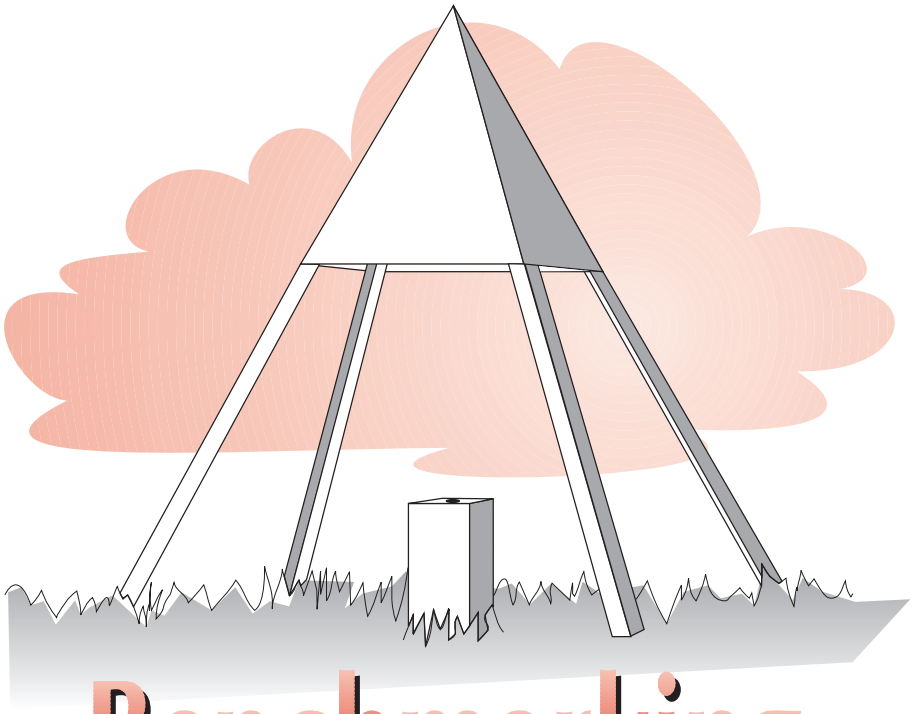

Benchmarking Cadastral Systems

Compiled and edited by: Daniel Steudler and Jürg Kaufmann

With contributions from:
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Daniel Steudler and Ian Williamson
Don Grant and Daniel Roberge
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FIG-Commission 7 – Cadastre and Land Management
Working Group 1998-2002 – Reforming the Cadastre

April 2002

Benchmarking Cadastral Systems

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We would especially like to thank the ten authors for their invaluable contribution to this booklet. We also wish to acknowledge the support and assistance of Land Victoria and of the Department of Geomatics of the University of Melbourne, especially the members of the "Center for Spatial Data Infrastructures and Land Administration". Lastly, but surely not least, printing was made possible by different sponsors.

To all of these kind supporters, we give our most cordial thanks.

Jürg Kaufmann and Daniel Steudler

Foreword

Land management and cadastral systems develop according to the particular precedent conditions, the pressures and the requirements of a given jurisdiction. The result is that each jurisdiction has its own institutional framework and legal approach to the cadastre and to land management. This presents a challenge, in two specific contexts:

- Identifying the most appropriate features of such systems and how they should be developed in a jurisdiction which wishes to upgrade or institute a system;
- Supporting decision-making and objective target-oriented management of a given system.

Commission 7's Working Group on "Reforming the Cadastre", 1998-2002, has recognised the need for these issues to be addressed, and has devoted valuable efforts into doing so. These efforts are a response to nations that need support in instituting or upgrading their existing systems in as economic and efficient a way as possible. They are of importance to the surveying community and to the international agencies, such as the World Bank and the UN system, that have a particular responsibility and interest in providing objective advice in this field. They support the managers of developed systems in identifying and implementing appropriate targets in their drive to achieve improved quality management.

The use for benchmarks based on objective, standardised information, maintained over a period of time, is now well recognised as a means of comparing, targeting and achieving improved performance. Several initiatives are under way in different organisations to secure this information. Many such approaches are, however, "one-off" snapshots of the current situation. FIG is in a unique position to maintain a time series of such data through the development of its annual reporting system, spearheaded by this Commission 7 Working Group. Although these efforts are in their early stages of development, this is an area that will be of great international interest in the future. It represents a great opportunity for the Commission and FIG as a whole if it continues to be appropriately developed and is then carefully maintained.

This present publication presents a selection of national experiences in the area of benchmarking. It will, I am sure, be the first of a series of publications providing valuable information to the surveying profession, supporting us in undertaking our work in the fields of cadastre and land management more effectively and for the benefit of all.

Jürg Kaufmann, the chair of the Working Group, and Daniel Steudler, the secretary, who have spearheaded this endeavour, are to be congratulated for all of their efforts in doing so.

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Preface

Probably all cadastral systems worldwide are in a permanent state of reform as they try to adapt and cope with new challenges. Benchmarking and comparing the performance is increasingly being recognized as necessary steps to identify and monitor strategies, objectives, and progress.

The FIG-Commission 7 working group (1998-2002) on "Reforming the Cadastre" was aware of these developments and invested as much effort as possible into the topic over the last four years. Several initiatives were taken. One was the organization of an international Symposium on *'Reforming and Benchmarking the Cadastre: Measuring the Success'* in June 2001 in Gävle, Sweden. Another was the proposal for a standardized country report of the national cadastral systems usually carried out among the national delegates during the annual meetings of FIG-Commission 7.

The aim of this booklet is to present a selection of different views of how cadastral systems are or could be benchmarked. In nine contributions, ten authors from different countries give an insight into how diverse the understanding of benchmarking still is in the field of cadastral and land information system:

- *Jürg Kaufmann* presents the work and results of the working group itself, giving a brief introduction into benchmarking in general and identifies the relevance of benchmarking for cadastral systems.
- *Daniel Steudler* and *Ian Williamson* present a research project, which aims to develop a framework to measure and compare the performance of land administration systems in a generic way, linking the operational level of land administration with the policy level.
- *Don Grant* and *Daniel Roberge* compare the cadastral reform projects in Québec and Greece. They identify management problems, key success factors and give some valuable suggestions for future reform projects.
- *John Manthorpe* describes how 'Her Majesty's Land Registry' aimed to improve its public services and introduced regular assessments of its regional offices by introducing a series of performance measures such as productivity, cost effectiveness, speed of service and accuracy.
- *Paul van der Molen's* contribution first looks at benchmarking cadastral systems from a general point of view and then focuses on the various benchmarks that the Dutch Cadastre uses to measure internal and external performance .
- *Bronislovas Mikūta* presents the reform program for re-establishing private land ownership in Lithuania and illustrates how indicators provided input for improving and adapting the different registration activities .
- *Edwīns Kāpostiņš* presents the reform of the cadastral registration system of Latvia and what role benchmarking played from a data quality and coverage point of view.

- *Wojciech Wilkowski* presents the progress of computerization of the cartographic part of land records in the different cadastral districts in Poland, how benchmarking is applied and to what effects.
- *Daniel Steudler* presents how in Switzerland benchmarking is used to monitor the progress made in cadastral surveying in the different Cantons and how this information is used to re-evaluate and re-define objectives and strategies.

This booklet *'Benchmarking Cadastral Systems'* is the concluding work of the working group in the four-year period 1998-2002. It is intended to be a first step into the broad topic of benchmarking and to hopefully initiate further discussion in that field.

Jürg Kaufmann and Daniel Steudler
(Chairman and Secretary of the working group)

January 2002

Benchmarking Cadastral Systems – Results of the Working Group 7.1 of FIG-Commission 7

Jürg Kaufmann

Introduction

In 1998, FIG-Commission 7 launched three new working groups for the period 1998-2002. Working group 7.1 entitled "Reforming the Cadastre" has as its terms of reference:

1. to create a framework to determine the progress and effectiveness of cadastral reforms;
2. to develop key criteria to determine the benefits of cadastral reforms; and
3. to continually update the Commission 7 inventory on cadastral systems.

The working group decided to apply the approach of benchmarking to deal with items 1 and 2. Benchmarking concerns questions of effectiveness, efficiency, best practice and customer satisfaction.

Item 3 is considered to be a permanent task of Commission 7. This task started some years ago by asking standardized questions in the context of country reports by the delegates. The secretary of working group 7.1 takes care of this inventory and makes the information available on the homepage of working group 7.1. The material gathered may be used as a source for comparisons of different international solutions in the field of cadastre. And it also may serve for benchmarking purposes as well.

What is Benchmarking in General?

The working group looked at the publications of Robert C. Camp (1989), one of the pioneers of the benchmarking method. Camp works with several definitions of benchmarking, and the formal definition he uses is:

> *Benchmarking is the continuous process to measure products, services and practices against the strongest competitor or the companies considered as market leaders.*

Webster in his dictionary defines benchmarking in a way that has a lot to do with surveying:

> *Benchmarking is surveying the mark of an earlier defined position and used as a reference point or standard against which something else is measured or assessed.*

James G. Patterson, another benchmarking specialist explains that (Patterson, 1992.

Initially benchmarking was a notion in land surveying. A benchmark in this context is a mark, which was mounted on a rock, a building or a wall. It was a reference mark to define the position or the height in topographic surveying or to determine the time for dislocation. Today a benchmark is a value against which other things may be measured.

We can see from these definitions that benchmarking has a lot to do with our profession. Camp's working definition of benchmarking is:

... the search for best practices leading to top performance.

The purpose of benchmarking for a company, therefore, is to detect weaknesses in its own organization by comparing indicators. Camp says that benchmarking is not a mechanism to save resources, nor a cure-all or a program. Benchmarking is rather: *a new way to be entrepreneurial, a new management approach, which forces a company to use an external view to make sure that the defined targets are the correct ones.*

Camp distinguishes between different types of benchmarking:

- **general benchmarking** is a comparison of functions or processes;
- **internal benchmarking** is a comparison of internal sections of the enterprise;
- **competition benchmarking** is a comparison of direct competitors on the basis of products or functions;
- **functional benchmarking** is a comparison of similar functions within the branch or with leading organizations.

General benchmarking (as shown in Figure 1.1) has the potential to identify best practices and is considered the type of benchmarking to create the best long-term benefits.

Benchmarking is quite a normal process. We used benchmarking when we were children and watched what others did, and we use benchmarking every day to find better solutions to deal with certain tasks. There is no reason to consider benchmarking as mystical and highly sophisticated.

What is the Technique of Benchmarking?

Process of Benchmarking

The process of benchmarking consists of two parts, a metrological one and a practical one (Figure 1.1). On the basis of information gathered about functions and processes, the performance gap can be identified and measured. A better understanding of the functions and processes may produce more efficient approaches and practices. With this input, the action to be taken to improve the situation can be defined and communicated. This will lead to a performance that is comparable to best practice.

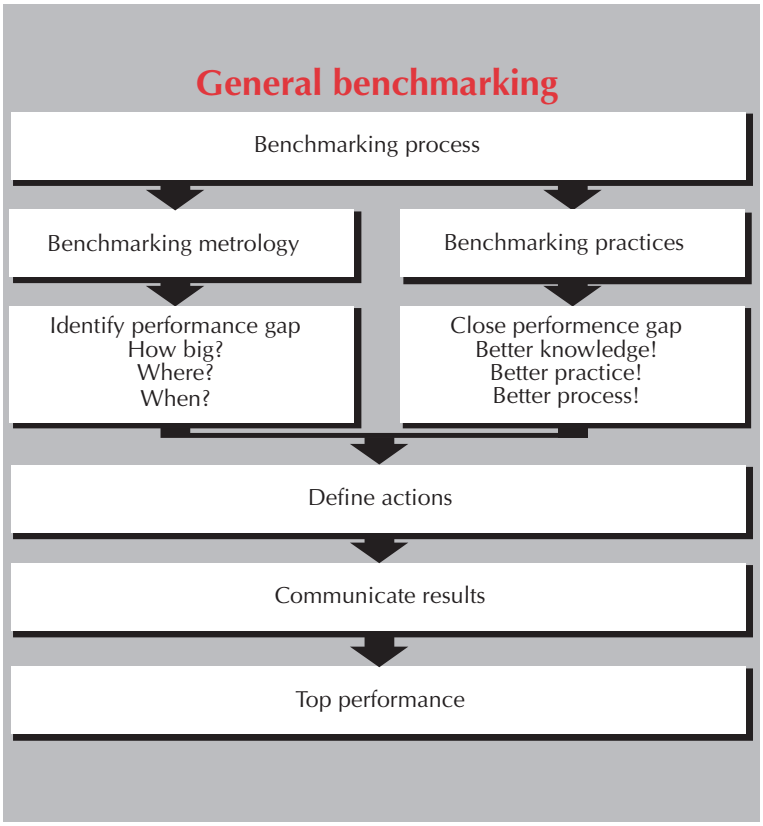

Figure 1.1: Process of benchmarking

Steps of Benchmarking

The process of benchmarking is carried out in different stages and steps. The stages and steps are shown in Figure 1.2. In the planning stage, the topic to be benchmarked is defined and the functions and processes to be compared are identified. The framework for the acquisition and compilation of the required data is defined and the data are collected.

The analysis stage serves to compile and compare the data and to identify weaknesses of the given situation by measuring the performance gap. The potential for improvement is investigated and estimated.

The integration stage is the communication of the results to the organization benchmarked and the definition of the goals to be achieved.

Finally, in the action stage, an action plan is developed. This action plan is translated into action, during which adjustments might be necessary.

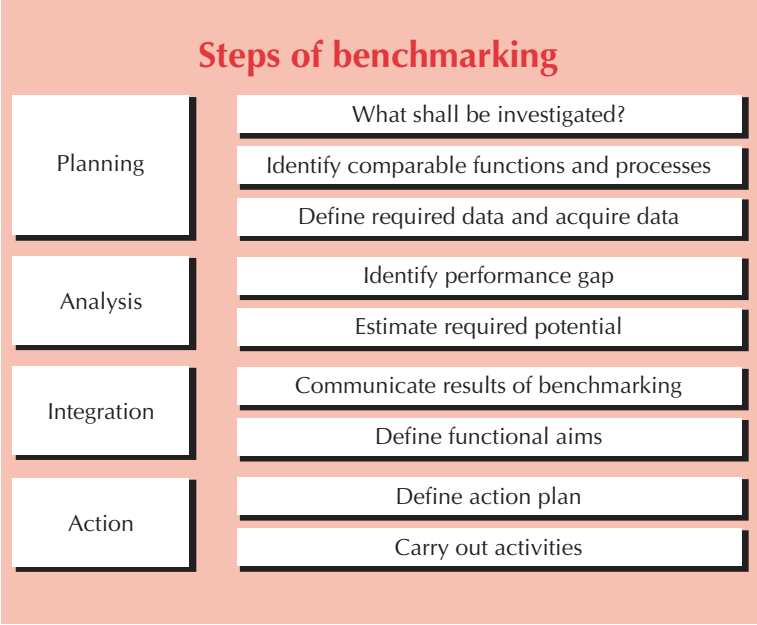

Figure 1.2: Stages and steps of benchmarking

Z- Diagram

One important result of the analysis is the z-diagram. Figure 1.3 illustrates a possible z-diagram in the field of land administration. The example shows the time it takes to subdivide a parcel of land. It can be taken as fact that the participants in the land market, that is the landowners, the real estate agencies, and the banks, have an interest in having the necessary services carried out in the shortest possible time with sufficient reliability. If a given system is compared with another, the focus will be on the time needed to get the required working steps done from the time the application has been lodged with the organisation to the time the result is delivered to the applicant. This time period is expected to be as short as possible. The shortest time found in the comparison may be the future benchmark. The difference between the organization's procedure and the best one indicates the performance gap. The gap must be closed by strategic actions.

The z-diagram shows not only the gap but also the total improvement necessary to stay competitive because it can be expected, that continuous efforts to improve the functions are taking place. The comparison also considers past and future performance. We can see in the example whether a given system has been perfected in the past or whether the performance

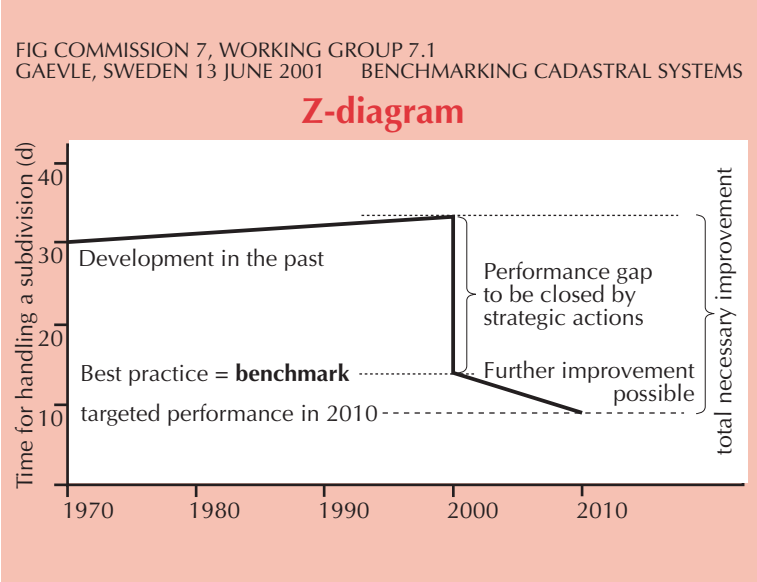

Figure 1.3: Example of a Z-diagram

has become worse because of other reasons. Looking into the future, the performance in 2010 can be forecasted by taking into account the improvements achieved by further efforts or by technical developments.

The z-diagram not only shows the gap but also the total improvement necessary to stay competitive over time. The z-diagram can be used to investigate further indicators relevant to the improvement of services, products, procedures and organizations.

What Does Benchmarking Mean in the Field of Cadastre?

For cadastral organizations, it should be possible to measure the success of the reform work done in the field with the help of clearly defined indicators and against generally accepted benchmarks.

Cadastral systems differ significantly worldwide. Countries have different cultural backgrounds and different legal systems. It is difficult, therefore, to compare the systems. However, cadastral systems have more or less the same characteristics according to the official definition of OICRF[1]:

[1] OICRF = "International Office of Cadastre and Land Records", which is a permanent institution of the International Federation of Surveyors (FIG) and serves as a study and documentation center for cadastre, land administration and affiliated fields of interest (www.oicrf.org).

*Cadastres are methodically arranged public inventories of data concerning **properties** within a certain country or district, based on a survey and geographic determination of their boundaries.*

With the development of the visions for a future cadastral system, known as "Cadastre 2014" (Kaufmann and Steudler, 1998), the content of the traditional cadastral systems has been expanded. Besides the traditional information on private property rights, the information resulting from public law – rights and restrictions – has become part of a modern cadastral system. The future cadastre will be a systematic public inventory of all rights and restrictions concerning land and land resources. We may call it "space cadastre" and it is a sort of multipurpose cadastre.

The definition of Cadastre 2014 is:

*Cadastres are methodically arranged public inventories of data concerning **all rights and restrictions to land** within a certain country or district, based on a survey and geographic determination of their boundaries.*

The vision gained a widespread interest, and the brochure "Cadastre 2014" released in 1998 has been translated into 21 languages so far.

Based on the same principles as the traditional cadastral systems, the future space cadastre will guarantee the same reliability or – in other words – the same legal security of all rights and restrictions defined by any law dealing with spatially related aspects. It can be assumed, therefore, that these future "space cadastres" will be a benchmark against which the services, efficiency and performance are to be measured.

Independent of the type of cadastre, it is important that it be reliable, efficient and cost-effective. This means that anybody using the services of the cadastre can expect to have the required results in a reasonable time and at a reasonable cost. Significantly the user will be able to rely on the cadastre. The indicators we are looking for will have to cover these aspects.

Why Benchmarking of Cadastral Systems Is Useful?

With a worldwide perspective, the situation in the field of cadastre is rather heterogeneous. Next to perfectly functioning systems, we find incomplete and partial systems. In countries with colonial backgrounds, cadastres often cover only the colonized land not taking the still existing traditional and customary rights into consideration. Other countries – mainly those in transition – have to build up cadastral systems from scratch, and in other countries, the cadastral systems have been destroyed due to conflicts and have to be re-established.

Cadastral systems, where they exist, usually have a long tradition, and in most cases have existed for more than a century. Over this long period of time, the systems have been improved and perfected. The emphasis on

perfection may have created a certain heaviness, and often the performance has not kept up with the customers' needs. Nowadays, in the era of globalization, decisions concerning land resource matters have to be taken much faster than in earlier times. The worldwide interest in Cadastre 2014 has shown, that the traditional systems often increasingly do not correspond to such new requirements.

Where partial cadastral systems exist, they have to be completed to cover the whole territory. Only when complete and all-encompassing can they serve society in a beneficial way. In these cases, it must also be discussed at the same time, if the contents of the systems are sufficient to provide the needed services. Where customary and traditional rights exist in parallel, these must be taken into consideration.

When cadastral systems are to be newly introduced, there is a need to design a completely new solution to provide the appropriate services over a long period of time. Where a re-establishment of the cadastral system is necessary, the question often arises whether it is appropriate to have the earlier situation restored.

In all the aforementioned cases, the changes caused by technological development, especially IT, are to be considered. All these activities are different forms of cadastral reforms. When undertaking reform it makes sense to search for the best solution. Benchmarking can help to identify best practices and to find the best solution for a given problem.

Does Benchmarking Contribute to the Strategies of FIG ?

The aim of FIG is *to ensure that the disciplines of surveying and all who practice them meet the needs of the market and communities that they serve. This aim is realized by promoting professional practice and by encouraging the development of professional standards.*

The current work plan focuses on the surveyor's response to social, economic, technological, and environmental changes and the particular needs of countries in transition. The plan lays emphasis on strengthening professional institutions; promoting professional development; and encouraging surveyors to acquire new skills and techniques so that they may be properly equipped to meet the needs of society and the environment (FIG, 2001).

Benchmarking helps to meet the needs of the participating countries. Functions and processes are improved because there is a need for better services. To look for better practice is a continuous task of a profession. With benchmarking it is easier to identify better solutions by taking into consideration what others already have achieved. The existing experience can then be used to improve an organization's performance. Benchmarking therefore promotes professional practice and supports the development of professional standards.

How Does Working Group 7.1 Deal With Benchmarking?

Working group 7.1 adopted for its work the type of general benchmarking. This means that important functions and processes of the different national cadastral systems are compared with each other.

The aim of the work is not to measure the success of cadastral efforts and reforms for individual approaches and solutions or to prescribe best practices. The idea rather is to create a framework to show indicators and to suggest procedures. This would enable FIG and its member associations to carry out benchmarking operations, to identify weaknesses of their own processes and, hopefully, to find best practices to strengthen their own systems.

With the help of these tools, comparisons among different countries have been carried out based on information gathered by questionnaires and the national reports delivered by organizations and delegates to Commission 7.

Results created with these tools shall show the facts for comparison of different approaches and solutions. The interpretation and assessment of the results, however, have to be left up to the players and stakeholders.

What are the Results?

Work on benchmarking had started even before the working group 7.1 (1998-2002) formally took up its task. On the basis of information gathered for work on the Cadastre 2014, the first data collection was carried out in 1997. These results have been published in Steudler et al. (1997).

There were positive as well as negative reactions following this publication. The issue of comparing different systems has been put on the agenda and discussion has begun within FIG. The establishment of working group 7.1 (1998-2002) certainly was a result of these discussions.

Daniel Steudler, the secretary of the working group has started work on a PhD thesis related to this topic. With a view to the comparison of different solutions, he developed a set of indicators to be used in the benchmarking process (Steudler and Williamson, 2001).

The working group was responsible for a one-day seminar on 'Reforming and Benchmarking Cadastral Systems – Measuring the Success' held jointly with the Working Party on Land Administration (WPLA) in Gävle, Sweden during the 2001 annual meeting of Commission 7.

The results of past investigations, proceedings of the one-day seminar in Gävle, and as well other references and information related to the topic can be found on the web site of the working group at www.swisstopo.ch/fig-wg71/.

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A Framework for Benchmarking Land Administration Systems

Daniel Steudler and Ian P. Williamson

Context and Background

FIG Context

Benchmarking land administration systems became an issue during the work of FIG-Commission 7 in the period between 1994-1998. Working group 1 was looking at visions where cadastral systems might be in 20 years' time and thus produced the booklet "Cadastre 2014 – A Vision For A Future Cadastral System" (Kaufmann and Steudler, 1998). Under the leadership of working group 1, a first attempt to collect data and figures from more than 50 countries has been undertaken in 1997 (Steudler et. al, 1997). As a result of this work, it became apparent that monitoring and comparing systems with each other would be essential for improving and further reforming national systems. As a result, the new focus of working group 1 of Commission 7 for the period 1998-2002 became "Reforming the Cadastre" with benchmarking as a key issue. For the annual meeting of Commission 7 in 2001, a standardized country report had been established and replies of 13 countries were included in the final report (see web site of working group 1: www.swisstopo.ch/fig-wg71).

Land Administration Background

Land administration systems and their central cadastral component are increasingly evolving. Not only were traditional cadastral systems slow in responding to the changing needs of society (Dale and McLaughlin, 1988), but also the relationship of humankind to land is more dynamic. This tendency can also be observed in the resolutions of the successive FIG efforts: the FIG "Statement on the Cadastre" (1995), the UN-FIG "Bogor Declaration" (1996), the "Cadastre 2014" (Kaufmann and Steudler, 1998), and the UN-FIG "Bathurst Declaration" (1999).

Ting and Williamson (1999) identify different phases in the humankind to land relationship depending on the different rates of development of countries. They established a cumulative model of cadastral developments: (i) land as wealth, (ii) land as commodity, (iii) land as scarce resource, and finally (iv) land as a scarce community resource. They conclude that "each of these phases in the humankind/land relationship elicited a corresponding layer of complexity in the function of cadastral systems from a simple record of ownership and fiscal tool, to a cornerstone of land markets and then increasingly detailed land-use planning"; and that "the world is at different points in the continuum. Many developing countries are only just establishing more formal cadastral records for fiscal and also land market

purposes ... while ... western nations are rushing to create multi-purpose cadastres that take a community approach to sustainable development issues whilst maintaining private ownership."

Cadastres are evolving into broader land administration systems addressing a diversity of issues, ultimately supporting not only land ownership and land markets, but in a more global perception also sustainable development.

Research Project

On the basis of this above-mentioned context, a four-year research project commenced in April 2000 at the Department of Geomatics at the University of Melbourne, with this paper describing the current state of the research. The authors spent several months at the World Bank in Washington DC in late 2000 exploring this research topic.

Definitions and Benefits

Definition of Land Administration

For the purpose of the research project, a definition of land administration was adopted. In its "Land Administration Guidelines", the UN-ECE (1996) defines land administration as "the processes of determining, recording and disseminating information about the tenure, value and use of land when implementing land management policies. It is considered to include land registration, cadastral surveying and mapping, fiscal, legal and multi-purpose cadastres and land information systems. In many jurisdictions, land administration is closely related to or facilitates land use planning and valuation/land taxation systems, although it does not include the actual land use planning or land valuation processes."

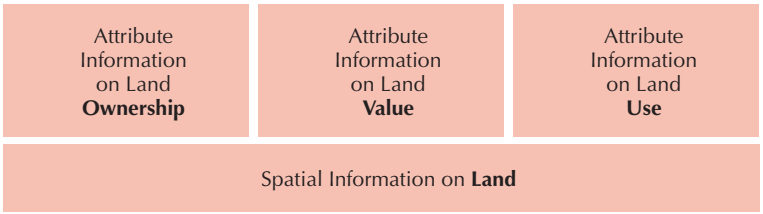

Figure 2.1: The four basic components of land administration

The processes for the traditional cadastres – land registration and cadastral surveying – are often carried out by two separate professional groups in often two separate organizations. For the definition of land administra-

tion in this project, a fourth component has been added considering the spatial component as the one component underpinning the other three (see Figure 2.1).

Definition of Benchmarking

Modern industrial benchmarking had its origins in 1979, when Xerox decided to examine its unit costs and to compare them with those of Japanese competitors. Xerox found that the Japanese competitors sold their products for the same amount that it cost Xerox to just produce them. Camp (1989) later established a widely recognized reference for an industry standard for searching for best practices and establishing benchmarking procedures.

The benefits from benchmarking can be big in terms of improvements to processes such as service delivery, time taken to manufacture, warehousing or distribution. But benchmarking is not a one-time project; it needs clearly defined objectives and a long-term commitment by the top management. The AusIndustry-Best Practice Program (1995) accordingly defines benchmarking as "an on-going, systematic process to search for and introduce international best practice into your own organization, conducted in such a way that all parts of your organization understand and achieve their full potential. The search may be for products, services, or business practices and for processes of competitors or those organizations recognized as leaders in the industry or specific business processes that you have chosen."

Other sources make plain references to benchmarking and its benefits:

- "You can't improve what you can't measure!"
- "If you cannot measure it, you cannot manage it!"

Benefits in Benchmarking Land Administration Systems

Land is one of our most valuable resources and the administration of this good deserves an optimized approach. As mentioned, no common standardized approach has been established so far in the international land administration community. But the benefits in benchmarking land administration systems can be extensive:

- facilitating cross-country comparisons in land administration performance;
- providing a basis for comparisons over time;
- demonstrating strengths and weaknesses of land administration systems;
- justifying why a country should improve its land administration system and identify areas/priorities for reform;
- helping to draw links to other issues and sectors (financial, governance, environmental, social, etc.);
- justifying an investment to improve;
- monitoring improvement.

Elements for an Evaluation Framework

The Four Evaluation Elements in NPM

The task of looking at different land administration systems and evaluating them against each other in a balanced and culturally non-biased way is not obvious (Williamson and Fourie, 1998). Some guidance can be found in "new public management" (NPM) developments that swept through government administration over the last decade.

In a World Bank Seminar, Baird (1998) emphasized four elements that are central in how to evaluate the performance of an organization or system, be it private or public:

- well-defined **objectives** – to know where to go to;
- clear **strategy** – to know how to get there;
- outcomes: monitorable **indicators** – to know if on track;
- **evaluation** of results – to gain input for improvements.

This schema can further be explained by the approach that has been taken in the cadastral surveying context in Switzerland, where NPM principles have been introduced over the last few years (Selhofer and Steudler, 1998). NPM principles have been introduced increasingly within the Swiss Federal administration in order to overcome the shortcomings of the traditional input-oriented approach. With NPM, the Swiss Federal administration attempts to use a more output-oriented approach, emphasizing the products, performance, and outcomes rather than the input-oriented approach of using up the remaining budget at the end of the year.

Cadastral surveying was among the first areas where such principles were introduced, and the same four evaluation elements as mentioned above were at the core for re-organizing the financial and administrative relations between the Federal and local (cantonal) government levels. The Federal agency – being responsible for cadastral surveying – established performance contracts with each of the 26 Cantons, which are responsible for carrying out cadastral surveying. The performance contracts are based on a controlling system monitoring the results and outcomes by means of performance indicators. The performance indicators are used to re-evaluate the processes and targets every one respective four years in a periodical controlling cycle (see Figure 2.2).

The basic terminology in this performance monitoring system corresponds with the four evaluation elements above: the targets represent the objectives, the processes represent the strategy, while the indicators and benchmarking results provide the information for the "regulator", which is basically the mechanism to re-evaluate the objectives and strategies.

The relationship between the performance monitoring system with the four evaluation elements confirms and supports their use as part of the basic evaluation framework for land administration systems. In the context

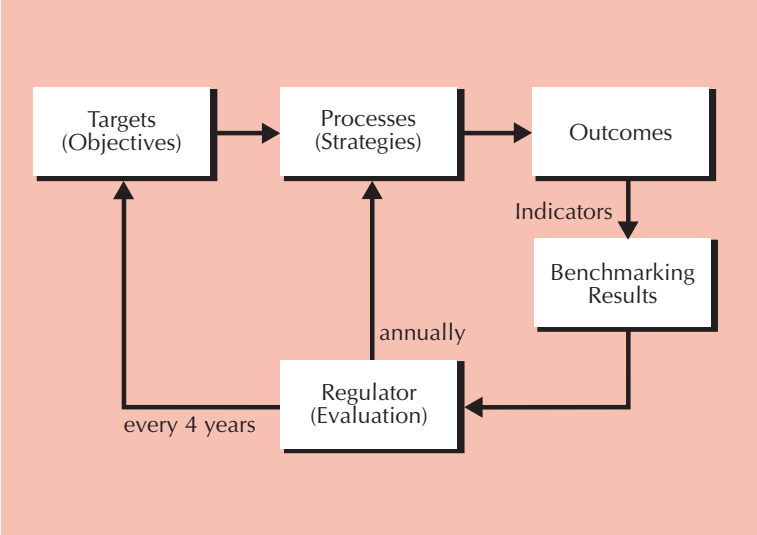

Figure 2.2: Basic controlling cycle for performance monitoring in Swiss cadastral surveying (Selhofer and Steudler, 1998)

of land administration, the four evaluation elements might look at the following aspects:

- **Objectives:** what are the defined objectives of the national land administration systems; what do they have to respond to from an economic, social and environmental perspective, and how are these objectives fulfilled.

- **Strategies:** what are the chosen processes and what is the strategic approach that has been adopted to reach the objectives; what financial, organizational, structural and technical definitions have been established.

- **Performance / outcomes:** what are the outcomes and what is the performance of the chosen processes and strategic approaches, and what are the effects.

- **Evaluation of results:** how is the land administration system managing change; how are the objectives and strategies re-evaluated.

Three Management Levels

The above-mentioned four evaluation elements have a strong link with the three management levels, which are often used to define the different control levels within an organization. The policy level is responsible for deciding on the objectives that the organization wants to achieve and what resources are to be applied. The management control level is responsible for the reasonable and effective use of the resources and of setting up the appropriate organization and structure. The operational control level carries out the specific tasks as efficiently as possible.

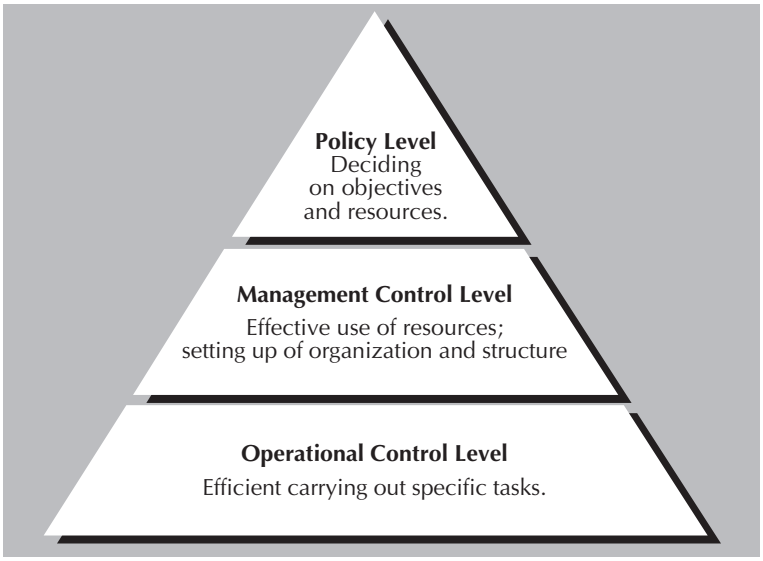

Figure 2.3: Three management control levels within an organization

Development of a Framework

Analogy to Accounting System

In a paper presented in Bogotá at the "1st International Seminar on Cadastral System, Land Administration and Sustainable Development", Kaufmann (2000) introduced a new perspective of how cadastres can be looked at in relation to land management and land administration. He makes the analogy that the cadastre – with its role of administering information on rights, restrictions and responsibilities on land and its resources – can be considered as a form of "accounting system" for land issues, ultimately supporting sustainable development. Like the accounting system of an organization or business, the cadastre has to follow certain rules and principles. For the cadastre, these principles have traditionally been to provide reliable and systematic information on land issues, primarily in support of land markets or land tax.

Level	General Business	Global Development
Strategic (goal setting)	Sound economic development	Sustainable development
Management (measures to meet strategy)	Company management	Land management, resource management
Administrative business processes	Administrative unit	Land administration
Operation (tools for documenting and monitoring)	**Accounting system** • accepted principles of bookkeeping • reliable • complete • appropriate to needs • adaptable to development	**Cadastre** • accepted principles of documentation of rights/restr. • reliable • systematic • appropriate to needs and laws • adaptable to development • public

Figure 2.4: Cadastre in relation to land management and administration (Kaufmann, 2000)

For sustainable development and land administration purposes, another principle of the accounting system has to be considered: the principle of adaptability. When there is a new project or a new client, the accounting system of a business-oriented company simply adds another account into the system. For land administration issues, very similarly, another layer or topic can be added to the cadastre, administering all legally binding issues (compare Figure 2.4).

Structure for Evaluation

By taking this analogy a step further, the whole land administration context can be looked at in a more structured way, which may provide the basic framework for evaluating land administration systems. As Kaufmann argues, land administration as a whole can be regarded as society's task, as it is up to societies respective their governing bodies to look after and "take account" of their own land and related resources.

This "land business" can be considered to have the three management levels as mentioned above. It is however important to keep the actual land management and administration processes apart from the data/information processes. On the *policy level*, there would be "Land Policy" and "Land Information Policy" defining the rule of the law, the use and ownership of land, and how and what information is to be administered. The *management control level* includes "Land Management" and "Land Information

Management" as the processes to manage the land resources and the related information. The *operational control level* then would include "Land Administration" as the functions involved in the actual implementation and the "Land Information Systems" for managing the data and information (compare Figure 2.5).

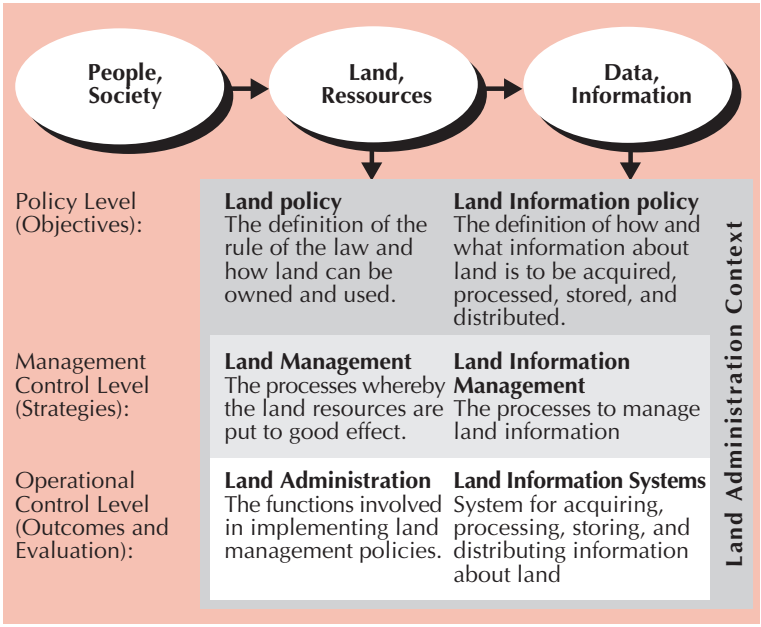

Figure 2.5: Management levels in the land administration context

Areas and Examples of Indicators

Expanding the suggested structure in Figure 2.5, the management levels can be regarded as the areas in which a land administration system may be evaluated. The evaluation could address the following issues:

Land Policy – if, how, and what economic, social, and environmental objectives are defined; how the land administration system is supporting sustainable development; and how it supports good governance.

Land Information Policy – would include issues such as the definition of data standards, privacy issues, access to data, and pricing policy.

Land Management – would evaluate the structure and organization of how land issues are administered, for example what rights are included in the registry system (bundle of rights), what government agencies are involved, if they are centrally or decentrally organized, and their efficiency.

Land Information Management – is the area where the organization and structure of land administration data is evaluated. For example what in-

formation is registered, how it is administered in a centralized or decentralized manner, what is the role of the private sector, is there a custodianship principle, and how are the users being served.

Land Administration – is the area where the financial input and return are evaluated, what efficiency (performance, reliability, timeliness) the system is providing, and what human and technical resources are involved. Indicators could for example be: total number of properties and parcels, number of disputes, annual number of transactions, time for transactions, cost and fees for transactions, etc.

Land Information Systems – in this area, the technical part of the land administration context are evaluated, for example how the information actually is administered. There may be big differences in the different countries in terms of fitness for use of the land information (paper vs. digital data, data exchange and distribution mechanisms), what human and technical resources are involved and what is the financial input and return.

Development of Performance Indicators

For monitoring and comparing land administration systems with each other, indicators need to be developed that can represent the performance of the systems in each of the six areas within the land administration context. The development of performance indicators is however rather difficult, as many different understandings have to be brought into a common framework.

An approach that has been developed by Kaplan and Norton (1996) may provide some help. Kaplan and Norton recognized some weaknesses and vagueness of previous management approaches and introduced the "Balanced Scorecard" system providing a clear prescription as to what companies should measure in order to "balance" the financial perspective against other perspectives. They describe the balanced scorecard (BSC) as follows: "the BSC retains traditional financial measures. But they tell the story of industrial age companies for which investments in long-term capabilities and customer relationships were not critical for success." The BSC suggests viewing the organization from four perspectives and to develop indicators, collect data and analyze it relative to each of these perspectives:

- learning and growth perspective;
- business process perspective;
- customer perspective;
- financial perspective.

The BSC method might provide a methodology to assist in developing performance indicators for the six areas in the land administration context. However, further research is necessary before the approach can be used.

Conclusions

This paper describes an on-going research project that aims to develop a framework and methodology to evaluate and compare land administration systems with each other. The framework takes into account four evaluation elements of "new public management" and three management control levels. It considers the management functions of the land and its related resources separately from the management functions of the related data and information. As a result, it suggests breaking down the context of land administration into six areas, which for benchmarking would have to be looked at separately from each other. The method of the balanced scorecard then may lead to the development of key performance indicators in each of the six areas.

Acknowledgements

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Success Key Factors to Be Considered in Benchmarking Cadastral Projects – Based on the Experience of Two Large-Scale Land Projects

Don Grant and Daniel Roberge

Background

According to current estimates, there are approximately thirty national-level cadastral projects being developed throughout the world. The authors have examined two of these projects in particular, namely the cadastral reform program in Québec and the Hellenic cadastre in Greece and referred to a range of other documents.The two projects, although apparently very different at first glance, nevertheless share some significant similarities. Québec's reform program is designed to renew and computerize an existing cadastre, while the Greek project is designed to implement a new cadastre.

These two projects will be used to illustrate some key success factors that should be considered in benchmarking cadastral projects in the opinion on the authors and other land administration specialists among them Frederic De Dinechin of the World Bank.

The following document is based on a paper presented at the International Conference on Spatial Information for Sustainable Development held in Nairobi in October 2001.

Introduction

Land registration and title registration systems were introduced in most western countries during the second half of the 19th century. In Québec[2], the land registration system was created in 1840. Initially, it was based on names of persons and contributed to the protection of people against fraud but did not eliminate the uncertainty about land identification. In 1860, with the implementation of the cadastre, the registration system was improved and was turned from a name-oriented system to a parcel-oriented system.

The deeds registration system of Greece[3], based on the French Mortgage Bureau System, was introduced in 1853, but the cadastre itself was never implemented, despite several attempts over the years.

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[2] Québec's population: 7'400'000 inhabitants; Total area: 1'667'926 sq. km. 8% (116'910 sq. km) of the territory is private and covered by the cadastre. Québec, whose population is mainly French-speaking, is the only one of the ten Canadian provinces where private law is regulated by a code. The Civil Code is inspired by France's Napoleonic Code. The rest of Canada uses the Common Law system.

[3] Population of Greece: 10'600'000 inhabitants; Total area: 131'940 sq. km.

In recent years, Québec and Greece started countrywide cadastral projects. In Québec it was to renew the existing cadastre and in Greece to attempt, once again, the implementation of a cadastre.

The Québec Project

The original cadastre in Québec was produced at the end of the 19th century. It remained unchanged for more than a century, with the 700'000 original lots still represented on the same 1'450 original plans. Subsequent subdivisions of the original lots were, once registered, shown on 350'000 parcel plans that were never transferred to an overall plan. These and other factors, combined with the absence of a formal process for updating the cadastre, gradually created a number of deficiencies in the cadastral system.

For all these reasons, the Québec government launched a cadastral reform program in 1985. Six years after work first began, nearly 85% of the initial budget had been spent but the cadastre had been renewed for only 5% of Québec's 3.5 million properties. The program was therefore suspended for a complete overhaul.

After the problems had been analyzed and solutions identified, the program was resumed in 1992 on an entirely new legal, technical, administrative and financial basis, while the initial objectives were maintained:

- Provide a full and accurate record of land divisions;
- Ensure that the cadastre is updated; and
- Ensure the versatility of the cadastre.

Québec's cadastral reform project is now well on the road to success. Renewal work is currently underway, covering 50% of all land under private ownership. In addition, 20% of the lots to be renewed are now correctly represented and in force in the new cadastral database.

The Greek Project

On the other side of the Atlantic, another national cadastral project was launched in 1994 and pursued the following goals:

- Ensure the security of tenure of private rights and the operation of an efficient land market;
- Determine state lands and all public rights;
- Establish a large scale cadastral infrastructure for Greece; and
- Establish a 1:5000 digital orthophoto map base for the nation.

Six years after work first began, this project has run into difficulties. The Hellenic Cadastre expenditure is 47% in excess of the original budget and as yet no properties are correctly and finally represented in the cadastre.

Problems Identified in the Initial Phase

In their initial phases, both projects experienced similar problems. Some of these are described below:

1. Financial Realities

In a nation-wide cadastral project, administrators often underestimate the extent of the work to be done, and consequently the costs. This happened in the Québec project. The project was initially evaluated at US$55 million (US$23 million was dedicated for cadastral work and the rest was for geodetical and cartographical work). Six years later, 85% of the initial budget had been spent but the cadastre had been renewed for only 5% of Québec's 3.5 million properties. The re-evaluated budget is now US$328 million.

The Greek project is facing the same kind of problem. The initial budget of US$1.1 billion was well below the recent and varied estimates (which have been questioned by KT management) of up to US$2.1 billion. Moreover, six years after the approval of the program, and despite the allocation of significant European Union (EU) funds, no part of the cadastre is in operation. In this case it could be claimed that the inadequacy of funds is not the cause but the result of other problems discussed below.

However, in the case of Quebec, a sound decision was taken in the initial phase to implement a self-financed fund based on the user-pay principle to finance the project. It is easier to establish long-term planning when a stable flow of income is established. This principle was maintained after the realignment.

In the case of Greece, the project is publicly funded, with costs shared by the EU (75%) and the Greek government (25%). Several years into the project, and in light of international experience, it became clear to all involved in the Greek project that a user-pay approach would be necessary to accommodate the expanding scope of the cadastre and the future maintenance of the project.

In December 2001 the Ktimatologio Board and the Management of KT offered their resignation. This was accepted and a new Board and senior management was appointed.

2. Misunderstanding of the Cadastral Product

A major problem identified on both sides of the Atlantic was the failure to establish a clear definition of the cadastral product shared by the government departments involved in the project, the cadastral authorities and land surveyors. As a result of this misunderstanding, there was a serious divergence between the respective expectations of the producers (land surveyors), the users (government, ministries, landowners), the owners of the cadastre (the cadastral authorities) and the general public. This situation was, and in the case of Greece remains, a major source of dissatisfaction for all those concerned with the cadastre.

3. Planning and Monitoring

The lack of holistic and integrated planning, the method used to establish priorities, and the process for allocating contracts, which were too small in area, were identified as major sources of problems in the production agenda and again resulted in budget over-runs.

In the case of Quebec, an overall planning approach was impossible, because each municipality had to make a formal request to be included in the program. Also, as there was neither a dedicated lead organization nor a work management system, monitoring of the work proved difficult.

In the Greek project, monitoring has been ineffective. Whilst there has been no shortage of reports on progress and a significant documentation flow between the Greek Government and the European Union, project monitoring has been largely self-assessed and internal Periodic external criticism has been largely ignored. There has been an absence of independent and continual quality or milestone assessment This absence has been identified for adoption in the realignment.

4. Institutional Arrangements

One of the major problems identified in the initial phase was the non-existence of a dedicated organisation in charge of the management of the overall project. The human resources involved in the full span of the project were under the authority of several organizations. These organizations continued to operate in isolation with scant regard to the national implications of the project.

In the case of Greece, there was and remains another major strategic issue. There has been no definition nor, until recently, any high-level acceptance of the need for a National Spatial Data Infrastructure, which is essential for effective co-ordination of the national land related information database.

The situation in Québec was quite different from this point of view. For many decades, all land related data produced by the Government of Québec are linked with the official geodetic system. Furthermore, since 1988, the Québec government has had a governmental Geomatics Plan[4]. This plan is to support, structure and channel the efforts of departments and agencies wishing to use geomatics, and to prevent the field from developing in an anarchic manner, with no overall vision, giving rise to numerous and costly duplications.

5. Quality Considerations

In Québec, quality control was also identified as a source of problems. The main reason for this was the existence of two versions of the cadastral plan: a hard (paper) copy and a computerized (digital) version. As the pa-

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[3] Geomatics Plan website: www.pggq.qc.ca

per version of the cadastral plan prevailed, all the controls of the renewal plans were made manually (visually) on this version. The quality assurance approach in Greece was the traditional audit checking in a "poacher and policeman" climate. This was recognized in the realignment with recommendations that quality would be infused in the entire process.

Another issue identified in the two projects was the updating of the cadastral data. The challenge in a large-scale cadastral project is not only to capture data and implement the cadastral database but also to keep data current. In the initial phase of the project in Québec, the process of data updating was not systematic. The data was updated only from time to time. The database was never up-to-date and so, not reliable.

In Greece, there has been no corporate solution to the up-dating procedure and each interim cadastral office has its own approach.

6. IT Development

In the case of Québec, when the initial phase of the project was launched, the geomatics philosophy was not very mature. The tools available did not support GIS standards, meaning that quality control and data updating were not reliable. Financial, operational and management systems were insufficient and inadequate.

In the Hellenic project, there is no system in place to maintain the information and work done so far. Neither is there a financial management system for the development, operations and maintenance of the cadastre. The principles of the Information Technology Plan have been professionally developed and accepted by the Project Management Team for some time. Considerable work has also been done in developing the financial systems but, as yet, there is no formal document, as approved by the Board of Management.

Some Key Success Factors

It is accepted that key success factors vary from country to country in response to national and global drivers and that what is "best practice" for one country is not necessarily "best practice" for another. But there are, it seems, some fundamentals for success, which have emerged in reviewing many cadastral projects. Initially there should be a sound methodology or process that is capable of describing:

- Well-defined **Objectives** – to know what to achieve,
- A clear **Strategy** – to know how to get there,
- Monitorable **Indicators** – to know if on track, and
- **Evaluation** of results – for accountability and the learning process.

Many factors must be considered in defining and completing this process, and an analysis of the factors leads to the means of reforming or re-

engineering existing systems. Often this provides a way of overcoming existing shortfalls or minimising cultural endemic traits, like land disputation, or inherent bureaucratic characteristics in places where the idea of strategic planning, performance indicators and continuous evaluation techniques is alien. Importantly the process can also identify "project killers", which are forces whose very presence can prevent project achievement.

In considering the Québec and Greek projects the following issues were identified as contributory factors for a successful realignment once it was realised that a new path had to be taken.

1. Financial Clarity

To ensure the economic sustainability of the project, the organization responsible for the project must be able to plan in the long term. To do this, it must be able to rely on adequate financial resources that are independent of annual government budgets: a cadastral fund should be implemented and a fee structure should be developed.

To avoid budget over-runs in the project, continuous performance indicators should be developed to monitor project development and cost control and to ensure that the objectives are still directed to the target.

2. Clear Vision of the Cadastral Product

It is also important to have a national vision and a clear definition of the anticipated result in terms of the final product, to avoid a situation where the expectations of certain stakeholders are not met. It is important to establish clearly:

- the main objective of the cadastre (fiscal, juridical or registration purposes);
- the scope of the cadastre (what is the cadastre and what it is not); and
- what are the descriptive and geometrical cadastral data.

Everyone involved in the cadastral project should have the same expectations concerning the final product.

This vision may be subject to incremental change but all stakeholders must be nurtured, informed and comfortable with any modification. A comprehensive communication plan should be developed to ensure this common understanding and to keep producers, users and everyone involved well informed about the project.

3. Institutional Arrangements

To achieve a national-level cadastral project, it is mandatory to establish an organizational plan to bring the project to completion. Not only should all parties be clear as to the identity of the agency responsible for the establishment and operation of the cadastre, but also the institutional infrastructure within which the responsible agency operates must be apparent to all.

The completion of a national cadastral project, whether it involves the introduction of a new cadastre, as is the case in Greece, or the renewal of an existing cadastre, as is the case in Québec, involves some major changes in methods. Managers must share a clear vision of the lead organization and be in a position to demonstrate the leadership required to re-engineer working processes and implement the necessary changes in the face of inevitable resistance to change.

4. Technical Ambitions

Obviously, the final product must be as perfect as possible and must meet the expectations of users. Coherent technical standards and rigorous quality controls are needed to achieve this.

The cadastral plan should contain only the data required by its mission and the cadastral plan should contain only cadastral data, which are under the entire responsibility of the cadastral authorities. External data, if required for other purposes, should be maintained separately.

The data must be in conformity with the national standards and compatible with the national spatial data infrastructure. The cadastre must be polyvalent and be easily linked with other data.

5. Legal Relevance

At the same time, the legal framework must be clear and consistent with the product. It must give the organization responsible for the cadastre all the powers it needs to accomplish its mission successfully with the least possible number of constraints (legal, administrative and others). It must also limit legal proceedings and other types of disputation while preserving the rights of landowners. A solution is to give to the cadastral data a presumption of accuracy and emphasise the administrative solution path rather than the litigious obstacles.

It is essential to be clear as to the aim of the cadastral process. Is it to resolve disputes between landholders, is it to resolve the determination of the extent of public lands or is it, initially, to create a graphical cadastre, which can clarify property rights for land market purposes? Each aim may require a different emphasis of the legal energies and intellect.

A major obstacle to innovation in servicing a dynamic property world is the historical reluctance of the legal profession to adopt change – more so in a property environment. If this obstacle becomes serious in the introduction of a modern cadastre the relevance of the legal presence in that business must be questioned.

Above all, in establishing, correcting and maintaining cadastral data, the legal process should be as simple as possible. Since the cadastre is a State mission, its purpose is to serve the community and not enhance any historic or vested interest.

6. IT development

No modern cadastre can be developed without a large contribution of information technologies and geomatics in particular. This aspect must not be neglected, because the systems developed will influence the planning of work, compliance of the final product with technical standards and the integrity of the cadastral database.

The IT development plan may be given to an external IT firm. This plan should include at least the following components:

- Financial management system;
- Monitoring of work; and
- Cadastral database management.

To avoid developing a GIGO (garbage-in and garbage-out) system, the IT development plan should include re-engineering of the institutional processes. Before computerizing work processes, the organization should first re-think them to be sure they are as efficient as possible. If processes are coherent, well-organized and as simple as possible, suitable technological solutions will be found.

7. Key success factors in compliance with the World Bank vision

The previous key success factors are in compliance with some mentioned by Frederic de Dinechin, land administration specialist from the World Bank, in the 7th Regional Cartographic Conference for The Americas which was held in New York in January 2001, which were:

- Clarified legal framework;
- Sustainable institutional arrangements;
- Strategic partnership;
- Spatial data infrastructure;
- New technologies to solve old problems.

Much is to be found in common with the findings of the World Bank land administration specialist and ourselves. With some decades of public service life combined we find no surprise in such findings.

Conclusions

Based on the experience of the above-mentioned large-scale cadastral projects, the areas that should be considered in developing a benchmarking approach for evaluation of cadastral projects should include:

- Political Support;
- Programme Capacity;

- Financial Clarity;
- Clear and Accepted Vision of the Cadastral Product;
- Institutional Arrangements;
- Technical Ambitions;
- Legal Relevance;
- IT Development;
- Underestimation of the extent of change and the effort needed for completion.

Without a clear understanding of the implications of each of the above elements, success is unlikely.

England and Wales – Benchmarking and Performance Measurement in Her Majesty's Land Registry

John Manthorpe

Context

Her Majesty's Land Registry (HMLR) is an Agency of the United Kingdom Government operating under the jurisdiction of the Lord Chancellor (the Minister of Justice). Established in 1862 it is a statutory body. The Head of the Registry is accountable directly to the Minister and has duties and responsibilities deriving from the Land Registration Acts for granting and guaranteeing title to land. The comprehensive land register comprises over 18 million separate titles of which 98% are computerised. All these computerised registers, containing some 100 million separately registered rights, are accessible on-line instantly to customers. Every title is supported by an individual title plan prepared by the Land Registry's mapping and survey staff and based on the largest scale Ordnance Survey Map.

Each day the Land Registry provides guaranteed results to some 35'000 pre-contract and pre-completion enquiries and searches that enable decisions on land to be made by the public, by business, by lenders and by government. Every day some 17'000 land transactions including over 6'000 mortgages are given legal effect and protected by registration.

The Registry serves a population of 54 million people. It employs 8'000 staff and meets all its costs from fees paid by customers.

Like Registries across the World its high level aims are to ensure social stability through secure tenure and to support a successful economy through a functioning land market and confident investment. Impartiality and professionalism are the hallmarks of its work.

Improving Public Services

Since the early 1980s successive UK governments have given a high priority to improving public services. This has developed through a series of initiatives, notably:

(a) Utilising the capacity and skills of the private sector to support public service delivery,
(b) Harnessing the increasing potential of computing to simplify and improve internal procedures and customer access,
(c) Improving management in government and the public sector

It is in this last area 'Improving Management in Government' that a range of initiatives has ensured that the public sector has actively developed Benchmarking and Performance Measurement systems. These enable mea-

surable targets to be set, performance to be monitored, and results improved by comparison and analysis of best practice within and outside the organisation.

Benchmarking

The Land Registry carries out regular assessments of its regional offices including annual 'partial organisation' assessments and a full assessment every three years. These assessments are conducted against the European Foundation for Quality Management Excellence Model. The formalised process enables the Registry to identify independently its strengths and any areas where improvements are most needed.

Performance Measurement

In the early 1970s, before the major central initiatives to introduce benchmarking in the government service, the Land Registry developed a series of performance measures to operate across its regional organisation. Productivity, Cost Effectiveness, Speed of Service and Accuracy were all measured to enable the organisation to better manage its resources, to identify its successes and any weaknesses.

These measures have been developed and now form the basis of the Registry's well established internal performance measurement systems. They also form the basis of forward planning, enabling manpower and financial resource requirements to be projected for any workload forecast.

The range of performance measures, described below, apply throughout the organisation; for the Agency as a whole, for individual regional offices and for the district teams within the regional offices. It is this intelligence which forms the basis of negotiations between the regional office and the Headquarters of HMLR on target setting and resource allocation and similarly between the Registry and the Treasury (the Ministry of Finance) in its annual public expenditure negotiations.

The Land Registry (as with other Agencies of Government) is set annual targets by its Minister based on these developed performance measures. Results achieved against target are reported annually to Parliament. Targets and results are also displayed in public areas of the Land Registry offices so that customers are aware of what to expect and how the Registry is succeeding in meeting its objectives. Importantly a component of the pay of the staff of the Registry depends on the results achieved against target.

The Basic of Benchmarking and Performance Measurement

Finding valid comparators outside the Land Registry to enable effective external assessment of the performance is not easy so three main approaches are adopted to ensure that the search for improvement is sustained and understood:

(a) Measurement through time – comparing results achieved progressively year-on-year and ensuring that testing and improving targets are set for the organisation. These apply for the whole Agency, for each district office and for each team, competing with its own previous results
(b) Comparing results between offices – publishing monthly and year-to-date league tables so that there is a wide understanding of performance throughout the organisation. This highlights best practice and good management so that the least successful can seek to meet the standards of the best.
(c) Customer surveys – independently conducted annual surveys of customers enables the Registry to understand how and where those who depend on its services see the need for improvements.

The Range of Performance Targets and Measurements

Table 4.1 shows the performance measures and indicators used by the Land Registry.

Efficiency	Cost per unit* in cash terms Cost per unit* in real terms#
Financial	Percentage return on capital employed
Speed	Percentage of applications received completed within various target times
Accuracy	Percentage of registrations processed free of any error
Customer satisfaction	Percentage of customers who are very satisfied/satisfied with the speed of service of registrations Percentage of customers who are very satisfied/satisfied with the accuracy of registrations
Developmental	Measured progress in the implementation of any particular project (e.g. computerisation of records, increasing access for customers, implementing new legislation)
Fees	The Registry is concerned with holding the fee per application at the lowest level consistent with good service

Table 4.1: Performance measures and indicators used by the Land Registry

The index is adjusted each year to reflect government published inflation figures so that year on year comparisons can be made of the true relative cost)

* Because various activities make greater or lesser demands on staff time, and therefore on actual cost, a system of **Unit values*** for different application types has been developed. This enables realistic comparisons to be made through time and between regional offices. For instance a different unit value would be appropriate for a sale of an existing registered title, a sale of part, a straightforward registration of a mortgage or a lease and for simple enquiries. Each application type is given a value, derived from actual historically observed and costed average time spent on these varying transactions and enquiries. Thus the true relative 'weight' of the received workload, through time and between offices, can be measured.

Table 4.2 shows an example of units and aggregate workloads that might arise in a regional office in a year.

	Applications handled	Unit Value	Unit Workload
First registration	4'000	3.5	14'000
Sales of Part	500	4.0	2'000
Sales of whole	8'000	1.0	1'000
Enquiries	16'000	0.1	1'600
Total	**28'500**	***	**18'600**

Table 4.2: Example of annual units and workloads in a regional office

The chart in Figure 4.3 indicates the relationship between these performance measures.

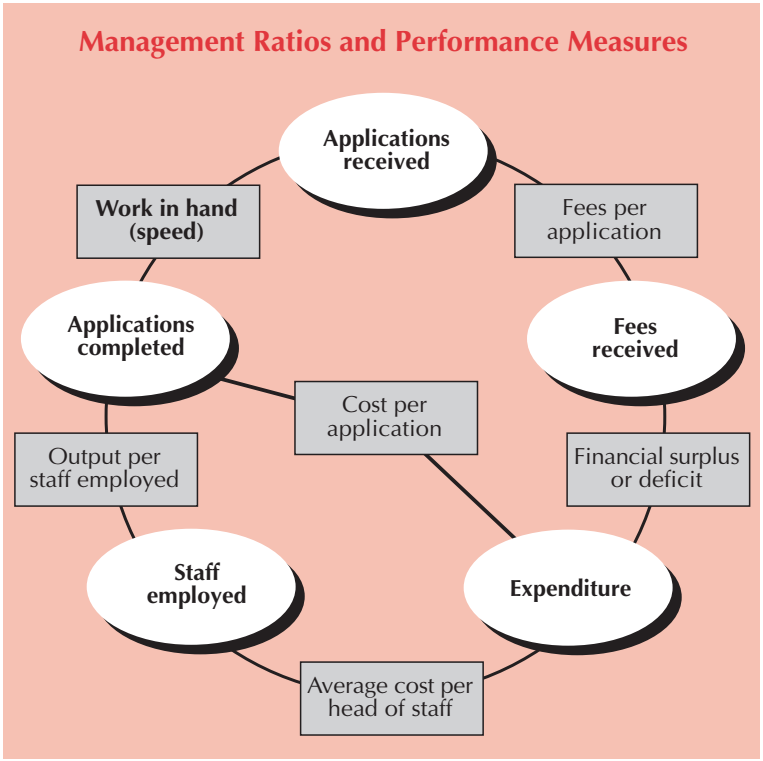

Figure 4.3: Relationship between performance measures

Resourse Use

The actual cost of the resource is known and attributable to the various tasks and categories. To avoid complex tracking of the actual and changing salaries of individual staff members average salary levels by staff grade are applied. Providing the numbers and grades of staff employed in an office are known such 'costing' is straightforward. Distinguishing between staff based unit costs and total costs (including overheads) per unit is useful to indicate the difference between those matters over which the regional staff manager has control and those which incorporate central expenditures over which only the central management can influence.

Speed of Service

Maintaining actual completion times for transactions and enquiries depends on recording the date of receipt and the date of completion and issue. Producing averages of the time taken and indicating also the percentage completed within a specified target time provides the basis of a speed of service performance measure.

For example, targets are expressed as follows:

- 'Average time taken . . . 7 days
- Percentage of transactions completed within 5 days . . . 85%

Accuracy

For accuracy and quality measurement the incidence of error is recorded.

For example targets are expressed as follows:

- 'Percentage of completed transactions returned for correction . . . 0.8% (this requires all errors and complaints to be recorded independently within the office)

Developmental

Specific projects and plans are measured and monitored against agreed cost and time targets.

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Benchmarking the Cadastre in the Netherlands: Some General Considerations and the Case

Paul van der Molen

Introduction

First of all this contribution to the benchmarking booklet considers benchmarking of cadastral systems from a general point of view in order to provide understanding of the Netherlands approach. Then the report focuses on how the Netherlands 'Cadastre and Land Registry Agency' (the 'Cadastre' for short) uses various benchmarks to measure its internal and external performance.

What is Benchmarking?

There are many definitions of 'benchmarking'. A working definition for this contribution is: 'benchmarking is the process of comparing an organisation's performance with some standard'. The standard might be based on previous performances, on the performance of other organisations, on the best performers in a certain field of action, or even on scientific facts.

FIG-Commission 7 – aiming to compare cadastral systems throughout the world – embarked on the use of the performance of other cadastral systems as a benchmark (Steudler et al., 1997).

The Netherlands Cadastre uses both types of benchmarks:
- *comparison with **standards***
- *comparison with similar **organisations***

Why We Support Benchmarking Cadastral Systems

The role of land registry and cadastre for sustainable development is widely recognised as being of vital importance (UN-FIG, 1999). Therefore the demand for better and available knowledge on the efficiency and effectiveness of cadastral systems is increasing (see also papers at the symposium in Gävle: FIG, 2001). Governments seek the best possible guarantee that investments in cadastral systems will result in the returns they aim for, in fact a normal businesslike desire for return on investment (ROI).

In the Netherlands we tend to recognise two aspects of return on investments: the micro and the macro level. The micro level (the economic aspects of the land administration organisation as such) puts focus on the

efficiency of the operational activities of the organisation, in terms of in-, through-, and output performance. If for example 'cost recovery' is a government objective in this respect, it will reflect the micro level. Equally important however – in our view – is the macro level of return on investments, which puts emphasis on the materialization of society's benefits of a sound cadastral system (UN-ECE, 1998).

Benchmarking at the Macro Level

The Netherlands Cadastre aims at supporting the implementation of the government's land policy (Molen, van der and Österberg, 1999). Land policy reflects the way governments want to deal with the land issue in sustainable development. That depends on the culture, history and attitude of a people. Therefore cadastral systems will differ from country to country. This understanding explains – by the way – why no cadastral system is 'the best'. Benchmarking of the systems in the world will by consequence never lead to a 'scientifically' declared best system: watchfulness is definitely necessary in the interpretation of benchmarks. However it is worthwhile to draw up a picture of the support cadastral systems give – also in the Netherlands – to the implementation of (the most important) land policy instruments, as there are:

1. *Improving land tenure security*
2. *Regulating the land markets*
3. *Implementing urban and rural land use planning, development and maintenance*
4. *Providing a base for land taxation.*
5. *Management of environmental resources*

Concerning the *improvement of land tenure security,* the legal framework of cadastral systems (related to the registration or recording of rights and interest in land) is determining the nature of the security provided. Within the context of the definition of these rights 'in rem' (as an institutional prerequisite), deed-systems provide another security than title systems. The combination of a strong notary-system (e.g. *latin notary*) and a deed registration might provide as much security as the combination of non-authentic (underhand) documents with a title registration (strong role of the registrar). Other relevant aspects are the extent to which legal facts are guaranteed by the State, compulsory or voluntary registration, land survey of a subdivision prior to or afterwards the transaction, type of land tenure (individualized, customary), litigation, and the definition of the legal object (Kaufmann and Steudler, 1998) to be surveyed (individual parcel, group parcel, object). *The Netherlands has a deed registration system, with a*

strong role of the notary, who is appointed by the Queen as the only professional entitled to draw up authentic documents. Such a document is compulsory for land transfer. Registration of the deed is compulsory.

Concerning the regulations for the *land market*, cadastral systems provide transfer procedures of a different nature. On one hand there are plain procedures of submission of a transfer document and a recording after a minimum of formalities (e.g. *simple deed registration*), on the other hand more complex procedures regarding investigations prior to the approval of the legal impact of the transfer (e.g. *issuing of a title certificate*). Some countries require approval by a chief surveyor, a chief planner or another authority. Advantage is that e.g. a building permit is granted together with the title, while in the first case the procedure for planning- and building permits starts just after the transfer. The process-time necessary for the transfer procedure (for example from the obligatory agreement to the official recording or registration, that is often used as a benchmark) therefore might result in a different *'value'* for the applicant. *In the Netherlands the transfer procedure does not comprise any planning or building permits. Owners have to follow a separate procedure for such permits.*

Concerning *urban an rural land use planning, development and maintenance*, the support of cadastral systems lies foremost in the phase of development and maintenance of a given land use. This activity is to be seen as an intervention by the government in private rights to dispose. Without knowledge about who owns what and where (also in *customary areas!*), land management will be hardly possible for the government. The increasing government interests in land bring Kaufmann and Steudler (1998) to the concept of ('legal') object-based cadastres instead of parcel-based cadastres. From the landowners' point of view, intervention by the government specifically limits his private right to dispose on the actual parcel, being the legal object of his private rights. A benchmark might be the actual use by the government of parcel information for intervention purposes. The intervention takes an ultimate form in the execution of pre-emptive rights and expropriation. Regarding protection of third parties in good faith, pre-emptive rights and expropriation decisions should definitely be recorded in the cadastre. *According to the regulations, in the Netherlands many spatial planning procedures must include reference to land registers and cadastral parcels (e.g. zoning plans, permits, public acquisition of land etc.).*

Concerning the support of land taxation, the fact that land tax is an outstanding example of local tax, a benchmark might be the extent to which local governments cover their local expenditures with land tax revenues. Without knowledge about taxable persons, taxable objects and land values (all data to be provided by cadastral systems), the generated revenue cannot be high. *In the Netherlands the Cadastre provides such information on a regular basis to all municipalities and waterboards, which are entitled to levy land tax. The tax revenue based on landownership and land use is about $7000 million. Compared with the costs of the Cadastre ($200*

million) and the municipal costs for valuation and levying ($100 million) not a bad return on investment anyway.

The *management of environmental resources* is of increasing importance. The measures a government can take are in many cases executed through imposing restrictions on the use of land. A good example is soil sanitation, where governments can impose to landowners a compulsory soil cleaning, and can give such measures the status of real right, which means that these orders have legal power against third parties (e.g. new owners). Therefore these public encumbrances are eligible for registration. *In the Netherlands various types of environmental measures are recorded (mainly based on the Soil Act).*

Benchmarking at the Micro Level

There are a few parameters that indicate the performance of worldwide cadastral systems at the organisational level (in addition to 'macro'-indicators), as there are:

1. coverage of the country
2. completeness of the registers and the maps
3. actuality of the registers and the maps
4. costs or expenditures

Considering the *coverage of the country*, it is important to recognise that an insufficient coverage might easily hamper the implementation of the earlier mentioned land policy instruments. In the Netherlands, *there is a 100% coverage for many years already; coverage is therefore not an issue.*

Concerning the *completeness and actuality* of cadastral systems, it is important to recognise that cadastres aim to provide actual information on the legal status of land as comprehensive as possible. *As in the Netherlands the recording of a transfer deed is a requirement of the law for a legal delivery of real estate ('without registration no ownership'), the actuality of the public registers is guaranteed.* The actuality reflects by the way on both private and public rights and interests in land. The recording of the latter is anyhow quite problematic in all cadastral systems worldwide. *In the Netherlands a new law is pending in the Parliament to oblige all government bodies (that are lawfully competent to impose public encumbrances to land), to register these encumbrances properly (either at a new municipality-register or the Cadastre) and to relate these public land 'rights' to cadastral parcel numbers.*

Regarding *costs or expenditures*, the financial impact of cadastral operations is an important measure for efficiency, however the differences in 'context' and 'value' that are delivered, form a complicating factor (Molen van der, 2001). *The Netherlands Cadastre is completely financed by its customer fees. No government subsidies are granted.*

Benchmarking of the Netherlands Cadastre at the Macro Level

Annual Accounts

According to the law, the Cadastre is obliged to submit annual accounts to the Minister of Housing, Spatial Planning and Environment. These annual accounts are to be approved by an independent auditor (KPMG). The annual accounts are open for public inspection, in the form of a public annual report. The annual report includes general considerations on topical subjects (like how the Cadastre deals with privacy, with public accountability etc.). An important benchmark is the development of the structural equity in the balance sheet, as the law says that the structural equity should not exceed 30% of the balance sheet total (without provisions and reservations). Apart from this structural equity, there is a so-called cyclical equity that is a reservation for bad times. If the structural equity in a mid term perspective exceeds 30%, the income of the Cadastre should be reduced through decreasing the fees. That was the case in January 1995 (-15%), August 1995 (-30%), September 1997 (-10%), and October 1998 (-25%). If the structural equity is less than 30%, the fees can be increased. That will be the case in June 2002 (+25%).

Users Council

According to the law there exists a Users Council representing the umbrella organisations of notaries, real estate agents, mortgage banks, municipalities, waterboards, and consumers. The Board and the Cadastre confer on matters of quality of products and services, efficiency and effectiveness, long-term policy, and on all other matters of common interest.

Planning and Control Cycle

In order to provide rules for the management of the organisation, there is a Management Manual, comprising the principles of management, the allocation of tasks, responsibilities, and competencies with regard to the management. The Manual gives rules for a Planning and Control Cycle. There are annual plans, and quarterly and annual control mechanisms.

Quality Assurance and ISO

The Cadastre maintains a Quality Manual that describes all work processes, production standards, quality requirements, and allocation of tasks, responsibilities and competencies. The manual is the fundament for a quality assurance system, which will be audited for ISO certification in 2002 (ISO 9001:2000). Important part of the Quality Manual is the so-called Technical Manual (Regulations for the technical work of the Cadastre), that gives quality rules for the land survey activity (accuracy rules, adjustment rules, guidelines for field survey, guidelines for cartographic work, geo-

metric quality control). An essential part of the QA system is the annual audit plan, comprising:

- operational audits, to be ordered by the top management;
- ICT-audits, idem;
- internal audits, to be ordered by head of a unit.

Recent audits (1999-2001) concerned – for example – the way the Cadastre executed the update processes for the land registers, idem the Technical Manual, and the cost-level of ICT departments (system development and daily exploitation). These audits resulted in respectively more attention to day-to-day checks of changes in the databases, more effort in educating land surveyors for using the Technical Manual, and for purposeful decrease of costs for ICT.

Benchmarking Corporate Staff and ICT-Departments.

The performance of ICT departments is benchmarked against the performance of ICT departments of similar organisations. These investigations are done by independent consultants, which have access to databases with performance data of hundreds of organisations. The last benchmark was performed by Gartner group. A new development is a similar benchmarking of the rest of the corporate staff (departments of marketing, finance & control, personnel & recruitment), which started in 2001 and will soon be finished.

Customer Satisfaction Measurement

Since 1994 (when becoming an independent public body) the Netherlands Cadastre conducted two independent customer satisfaction measurements, in 1996 and 2001. The policy is to conduct such surveys every 4 years. An independent research bureau investigates the opinion of professional parties, government agencies and citizens in the field of the land market (notaries, real estate brokers, financial banks, companies, citizens), land-use planning and development, land taxation and resource management (municipalities, provinces, waterboards). Issues that are addressed are (headlines):

- satisfaction regarding reliability of the Cadastre;
- satisfaction regarding expertise of the staff;
- satisfaction regarding delivery times of products and services;
- satisfaction regarding accessibility of data (on-line services);
- satisfaction regarding customer orientation;
- satisfaction regarding clearness of customer communication;
- satisfaction regarding thinking along with customers.

More detailed questions concern the opinion of the customers on:

- waiting time at customer desk;
- opening hours;
- keeping promises;
- correctness of products and services that are delivered;
- speed of delivery;
- prices of products and services;
- transparency of invoices;
- product innovation;
- market communications and public relations;
- dealing with complaints.

The customer satisfaction measurement ends with:

- what is the (relative) importance of these issues?
- what are priorities for improvement?
- what are specific targets for improvement?

The overall results of the measurement 2001 are in brief:

- slightly better satisfaction than in 1996 on all issues (average from 73% to 79% satisfaction, except dealing with complaints: from 66% to 57% satisfaction);
- accessibility of data (on line service): should be improved;
- product innovation: Cadastre should be more innovative;
- clearness information on products and service is good but customer misses overall view;
- clearness of invoices is insufficient;
- customers do not always know what to expect (interpretation legal meaning of land information, cadastral maps);
- citizens are not always satisfied with the way the Cadastre deals with their complaints (31% dissatisfied).

Benchmarking of the Netherlands Cadastre at the Micro Level

Economic Performance

Local branches (15) have to comply with the rules of the Management Manual for monitoring the economic performance.

Based on their day-to-day financial management, the local branches submit every three months the progress on profit and loss account, balance sheet and some management indicators. These are for example:

- business turnover;
- business costs;
- business results;
- cash flow;
- sales;
- cost prizes;
- investments;
- productive workdays;
- workflow (input, throughput, output, stock);
- various control parameters;
- absence through illness;
- complement (staff resources).

Quality Performance

Furthermore the local branches should comply with the Quality Assurance Manual, so they have to stick to the described work processes, production standards, quality standards, and quality checks.

On a day-to-day basis they record the results of their measurements. Every three months they report to the head office on several indicators, from which the most important are:

- *indicator efficiency:* realised production lead time (compared with the production time standard);
- *indicator workload:* various parameters concerning the number of registered legal documents (is a measure for the expected workload for update processes of land registers and cadastral maps etc.);
- *indicator actuality:* realised process time between submission of a legal document and setting a warning flag in automated land registers compared with a standard (not later than 9 o'clock next morning);
- *indicator actuality:* realised process time from submission of a legal document and updating land registers compared with a standard (maximum of 4 working days);
- *indicator correctness data in database:* quality check of a sample of 5% of the changes in the land registers, compared with a standard (maximum 0,1 % incorrect);
- *indicator quality references right to parcel:* total number of mortgages without a reference to a parcel number, compared with a standard (zero);
- *indicator quality submitted deeds:* number of necessary rectifications to be submitted by the notary (needed in the case a deed includes an incorrectness, e.g. a wrong parcel number) older than three months, compared with a standard (zero);
- *indicator incorrectness subdivision cadastral parcel:* number of subdivisions that cannot proceed because of disagreement between seller and buyer concerning new boundaries;

- *indicator process quality parcel subdivisions:* correctness of a sample of 5% of three main formal documents concerning subdivision (protocol, input document for updating the registers and maps, and field sheets);
- *indicator delivery times:* realised delivery times of about 20 products and services, compared with a standard (e.g. 95% of the official declarations on the existence of servitudes on a certain parcel should be delivered within 4 working days).

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Lithuania - Benchmarking of Real Property Cadastre and Register Activities

Bronislovas Mikūta

Background

Lithuania, with the capital city Vilnius, is situated on the coast of the Baltic Sea and covers an area of 65'300 square kilometres. The territory of Lithuania is divided into administrative territorial units – 10 counties and 60 municipalities.

After the re-establishment of independence on 11 March 1990, the Republic of Lithuania adopted the laws, which legalised private ownership in land, forest and other immovable property. There was a need to establish a relevant real property administration system to legalise private ownership in real estate and create the conditions for the development of a real property market.

Institutions on central, county and district level were established to restore ownership rights in immovable property and to implement land reform. Besides the mentioned institutions, also more than 1000 surveyors from state institutes and private surveying companies took part in the implementation of this task. In 1997, the Government established the State Land Cadastre and Register (SLCR) to administer the cadastre and the register of real property (land, buildings and flats), to carry out market researches, and to prepare data for the computation of real property taxes. The SLCR has a central office in Vilnius, 11 Branch Offices and 37 Client Services Bureaux in districts and major cities.

Restoration of Ownership Rights in Immovable Property and Privatisation

Lithuania made the decision to restore ownership rights in land, forest, water bodies, and buildings to the citizens of the Republic of Lithuania. Legal acts were adopted which regulated one of the main tasks of the country - to implement the state policy on restoration of ownership rights in land, forest and other immovable property and privatisation. Figure 6.1 below illustrates the formation procedure how the ownership rights in land and other immovable property are legalised for the Lithuanian citizens.

Necessary institutions on county and municipal level were established to carry out the restoration of ownership in real property. The specialists on land administration in counties and municipalities, surveyors of state institutions and private companies were involved in land restitution pro-

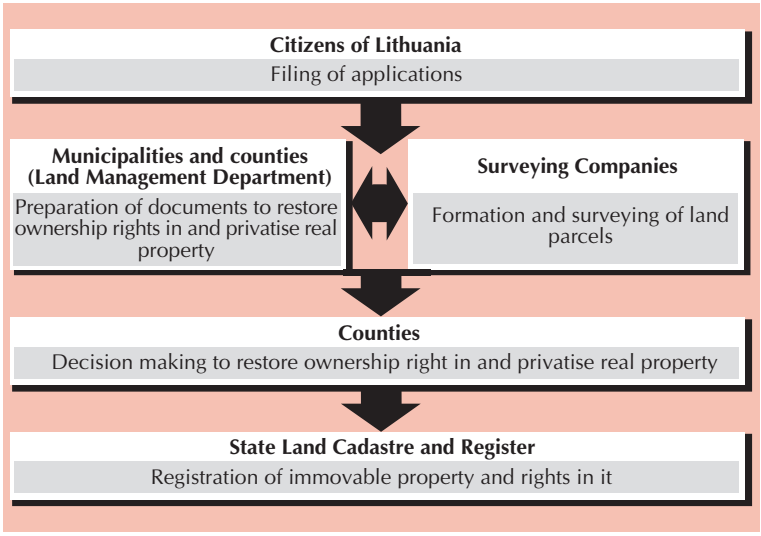

Figure 6.1: Procedure to legalise the ownership rights in land and other immovable property

cess. Land in cities that is not subject to restitution to the previous landowners and their inheritors is privatised (sold) by announcing an auction for a land parcel.

In order to restore ownership rights in land parcels, to privatise them or document their use rights, it is necessary to mark the vertex of land parcels on the ground by using boundary marks and perform the surveying by using geodetic instruments or interpret the vertex of land parcels on the latest mapping material. Such methods are used in the whole territory of Lithuania. By using geodetic instruments the following accuracy of boundary marks is tolerated:

- in cities - up to 0.1 m;
- in urbanised rural areas - up to 0.2 m;
- in other rural areas - up to 0.6 m.

When the vertex of land parcels are interpreted on the latest mapping material, the accuracy of co-ordinates in urban areas is 0.5 m and in rural areas up to 1-5 m. Land parcel boundaries plotted by surveyors are co-ordinated with the land parcels boundaries stored in the GIS units of the State Land Cadastre and Register. Such procedures help to avoid overlapping and gaps. Over 987'000 land parcels or 66% of all planned land parcels are formed, boundaries are marked with boundary marks and surveyed with geodetic instruments or interpreted on mapping material. Statistics show that the major formation of land parcels took place in 1994-1996 and

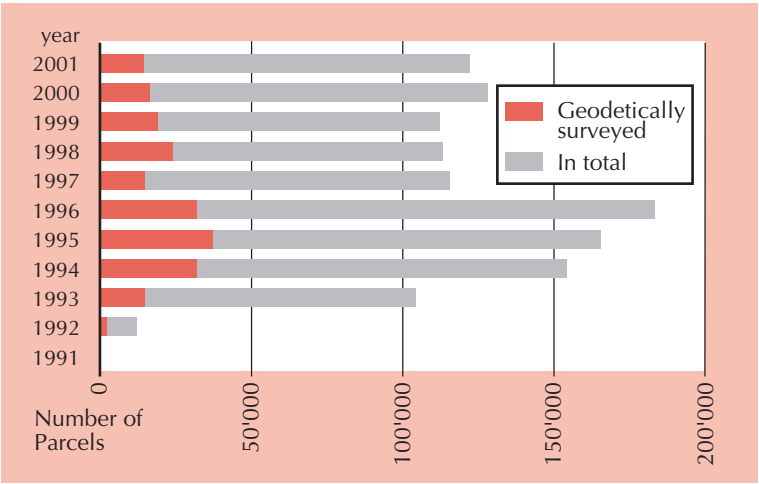

Figure 6.2: Number of annually surveyed land parcels (1992- 2001)

that the formation is still continuing. More detailed information on formed and surveyed land parcels is presented in Figure 6.2.

All land parcels, which are surveyed by using geodetic instruments or interpreted on cartographic material, are registered in the Real Property Register. Land parcels without surveying are not registered in the Real Property Register. This means at the same time that only surveyed and registered land parcels can be transferred. Statistics show that buyers of land parcels - especially in urban areas where land is more expensive - prefer to buy land parcels with precise surveying. Geodetically surveyed land parcels are connected to the Lithuanian Co-ordinate System (LKS-94) based on the common European Co-ordinate System ETRS'89. Land parcels are surveyed by private companies and by state institutes that have the licences issued under the procedure approved by the Government of the Republic of Lithuania.

After land parcels are formed and surveyed, county administrations make the decision to actually restore the ownership rights of a particular land parcel. Figure 6.3 shows the actual area where land ownership rights have been restored.

Ownership rights in land are restored to 80% of the area subject to restitution. The process of restoration of ownership rights in land is relatively stable and planned to be finished in 2003. The statistics show that the restitution was influenced by changes in legislation, funding, and organisation of activities and interest of citizens to restore ownership to immovable property. Analysis of statistical data shows that even more differences can be noticed in the activities related to the restoration of ownership to immovable property and the activity of land reform performed in each county.

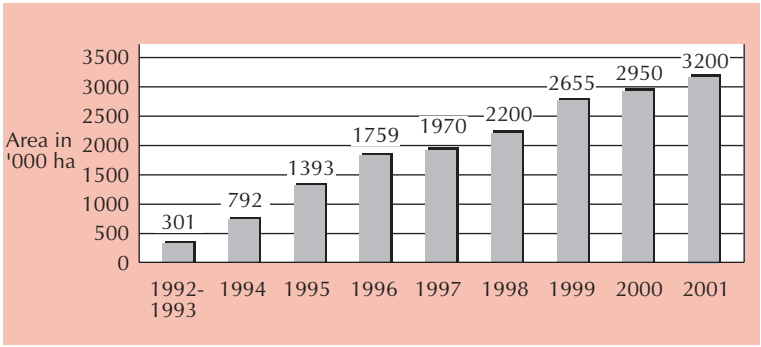

Figure 6.3: Decisions passed to restore ownership rights in land area ('000 ha)

After the land restitution is completed, land reform will continue – projects will be designed to enlarge the cultivated areas and land consolidation will start. It is envisaged to form and sell the state-owned land parcels, for which no previous landowners or their inheritors applied to restore ownership rights.

Registration of Immovable Items and Real Rights

Immovable items (land parcels, buildings and flats) to which ownership rights are restored or acquired from the state or other landowners are registered in the Real Property Register, for which the SLCR is responsible. The SLCR guarantees security of the rights of owners of immovable items registered in the Real Property Register. The registration of immovable items

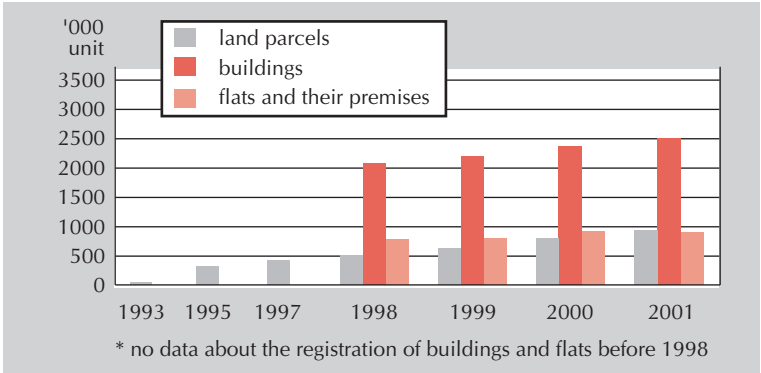

Figure 6.4: Registration of immovable property units

and real rights is computer based. A single data transmission network guarantees that the data is reliable and updated. Data about registered properties, real rights and their changes from Branch Offices and their units of the SLCR are transferred via on-line network to the central databank of the Real Property Register. The progress in the registration of immovable property is presented in Figure 6.4.

Land parcels, buildings, flats, and other premises as well as ownership rights to them are registered within the terms prescribed by law. The pace for the registration of land parcels and ownership rights to them was closely interrelated with the decision of the counties' administrations to restore land ownership rights. Until 2002, the records of the immovable items in the Central Databank totalled 4.5 million, which included more than 985'000 records of land parcels, and more than 3.5 million records of buildings and rights to them. These figures make up 80 per cent of the estimated number of items to be registered.

The majority of the citizens are involved in activities of the real property market to a larger or smaller extent, i.e. they buy, sell, inherit, gift, and mortgage their real properties. Any transaction with real property is not possible if the property and the rights to it have not been registered in the Real Property Register. More than 160'000 transactions with real property are concluded each year, therefore the Real Property Register stores records not only of newly formed immovable items and rights to them, but also of changes made in the real property on the basis of transactions certified by the notary.

Users of the Real Property Register Data

The integrated databank of the Real Property Register, which is under development at the moment, ensures the storage of cadastral data and legal registration data in one system. Reliability and accuracy of data are ensured through the single data transmission network, which has a constant connection with the central databank of the SLCR. The on-line system makes it possible to carry out a computerised registration of immovable items and real rights in any Branch Office or Client Service Bureau.

Operation of the real property cadastre and register data is presented in Figure 6.5.

Integrated registration of immovable items and real rights in a single system is more convenient, cheaper and attractive to the customers. More and more customers are asking not only for attribute data about properties, rights and legal facts but they also ask for graphical data, such as location of a land parcel, its shape, area, planning of a building, flat, etc.

Statistics show that the interest in real property information system is increasing, the number of users is increasing and becoming more diverse. Searches in the central Real Property Register databank are shown in Figure 6.6.

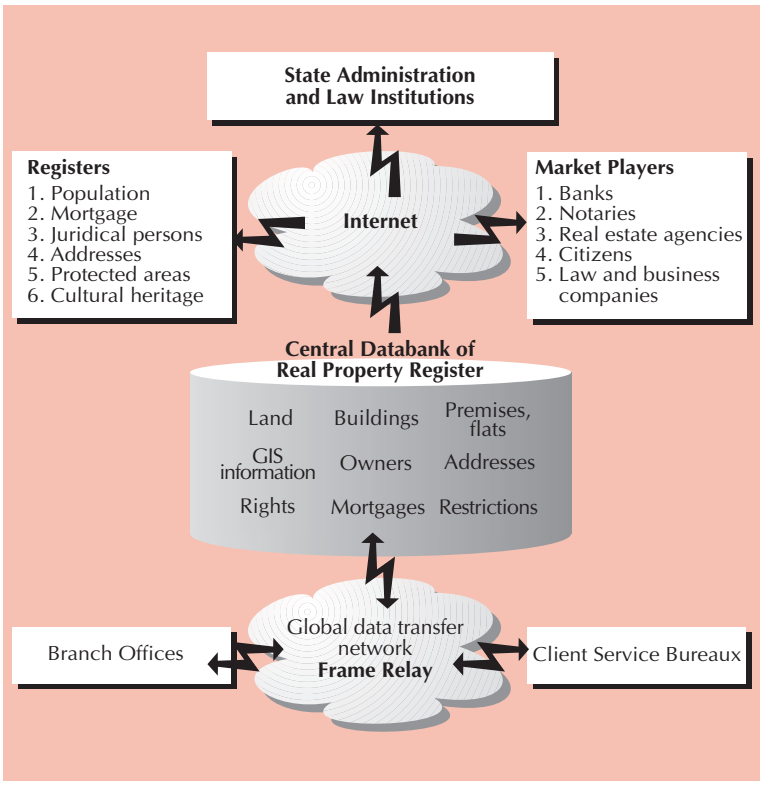

Figure 6.5: Operation of real property cadastre and register data

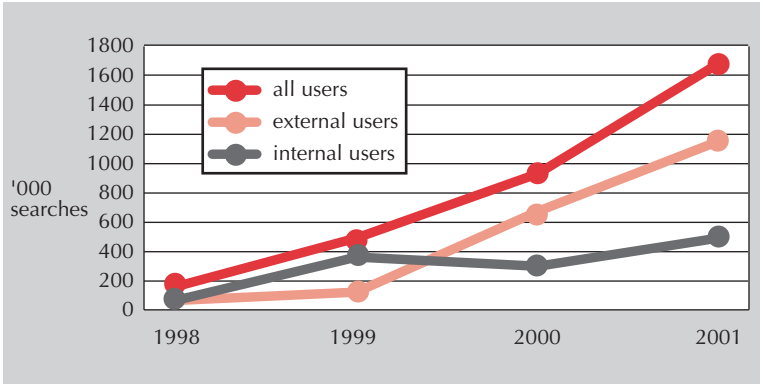

Figure 6.6: Number of searches in the Real Property Register Databank via Internet (1998-2001)

Users of the databank are citizens, banks, state authorities, private companies, etc. The most active clients are banks, taxation authorities, law enforcement institutions, notaries, municipalities, and institutions restoring ownership and others.

The number of customers is apt to increase in the future. Since 1999 the number of queries made by external users via Internet about properties, real rights and restrictions increased 10 times. Analysis shows that clients request comprehensive and integrated information about immovable items, real rights, encumbrances and restrictions; and besides, they also ask who the owner or possessor of a specific property is. Considering the clients' wishes, a new service was introduced. It is now possible to lodge an application to register immovable items, real rights and to order other service via Internet from any place in the country. The Real Property Register system is oriented towards quick supply of the information necessary for customers to make transactions. It is seeking to present such data that is necessary for the development of real property market.

Real Property Market

Lithuania has created a favourable environment for the development of a real property market. Over 80% of properties and real rights are registered in the Real Property Register. Buildings with 78% make the major part of the registered real properties while the remaining 22% are land parcels. In 2001, 4% of the formed and registered properties were transferred, inherited and mortgaged. Figure 6.7 illustrates the real property market in 1995-2001.

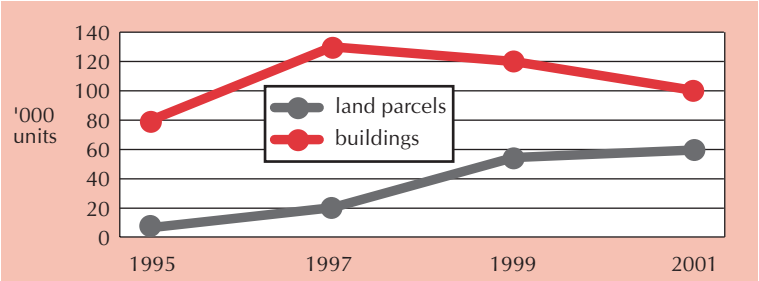

Figure 6.7: Dynamics of real property market

Statistical data shows that the market of land parcels is constantly increasing, however the land market differs very much if compared in each county. For example, almost 50 percent of all land transactions in Lithuania are carried out in Vilnius and Kaunas counties, an area that covers only 27% of the territory of Lithuania. The land market is also more active in counties such as Klaipeda, Panevezys, Siauliai if compared with other counties.

While the land market is constantly increasing, the market of flats and family houses decreased in recent years. The market of flats and family houses is most active in major cities, such as Vilnius, Klaipeda, and Kaunas, where 55% of all transactions in the country took place.

The analysis of the real property market changes in 1995-2001 shows that the real property market depends very much on the growth of the national economy, business investments, employment, density and living standard of citizens.

The availability of statistical data on real property cadastre and register in different institutions and Branch Offices of the SLCR enables to benchmark the efficiency, advantages and drawbacks of the real property cadastre and register activities.

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Benchmarking the Cadastral Registration System of Latvia

Edwīns Kāpostiņš

Introduction

Latvia with its registration of its real estates or Cadastral registration system is in a very unique situation. Firstly, Latvia has regained its independence 10 years ago and land reform had to be carried out as quick as possible; and secondly, the Latvian cadastral system had to be renewed in a very short time. Unique is that the digital registration system had to be developed in a very short time in order to avoid manual registration of properties. Today we can compare the cadastral system from a historical point of view – comparing it with the Soviet times, when land was common property – and compare the cadastral system as well with other states, which have experience and where traditions of private properties are long-standing. In this document, the cadastral system will be benchmarked from data quality and coverage aspects.

General Information

Latvia has a territory of 64'200 square kilometres and a total population of about 2.3 million. As a result of the land reform, which begun in 1991, about 600'000 real estates were created. It must be mentioned that the number of properties is rapidly growing due to increasing numbers of subdivisions of real estates. That is why about 2'000 new properties are registered in the Cadastre register per month as a result of transactions. The legislation of the Republic of Latvia allows to consider buildings (if owners of buildings and land are different persons) and apartments as independent real estates without land property. Today 20'811 building properties and 251'794 apartments are registered as separate properties in the Real estate cadastre (hereinafter referred to as the Cadastre register).

Benchmarking of the Cadastral Registration System

The Cadastre register is a public register, which is developed according to the Law "On the State Land Service" and regulations of the Cabinet of Ministers "Regulations of National Real Estate Cadastre". Its aim is to develop a modern computerised registration system of real estates, tenures

and physical objects to ensure registration of ownership rights and to solve problems related to real estate taxes.

The structure of the Cadastre register includes real estates, tenures, land parcels, buildings, apartments, and valuation blocks. The register consists of a textual and graphical part, both of which are mutually linked and are operated in a unified system integrated with the State Address Register.

The information system of the Cadastre register is based on the unified identification system of real estate, cadastre objects and physical objects in it. It consists of cadastre numbers and designations, which are unique in the whole state and used in any reference to real estate or physical objects. Information of all real estate objects, which are situated in the territory of the state (properties, land parcels, buildings and constructions, complexes of spaces, value, address, servitudes and encumbrances) and subjects connected with them (data about the owner or the tenure) are collected here. The graphical part of the Cadastre register is based on updated base maps and the unified national geodetic network LKS-92 and contains information about boundaries of land parcels, buildings and encumbran-

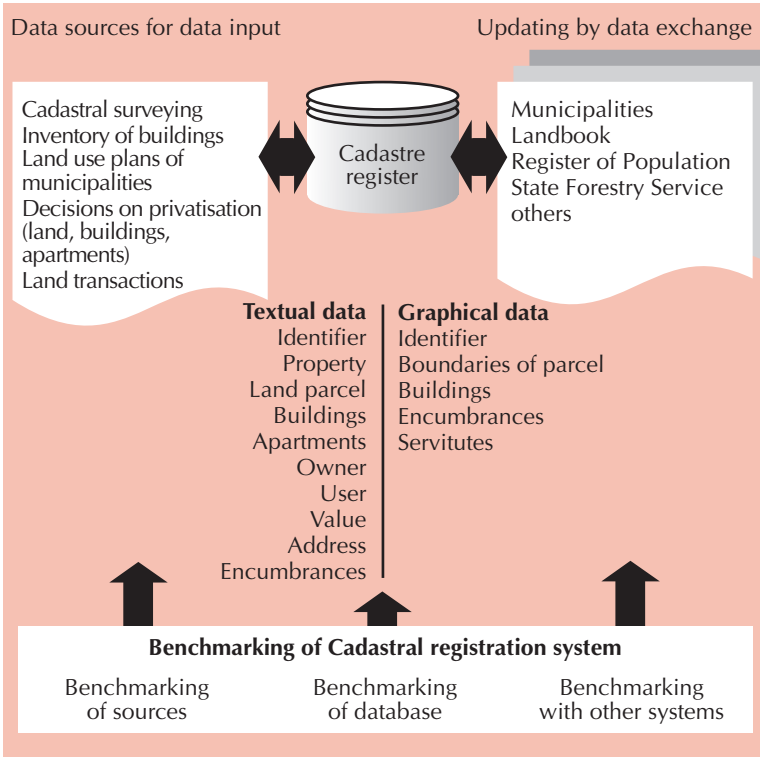

Figure 7.1: Principal structure of Cadastre registration in Latvia

ces. Input of information is carried out in the Regional Offices of the State Land Service. Information sources will not be analysed in detail (see Figure 7.1), but it is necessary to mention that data registration is based on documents. It means that all information is justified and considered official.

Figure 7.1 shows the principal structure of the Cadastral registration system with data sources for the first information input and data updating using other information system data. Taking into consideration the structure of registration system it can be benchmarked in overall or separately in details - performing benchmarking of origins of information or can be benchmarked by data quality, maintenance expenses and other indicators, or comparing the operation of the system with other information systems - data exchange and integration possibilities.

The system can be benchmarked over periods of time. Until 1997, the Cadastre register in Latvia operated as a register for information preparation about real estates for registration of ownership rights and developed sporadically, but later it was a cornerstone for the real estate taxation system. It responded to the necessity for updated information about real estates and their owners for the whole territory of Latvia. In 1997 the State Land Service began mass or systematic input of data about real estates in the Cadastre register using different information sources. In this process, information mainly from the land use planning projects of municipalities was used. The boundaries of properties and their areas were defined graphically in these projects, which are the base for boundary surveying in the field and registration of ownership rights in the Land Books. Positive and negative consequences can be found in the evaluation of theses activities in 1997 and 1998.

Benefits

- in a relatively short period of time almost 100% of the state territory could be covered with information about real estates (see Figure 7.2);
- the Cadastre register began to operate as an information system of full value;
- all municipalities were provided with base information for administration of real estate tax;
- as the information of the Cadastre register is a base for real estate tax calculation and collection, the cadastral data are examined at least once a year (at the beginning of the taxation year). They are indirectly examined by other institutions (municipalities, State Forestry Service etc.), which inform about inaccuracy - this means that information of the Cadastre register is not older than one year.

It must be mentioned that one of the main drawbacks from these activities was unsatisfactory data quality and the improvement of information quality demanded big efforts.

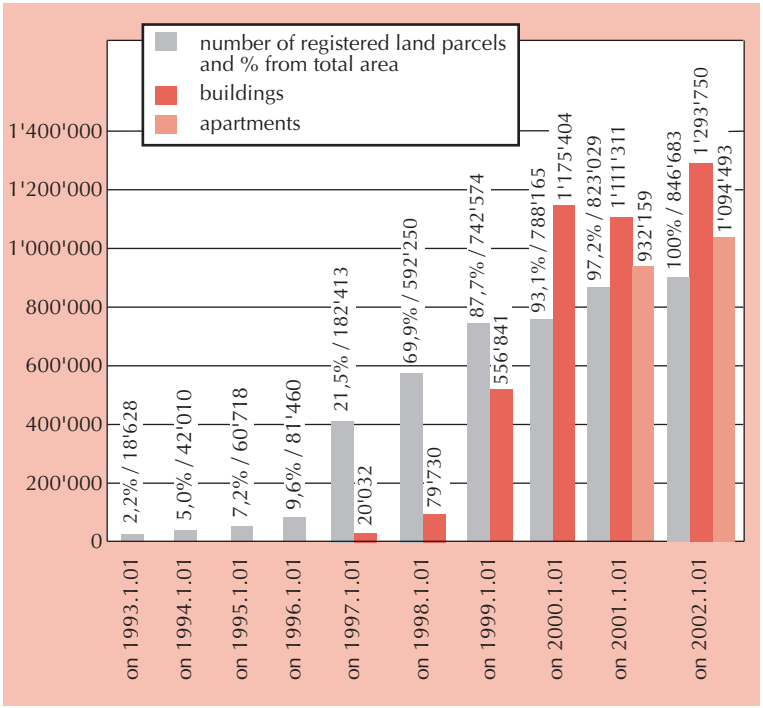

Figure 7.2: Development of the Cadastre register (textual part)

The development of the graphical part of the Cadastre register mostly depends on quality and development of mapping and cadastral surveying. In the beginning, the graphical part of the Cadastre register was maintained manually by use of aero photo plans as base, which were made in the 1980s. In 1998 the transition to the digital method began and the latest orthophoto plans in the unified geodetic co-ordinate system were used as a cartographic base. At the same time digitisation of manual cadastre maps and arrangement of information were performed according to the latest base data. The development of the graphical part in the beginning is shown in Figure 7.3.

By analysing the process, it can be concluded that the development of the graphical part is a bit behind the textual part coverage, but the development of both parts is a simultaneous process. As mentioned before, the textual information of the cadastre covers today 100%, while the graphical information covers 94% of the whole territory of Latvia.

However at the same time, the aim of the Cadastre register is not only for fiscal purposes, but for other aims as well, for example as a basis for the development of the land information system.

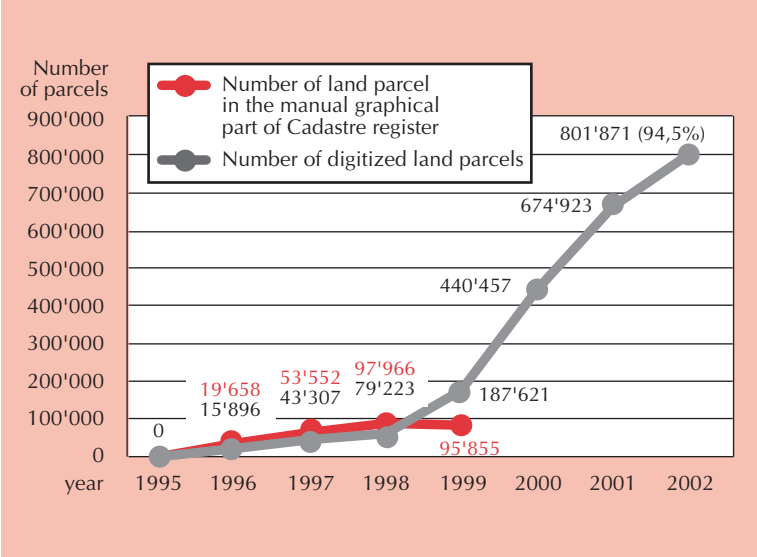

Figure 7.3: Development of the Cadastre register (graphical part)

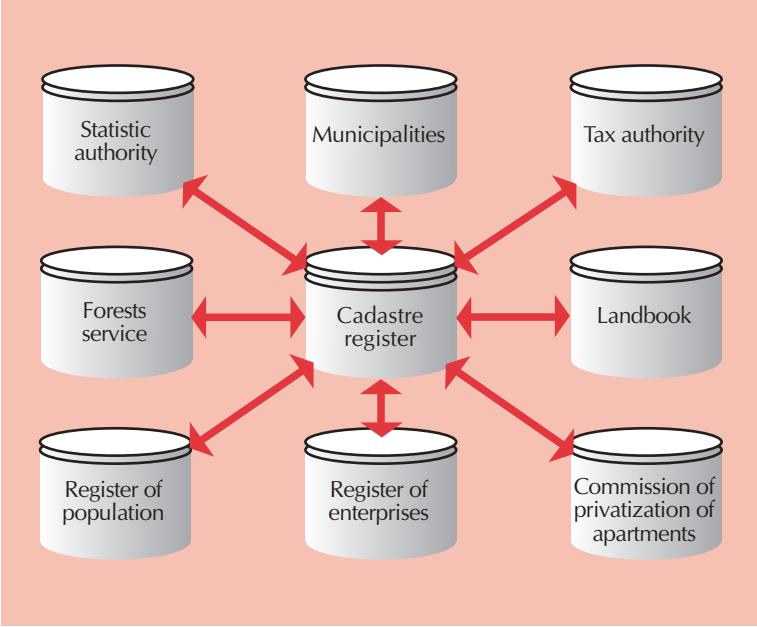

Figure 7.4: Information exchange system with other registers

Benchmarking in Comparison with Other Information Systems

In regard of data updating, the philosophy of the Cadastre register in Latvia is not to involve the real estate owners directly in the process of data updating, but more to use other sources of information of other state registers. It must be mentioned that this principle has the MEGA (integrated system of state registers) system also at the base of its operation – data input must be in that information system where they originate, other information systems use the data, but do not input them again.

Data exchange with other registers and information systems give the possibility to compare them with others and give answers to many questions:

i. are the data of the Cadastre register useful for other users?
ii. is data content and quality useful for other information systems?
iii. what are possible and necessary directions of development?

Poland - Benchmarking Cadastral Surveying

Wojciech Wilkowski

Outset

Poland is a country, in which the Surveyor General is the central body dealing with the cadastre.The maintenance of the cadastre has been assigned to chiefs of districts (powiats), who perform tasks commissioned by the state administration.

In 2001 the new ordnance came into force, which specified principles of maintenance of the cadastre, cadastral objects and types of information concerning particular cadastral objects, which are to be presented in the cadastre. The basic solution assumed in this ordnance was the rule that the cadastre should be maintained in a digital form.

The ordnance specifies particular stages and dates related to modernisation of the existing cadastre in Poland, in order to transfer it into a computerised system concerning lands, buildings and premises (see Table 8.1).

No.	Type of activities	Date of implementation
1	Substitution of manual, paper land records with appropriate computer files	December 31, 2001
2	Commissioning of a computer system, allowing for maintenance of the cadastre of lands (parcels), buildings and premises.	December 31, 2003
3	Creation of computerised cadastral databases allowing for creation of reports concerning lands (parcels), buildings and premises: a) for urban areas b) for rural areas	 December 31, 2005 December 31, 2010

Table 8.1: Time schedule of modernisation of Polish cadastre

What is Being Benchmarked?

The first period of implementation, which is the transformation of the existing cadastre into a spatial information system concerning lands (parcels), buildings and premises, included:

- inventory of the state of implementation of the first task listed in the time schedule;
- inventory of existing cadastral database management systems, which are used for maintenance of the descriptive part of the cadastre;
- specification of the progress of computerisation of the cartographic part of the cadastre.

During the first stage, the progress of computerisation of the existing cadastre of lands was evaluated. As a result it was stated that for 98.7% of Poland descriptive information concerning cadastral parcels exist in specified database management systems (as of March 2001). This concerns 30.5 million cadastral parcels, which exist in Poland.

During the second stage, inventory of cadastral database management systems, used for maintenance of the descriptive part of the cadastre as well as areas, where such systems exist, was performed. It was stated that 22 various systems exist, which are used for maintenance of the descriptive part of the cadastre.

During the third stage the progress of computerisation of the geometric part of the cadastre, i.e. cadastral maps, was evaluated.

As a result, unequal regional levels of development of numerical cadastral maps were stated. Statistical data, corresponding to coverage of Poland with numerical cadastral maps, are illustrated in Figure 8.2.

Effects of Benchmarking

There were several effects of performed statistical investigations and analysis of their results:

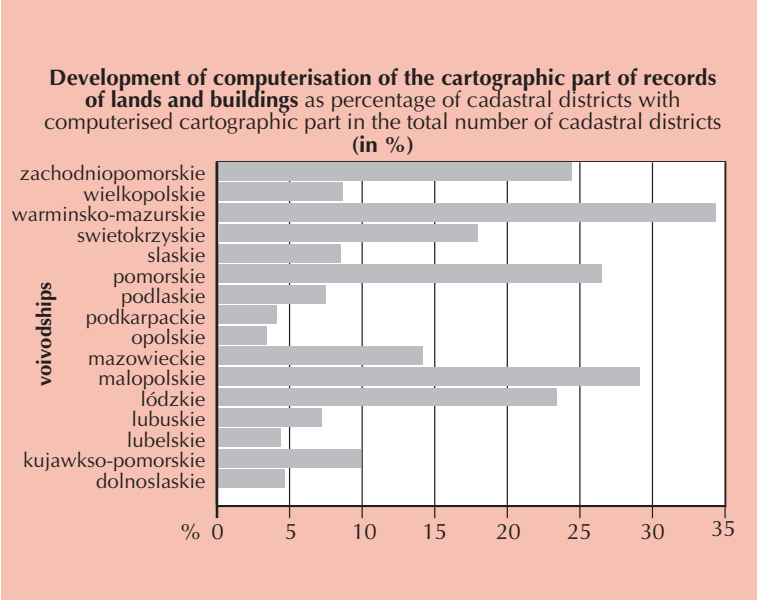

Figure 8.2 Development of computerisation of cartographic part of records of lands and buildings

1. Due to operations of the descriptive part of the cadastre in many cadastral database management systems, difficulties in cadastral data exchange between other public records, as well as making cadastral data accessible in the form of computer files, have been stated,
2. In order to improve the situation discussed in point 1 above, the following standards have been developed:
   - the standard of transfer of cadastral data in the form of computer files;
   - the standard of data exchange between cadastral data banks developed in various systems.
3. Statistical data concerning the level of development of works aiming at creation of numerical cadastral maps have the effect of "benchmarking", since they allow the comparisons between particular voivodships (provinces).
4. Monitoring of progress of works related to:
   - Development of the numerical cadastral map;
   - Development of the cadastre of buildings and premises, in order to meet the objectives specified in the ordnance on the cadastre of lands and buildings, should be continued.

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Switzerland – Benchmarking Cadastral Surveying

Daniel Steudler

Outset

Switzerland is a political Federation of 26 Cantons and like other administrative tasks, the administrative organization of cadastral surveying is based on this federative system. The 26 Cantons have the operational responsibility for cadastral surveying, while the "Federal Directorate of Cadastral Surveying" is setting the standards, and is supervising and coordinating the work.

In 1993, a new ordinance for cadastral surveying has been put in force, which defines the new AV93 digital standard for cadastral surveying. From the organizational point of view, it is up to the Cantons to establish their own concepts how they are going to achieve this new standard - of course according to Federal law and under the supervision and with financial support of the Federal Directorate.

In consequence of the recession in the 1990s, there was a general trend in the Federal administration to redefine the financial and organizational relations between the Federal and the cantonal administrations. Cadastral surveying was one of the first domains where principles of new public management have been introduced in order to better define and focus on the objectives (Selhofer and Steudler, 1998). The Federal Directorate defined

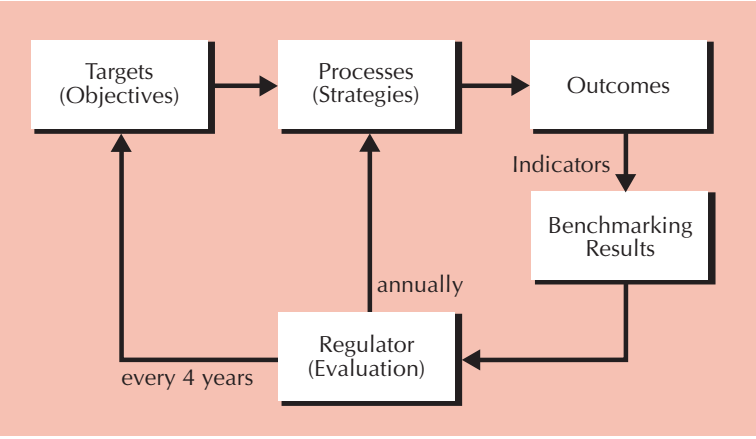

Figure 9.1: Controlling cycle for performance monitoring (Selhofer and Steudler, 1998)

the objectives for cadastral surveying and negotiated performance mandates with each of the 26 Cantons. The Cantons had to define their strategies according to these objectives and performance mandates. For monitoring the progress, the Federal Directorate established a controlling system, which monitors the outcomes with indicators and which re-evaluates the strategies and objectives every one respective four years in periodic controlling cycles.

What is Being Benchmarked?

The first 4-year period of the performance mandates started in 1998, and the objective of the Federal Directorate was to achieve within 12 years a full AV93-coverage in areas with high and medium economic activities, i.e. urban and built-up areas, including corridors between centers. This means that until 2010 approx. 70% of the Swiss territory is to be covered with cadastral surveying data in the AV93 digital format.

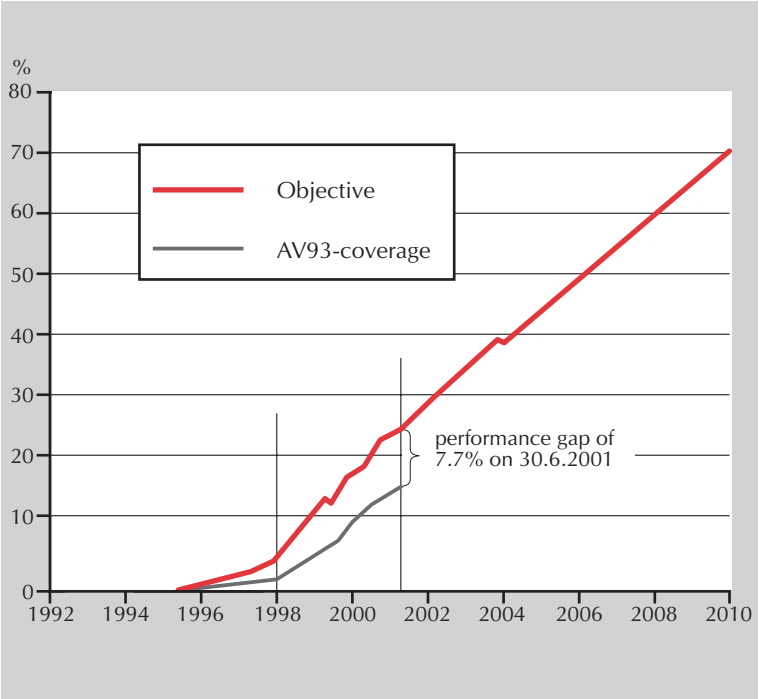

Figure 9.2: Performance gap of AV93 coverage on a national level

In order to support the above-mentioned controlling cycle, to document the progress of cadastral surveying, and to collect other statistical indicators, the Federal Directorate established a database for administrative data, such as coverage, costs, duration, and other project details. The statistic that draws most attention is the progress of data coverage as presented in Figure 9.2.

It becomes obvious, that there is a performance gap already before the end of the first 4-year period, i.e. the objective to reach 70% of AV93-coverage in the year 2010 is endangered already in an early stage. It is therefore the challenge of the Federal Directorate to re-define the strategies or even the objectives for the coming 4-year periods in order to achieve what has been set as goal in 1998.

With the statistical database, it became possible to also make transparent the progress of the different Cantons (Figure 9.3). This statistic has been published in information bulletins and serves as basis for the discussion of further strategic decisions to be taken.

Effects of Benchmarking

There were several effects in publishing statistical figures and diagrams:

(i) There are many explanations why the Cantons are on different levels of coverage: financial, organizational, and mainly political reasons are the most important ones. But nevertheless, the publication of the diagram with the cantonal ranking not only gave an insight in the status of AV93, but it also gave an incentive for the Cantons to improve their performance – of course, none of them wants to be at the end of the list.

(ii) The whole cadastral surveying community gained a clearer vision where it is, where it should be in a given period of time, and if it is on track.

(iii) The Federal Directorate gained some "hard facts", which it needs for its strategic role. Objectives and strategies have to be re-evaluated, and performance mandates have to be re-negotiated (less money for less performance).

The statistics have a benchmarking effect because they make comparisons over time and between different actors, i.e. Cantons. The recognition that there is a performance gap on the national level and huge differences between the Cantons means that further measures and actions need to be taken in order to achieve the defined objective of 70% coverage until 2010.

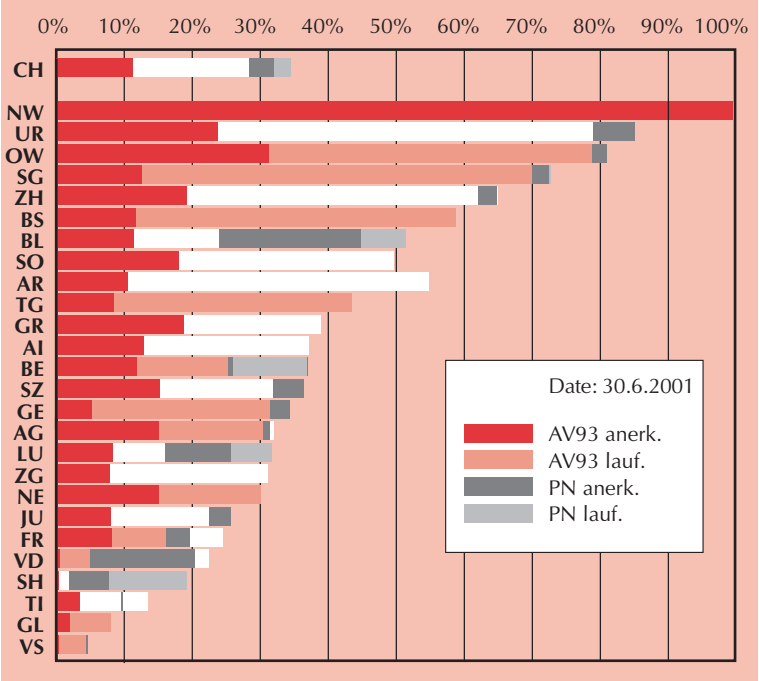

Figure 9.3: Progress in AV-coverage in each Canton

Reference

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Jürg Kaufmann was born in 1942. He is a graduate of the Swiss Federal Institute of Technology with additional studies in economics and commerce. He runs his own company, KAUFMANN CONSULTING, working for public and private institutions in the field of cadastre and geomatics in Switzerland and abroad. Jürg Kaufmann represents Switzerland in FIG-Commission 7 and chaired the working groups producing the publications 'Cadastre 2014' in 1998 and 'Benchmarking Cadastral Systems' in 2002.

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Daniel Roberge graduated from Laval University's Faculty of Forestry and Geomatics, and is a member of the Québec professional order of land surveyors. After carrying out several large-scale projects in the private sector (for a gas pipeline, water treatment plant, land consolidation in isolated regions, surveying of Northern villages, etc.), he joined Québec's Ministère des Ressources naturelles (Department of Natural Resources), where he is currently Director of land information on the public territory, working on the development of a web-based land register for public lands. Between 1993 and 1999, as head of the Analysis and Officialization Service, he was responsible for implementing Québec's new cadastre. Among other

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