and communities may realise the usefulness of cadastral products. Such realisation is likely to develop a need for cadastral products, which may be translated into demand.

The complex processes in MHD for cadastral organisations operating under 'partial cost recovery' or 'full cost recovery' regime may be coupled with the need to enhance revenues while its ability to provide cadastral products and the demand from the general population is low. This can be solved through altruistic means by encouraging individuals and experts to volunteer in the provision of cadastral products.

However, such low capacity may be coupled with the desire to eliminate monopoly or declining investment in products complementary to cadastral products. That means the complexity in registration processes discourages investors despite effort to eliminate monopoly in the provision of cadastral products. Given the low ability of the cadastral organisation to provide cadastral products the solution in this case may be to simplify the registration processes. Pricing may not be useful in this case.

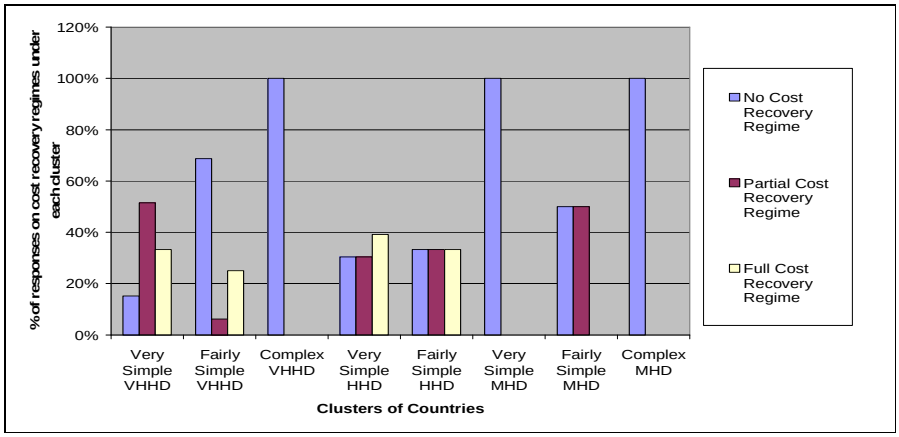


Figure 6.6 Cost recovery regimes in relation to clusters of countries

6.5. Concluding Remarks

In this chapter I have explained how cadastral organisation in different countries face challenges when operating under or moving towards 'partial cost recovery' or 'full cost recovery' regimes. I have argued that appropriate pricing schemes may help cadastral organisations to handle some challenges. However, appropriate pricing options may not provide answers to all challenges facing cadastral organisations. Therefore, the changes associated with operating under a cost recovery regime do not only lie in pricing cadastral products rather in taking into account the wider socioeconomic relations existing between the cadastral organisation, the government and the user community. Pricing options as a tool to achieving cost-recovery goals is only useful when there is a market for cadastral products and the majority in the population are fully aware of the use of cadastral products. As a strategic tool to deal with challenges of the open market economy, pricing options need to be flexible to reflect market realities as long as this is not the case for most cadastral organisations investigated, operating under 'cost recovery regime' remains complex and a major challenge to cadastral organisations.

7. Conclusions and Recommendations

7.1. Introduction

In this research, three research questions were addressed. The first question was "What are the different forms of cost recovery regimes implemented by cadastral organisations?" It required the classification of cost recovery regimes under which cadastral organisations operates. This entailed the accomplishment of three tasks. Firstly the identification of cadastral organisations and cadastral organisational models in the provision of cadastral products, secondly the identification and development of criteria to be used in classifying cost recovery regimes, and lastly establishing a theoretical relationship between cadastral organisational models and cost recovery regimes. The second question was "What are the anticipated pricing options for cadastral products under different forms of cost recovery regimes?" It needed an exploration into possible pricing options that cadastral organisations may adopt when moving from a 'no cost recovery' regime to a 'cost-recovery' regime. This required firstly, a definition of cadastral products, secondly, a categorisation of pricing options for cadastral products, thirdly, the determination of how cadastral organisations choose between these pricing options when assigning prices for their products and lastly, how these pricing options are related to different cost recovery regimes. The last question was "what are the major forces driving cadastral organisations into implementing some form of cost recovery regimes?" It needed an explanation on whether the imposition of cost recovery regime was associated with socio-economic conditions that cadastral organisations face or not. This required the identification of reasons for operating under a particular cost recovery regime, challenges faced and methods of dealing with those challenges. The findings on all these three research questions are summarised in this chapter.

7.2. Conclusions on Findings

7.2.1. Forms of cost recovery for cadastral organisations (Q. No. 1)

In order to identify different forms of cost recovery for cadastral organisations, it was first necessary to understand what these cadastral organisations are. In this research I defined a cadastral organisation as an organisation providing cadastral products to the public. They were categorised into two organisational models. The first is the budget-based cadastral organisational model where the government takes a central and proactive role in the provision of cadastral products. The government (cadastral organisation) may charge for these products but profit making is not favoured (Gompel and Steyaert, 2002). The second is the self-financing cadastral organizational model which attempts to distance a cadastral organisation from the arm-length of the central government (Caulfield, 2002). Cadastral production under this model is a business (Van der Molen, 2001), therefore profit charging is a viable option. It should be noted that cadastral organizations under the self-financing model share some characteristics with private corporations especially in management (Kadaster, 2008), such as limited liability and transferable shares (see PSMA, 2009). Although these characteristics are valid to some self-financing cadastral organisations, most of these organisations are recognised as legal bodies

'sui generis' (by law), which is different from a typical private company (Barnasconi and Van der Molen, 2009).

From the land administration point of view, cadastral organisational models are directly linked to the ability of the cadastral organisation to generate funds and therefore to recover costs (Van der Molen, 2003b). However, this study takes a slightly different approach to cost-recovery. It considers cost recovery from a regime perspective. A cost recovery regime is not only associated with the legal obligations imposed upon a cadastral organisation to generate revenues so as to recover the costs, but also the fate of the realised revenues and possibilities of subsidisation from the government. In case of any partial claim of the revenues generated by the cadastral organisation or any fixed budgetary allocation, such organisation was classified as operating under 'partial cost recovery'. regime. 'Full cost recovery' regime means the organisation operate without any claim from the government on its revenues and no budgetary allocation. Relevant claims under 'full cost recovery' regimes are only those related to contractual agreement between the government and the cadastral organisation. A 'no cost recovery' regime means either there is no cost recovery policy or if there is any such policy, all the revenues collected by the cadastral organisation are for enhancing the general revenue base of the government.

Classifying cost recovery regimes may be useful for making decision about pricing options that may be adopted. Most of the benefits of cost recovery initiatives accrue because of the limited role of the government in the provision of cadastral products (Van der Molen, 2002). Such role may be at the management decisions such as price setting or at the operational levels such as production and marketing.

This research also investigated whether cost recovery regimes were related to certain forms of cadastral organisation models. It was found that the majority of budget-based cadastral organisations were associated with either 'partial cost recovery' or 'no cost recovery' regimes while the majority of self-financing cadastral organisations were operating under the 'full cost recovery' regime. Therefore it can be concluded that the imposition of cost recovery regime is associated with certain forms of cadastral organisational model. However this does not exclude some possibilities that self-financing cadastral organisation may operate under 'partial cost recovery' regime specifically when there is a clear demarcation between administrative and operational costs or when cadastral responsibilities are well defined under 'partial cost recovery' regime.

7.2.2. Pricing option for cadastral products under cost recovery regimes (Q. No. 2)

The second question intended to anticipate possible pricing options that may be imposed or adopted by cadastral organisations for the seven products investigated. To adequately tackle this question, data were collected from a total of 35 cadastral organisations across the globe coupled with intensive literature review. The results were that, four pricing options were identified for cadastral products these are 'completely free of charge', 'subsidised fee', 'full cost charges' and 'full cost charges with profit' (fig 2.1). The classification of pricing options depended on the characteristics of different approaches in pricing PSI as understood by different scholars. The actual price setting for cadastral products is not uniform across cadastral jurisdictions, just like other PSI, it depends on the wider social, political, technological and economic circumstances (Pollock, 2008). There was one extreme

case where pricing cadastral products was completely outside the mandate of the cadastral organisation while the organisation was under 'full cost recovery regime'.

In pricing cadastral products certain pricing options were discovered to dominate for cadastral organisations under 'partial cost recovery' or 'full cost recovery' regime as shown in table 4.2. The result shows that most cadastral products are charged at 'full cost charges' with the exception of 'statistical data on the land market', regardless of the cost recovery regime under which they are provided. Most cadastral organisations charge 'statistical data on the land market' at either 'completely free of charge' or at 'full cost charges with profit' (table 4.3). It was observed that the 'full cost charges with profit' pricing option is predominantly applied by cadastral organisations under 'full cost recovery' regime, while the 'completely free of charge' and 'subsidised fee' pricing options are predominantly applied by cadastral organisations under 'no cost recovery' and 'partial cost recovery' regimes. Under 'no cost recovery' regime, the 'full cost charges' dominated in charging cadastral products. 'Completely free of charge' pricing option dominated charging of cadastral products under 'partial cost recovery' regime while 'full cost charges with profit' was predominantly applied under 'full cost recovery' regime. However, for some cadastral products, a substantial number of responses under 'partial cost recovery' regime were associated with 'full cost charges with profit'.

From the direct observation, it was difficult to infer remarkable pattern in pricing cadastral product other than the fact the most cadastral organisations investigated were charging at 'full cost charges'. This observation supports the argument by most scholars that there is an international agreement that the provision of cadastral products should be based on user fee (Karikari, 2006). However in terms of pricing options adopted under different cost recovery regime, the differences are much clearer. Cadastral organisations under 'full cost recovery' regime were observed to charge predominantly at either 'full cost charges' or 'full cost charges with profit'. Cadastral organisations under 'partial cost recovery' regime were observed to charge predominantly at 'full cost charges with profit', but also adopted all other pricing options, cadastral organisations under 'no cost recovery' regime were charging predominantly at 'full cost charges', and also adopted 'subsidised fee' and 'completely free of charge' (table 4.2). However, most of the responses from these organisations were associated with with a 'fixed budget' (table 4.12) which means that charging was disconnected from spending. The 'full cost charges' claimed in most of the responses can be associated to the general revenue requirement by the government rather than the need to meet cost-recovery requirements. from the central government and the majority were These generalisations show that all pricing options appeared under 'partial cost recovery' in charging at least one product but under 'no cost recovery' regime the profit option was not observed and under 'full cost recovery regime, the 'subsidised fee' and 'completely free of charge' were completely unobserved.

This study found that there was a significant association between cost recovery regimes and pricing options implemented by cadastral organisations. Such relationship manifested itself through 'cadastral organisational model' rather than 'cadastral products'. That could mean either most cadastral organisations do not consider specific characteristics of cadastral products when setting prices or though they consider the characteristics of different type of cadastral products, the effects of such characteristics in pricing option or cost recovery regime was not remarkable among the investigated organisations.

In terms of the 'availability of a 'fixed budget,' It was observed that all cadastral products offered at 'completely free of charge; and the majority of those offered at a 'subsidised fee' and 'full cost charges' had a fixed budget (table 4.12). These products were provided under either 'no cost recovery' or 'partial cost recovery' regimes. The conclusion of this study is that budget had a significant influence on both pricing options and cost recovery regimes imposed upon the investigated organisations. In order to provide product at 'completely free of charge' or 'subsidised fee' it may be difficult without a fixed budget. Therefore the imposition of cost recovery regime predefines budgetary conditions attached to it. Likewise the allocation of a fixed budget mandates cadastral organisations to charge at predefined pricing options.

In terms of 'availability of competitors' in the provision of cadastral products, this research failed to establish a clear association between competition and cost recovery regimes among the investigated organisations (table 4.15). However 'availability of competitors was both directly and indirectly (through cadastral products) related to pricing options (table 4.14). It was observed that some products were offered under competitive influence the majority of which at either 'full cost charges or 'full cost charges with profit' pricing options. However most responses from cadastral organisations investigated were not associated with competitors in the provision of cadastral products. Given the fact that most cadastral organisations investigated were from developed countries (where competition is high), it can be concluded that competition had limited role in defining cost recovery regimes for a cadastral organisation but had an important influence in pricing of cadastral products.

Pricing cadastral products, for most cadastral organisations investigated was a legal issue rather than a strategic tool to facilitate operations under a particular cost recovery regime. Both cost recovery regimes and pricing options for cadastral products were associated with exogenous factors such as 'availability of a 'fixed budget' which reflected the central role of legal provisions in pricing cadastral products.

7.2.3. Implementing cost-recovery in the provision of cadastral products (Q. No. 3)

To tackle the last question, two approaches were adopted in this paper. The first is direct interpretation of the responses on the reasons for operating under cost recovery and challenges faced (chapter 5) and the second was to examine possible challenges that may face cadastral organisations under certain socio-economic context and derive possible options for pricing cadastral product within that context (chapter 6). The main reason given by most cadastral organisations for implementing cost recovery was to meet legal requirements or implementation of a government policy (table 4.17). This response, though valid, waives cost recovery off most of its attributes. It has been argued that cost recovery should be implemented basing on its economic potentials(Productivity Commission, 2001). Cost recovery potentialities can be achieved if cadastral managers are cost conscious and assign appropriate charges to products (CEC, 2000), which requires a sense of ownership of the organisation and cost recovery initiatives. Another reason for operating under cost recovery was to support the operational budget of the cadastral organisation. This reason is only valid under partial cost recovery regime. This is because the operational budget only covers financial expenses regardless of current tear and wear in capital goods and the need for future expansion (Van der Molen, 2001). Most of these organisations did not invest in research and development and were inclined to the recovery of recurrent costs (CUZK, 2007). Some cadastral organisations were implementing cost

recovery as a result of external influences through directives and guidelines. This is related to the overall implementation of government policy and the ability to achieve cost-recovery goals may be at jeopardy.

However, some cadastral organisations implemented cost recovery with the purpose of ensuring the sustainability in the provision of cadastral products. This is in conformity with the theoretical benefits associated with cost recovery (Productivity Commission, 2001; Commonwealth of Australian, 2005). Although cadastral organisation implementing cost recovery for sustainability reasons were few, their responses reflected the extent to which cadastral organisations internalises cost recovery policies to achieve long-term ambitions in the provision of cadastral products. Related to sustainability is the belief by some cadastral organisations that cost recovery may help to reduce the adverse impact of an economic crisis on the provision of cadastral products. This research advocates that the potentiality of cost-recovery initiatives to deal with economic crisis is determined primarily by the flexibilities in pricing options open to the cadastral organisation. Rigid prices requiring long legal and political processes may not be useful in dealing with economic crisis. The last reason that was identified as influencing the move towards cost recovery was the need to capture individual's willingness to pay. This is a good strategy especially when there is a high demand for cadastral products from the minority rich people. The main danger may result from much concentration of the organisation into the production of those products for which there is a market and ignoring those products where there is a limited market (Productivity Commission, 2001).

Although there is ample literature on the benefits of cost recovery, this research has established that some cadastral organisations do not implement cost recovery because of benefits rather it is because of some legal requirements. Cost recovery regimes to most cadastral organisations investigated were imposed as a 'black box' predefining prices for cadastral products, the type of products to be charged and the aftermath of revenues. With these circumstances most cadastral personnel are unaware of the price setting mechanism underlying the provision of cadastral products within their organisation. This, as explained above removes cost-recovery off most of its benefits, because operating under a particular cost recovery regime due to the expected benefits can be useful in designing measures to avoid the negative and undesired consequences of cost-recovery.

This research has identified a number of limitations faced by cadastral organisations when implementing prices that reflects cost-recovery ambitions. On one extreme some respondents stated that price setting was external to the cadastral organisation and on the other, proposals for price changes were prepared by the cadastral organisation and submitted for approval to a ministerial authority or parliament. In either case, the requirement for review or approval, though done with good intentions, may not fit properly within commercial realities facing modern cadastral organisations. For self-financing cadastral organisation, this research advocates flexible prices as an appropriate approach in pricing cadastral products. This can be attained through granting full price setting autonomy to the cadastral organisation and the monitoring powers be reserved to the government. In case of unreasonable price setting, the government can intervene with evidence to justify that the cadastral organisation is/was charging prices which were/are incompatible with market realities. Reasonableness can be assessed from the market point of view, for example how expenses for inputs such as salaries, rents, maintenance of equipments, and data collection and maintenance cost of the cadastral organisation deviate from the expenses of similar inputs in the market. This however

requires the existence of a market for cadastral product and hence relevant only for countries with such a market.

For organisations under a mixed-financing model or pure budget-financing model, the role of price setting on the efficient provision of cadastral products is limited. This research has established that, cadastral organisations under the budget-based model can perform well under 'partial cost recovery' regime only if the financial obligations between the cadastral organisation and the government are distributed on 'per product bases'. In such cases the organisation will behave like a self-financing organisation only for those products not receiving a subsidy from the government. The problem of this approach was identified to be cross-subsidisation. Therefore a close monitoring mechanism may be required to ensure that the cadastral organisation do not cross-subsidise products for which it has the obligation to provide under cost-recovery.

This research has separated challenges and limitations in pricing cadastral products according to socio-economic circumstances coupled with complexity in registering properties. It was found that pricing options that may be appropriate for cadastral organisations in MHD countries with simple processes in registering properties could be legally fixed, subsidised prices or some form of price discrimination. The imposition of 'partial cost recovery' or 'full cost recovery' regime to cadastral organisation in MHD countries with complex processes may need to be coupled with a reward mechanism (negative prices) in addition to subsidisation and price discrimination. This is because with complex process the majority of the people may not be motivated to register properties given the fact that they are also poor and not aware of the usefulness of cadastral products (Wessely, 2002; UN, 2007).

This research advocates the adoption of flexible prices for cadastral organisations in HHD or VHHD countries when implementing 'partial cost recovery' or 'full cost recovery' regime. This takes for granted whether the cadastral organisation operate under simple or complex processes. Flexible prices will empower a cadastral organisation to adjust immediately to changing economic circumstances. However this is only possible when governments in these countries have the legal and economic capacity to monitor the daily operations of the cadastral organisation which will facilitate the assessments of the extent to which prices set by a cadastral organisation for its products reflect market realities or are just an exaggeration of reality.

In a nutshell, I conclude that cadastral organisations operating under different cost recovery regimes are more likely to implement different pricing options. These differences can be explained by the legal requirements that are associated with the imposition of cost recovery regimes. These legal requirements are directly related to the cadastral organisational models, budgetary allocation as well as socio-economic conditions prevailing within a particular country. That means policy makers (at a political or ministerial level) consider certain pricing options as appropriate for certain type of cost recovery regimes depending on those factors. However, for most cadastral organisations investigated these policy makers are external to the management of cadastral organisation and therefore the reasoning associated with price setting is not associated with other internal factors such as cost-per-product or profit-per-product.

Cost recovery regime was imposed as a package to most cadastral organisations investigated. It predefined, prices to be set, products to be offered, organisational model under which to operate and the ultimate aftermath of the revenues. Under these circumstances cadastral organisations have limited to do with either cost recovery regime or pricing options to be implemented. The findings in this study deviate from some of the existing literature on several aspects; the first is that, although there is a global convergence in the adoption of 'full cost charges' pricing options in charging cadastral products, there is no such convergence in terms of cost recovery regimes, secondly, although theoretically varieties in cadastral products may be enhanced through cost recovery mechanism, there was limited evidence to substantiate the relationship between cost recovery regimes and cadastral products, thirdly, though lack of autonomy in price setting is a major constraints in implementing cost recovery, granting autonomy may not directly influence pricing options unless it is embedded in certain cost recovery regimes.

7.3. Recommendations for further research

This research opens up a number of questions that need further investigation through academic research. I have tackled the issue of cost-recovery from the perspectives of cadastral organisations assuming that pricing decisions are wholly within the capacity of the cadastral organisation. However pricing decisions may be related to the level of customer satisfactions with the quality and type of products offered (see OFT, 2006). Therefore one area of interest in research could be how pricing of cadastral products is related to the quality of products offered. Likewise, in the provision of most public products and services, it is contested whether cost recovery should come first or quality products should be the first (Ronald J. Vogel, 1988). This could be relevant for cadastral organisations since it is advocated that LIS and basic dataset should be collected through government finances but due to limited finances quality may be sacrificed for quantity. This problem can be understood from a social perspective of individuals and firms who are customers of cadastral products by examining their satisfaction in relation to products offered. A second issue that need further investigation is the relationship between different type of cadastral products and costs involved in providing them. This is because under this study most cadastral organisations charge at 'full cost charges', which is associated with costs-per-product. However, cost-per-product was considered by only a few organisations in pricing their products whereas the majority asserted legally fixed prices as a major determinant of cadastral prices. The link between 'full cost charges' pricing option and costs-per-product or legally fixed prices and cost-per-product, was missing.

The third area of interest in this regard is the understanding of the rationale for cadastral organisations not to explicitly charge at 'full cost charges with profit'. This research has observed that some cadastral organisations operated under 'full cost recovery', which is difficult and almost impossible to attain by charging exactly at 'full cost charges'. Some organisations coincided that in most cases some profit/surplus is realised. However tracing the source of surplus to products can be impossible because these organisations did not explicitly declare 'full cost charges with profit' as their pricing options. Whether this pricing option is only morally undesirable or actually leads to socioeconomic or even political problem to economic or political systems may be a subject of further investigation. The fourth area for further study may be on how 'partial cost recovery' regimes lead to inefficiency in the provision of cadastral products. The fifth area of interest could be to understand the interactions among external factors considered in this research such as 'availability of competitors' and 'autonomy

in price setting'. Lastly an investigation may be carried out on how different cadastral products are potential in achieving cost recovery ambitions. This can be done through time series analysis by collecting data on revenues on the same products over time to see whether such revenues are related to the cost recovery ambitions of the organisation.

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Appendix I

Questionnaire on pricing cadastral products under cost recovery

Questions

Q.No.	Questions					
1	Does your organisation Supply any cadastral Products? (including cadastral information/maps and land title registrations services) –(Please tick)				**Yes**	**No**
	If No (please specify your duties in relation to the cadastral survey and the land title registry and go to the last page)					
2	What cadastral products are offered by your organisation? (Please tick on the appropriate box to the right of products)					
	Products				**Yes**	**No**
	Certificates of title/deed registration					
	Cadastral Map					
	General real property information					
	General mortgage information					
	Extract from mortgages and encumbrances					
	Extracts from cadastres					
	Statistical data on land market					
	Other (please specify any other products)					
3	For each product, please indicate the level you adopt in charging.(Please tick under the relevant number 1-5 on the boxes to the right of each product) **1.** Completely free of charge **2.** Subsidised fee **3.** full cost charges **4.** Full cost charges with profit **5**. Not applicable (not your product)					
	Products	**1**	**2**	**3**	**4**	**5**
	Certificates of title/deed registration					
	Cadastral Map					
	General real property information					
	General mortgage information					
	Extract from mortgages and encumbrances					
	Extracts from cadastres					
	Statistical data on land market					
	Other (please specify any other products and indicate accordingly)					
4	If you do Not charge for any of your product, Why do you offer those products for free?					
5	Do you get a fixed budget to produce each of the following products?. (Please tick on the appropriate box to the right of products)					
	Products				**Yes**	**No**
	Certificates of title/deed registration					
	Cadastral Map					
	General real property information					
	General mortgage information					
	Extract from mortgages and encumbrances					
	Extracts from cadastres					
	Statistical data on land market					
	Other (please specify other products and indicate whether you have a fixed budget for its production)					
6	Is there any other organization in your “cadastral” jurisdiction which produces or supplies any of the following cadastral products? (Please tick on the appropriate box to the right of products)					
	Products				**Yes**	**No**
	Certificates of title/deed registration					
	Cadastral Map					
	General real property information					
	General mortgage information					

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Q.No.	Questions							
	Extract from mortgages and encumbrances							
	Extracts from cadastres							
	Statistical data on land market							
	Other (please specify other cadastral products for which other producers or suppliers exists)							
7	For each product that you have other providers within your jurisdiction in which range among the following do they total in number?							
	Products	**1-5**	**6-15**	**16 - 30**	**above 30**			
	Certificates of title/deed registration							
	Cadastral Map							
	General real property information							
	General mortgage information							
	Extract from mortgages and encumbrances							
	Extracts from cadastres							
	Statistical data on land market							
	Other (please specify other products and relevant factors for price setting)							
8	Which factors determine the prices of each of your products? (please tick under all relevant numbers for factors numbered below); **1. Not Applicable 2:Legally fixed prices. 3: Costs of production per product. 4: Profit per product. 5: Price discounts. 6: Others**							
	Products	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	Certificates of title/deed registration							
	Cadastral Map							
	General real property information							
	General mortgage information							
	Extract from mortgages and encumbrances							
	Extracts from cadastres							
	Statistical data on land market							
	Other (please specify other products and relevant factors for price setting)							
9	Is the central government-state or National, claiming any proportion of the revenues generated by your organisation? (please tick to the right					**Yes**		**No**
	If Yes (please explain the reasons given for such practice							
10	Does your current mode of financing products and services in your organisation reflect any form of cost recovery policy? (please tick in the box to the right)					**Yes**		**No**
	If Yes what factors motivated your organisation to implement the policy?							
11	If the answer to question 9 is No, Please explain why your organisation has not adopted Cost recovery?							
12	Does your organisation have enough autonomy in setting prices for each product? (please tick in the box to the right)					**Yes**		**No**
	If No what constraints do you face?							
13	Are the fees covering the actual costs for producing each of your products?					Yes		No
	If No which products do not currently recover the cost of production?							
14	Please provide the estimated degree of cost recovery as a ratio of the most recent total revenues (if any) from all your undertakings over total spending.							
15	Please provide an estimated degree of government dependence as a ratio of the most recent revenues that you generated (if any) over total allocated budget.							
16	Please, would you provide me as attachments to my email address, digital copies for each of the following data/documents:- • The latest available annual reports of the organisation (2005-2009) • The latest available financial reports (2005-2009) of organisation and the price list for each product • Number of competitors/potential competitor from 2005-2009 • Other documents or references related to pricing strategies and cost recovery in your organisation and/or country.							
	If you are unable to provide the requested information, please indicate an alternative means, source or reference to obtain the requested information							
17	What would you like to add to any of the above questions?							
18	Do you want to receive the results of this survey? ..... If so, please specify your email or address.							

Appendix II

Contact details of respondents

NO	Name of Organisation	Contacts	Name or Respondents	Title of Responding Officer	Education Background
1	Institute of Geodesy, Cartography and Remote Sensing (FÖMI) -Hungary	mihaly.szabolcs@fomi.hu ;36 1 460 4001	András Osskó	expert	
2	Kosovo Cadastral Agency -Kosovo	hamit.basholli@ks-gov.net ;+38138512355	Hamit Basholli	Chief Executive Officer	MSc Geomatics
3	Macao Cartography and Cadastre Bureau –Macao China	85387991647; mail@dscc.gov.mo casey@dscc.gov.mo	Casey Wong		
4	The Land Registry –Hong Kong	28/F Queensway, 66 Queensway; csa@landreg.gov.hk ; (852) 2867 2707	Customer Services and Administration Section	Customer Services and Administration Section	Non
5	Land Administration Project -Ghana	benguaye@yahoo.com ; +233243128201	Armah Quaye		MSc
6	Geodesy, Cartography and Cadastre Agency -Bulgaria	1618 Sofia, 1 Musala Str;+359 2 81883 06; piu.ca@cadastre.bg	Rossen Kostov	Projects Implementation Unit and International Cooperation	geodetic engineer
7	Federal Office of Metrology and Surveying – BEV -Austria	Schiffamtsgasse 1-31020 Wien	DI Bernhard Jüptner	Diplomingenieur	Technical University / surveying
8	Statens kartverk- Authority	3507; Heming.herdlever@statkart.no	Heming Herdlevær	Director cadastral departement	
9	Property Registration Authority -	anne.heneghan@prai.ie ;+353 1 4188572	Anne Heneghan	Assistant Principal Officer,	Na
10	National Land Survey of Finland	www.nls.fi	Anne Dahlqvist	Product Group Manager	MSc, degree
11	Survey and Mapping Office, Lands Department, HKSARG –Hong Kong	23//F, North Point, 333, Java Road, North Point, 852 – 2231 3829	TI Section		
12	Norsk Eiendomsinformasjon as	Postboks 2923 Solli N-0230 Oslo Norway	Kristian Strønen	Marketing Manager	Marketing
13	Korea Cadastral Survey Corporation(KCSC)	624 Unhak-dong Chein-gu, Youngin City; +82 31 8006-7015	Jongcheul, Park		MSc
14	National Agency for Cadastre and Land Registration -Romania	202A Splaiul Independentei Bld, district 6, Bucharest, Romania:	Luminița Sasu	Mrs	Master/ Bachelor of Law
15	General Administration of Patrimonial Documentation -Belgium	North Galaxy (B8) – Bd Albert II, 33, bte 50 1030 Bruxelles;00 32 257 635 49	FRAISSE Pierrette	First attaché	land surveyor graduated of Government
16	Service New Brunswick -Canada	985 College Hill Road, P.O. Box 1998, Fredricton, NB, E3B 5G4; 506-444-4871	Edgar Quinton	Land Registry Manager	Land Surveyor

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NO	Name of Organisation	Contacts (email and phone)	Name of responding Officer	Title of Responding Officer	Education Background
17	State Enterprise Centre of Registers - Lithuania	V. Kudirkos street 18, LT-03105 Vilnius, Lithuania;+370 5 2688 229	Bronislovas Mikuta	Head of International Relations Division	University of Agriculture, Engineer-Surveyor
18	Surveying and mapping authority of the Republic of Slovenia	Zemljemerska ulica 12, SI-1000 Ljubljana, Slovenia; 00386 1 4874850	Franc Ravnihar	Office Director (Real Estate Office)	B. Sc. Geodesy
19	Lantmäteriet -Sweden	olle.zingmark@lm.se; Lantmäterigatan 2, 802 57 Gävle	Olle Zingmark, Mattias Persson, Ulrica Olsson, Christel Andersson	Financial manager, Land registration	Economics; Surveyor
20	Department of Lands & Survey -	dls@dls.gov.jo	Na	Na	Na
21	General Directorate of Land Registry and Cadastre	06100; nsahin@tkgm.gov.tr	Nihat Şahin	Deputy Director General	Surveying Engineer
22	Estonian Land Board -Estonia	priit.kuus@maaamet.ee	Priit Kuus	Head of bureau	Geomatics
23	Cadastral Survey Branch -Nepal	survey@ngiip.gov.np	Keshab Raj Lekhak	Survey Officer	Masters in Geo- informatics
24	Survey of Israel	felus@mapi.gov.i;l 972-50-6225448	Yaron Felus	Director- mapping technologies	PhD, Geodesy, GIS
25	Government of Alberta - Sustainable Resource Developnment -Canada	mike.michaud@gov.ab.ca 7804220020	Mike Michaud	Director of Surveys	Land Surveyor
26	The National Land Agency of Republic -Indonesia	Jl. Sisingamangaraja nr. 2 Kebayoran Baru, Jakarta Selatan, Indonesia	Drs. Pelopor, MEngSc	MEngSc	Master in Land Administration
27	Land and Property Services (LPS) Northern Ireland	wally.gamble@dfpni.gov.uk 028 90251661	Wally Gamble	LandWeb Project Manager	Operational Management
28	Geodesy, Cartography and Cadastre Authority SR -Slovakia	martina.behuliakova@skgeodesy.sk	Martina Behuliakova	Ing.	Technical
29	Czech Office for Surveying, Mapping and Cadastre	Praha 8, 182 11, Pod sidlistem 1800	Svatava Dokoupilova	Dipl.Ing	Land surveying and cartography
30	Land Registry –UK England and Wales	Head Office, Lincoln's Inn Fields London WC2A 3PH UK	Rose Braithwaite	Financial Controller	Qualified Accountant
31	Land Information New Zealand (LINZ)	160 Lambton Quay, PO Box 5501, Wellington 6145,	Jason Dwen	Account Manager, Customer Services	
32	Department of Primary Industries, Parks, Water and Environment	GPO Box 541, Hobart, TAS., AUSTRALIA	Michael Varney	A/Manager Land Titles Office	BA
33	PSMA Australia Limited -Australia	Level 1, 115 Canberra Avenue,	Sarah MacDonald	Business Manager	BA Business Management,
34	Ministry of Lands Housing and human Settlement Development	Po Box 1191 Dar es Salaam Tanzania	Ms. Subira Sinda	Registrar of Title	LLB hons UDSM, MSc Land Management an Land Tenure
35	Kadaster –The Netherlands	dick.eertink@kadaster.nl;+31 88 1833029	Dick Eertink	Senior consultant	MSc Economics

Appendix III

Examples of cadastral products provided by cadastral organisations across Europe

Name of Cadastral Organisation	Examples of Products	Terminologies used in this research
Austria; *"Bundesministerium für Justiz"*	Data of the parcel like address, size, usage as text (list) or in form of the cadastral map showing ID of parcels, their boundaries, land cover, buildings, street names and numbers	Cadastral Map
	Data of the real estate like data of the owner and his/her ownership, mortgages, other encumbrances and servitudes (like right of way, usufructs), full text of documents which are the basis of these entries	General information on Real Property
	Data annotated at the real estate and based on administrational/public law like historic monument/building, as monument listed trees, airport zone or obligations in favour of the municipality like the obligation to erect the pavement.	Na
England and Wales"HM Land Registry"	Official Copies or views of the Register and/or	Extract from the cadastre
	Title Plan held electronically for any property, which is registered.	Cadastral Map
Netherlands; *"Kadaster"*	**General real property information** containing: Kadaster code, size, address, description, type of ownership, owners involved and their addresses and partner relationships, reference to the register unit identifier(s). This is the actual information in the database, open to public access immediately after updating.	General Information on Real Property
	Extract from Kadaster containing: Kadaster code, size, address, description, type of ownership, owners involved and their addresses and partner relationships, reference to the register unit identifier(s). Although this product contains the same content as the general real property information (see above), it is the authenticated information guaranteed by the Kadaster for a moment in time three to five working days earlie	Extract from Cadastres
	General mortgage information containing: Kadaster code, size, type of ownership, mortgagee(s), mortgagor(s) and their addresses, amount of the mortgage, charges, attachments, reference to the register unit identifier(s). This is the actual information in the database, open to public access immediately after updating.	General Mortgage information
	Extract from mortgages and encumbrances containing: Kadaster code, size, type of ownership, mortgagee(s), mortgagor(s) and their addresses, amount of the mortgage, charges, attachments, reference to the register unit identifier(s). Although this product contains the same content as the general mortgage information (see above), it is the authenticated information guaranteed by the Kadaster for a moment in time three to five working days earlier.	Extract from mortgages and encumbrances

Cont…Appendix III

Sweden *"Lantmateriet"*	Description of property,	General Information on Real Property
	digital index map,	Cadastral Map
	address of property, name and address of registered owner, title,	
	type of conveyance and purchase price, details of legal burdens and encumbrances including mortgages, official and private legal rights affecting the property, land regulations and plans, ancient monuments concerned, taxation information as type of property, buildings and value.	
Belgium *"Administration générale de la Documentation patrimoniale"*	Mortgage certificate: issue of mortgage certificates under the liability of the registrar of mortgages (exclusivity) to guarantee third party opposability and mortgage registration (available on written demand to the Mortgage Registry Office)	Extracts from Mortgages and encumbrances
	Issue of property title (& other rights) certificate on written demand to the Registration office	Certificate of title
	Extract of cadastral documents: issue of extracts of cadastral documents by means of an application form (available online or on demand in the regional directions or in the local cadastral offices).	Extract from the cadastre
	Copy or extract of transcribed or registered acts to guarantee third party opposability and mortgage registration (available on written demand to the Mortgage Registry Office)	Extracts from mortgages and encumbrances
	Issue of a document relating successive owners of a real estate during the last thirty years on basis of the available documentation (available on written demand to the Registration office)	General real property information
Czech; *"Český úřad zeměměřický a katastrální"* – CUZK	Extract from the cadastre of real estates containing information on the owner, on the property (parcel, building and flat), depiction in the map.	Extracts from the cadastre
Estonia; *"Kinnistusraamat"*	Cadastral information – address, area, purpose of land	Extract from the cadastres
	Ownership relation	General information of real property
	Encumbrances, restrictions, rights of use, other notations	Extracts from mortgages and encumbrances
	Mortgages	Extracts from mortgages and encumbrances
Slovak Republic *"Úrad geodézie, kartografie a katastra Slovenskej republiky"*	Registered owners, parcels, constructions, apartments, non-flat spaces, ownership documents, mortgages, legal rights, encumbrances.	General information on real property
	View cadastral map.	Cadastral map
	Register of municipalities/cadastral districts	
	Statistical reports (presented by selecting variables such as regions, districts, municipalities, cadastral districts, area, number of parcels, owners, buildings etc)	Statistical data on land market
	Information on cadastral proceedings.	

Data Source: http://www.eulis.eu/countries/

Appendix IV

Additional documents and links

NO	Name of Organisation	Additional Data	Links to online documents and other information
1	Macao Cartography and Cadastre Bureau – Macao China		website http://www.dscc.gov.mo
2	The Land Registry –Hong Kong		Please refer to the Annual Reports on our web site http://www.landreg.gov.hk/en/public/annual.htm and the Profit and Loss Account therein. For financial reports, please refer to the Annual Reports on our web site http://www.landreg.gov.hk/en/public/annual.htm and the Certified Financial Statements therein. For price list of each product, please refer to the fees schedule on our web site (http://www.landreg.gov.hk/en/services/fees.htm).
3	Land Administration Project -Ghana		You may visit the following website for some information on the above www.ghanalap.gov.gh
4	Federal Office of Metrology and Surveying – BEV -Austria		http://www.bev.gv.at/portal/page?_pageid=713,2067738&_dad=portal&_schema=PORTAL ; http://www.bev.gv.at/pls/portal/docs/PAGE/BEV_PORTAL_CONTENT_ALLGEMEIN/0200_PRODUKTE/BESTELLFORMULARE/BEV_STANDARD_CHARGES_2008_V1.3.PDF
5	Statens kartverk-Norwegian Mapping Authority		www.tinglysing.nowww.statkart.no
6	Property Registration Authority -Ireland		Our Annual Reports for the years 2005 - 2009, which include a financial report, are available on our website www.prai.ie.
7	National Land Survey of Finland		14. -3,4 % if only chargeable activities are included and 1,8 % if all activities are included.
8	Survey and Mapping Office, Lands Department, HKSARG –Hong Kong	Notice of service charges	Hong Kong Government Bookstore http://www.gov.hk/en/residents/government/publication/bookstore.htm Price list of our products is attached for your information
9	National Agency for Cadastre and Land Registration -Romania	Normative Act regarding the fees for cadastre and land registration activity	Please find attached the Order of Minister of Administration and Interior, no. 39/06.04.2009
10	General Administration of Patrimonial Documentation -Belgium	or Ministry decrees (see Appendixes)	http://www.fiscus.fgov.be/interfakredfr/Publicaties/RAV08.htm In Belgium, there are no competitor (CIR art 504)

Cont… Appendix IV

NO	Name of Organisation	Additional Data	Links to online documents and other information
11	Service New Brunswick -Canada		www.snb.ca .
12	State Enterprise Centre of Registers - Lithuania	Excerpt from the Real Property Register Regulations; RESOLUTION No 565 of 6 June 2007;	
13	Surveying and mapping authority of the Republic of Slovenia		The latest available annual reports of the organisation (2005-2009) AVAILABLE ON: http://www.gu.gov.si/en/publications/ The latest available financial reports (2005-2009) of organisation and the price list for each product AVAIABLE ON: http://e-prostor.gov.si/index.php?id=560 (PRICE LIST FOR ALL OUR PRODUCT, BUT ONLY IN SLOVENE LANGUAGE)
14	Estonian Land Board -Estonia		http://www.maaamet.ee/index.php?lang_id=2&page_id=52&menu_id=51 http://www.maaamet.ee/index.php?lang_id=2&page_id=512&menu_id=89 http://www.fin.ee/index.php?id=79458
15	Cadastral Survey Branch -Nepal		Since every data in this connection is in our national langauge its not possible to send, Neverthless some information can be shared via www.dos.gov.np
16	Survey of Israel		SOI website http://www.mapi.gov.il/?l=en
17	Land and Property Services (LPS) Northern Ireland		Visit www.lrni.gov.uk or www.lps.gov.uk where information on financial performance and pricing is available.
18	Geodesy, Cartography and Cadastre Authority SR –Slovakia	National report 2008	
19	Czech Office for Surveying, Mapping and Cadastre -Czechslovakia		find it on www.cuzk.cz English– annual reports Prices for cadastral products are published only in Czech : http://www.cuzk.cz/Dokument.aspx?PRARESKOD=100&MENUID=42&AKCE=DOC:10-AA634
20	Land Registry –UK England and Wales		Please go on-line to our website at http://www.landregistry.gov.uk/
21	Land Information New Zealand (LINZ) –New Zealand		Annual reports can be found on the LINZ website: http://www.linz.govt.nz/ The fees presently charged by LINZ can be found on the following Landonline website: http://www.landonline.govt.nz/about-landonline/pricing/pricing-fees.asp
22	Department of Primary Industries, Parks, Water and Environment –Tasmania Australia		http://www.dpiw.tas.gov.au/inter.nsf/Home/1?Open http://www.thelist.tas.gov.au/index.html http://www.treasury.tas.gov.au/domino/dtf/dtf.nsf/LookupFiles/Costing-Fees-and-Charges-Guidelines-2006.pdf/$file/Costing-Fees-and-Charges-Guidelines-2006.pdf
23	PSMA Australia Limited -Australia	Cadlite, Concise History of PSMA, Annual Report 2008/09	
24	Kadaster –The Netherlands	Annual Reports 2004-09 Price list 2004-2009	

Appendix V

Price List

Survey and Mapping Office, Lands Department (HKSARG), Hong Kong

SURVEY AND MAPPING OFFICE, LANDS DEPARTMENT
NOTICE (SERVICE CHARGES)

INFORMATION AVAILABLE

The following survey records and information may be searched at SMO Sales Counter and copies of plans and data purchased :-

(a) Basic Mapping Sheet
(b) Demarcation District (DD) Sheets and Survey District (SD) Sheets
(c) Aerial Photo Index
(d) Aerial Photo
(e) Geodetic Survey Information) Available at all District Survey Offices
(f) Lot Index Plan (LIP))
(g) Lot Number Enquiry)
(h) Survey Record Plan (SRP)) Available only at relevant
(i) Computation Folder) District Survey Office
(j) Land Boundary Plan (LBP))
(k) DD and SD Sheets Related Information)

CHARGES

1. There will be no search fee charged for locating general survey information or data unless otherwise stated in this Notice. However, cadastral or other searches by, and consultations with, Survey and Mapping Office staff will be charged on a time basis, with a minimum charge of **half an hour**.
2. **TRUE COPY**: Fee for the certification of a true extract of any map, aerial photograph, etc, will be **$140** per copy in accordance with the Fees for Official Signatures and Miscellaneous Services Notice (Cap. 2M).
3. Charges for the inspection and sale of Land Boundary Plan and Survey Record Plan deposited by Authorized Land Surveyors under **Land Survey Ordinance** shall be in accordance with the Land Survey (Fees) Regulation (Cap. 473A). (See separate price list.)
4. Inspection of **Lot Index Plan (LIP)** is by appointment and is free of charge. There will be charges for purchasing LIP or portion thereof.
5. The handling fee for the inspection of each **Computation Folder** is **$70**. All information in a computation folder **(except SRP, LBP** and **third party information)** may be copied at standard photocopying charges.
6. Enquiry on **Lot Number**: Enquiry on **ONE** lot number is provided free of charge. Urgent requests or enquiry on more than one lot may be entertained upon payment of a charge on a time basis at Technical Officer's rate subject to a minimum of **half an hour**.
7. Plans/data etc. to be delivered by ordinary post will be charged at standard postal rate.
8. The **total sum** will be rounded to the **nearest dollar**.

REPRODUCTION CHARGES

ITEM	PROCESS	MATERIAL	UNIT PRICE	REMARKS
Basic Mapping Sheet plotting from Land Information System	Computer Plotting (Size750 x 600 mm)	Paper	$ 205.00	Direct plotting from LIS upon request
		Film	$ 265.00	
Basic Mapping Sheet and **Standard Survey Plans** (except SRPs)	Plan Copying (Size 914 x 1189 mm)	Paper	$ 45.00	
		Film	$ 75.00	
	Film Reproduction (Size 760 x 300 mm)	Clear Film	$ 65.00	
	Inkjet Plotting (Size 300 x 300 mm)	Inkjet Coated Paper	$ 39.00	
Additional unit to a **Standard Survey Plan**	Plan Copying (Size 914 x 594 mm)	Paper	$ 11.00	
		Film	$ 26.00	
	Film Reproduction (Size 760 x 150 mm)	Clear Film	$ 21.00	
	Inkjet Plotting (Size 300 x 150 mm)	Inkjet Coated Paper	$ 8.00	
Aerial Photograph	Full Frame 1X (Size 250 x 250 mm)	Paper	$ 125.00	A charge equivalent to the rate of half an hour of a TO(R) may be levied on reproduction of restricted aerial photos.
	Full Frame 2X (Size 500 x 500 mm)	Paper	$ 175.00	
	Enlargement (Size) 250 x 250 mm 500 x 500 mm 760 x 760 mm 915 x 915 mm 1065 x 1065 mm 1220 x 1220 mm	Paper	$ 295.00 $ 415.00 $ 540.00 $ 660.00 $ 770.00 $ 895.00	
Large Format Photocopy (B/W)	Plan Copying (Size 914 x 1189 mm)	Paper	$ 45.00	
Additional unit to a **Large Format**	Plan Copying	Paper	$ 11.00	

1

Cont…Appendix V

STANDARD HOURLY RATES

Senior Land Surveyor	**$939**	Principal Technical Officer (C)	**$483**
Land Surveyor	**$683**	Senior Technical Officer (C)	**$374**
Principal Survey Officer (L)	**$478**	Technical Officer (C)	**$260**
Senior Survey Officer (L)	**$379**	Technical Officer (R)	**$260**
Survey Officer (L)	**$257**	Assistant Clerical Officer	**$192**

20 % overhead charge shall be added on all the above rates for computing a fee, and the fee shall be rounded to the nearest dollar.

OTHERS

1. Printed maps are available at Map Publications Centre/Hong Kong, Map Publications Centre/Kowloon and Map Sales Counters in District Survey Offices (except DSO/Kowloon), Lands Department.
2. LIP, digital maps and digital land boundary data of the whole territory are available at Map Publications Centre/Hong Kong, 23rd Floor, North Point Government Offices, 333 Java Road, North Point, Hong Kong.
3. Orders for Approved Town Planning Plans and other gazette plans prepared by the Survey and Mapping Office are accepted at the Map Publications Centre/Hong Kong, Map Publications Centre/Kowloon and Map Sales Counters in District Survey Offices (except DSO/Kowloon), Lands Department.
4. Copies of lease plans and related information are available at the Land Registry.
5. Hydrographic Charts produced by Marine Department are available at Marine Department.
6. For other records, such as engineering plans, the appropriate office, department or consultant must be contacted.
7. The charge of Aerial Photograph (Enlargement) applies to the general photographs.

(WONG Chung-hang)
Deputy Director/Survey and Mapping
12 August 2009

Additional unit to a **Large Format Photocopy (B/W)**	Plan Copying (Size 914 x 594 mm)	Paper		$ 11.00	
Standard Photocopy (B/W)	Photocopy	A3/A4 Paper		$ 1.00	Refer Lands Dept. Accounting Circular No. 6/2004
Colour Photocopy (Colour or B/W print)	Photocopy	A3/A4 Paper		$ 30.00	
Geodetic Station Summary Sheet	Computer Plotting or Photocopy	Paper		As per Standard Photocopy charges	
Lot Index Plan	Computer Plotting	Paper	SMO-PO4	$ 205.00	750 x 600 mm Whole Sheet
			SMO-PO3	$ 125.00	375 x 600 mm Half Sheet
			SMO-PO2	$ 40.00	275 x 270 mm
			SMO-PO1	$ 21.00	170 x 195 mm
		Film	SMO-PO4	$ 265.00	750 x 600 mm Whole Sheet
			SMO-PO3	$ 165.00	375 x 600 mm Half Sheet
Land Boundary Plan prepared by SMO	Plan Copying	Paper		$ 73.00	
Survey Record Plan prepared by SMO	Plan Copying	Paper		$ 73.00	
Land Boundary Plan prepared by RPS(LS) & ALS (other than those deposited under **Land Survey Ordinance**)	Plan Copying	Paper		$ 73.00	Available to RPS(LS) and ALS or their representative only
Survey Record Plan prepared by RPS(LS) & ALS (other than those deposited under **Land Survey Ordinance**)	Plan Copying	Paper		$ 73.00	

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Appendix VI

List of Abbreviations for Countries

S/NO	Name of Country	Abbreviations	S/NO	Name of Country	Abbreviations
1	Albania	ALB	41	Korea (Republic of)	KOR
2	Argentina	ARG	42	Lao People's Democratic Republic	LAO
3	Australia	AUS	43	Latvia	LAT
4	Austria	AUT	44	Lithuania	LIT
5	Belarus	BER	45	Macedonia	FRY
6	Belgium	BEL	46	Malawi	MAL
7	Bosnia and Herzegovina	BOS	47	Malta	MAT
8	Botswana	BOT	48	Mexico	MEX
9	Brazil	BRA	49	Moldova	MOL
10	Bulgaria	BUL	50	Mongolia	MON
11	Cambodia	CAM	51	Namibia	NAM
12	Canada	CAN	52	Nepal	NEP
13	China (Macao)	MAC	53	Netherlands	NED
14	Croatia	CRO	54	New Zealand	NZL
15	Cyprus	CYP	55	Nigeria	NIG
16	Czech Republic	CZE	56	Norway	NOR
17	Denmark	DEN	57	Philipines	PHI
18	Eritrea	ERT	58	Poland	POL
19	Estonia	EST	59	Portugal	POR
20	Ethiopia	ETH	60	Romania	ROM
21	Fiji	FIJ	61	Russian Federation	RUS
22	Finland	FIN	62	Rwanda	RWA
23	France	FRA	63	Serbia (Kosovo)	KOS
24	Germany	GER	64	Slovakia	SLV
25	Ghana	GHA	65	Slovenia	SLN
26	Greece	GRE	66	Srilanka	SRI
27	Hong Kong, China (SAR)	HKO	67	South Africa	SA
28	Hungary	HUN	68	Spain	SPA
29	Iceland	ICE	69	Sweden	SWE
30	India	IND	70	Switzerland	SWI
31	Indonesia	INDO	71	Tanzania (United Republic of)	TZA
32	Iran (Islamic Republic of)	IRA	72	Thailand	THA
33	Ireland	IRE	73	Turkey	TUR
34	Israel	ISR	74	Uganda	UGA
35	Italy	ITA	75	United Kingdom	UK
36	Japan	JAP	76	Ukraine	UKR
37	Jordan	JOR	77	United States	USA
38	Luxermborg	LUX	78	Uzbekstan	UZB
39	Kenya	KEN	79	Zambia	ZAM
40	Kiribati	KIR			