



Doctoral research on cadastral development

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ABSTRACT

The multitude of rights in land and the recording of these rights are addressed by a number of studies, yet a recognized paradigm for such studies seems missing. Rights in land are recorded and managed through either cadastral systems or land administration systems depending on the legal system of the countries concerned. The cadastre, however, is the core of both systems as it provides for systematic and official descriptions of land parcels or real property units. The research mentioned often has a development perspective, and in this article we will motivate the introduction of the research domain of cadastral development. This research is multi-disciplinary and draws on elements of theories and methodologies from the natural, the social, the behavioral, and the formal sciences. During the last decade or so, doctoral dissertations have come to constitute a substantial part of this research effort. The article focuses on the methodological aspect of doctoral research by analyzing ten doctoral dissertations. Our analysis is based on a taxonomy of methodological elements and aims at identifying commonalities and differences among the dissertations in the use of concepts and methods. Having completed the main analysis, we invited the authors of the dissertations to comment upon our analysis of their work and the developed taxonomy. The responses corroborate the view that the taxonomy could be used for further analyses and provide for a framework for further doctoral research. The article concludes with a call for a shared terminology and a shared set of concepts which may contribute to further theory building within the cadastral domain.

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Introduction

This article analyzes ten doctoral dissertations from the methodological point of view in relation to land tenure, immobile property rights, and the recording of these rights by either cadastral systems or land administration systems. The overall aim is to demonstrate commonality in the methodological and theoretical aspects of these dissertations and to present a taxonomy which may be used for further analyses and indeed for guiding Ph.D. level students. We take care to define the concepts used. For scholars well versed in the subject matter, the amount of definitions may appear as superfluous. However, we think the amount is justified by our intention of introducing a specific research domain.

Land tenure is a legal term. It originates in English feudalism and refers to right(s) in land (Bruce, 1993, p. 1, 6). It has been defined as the rights, responsibilities, and restraints people have with respect to the use and benefit of land (Nichols, 1993, p. 31). Land tenure varies among countries and even within countries. However, a

broad classification distinguishes formal (statutory) from informal (customary) land tenure. In formal land tenure, rights, responsibilities, and restrictions in land are administrated according to a legal system, be it common law, civil law, or religious law. The legal source is stated in writing and judicial precedent mostly is of importance. On the other hand, informal land tenure is administrated by customs or oral traditions. Land tenure is managed by a *land administration* (Nichols, 1993, p. 41). The term has been used especially in countries where the common law legal system exists (e.g. United Kingdom, United States, Canada, Australia and other former colonies of the United Kingdom) to describe 'the processes of surveying and mapping, land registration, land conveyance, land valuation and taxation, regulation of land tenure, allocation of interests in land, dispute resolution, and land markets' (Nichols, 1993, pp. 60–91).

In Continental Europe, the term immobile property is used for referring to rights in land rather than the term land tenure. This conceptualization inherently assumes that rights in land include the responsibility and restrictions that accompany each right (Rakai, 2005, pp. 32–33). Moreover, property rights are recorded, more or less complete, through national information systems in terms of *cadastre* and *land registry*. Land registration means 'a process of official recording of rights in land through deeds or title (on properties)' (Zevenbergen, 2002, p. 1). Noting different interpretations

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of the term 'cadastre', Silva and Stubkjær (2002) find support for defining cadastre as 'a systematic and official description of land parcels, which includes for each parcel a unique identifier'. The description includes text records on attributes of each parcel. The prototypical means of identification is a large-scale map that provides information on parcel boundaries (p. 410). Cadastre and land registers were born and evolved separately; later a combination of these dual systems was dubbed *cadastral systems* (see Zevenbergen and Bogaerts, 2000; Silva and Stubkjær, 2002). However, as different countries interpret the term cadastre in different ways, United Nations Economic Commission for Europe (UNECE) introduced the term of *land administration* by the Land Administration Guidelines in 1996, particularly for countries in transition. Land administration was defined in the Guidelines as 'the processes of determining, recording and disseminating information about the tenure, value and use of land when implementing land management policies' (p. 107). It is considered to include land registration, cadastral surveying and mapping, fiscal, legal and multi-purpose cadastres and land information systems (Stuedler, 2004, p. 15).

Although conceptions of cadastral systems and land administration vary among the countries, their basic function is similar, namely systematic and official recording of rights in land. The present article mainly focuses on this common function and uses the term of cadastral development for referring to the improvement of recordings of rights in land. The term of *cadastral development* was introduced by Silva and Stubkjær (2002), and defined by Silva (2005) as 'the processes of creating, reforming, improving or re-engineering cadastres' (p. 13) [and cadastral systems].

During the last three decades, scientific research on cadastral development covering aspects of cadastral systems and later land administration systems has been increasing. These initiatives have been performed based on different theories and research methodologies. The research themes may be grouped according to branches of science as follows:

- A. Natural sciences, i.e. including Geodesy, Physical Geography (Wilcox, 1984; Barnes et al., 2007; Mueller, 2008).
- B. Social and behavioral sciences, i.e. including Economics, Law, Politics, Management and Sociology (Stuedler et al., 1997; Kaufmann and Stuedler, 1998; Williamson, 2001; Silva and Stubkjær, 2002; Stuedler and Kaufmann, 2002; Ting, 2002; Zevenbergen, 2002; Park, 2003; Stuedler et al., 2003, 2004; Törhönen, 2003a; Griffith-Charles, 2004; Stuedler, 2004; Dalrymple, 2005; Silva, 2005; Rakai, 2005; Nkwae, 2006; Auzins, 2007; Rajabifard et al., 2007; Stubkjær et al., 2007; Vitikainen, 2007).
- C. Formal sciences², i.e. including Information sciences (Bittner, 2001; Oosterom and Lemmen, 2001; Effenberg, 2001; Bittner and Frank, 2002; Stoter and Oosterom, 2003; Stuckenschmidt et al., 2003; Navratil and Frank, 2004; Stoter, 2004; Tuladhar, 2004; Oosterom et al., 2006; Hess and Schlieder, 2007; Hess and Vaskovich, 2007; Navratil and Frank, 2007) and Systems sciences (Dale, 1979; Barnes, 1994; Barry, 1999; Zevenbergen, 2002; Ottens, 2004; Rakai, 2005; Nkwae, 2006; Ottens and Stubkjær, 2007).

Among these research efforts, the doctoral studies and their contributions constitute a substantial part. They are supposed to bring new knowledge to the research domain by describing the nature of a phenomenon, by developing a tool, a methodology, or a theory (Gile, 2001). In doctoral research, as well as in any scientific study,

these contributions and their validations mainly depend on the selected theories and applied methodologies. Despite the above-mentioned fruitful contributions, from our point of view, a coherent and universal core cadastral theory and related research methodology have not been developed so far. The lack of a shared set of concepts and terminology, and the various research methodologies applied, motivated us to present a taxonomy of research methodology elements to support more precise communication among the researchers. For these purposes we use doctoral dissertations as an empirical base and analyze them from the methodological point of view. However, the intention is not to (re)evaluate the qualities of doctoral dissertations which were already reviewed by the supervisor(s) and defended by the researcher in front of the scientific committees. Rather, the overall aim is to demonstrate commonality in the methodological and theoretical aspects of these dissertations and to present a taxonomy which may be used for further analyses and indeed for guiding Ph.D. level students.

Noting the various themes of doctoral dissertations, we suggest the following broad classification:

1. *Social and behavioral sciences aspects*, i.e. Barry (1999), Ting (2002), Zevenbergen (2002), Park (2003), Törhönen (2003a), Griffith-Charles (2004), Stuedler (2004), Dalrymple (2005), Rakai (2005), Silva (2005), Nkwae (2006).
2. *Information sciences aspects*, i.e. Bittner (2001), Effenberg (2001), Stoter (2004), Tuladhar (2004), Van Loenen (2006).

In this article, we analyze the following ten doctoral dissertations which all address social and behavioral sciences aspects of the research domain, more specifically land rights and the recording of land rights. They are written in the English language, defended during recent years, and available on the World Wide Web:

- *Conceptual framework for modeling and analyzing periurban land problems in southern Africa* by Nkwae (2006) at University of New Brunswick (Supervisor: Dr. S. Nichols),
- *A neutral framework for modeling and analysing aboriginal land tenure systems* by Rakai (2005) at University of New Brunswick (Supervisor: Dr. S. Nichols),
- *Expanding rural land tenures to alleviate poverty* by Dalrymple (2005) at University of Melbourne (Supervisors: Prof. I. Williamson and J. Wallace),
- *Modeling causes of cadastral development – cases in Portugal and Spain during the last two decades* by Silva (2005) at Aalborg University (Supervisor: Prof. E. Stubkjær),
- *The impact of land titling on land transaction activity and registration system sustainability: a case study of St. Lucia* by Griffith-Charles (2004) at University of Florida (Supervisor: Prof. G. Barnes),
- *A framework for the evaluation of land administration systems* by Stuedler (2004) at University of Melbourne (Supervisor: Prof. I. Williamson),
- *Sustainable land tenure and land registration in developing countries* by Törhönen (2003a) at Helsinki University of Technology (Supervisor: Prof. K. Leväinen),
- *The effect of adverse possession on part of a registered title land parcel* by Park (2003) at University of Melbourne (Supervisor: Prof. I. Williamson),
- *Principles for an integrated land administration system to support sustainable development* by Ting (2002) at University of Melbourne (Supervisor: Prof. I. Williamson),
- *Systems of land registration, aspects and effects* by Zevenbergen (2002) at Delft University of Technology (Supervisors: Prof. Dr. Ir. M. J. M. Bogaerts and Prof. Dr. Ir. J. de Jong).

² Research regarding information sciences and system sciences was classified under the heading of the formal sciences, although some of them did not apply formal science methodologies.

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