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Future themes in the operational environment of the Finnish cadastral system

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ABSTRACT

The cadastral systems used in each country and region have developed through the centuries to their current form. We cannot assume that the current situation will remain the same from this point to the future. There are signs in recent studies and development projects throughout the world that those cadastral systems which are traditionally seen as well-functioning also need to be renewed as society changes at a rapid pace.

This study is set up to analyze the future needs of a cadastral system and registers related to it in Finland. The objective of the study is to reveal future themes affecting the operational environment of the cadastral system by using research methods provided by futurology. The method used in this study is called environmental scanning and it consists of three phases: collecting events, recognizing phenomena and combining the phenomena as themes.

The study analyses 352 literature sources and reveals 14 different future themes in the operational environment of the cadastral system, which are economic pressure, demographic changes, development of technology, transparent society, safety, environmental values, globalization, digitalization, know-how, quality, political change, soft values, public-private partnership and crowd sourcing. The future themes, their possible relations between each other and their significance for the cadastral system are analyzed by using the concepts of megatrends, trends, wild cards, driving forces and weak signals and reflecting the results to research made in the field of land management internationally.

The results can be used when renewing a cadastral system, in order to consider possible future themes that may affect the system. Detecting and recognizing the future themes provides an opportunity to react and change the course of action in order to adapt to the future. The results are not only usable in the Finnish context, but can also be applied in other countries' development of their cadastre and as part of environmental scanning.

1. Introduction

Finland uses the German cadastral system for registering and maintaining property rights. The cadastral system has developed through centuries to its current form (see e.g. Niukkanen, 2014). There are signs in recent studies and development projects throughout the world that those cadastral systems which are traditionally seen as well-functioning also need to be renewed as society changes at a rapid pace (Bennett et al., 2011; Grant et al., 2014; Hirst, 2014; ICSM, 2014; LINZ, 2013).

The renewal process of a cadastre is not quick—a cadastre is a basic register of a society and needs to be revised with care. What are the needs of a future cadastre? In what kind of society will we live and what kind of framework does society set for the cadastre? These are questions that are not easy to answer. In this article, we try to set the basis for this kind of discussion by detecting the forces of change in the operational field of the cadastre.

There are tools to predict the future by observing the present and the past. The object of this article is to detect possible future themes that will have an impact on the operational environment of the cadastre. The themes are detected with the help of environmental scanning, a method from futurology. This article introduces the

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themes at a general level and discusses their significance in terms of the cadastre. By identifying the possible themes for the future, the actor(s) may change their own actions based on possible effects of the drivers (Naisbitt, 1984).

In the process of detecting possible future themes, the study analyses different megatrends, trends, wild cards, driving forces and weak signals of the cadastral system in Finland and registers related to it. The article will also contribute to the traditional methodology used in cadastral studies by introducing methods from futurology. To reach the research objective, the operational environment of the cadastre itself needs to be defined. So, the first research question is formulated as follows:

1 How is the operational environment of the Finnish cadastral system defined? (Q1)

The answer to the first research question (Q1) is formulated with the help of literature research. After defining the operational environment of the cadastral system, it is possible to focus the actual research on the object of this study. The object is the cadastral system, not the society as a whole. So, the second research question is formulated as follows:

2 What are the future themes of the operational environment of the Finnish cadastral system? (Q2)

The second research question (Q2) is answered by using environmental scanning as the method. The use of the method is explained more thoroughly in Section 2. The primary goal for the scanning is to detect future themes in the operational environment of the cadastre and analyze the themes by using the concepts of megatrends, trends, wild cards, driving forces and weak signals and reflecting the results to research made in the field of land management internationally.

This article is constructed as follows: the first section has given the reader an introduction to the objective of the study and its background and significance. The second section will introduce the methodology used in this study. The third section focuses on defining the operational environment of the cadastre. Finally, the fourth and the fifth sections present the results of this study and provide conclusions and discussion.

2. Methodology and material

2.1. Study design

Environmental scanning is a method used in futurology to recognize the changing forces, or drivers of change, in the operational environment chosen (see e.g. Gordon and Glenn, 2009). The operational environment is the socio-cultural, political, ecological and economic environment in which the chosen object operates. These four parts include the frames set by different resources (infrastructure, money), the actors acting in the environment (citizens, administration, companies) and their interactions. (Rubin, 2002).

The phenomena to be observed in environmental scanning are different megatrends, trends, wild cards, driving forces and weak signals. Toivonen (2011) and Toivonen and Viitanen (2015) recognized nine different categories of the forces of change: globalization, action optimization, differentiation, technology as an enabler, urbanization, aging population, environmental pressure, safety and search for meaning.

There are several ways to approach environmental scanning and they are related to the purpose of use of the scanning. The scanning may be conducted in a way that is undirected or conditional, passive, active or directed, informal or formal. (See Aguilar, 1967; Renfro and Morrison, 1983; Spies, 1991). The decision has to be done with the purpose of the scanning in mind. Overall, the purpose of scanning is to understand the context and the environment that the object is operating in. With the help of this understanding, the aim is to be able to adapt to future changes and create a better operating environment for the future, as well as to provide information for the decision-making process (Spies, 1991).

The concept of *megatrend* may vary from country to country (see Toivonen, 2011). In this study, *megatrend* is used to describe a widely recognizable phenomenon that has a realized development history and most likely will continue to develop in the future, such as globalization (Mannermaa, 2004). The difference between a megatrend and a trend is the significance of its effect. A *trend* in this study is a phenomenon which has less effect on everyday life than a megatrend, but still describes some overall development. It is widely recognized as a characteristic of a society, but most likely will not have a major effect in the future and may be a part of a megatrend (Kamppinen et al., 2002; Rubin, 2004). A *wild card* is a factor which creates uncertainty. Its likelihood for realization is small, but at the same time, if realized, the effects may be significant. Some examples of wild cards are terrorist attacks, an asteroid hitting the Earth or a change in the Gulf Stream (Petersen, 1999; Rubin, 2004). *Driving forces* are phenomena which steer public sentiment and decision-making in the society, in a certain organization, or among certain people. They might not be continual phenomena, but relate to the attitudes and the current thinking of people, and are regarded as truisms. A driving force could be, for example, “the world needs constant economic growth” (Rubin, 2004). *Weak signals* in this study are considered phenomena which give an early hint of some future event that has not been realized yet. They cannot be clearly recognized from the past and their realization is very uncertain. But if realized, they might become trends or megatrends (Hiltunen, 2010; Mannermaa 2004; Rubin, 2004).

2.2. Data sources

There are different options for conducting environmental scanning and the choice of the scanning method depends on the purpose of the scanning. This study aims to detect themes that may influence the future cadastral system and therefore the choice to conduct the search as directed scanning was made. We can say that the environmental scanning has a specific object, which is the cadastral system, and the goal is to find new information. Choo (2001) describes this kind of scanning as “formal search”, “directed scanning” or “searching”, depending on the terminology used. This approach to environmental scanning provides analyzable data, and the goal of the scanning is to find new information, which might even produce surprising results.

The information sources were selected to present the operational environment of the Finnish cadastre. In addition to this, a few other information sources were used to add the point of view of cadastre as part of the society. The selection of the data sources was made by the authors especially from the cadastral point of view and it is possible that if the sources were different, the results from the scanning might be different as well. The importance of the selection is discussed in Section 5. The literature sources include the leading magazine for land surveying (*Maankäyttö* http://www.maankaytto.fi/) and its articles from January 2012 until June 2015 were searched. In addition to this, literature sources included the blog and news webpage of the National Land Survey of Finland (http://www.maanmittauslaitos.fi/) from January 2014 until June 2015. A few other sources were also used: the personal blog of Zack Kanter (http://zackkanter.com/) and the leading Finnish newspaper *Helsingin Sanomat* (http://www.hs.fi/) for the summer of 2015. The data sources were magazine operating in the cadastral field, newspaper, lectures, blogs and websites, and also previous research