UNECE

Scenario Study on Future Land Administration in the UNECE Region

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CONTENTS

List of figures

List of tables

ABBREVIATIONS AND ACRONYMS

AI	artificial intelligence
CORS	continuously operating reference stations
COVID-19	coronavirus disease
FELA	Framework for Effective Land Administration
FIG	International Federation of Surveyors
IoT	internet of things
PCC	Permanent Cadastre Committee
PPP	public-private partnership
RPA	robot process automation
UN-GGIM	United Nations Committee of Experts on Global Geospatial Information Management
UNECE	United Nations Economic Commission for Europe
WPLA	Working Party on Land Administration

1. Introduction

The lives of people across the world, regardless of location, are increasingly being influenced by global trends and developments. These trends include urbanization, climate change, technology advancements, cybersecurity, new ecosystems of collaboration, and migration. These so-called "megatrends" are universal phenomena that are profoundly shaping the world over time.[1] Although challenging due to their complexity, these megatrends also provide tremendous opportunities, including for land administration. As such, they can have both positive and negative impacts. Technology advancements, for instance, can support access to information and knowledge, and thus help achieve universal literacy. At the same time, they can threaten privacy, erode security and increase the digital divide.

Drivers complement these megatrends. They are certain developments or causes that have an effect on, or shape, the future. As with megatrends, some drivers are particularly relevant to land administration. These include new emerging data sources and data integration options, structural shifts in collaboration opportunities, data privacy ethics and related legal considerations, and the introduction of new technology or analysis tools, to name a few. Megatrends and drivers, however, should not be considered in isolation. On the contrary, it is in combination that they generate faster and greater impact, shaping the ongoing transformation of the land sector.

The challenges and opportunities for land administration authorities to remain relevant and provide trustworthy services well into the future are related to their ability to continuously incorporate new user expectations, perform an often widening role as a key partner in solving emerging intersectoral state priorities (e-government, smart cities, spatial data infrastructure, accelerated digitalization, land development process integration, climate change initiatives, etc.), and manage the evolution of various constraints (financial, technological, human resources, legal, organizational, etc.). A central consideration in this continuously changing situation is how land administration authorities can create, increase, and retain value with respect to relevance, liability, stewardship and trustworthiness. The authorities should provide a foundation of trust, on the basis of which society and individuals can develop.

The United Nations Economic Commission for Europe (UNECE) Working Party on Land Administration (WPLA) is the coordinator of this study and is an intergovernmental body covering 56 countries across the pan-European region. Operating under the auspices of the UNECE Committee on Urban Development, Housing and Land Management, members of the WPLA are the national land administration and other related authorities of UNECE member States. The WPLA provides a forum for dialogue in identifying methods to strengthen and modernize land administration.

Overall, the WPLA aims to support security of tenure, improve and create more effective land registries and promote sustainable land use policies This is done through capacity-building workshops and land administration reviews at country level, upon request from governments. The WPLA contributes to the formulation, implementation and monitoring of land policy and the promotion of sustainable land management programmes and projects through developing guidelines, carrying out research studies and benchmarking; it also provides policy advice and expert assistance. It is hoped that this Study will initiate an ongoing dialogue among national land administration authorities, that draws on the scenarios and the self-assessment tool, and guides them in the development of long-term strategies.

2. Objective of the Study

Scenarios, in general, are used to understand potential future directions of development and to assess the readiness of an organization for this possible future environment. Moreover, they can support efforts to define and realize strategies for appropriately responding to the implications these possible futures could bring. The four scenarios set out in this Study are based on the relative importance and anticipated impacts of megatrends in combination with sector-specific drivers.

This Study thus aims to provide a "compass" for use by national land administrative authorities to navigate these megatrends and drivers and benefit from them. By setting out possible future scenarios for the land administration sector, the study can enhance the broad understanding of decision makers of the emerging developments that are expected to shape the future of the sector. It is intended as a dialogue instrument for use in strategic planning, shaping visions and self-assessment as to where land administration authorities need to develop as agencies within their

1 Report of the UN Economist Network for the UN 75th Anniversary: Shaping the Trends of Our Time, September 2020 (United Nations publication, Sales No. E.20.II.A.4). Available at https://www.un.org/sites/un2.un.org/files/20-124-unen-75report-full-en-revised.pdf.

relevant land administration and land management ecosystems, and estimate their readiness as well as efforts required in order to remain relevant long-term. The Study refers to land registry, cadastre and geospatial information management explicitly, while land use, valuation and development are covered implicitly.

Scenario analyses are neither predictions of the future nor expressions of intent for the future development of the land administration systems. Rather, they are developed as stories to stimulate discussion on the future development of land administration organizations. By engaging in discussion of possible scenarios, the risk of a simplistic approach being taken by land administration decision makers is reduced, and their preparedness to adapt to the future increases their flexibility and builds resilience for disruptive events.

The analyses will also include aspects such as the identification of challenges and opportunities in a transformative environment, the sharing of best practices for solutions and risk mitigation measures, the improvement of preparedness for future disruptive changes, and the assessment of impacts from national interventions. The Study explicitly encourages nations to elaborate and regularly reassess country strategies on future land administration.

The scenarios and the self-assessment tool were elaborated during a set of roundtables with senior practitioners, policymakers and academics from Austria, Finland, the Netherlands, Norway, Sweden, and Switzerland. The scenarios were presented for the first time at the Conference of the Permanent Committee on Cadastre in Helsinki (20 and 21 November 2019), with the presentation incorporating real-time interactive feedback from the audience on the expected impact of the megatrends and specific drivers, as well as predictions for the scenarios.

The outbreak of the COVID-19 pandemic is affecting the land administration sector. Immediate impacts that have been observed include an opportunity for accelerated digitalization. This involves an increase in the use of e-services and online applications as well as development of initiatives supporting the establishment of "unified system" structures where national key registers are based on a single platform, often referred to as "government-as-a-platform". Efficient measures to prepare for similar disruptive events through scenario analysis could be linked to this Study. The Study could, for example, support decisions to take early action regarding expected impacts on the land market, support measures to promote sufficient responsiveness and resilience within national land administration and land management ecosystems and be used for analyzing the impact of a chosen strategy. At the same time, the pandemic will also impact the elaborated scenarios, trigger implementation schemes, and lead to the revision of priorities.

3. Megatrends

Prior to creating possible future scenarios in land administration systems, the underlying external factors on which the scenarios are based needed to be defined and analyzed. These factors comprise both global megatrends and specific drivers related to the land administration sector. There was then the need to estimate the possible impact of these factors and the degree of uncertainty likely to occur within the given time frame. For this Study, the scenarios are based on a ten-year vision.

First, the scope of the Study and what land administration means were defined. The coverage is based on the definition of land administration (Enemark, 2005), covering the four land administration functions (land tenure, land valuation, land use and land development) in the context of a defined land policy framework, institutional arrangement and information infrastructure.[2] Land registries and cadastres and their main functions are considered relevant to this Study. Also included in the Study is the discussion of the management of geospatial information and its potential for generating societal benefits. In other words, the Study aims to outline a comprehensive and holistic perspective on land administration.

The Study has been aligned with the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) *Integrated Geospatial Information Framework* (UN-GGIM, 2018) and the *Framework for Effective Land Administration* (FELA) (UN-GGIM, 2020a). The latter was recently endorsed by UN-GGIM[3] as a reference for member States when developing, reforming, strengthening and modernizing effective and efficient land administration processes and systems. Reference is also made to the UN-GGIM report on *Future trends in geospatial information management: the five to ten year vision – Third edition* (UN-GGIM, 2020b), which reflects on a wide set of emerging and developing trends regarding the collection, management and use of geospatial information in the future.

2 Information infrastructure refers to the communications networks and associated software that support interaction among people and organizations.

3 Tenth session of the United Nations Committee of Experts on Global Geospatial Information Management (New York and online, 26 and 27 August 2020, and 4 September 2020) Available at http://ggim.un.org/meetings/GGIM-committee/10th-Session/documents/.

This Study engaged land practitioners, researchers and policy leaders in dialogues of ideas and visioning. Various stakeholders also took part in a verification process of feedback throughout the process. In this regard, intermediate results of this Study were presented at a joint event of WPLA, the International Federation of Surveyors (FIG) and the Technical Chamber of Greece in Athens (November 2018); the United Nations World Geospatial Information Congress in Deqing, Zhejiang Province, China (19-21 November 2018); the eleventh session of WPLA in Geneva (27-28 February 2019); the Permanent Cadastre Committee (PCC) conference in Helsinki, Finland (19-21 November 2019); the joint PCC and Eurogeographics conference in Lisbon, Portugal (26-27 May 2021, webinar); the twelfth session of WPLA in Geneva (1 May-1 June 2021, hybrid); the FIG e-working week (20-25 June 2021, webinar); and the Eastern Economic Forum (2-4 September 2021, hybrid meeting).

3.1 Megatrend identification

Most publications discussing scenarios regarding the recent and ongoing megatrends have focused on the development of cadastral systems without analyzing how different megatrends will impact them. For instance, two studies produced in New Zealand and Australia outlined expectations for the future of cadastres (LINZ, 2014 and ICSM, 2014). FIG also published a study entitled *Cadastre 2014 and Beyond*, describing future visions for cadastres. Some research carried out in Finland has similar objectives to this Study; it examined the perceived importance of 21 global megatrends in the context of cadastral systems and the implications of relevant megatrends for the Finnish cadastral system (Krigsholm, and others, 2018).

3.2 Megatrend analysis

The concept of megatrends has been explained by various authors (Naisbitt, 1981; Mittelstaedt, 2014). In comparison to regular trends, a combined definition of megatrends is their inevitability, the extent of their impacts and the duration of time within which they evolve. The WPLA Bureau agreed to use 11 out of 12 megatrends, as defined by Z-punkt[4] in 2018, as the basis for the analysis of this Study. A short description of the characteristics of these megatrends are given in table 1. They were complemented by drivers specifically related to land administration (section 3.3). Eight senior international land administration experts[5] were requested to describe possible impacts of these megatrends on land administration. They were asked to score the relevance and comparative importance of megatrends for land administration on a 10-point scale, from 1 (no or very low relevance) to 10 (very high relevance). Since they were not asked to rank the megatrends, it was possible to use the same score multiple times (see table 2).

TABLE 1: **Megatrends and their brief characteristics**

Megatrend	Indicator
1. Demographic change	Regional development asymmetries Global population ageing
2. Societal disparities	Increased wealth concentration Intensification of social conflicts
3. Differentiated life worlds	Weakening of traditional gender roles New forms of individuality
4. The digital transformation	Digital networking in everyday life New opportunities through "big data", artificial intelligence, robot process automation, etc.
5. Volatile economy	Global debt overload Concentration of productivity and profits
6. Business ecosystems	Expansion of the platform economy Sharing as a business model
7. Anthropogenic environmental damage	Anthropogenic climate change Increased environmental pollution
8. Decentralized environments	Decentralized organization Assisted and automated working arrangements
9. New political world order	Multipolar world Asymmetrical conflict lines
10. Global/regional power shifts	Growth of the global middle class Increased influence of non-State actors
11. Urbanization	Unmanaged urban growth Modernization crisis in municipal infrastructures

Source: Z-Punkt, 2017.

4 A consulting company specializing in trends and futures research. For more information, see http://www.z-punkt.de/en/.

5 David Boman, Lantmäteriet (Sweden); Wernher Hoffmann, BEV (Austria); Kirsikka Riekkinen, Aalto University (Finland); Martin Salzmann, Kadaster (Netherlands); Mats Snäll, Lantmäteriet (Sweden); Daniel Steudler, Swisstopo (Switzerland); Rik Wouters, Kadaster (Netherlands); and Fredrik Zetterquist, University of Gävle (Sweden).

TABLE 2: **Megatrends scored by their importance to land administration**

Megatrend	R1	R2	R3	R4	R5	R6	R7	R8	Average	Ranking
1. Demographic change	4	3	6	6	3	8	7	2	**4.9**	**7**
2. Societal disparities	3	2	6	4	6	5	4	3	**4.1**	**8**
3. Differentiated Lifeworlds	2	2	2	2	8	2	7	6	**3.9**	**10**
4. The digital transformation	10	10	10	10	10	10	8	10	**9.8**	**1**
5. Volatile economy	8	6	3	7	8	4	5	3	**5.5**	**6**
6. Business Ecosystems	8	7	8	8	10	4	8	10	**7.9**	**3**
7. Anthropogenic Environmental Damage	5	8	7	7	8	2	8	6	**6.4**	**5**
8. Decentralised environments	8	6	5	5	10	6	6	8	**6.8**	**4**
9. New political world order	3	5	3	3	3	7	6	2	**4.0**	**9**
10. Global/ regional power shifts	3	5	5	4	2	-	4	3	**3.7**	**11**
11. Urbanisation	7	5	9	8	10	-	8	10	**8.1**	**2**
Average	**5.5**	**5.4**	**5.8**	**5.8**	**7.1**	**5.3**	**6.5**	**5.7**	**5.9**	

Average scoring by the respondents turned out to be similar, indicating that there is a shared view on the relevance of megatrends for the land administration sector. Similarly, the scoring for each respective five categories using the so-called "PESTE framework" - political, economic, social, technological and environmental megatrends. This framework is often applied in future studies (Krigsholm, and others, 2017). In the megatrend scoring by

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