A Systems Approach to Land Registration and Cadastre

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Key words: systems approach, land registration, cadastre, trustworthiness.

ABSTRACT

Land registration and cadastre together play an important role in a society, as long as they function well and fulfil the goals set by that society. Unfortunately in many cases the land registration and cadastral functions are organized independently, and often do not cooperate in the most effective way. Improvements, both technological and others, in quite some cases only mend one or a few links in the chain. Regularly not even the weakest link.

In my PhD research, called 'Systems of Land Registration – Aspects and their Effects', a systems approach is used to study systems of land registration and cadastre as a whole. This to avoid the traditional divisions. The focus is on the technical, legal and organizational aspects and their interrelations. The research includes a case study of four countries (the Netherlands, Indonesia, Austria and Ghana). An important role within the systems approach is played by emergence; an attribute contributed to the system as a whole and not to one or more elements as such. It is argued that 'trustworthiness' is an example of emergence within the wider system of land registration. This and other main results of the research are presented.

This paper can be seen as a follow up to my paper "The interrelated influence of the technical, legal and organisational aspects on the functioning of land registrations (cadastres)" presented at the XXI FIG International Congress in Brighton in 1998 (Commission 7, p. 130-145).

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1. INTRODUCTION

Land registration and cadastre together play an important role in a society, as long as they function well and fulfil the goals set by that society. Land registration can be described as 'the process of recording legally recognized interests (ownership and/or use) in land' (McLaughlin and Nichols 1989: 81). This process forms an important part of the system of land registration. To fully understand such a system it should be studied in its wholeness. This way we can avoid the traditional divisions, which is especially found in the fact that in many countries the land registration and cadastral functions are organized independently, and often do not cooperate in the most effective way. Improvements, both technological and others, in quite some cases only mend one or a few links in the chain. Regularly not even the weakest link. The systems approach is used here to study systems of land registration and cadastre as a whole to prevent this.

In this paper a short introduction is given into the systems approach and the system of land registration as I see it, including a model of the static and dynamic system of land registration. Furthermore 'trustworthiness' is presented as an emergent property of the system of land registration. Emergence is a term used to describe an attribute contributed to the system as a whole and not to one or more elements as such.

2. SYSTEMS APPROACH

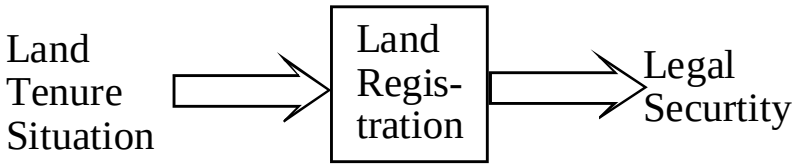
There is a tendency within the field of land registration to approach the object of study with a lot of emphasis on relative details, which has led to one-dimensional classifications. To break away from this, there is a need for a framework to approach land registration as much as possible as a whole. Such a framework can be found in the 'systems approach'. A characteristic of the systems approach is that a system is studied with emphasis on the relations between its elements and the common goal this wholeness is aimed at. Traditionally subsystems are studied separately, with the idea to later put the parts together into the whole. According to the systems approach this is not possible and the starting point has to be with the total system. (Kast and Rosenzweig 1970: 115).

There are many definitions of systems. Virtually all of them include the idea of wholeness, and the idea of (inter-)relation between components. A part of the definitions adds to this the idea of purpose towards which the activities of the system and its parts are working. (Keuning 1973: 56-57). For the purpose of studying land registration, I see a system as: "a set of elements together with relationships between the elements and between their attributes related to each other and to their environment so as to form a whole that aims to reach a certain goal."

'Whole' is the most fundamental word in the definition. The 'system as a whole' is more than

its parts together. Groups of elements have attributes that are only meaningful when they are attributed to the whole, not to its parts. And although they are derived from its component activities and their structure, they cannot be reduced to them. These attributes are the so-called emergent properties. This principle of emergence can be seen for instance with the smell of ammonia, the picture emerging form a completed jigsaw, the self-awareness of a brain or the vehicular potential of a bicycle. (Hitchins 1992: 10)

The system of land registration, being a so-called open system, can be depicted as a 'black box' in an input - throughput - output model. In my study, I take the increase of legal security for persons holding or purchasing rights in land as the (main) goal of the system of land registration. Then the input into the system is the (factual) land tenure situation and the output the legal security.



System of Land Registration as a Black Box

Another way to look at the system of land registration would be to see it primarily as an information processing system, with for instance 'agreement' as input and 'information' as output. However, this undervalues the importance of land registration in providing legal security for persons holding or purchasing rights in land. The 'information' is not the end product, and should be included within the system.

Administrators and professionals involved in systems of land registration, regularly get so absorbed in the legal and technical intricacies of the system, that they seem to loose sight of the system as a whole. Even when society does not support and rely on the system, they - often with the best of intentions- are discussing or implementing improvements to one small task, without changing the fundamental shortcomings that cause the lack of trust in the system. Therefore we have to start by looking at the system as a whole, with society's view on the system as the important emergent property of 'trustworthiness'.

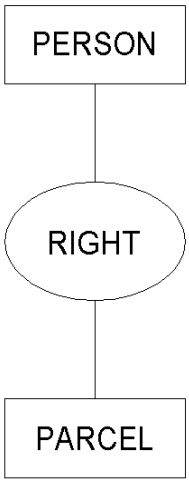
3. MODELING SYSTEMS OF LAND REGISTRATION

3.1 Static and dynamic systems

Several classifications of systems are used, one of them making the distinction between static and dynamic systems. Kast and Rosenzweig consider structure and processes to represent the static and dynamic features of organizations. In some cases the static features are the most important for investigation, in other cases the dynamic features. (Kast and Rosenzweig 1970: 171) When describing the system of land registration I find both of them useful. The static form of the system of land registration focuses on describing which information is kept, with regard to which objects and with which identifiers. The dynamic form of the system of land registration focuses on describing and understanding the main processes of land registration

(to fulfill the 3 main functions of first registration, transfer of whole parcel and subdivision).

3.2 Model of the static system of land registration



Entities of Land Registration

The static form of the system of land registration is represented by the regularly used figure that connects person, right and parcel, and exists in several varieties (e.g. Henssen 1995: 6; Kaufmann and Steudler 1998: 37-38; Zevenbergen 1998: 133). It also represents the question which person holds which parcel with which right. Each of these three questions is related to one of the main objects, being person, right and parcel. Each of these has to be identified correctly and unambiguously. These objects are very closely interrelated, and only when they are interconnected we can talk about a system of land registration. The person represents an individual or a group of people who are the rightful claimant, and gives the answer to the question 'who'. The parcel represents a certain part of land that is seen as a property, and gives the answer to the questions 'where' and 'how much'. The right or title represents a certain legal relation (ownership, leasehold, other form of tenure, etceteras) and gives the answer to the question 'how'. In my view the three entities are closely interrelated, and can represent different varieties of ‘humankind to land relationships’. I regret the adding of a one-directional arrow to the figure as is done in ‘Cadastre 2014' (Kaufmann and Steudler 1998: 37-38). They assume an arrow pointing from person to parcel in Henssen’s variety of figure, which they dub the ‘deeds approach’. In my terminology it could be described as a view from the legal aspect system (see paragraph 3.4). An alternative view is suggested in ‘Cadastre 2014’ in which the arrow points from parcel to person (and the whole figure is flipped around). It takes the point of view of (geo) information management (a part of the technical aspect system). I find that view equally limited, since it might encourage seeing land registration (and the wider land administration) as an end in itself, without looking at its goals. If an arrow has to be added, it should be a bi-directional one.

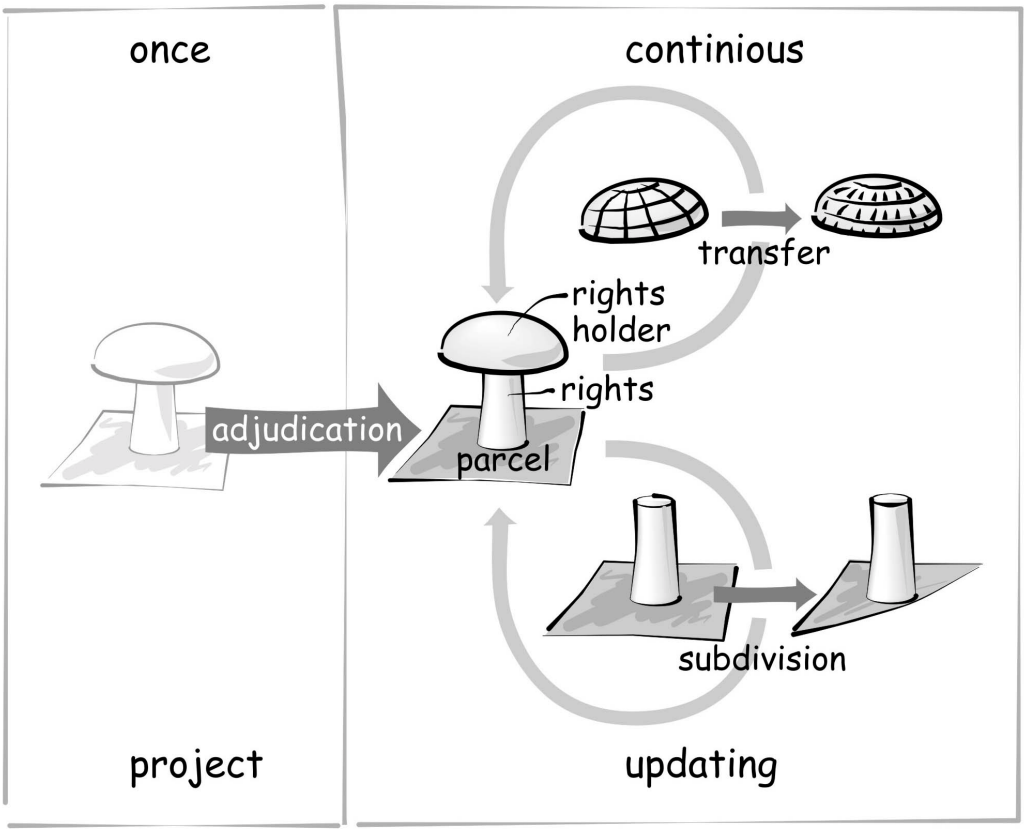
In several earlier papers I focused a lot on this static form of the system of land registration (Zevenbergen 1995, Zevenbergen 1998). But it falls short when trying to understand for instance the interaction between systems of land registration and land markets, the reasons for unregistered transactions, and the ’trustworthiness’ of the whole.

3.3 Model of the dynamic system of land registration

The dynamic form of the system of land registration can help here. Within the dynamic system three functions have to be fulfilled. They can be described as “the three main cadastral processes of adjudication of land rights, land transfer and mutation (subdivision or consolidation)” (Soni Harsono 1996: 3-4). The wholeness of the system of land registration is very apparent here, since each of the three functions is only useful when the other functions

are fulfilled as well. There needs to be something present in order to be able to update, and if no updating takes place the initial compilation becomes quite useless very fast. Depending on the history and development of a country the emphasis might be more on first registration or on updating. It is not easy to tackle both at the same time in a 'trustworthy' manner.

In the two developing countries studied (Indonesia and Ghana) the first function is of great interest since most of the land is still unregistered. However, many persons holding interests are not really looking for registration, because the benefits of it -as they perceive them- do not hold up to the time and money they will have to invest. Furthermore even transactions with regard to land that has been put on the register before, take place without updating the register. In certain cases even the courts have ruled such 'informal' transactions legally valid.



Dynamic model of system of land registration ('mushroom' encompasses the static model)

The system of land registration is depicted in the figure with the emphasis on the dynamic model, but it includes the static model as well. At the left-hand side we find an unregistered land tenure situation, which is transformed into a registered situation through adjudication, which can be seen as a project that is executed once. In the middle is the registered situation (with person, right and parcel connected to each other, here represented by a 'mushroom'). This registered situation is part of two circular processes, being the transfer and subdivision. This has to be seen as updating, a continuous activity. Both types of updating concentrate on a different part of the 'mushroom'. Nevertheless it can be seen that the change in the identity of one of the three objects that make up the static model of the system of land registration, is

only a useful activity as long as it remains connected to the other objects. This can be seen as another reason for looking at the system of land registration firstly as a whole, as the systems approach learns us.

Adjudication, the first of the three functions that the system of land registration has to fulfil, is the most common form of first registration. In certain cases it can also be called land titling. It deals with the initial compilation of the registers. It is of great importance when no (real) system of land registration exists yet in an area. In certain cases of cadastral reform conversion from the 'old' to the 'new' system may be applied. But when virtually no written documentation is available, a careful procedure is necessary to inventory all relevant interests that exist and should be entered in the register. Two methods of adjudication can be used: systematic and sporadic adjudication. An explanation of the differences and the advantages and disadvantages of them in different circumstances can be found in e.g. (Bogaerts and Zevenbergen 2001). Another important distinction is between administrative and juridical procedures, whereby under the former, claimants who are not satisfied with the preliminary register can appeal to an 'adjudication committee' before they will have to go to court (which often is very slow and expensive). Furthermore first registration could either directly lead to a full title, or deliver a qualified or provisional title at first, which can be upgraded later.

Once a register exists, it needs to be updated for the changes caused by subsequent transfers. Of the two varieties of subsequent transfers, the transfer of rights is the most common. It deals with the situation that one person takes over from another person, an interest in a property unit that remains the same well-defined parcel. If the system is working properly the former right holder is known to the system, and upon receipt of the notice of change (document) the information can be updated. Usually the register is only updated after certain conditions are checked. Sometimes the check is limited to purely formal conditions, in other cases the check includes several legal aspects of the transfer itself. This type of changes takes place for several reasons, of which sales transactions are the most important ones in case of an active land market, and inheritance in case of a more frozen situation. Especially with regard to sales transactions the legal security of the purchaser can be greatly enhanced when there is a good system of land registration. In principle the procedures for this situation can and should be kept relatively simple, not involving too many organizations, taking too long and being too expensive.

The other variety of subsequent transfers deals with the case that the property unit changes. This means that the existing registers (usually including maps) have to be updated due to subsequent changes in the boundaries of the parcel (subdivision, consolidation). This is also called property formation. Although this is less common, it is of great importance. It deals with a change in the part of the continuum we want to regard as one parcel. And since real properties could be seen as being liquid, subdividing and amalgamating existing parcels should be possible and is often even desirable. These changes often take place in conjuncture with a change in the land rights and the usage of the land. The formation of a new property unit needs to be accompanied by the redefining of a newly identified parcel, which will then become the object to which the land rights are (re-)connected. The procedures for this are often quite complicated. This is partly because of the control necessary to come (again) to a clearly defined and uniquely identified parcel. Further complications are present in most

countries because of land control mechanisms (need to get one or more permits) and the fact that these changes coincide with changes in usage and/or the rights.

In most systems of land registration, the new boundaries that subdivision creates will have to be surveyed. In a rare exception existing topographic features visible on a map or (aerial) photograph can be used to do this in the office, but in virtually all cases new measurements will have to be made (usually by field survey; airborne methods are not so efficient here because of the incremental nature of these changes). Quite a number of countries demand the erection of visible boundary markers, being either fences, ditches or hedges on the one side, or special corner stones ('monuments') on the other hand. The cadastral surveys usually need to have been completed before the land rights can be vested in the newly formed properties. And the cadastral map and plans have to be ready in their updated form before the transfer documentation can be fully processed.

Often subdivision involves an elaborate procedure. Usually one needs to get permission from the relevant (local) authority, the survey work will have to be carried out, the cadastral (index) map will have to be updated, the register will have to be updated, and the correct persons will have to be (re-)connected with the correct rights to the newly formed parcels. In many countries virtually all of these activities are performed by different organizations. To get the right understanding of the time and money a person needs to spend to have a subdivision processed in the formal way, we need to look at this as a whole.

3.4 Part systems

Although the systems approach teaches us to look at the whole first, it allows for identifying and studying part systems. Two types of part systems exist: subsystems and aspect systems. A subsystem consists of a part of the elements of the system, where we consider all relations in that part of the system. In an aspect system, however, we consider only a part of all the relations that can be found between the elements, and neglect the rest of the relations. With regard to systems of land registration a first division in subsystems would be one subsystem land registry and one subsystem cadastre, which is mirrored by institutional arrangements in for instance Austria. In Austria both subsystem clearly cooperate and exchange information (even share a database), making it very useful to see the whole as one system.

Regarding the aspect systems of the system of land registration, I focused in my study on three of those, being the technical, legal and organizational aspect systems[1]. Studying each of the aspect systems separately is done by the relevant aspect disciplines (like surveying and database technology; law (jurisprudence); and sociology and management science). However, to 'make a land registration go round' it is not enough to look at it from one aspect system. Doing that is likely to lead to a suboptimal solution or strengthening the wrong link in a chain (not the weakest). The interrelations between the different aspect systems play an important role, and they are constantly influencing each other. A well known example are survey regulations (part of the legal aspect system) which are so strict and detailed that they stand in

[1] It is clear that more aspect systems exist and are relevant, for instance the social, cultural and economical aspect systems.

the way of applying later developed technologies (part of the technical aspect system). Once again a clear reason for primarily looking at the whole of the system of land registration, in an interdisciplinary way.

4. TRUSTWORTHINESS

An important reason for something to be seen as a system is found in it having emergent properties. For systems of land registration I see 'trustworthiness' as the main emergent property. This can not be attributed to one or a few elements, but it depends on the system as a whole. 'Trustworthiness' could be seen as the ultimate expectation society has of the system of land registration; society wants to be able to trust the system. If that is possible or not depends on the way in which features and criteria as for instance mentioned in the Statement on the Cadastre (FIG 1995: 19-20) are being met[2].

The success of a system of land registration in the end depends on society's view on it. Society has to realize that it needs such a system, society has to support the system in place and society has to use and rely on the system of land registration and the information from it. However, in general the existing systems of land registration are not really tuned towards the needs and interests of the right holders. Even though 'customer demands' is an often-used buzzword, most right holders consider getting a land transfer finalized a pain in the neck. Land registration procedures are often expensive, slow and bureaucratic in their minds. (Zevenbergen 1999). Still, it is the willingness of these individual members of society to use and rely on the system, especially when they want to transact or mortgage a land right, that makes or breaks the system. Different individuals can be in different circumstances or might perceive their circumstances differently. This influences the balance between incentives and disincentives to use and rely on the system of land registration, and in the end the level of success of the system. The ultimate question is whether they have TRUST in the system.

In many countries there is ongoing work done on improving the system of land registration, but these improvements usually mean that some legal intricacy is further refined, that the accuracy of the surveying work is improved, or that the data has been moved to a new medium. These improvements might be interesting for the 'technocrats' involved, but often have very little bearing on the perception the right holders have of the whole system. His/her perception of the 'trustworthiness' of the system is much more influenced by the administrative layout and day-to-day operation. Although those are influenced by the limits of the law and other preconditions, it is the "daily practice" that really counts. Similarly Twaroch and Muggenhuber say that "Independent from legal and technical solutions a LAS[3] is successful when all partners involved in land management (owners, banks and agents dealing with information on land) can trust in this system." (Twaroch and Muggenhuber 1997: F.5). Unfortunately the administrators and professionals involved in the systems of

[2] Listed are a number of well recognized criteria for measuring the actual or potential success of a Cadastre, being security, clarity and simplicity, timeliness, fairness, accessability, cost and sustainability (FIG 1995: 19-20).
[3] LAS = Land Administration System; slighty wider concept than system of land registration as used here.

land registration, regularly get so absorbed in the legal and technical intricacies of the system that they seem to loose sight of this.

5. FINAL REMARKS

The right system of land registration for a society will be a great help and facilitator in achieving legal security of right holders and purchasers, especially when there is an active land market. Systems of land registration, however, are complex wholes of many interrelated elements. The so-called traditional aspect disciplines (like surveying or law) only see a part of the systems. If improvements are suggested from such a partial perspective, there is a serious risk that this does not affect the weakest link of the chain. Especially the (further) enhancement of technical or legal sophistication does rarely convince society, and especially the individuals that should use the system, of an improved 'trustworthiness' of the system. With 'trustworthiness' I mean living up to the expectations the society has of the system of land registration.

These preceding remarks follow from using the 'systems approach' with regard to land registration. This approach prescribes that we start by looking at the whole, before going into the details of the parts. This approach also points to the emergent properties of a system; properties which can only be attributed to the whole, and not to the parts. The use of this approach on systems of land registration has been very enlightening for me, and I consider it to be very useful for anyone who wants to study land registration from a wider perspective than any one of the aspect disciplines. The approach helps us to avoid the use of simplified one-dimensional classifications, and is in my view inevitable in designing and implementing true improvements for systems of land registration.

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BIOGRAPHICAL NOTES

Mr. Zevenbergen belongs to the section Geo information and Land Development of the Department of Geodesy of TU Delft. Since 1995 he has been working on his PhD study on systems of land registration, based on case studies in four different countries, which he is about to defend. He has also been involved as a consultant in land registration and cadastre projects in Central and Eastern Europe. Furthermore he takes an interest in especially the legal and administrative aspects of geo information in general and NSDI's in particular.