Transforming Land Administration – a Scenario study on Future Land Administration

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Key words: land administration, scenario, digital, transformation, UNECE

SUMMARY

Decision-makers in the field of land administration need a broad understanding of emerging developments that are expected to shape the future of the sector. To this end, the UNECE Bureau of the Working Party on Land Administration (WPLA) has initiated a study to develop future scenarios for the land administration sector based on the relative importance and anticipated impacts of global megatrends within the next 10-15 years. The challenges for land administration authorities to remain relevant and provide trustworthy services well into the future are also related to new user expectations, a widened role to participate in state priorities (e-government, smart cities, spatial data infrastructure, building process and land development, climate change initiatives etc.) as well as various constraints to evolve (financial, technical, HR, legal etc.).

The objective with the study is to support land authorities within the UNECE region and beyond to identify common challenges, share best practices for solutions and risk mitigation measures and to improve preparedness for future disruptive changes. Ultimately the study is aimed at contributing with relevant thought leadership to the long-term strategic work of the land authorities, to encourage the countries to consider today's transformative environment and provide possible scenarios for them to relate to when taking actions. The study also explicitly encourages countries to elaborate country strategies on future land administration and a self assessment framework and tools will be included in the final UNECE report to facilitate this process.

This paper presents the current status of the study and encourages dialogue to further strengthen the reasoning around the scenarios and the subsequent suggested recommendations for actions at country level.

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1. INTRODUCTION

An active participation in the international arena is increasingly important as we more and more are influenced by the same external global trends and developments, such as urbanization, new business ecosystems, climate change, disruptive technology advancements, migration etc. The new trends are definitely challenging in their complexity and at the same time they provide tremendeous opportuinties. Sometimes you get the feeling that the pace of change is faster than we are capable of handling without risking to make incorrect priorities and decisions and also risk the most important value towards the clients and citizens – the trust. We need to ensure sustainable authorities with good governance and trustworthy citizen-centric services meeting their needs and expectations. The authorities should constitute the glue of trust from which the society and individuals can grow.

The UNECE Bureau of the Working Party on Land Administration (WPLA) covers 56 member states including countries in Europe and Central Asia, and the US and Canada. It provides a forum for dialogue to develop the knowledge base on land administration and management and to share it among the member states and beyond. This is done through capacity-building workshops and land administration reviews at country level upon requests from governments. WPLA also develops guidelines, carry out research studies, benchmarking as well as provide policy advice and expert assistance. With the growing complexity of societies the role of the WPLA to facilitate collaborative endeavors and contribute to a holistic perspective on land administration increases in importance.

Decision-makers in the field of land administration need a broad understanding of emerging developments that are expected to shape the future of the sector. To this end, the WPLA has initiated a study to develop future scenarios for the land administration sector based on the relative importance and anticipated impacts of global megatrends within the next 10-15 years. The challenges for land administration authorities to remain relevant and provide trustworthy services well into the future are also related to new user expectations, a widened role to participate in state priorities (e-government, smart cities, spatial data infrastructure, building process and land development, climate change initiatives etc.) as well as various constraints to evolve (financial, technical, HR, legal etc.).

2. OBJECTIVE OF THE STUDY

The objective of this study is to support land agencies within the UNECE region and beyond to identify common challenges, share best practices for solutions and risk mitigation measures and to improve preparedness for future disruptive changes. Ultimately the study is aimed at contributing with relevant thought leadership to the long-term strategic work of the land agencies, to encourage the countries to consider today's transformative environment and provide possible scenarios for them to relate when making priorities and taking actions. The study also explicitly encourages countries to elaborate country strategies on future land administration and a self assessment framework and tools will be included to facilitate this process. As a final result, a report will be peer-reviewed by recognized organisations in the sector and submitted for approval by the UNECE to raise recognition and outreach. The adherence and contribution to Agenda 2030 will also be reflected. The study refers to land

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registry, cadaster and geospatial management in the first place while land use, valuation, land consolidation, land development etc. is covered implicitly.

3. DESCRIPTION AND STATUS OF THE STUDY

The study has a pragmatic approach with recognized land practioners, researchers and policy leaders engaged in a dialogue of ideas and visioning combined with verification procedure through synthesis of feedback from various stakeholders along the process. Intermediate results have been presented at the joint WPLA/FIG/Technical Chamber of Greece event in Athens (November 2018), the UN World Geospatial Information Congress in Deqing, China (November 2018) and the 11th Session of the WPLA in Geneva (February 2019).

The point of departure of the study was to frame the notion land administration and it was decided to use the broader definition as described by Stig Enemark et al in 2005, covering the four land administration functions (land registry and cadastre, land valuation, land use and land development) in the context of a defined land policy framework, institutional arrangement and information infrastructure. Land registry and cadaster are the main functions considered in the study while the latter three are more peripheral but still covered. In addition, the management of geospatial information and its applications for societal benefits are also included. In other words, the onset was to apply the study from a comprehensive and holistic perspective of land administration.

Desk study

The first step of the study was to investigate recent and ongoing R&D on megatrends and scenarios within the domain. Most publications identified have been industry-led and focused on the development of cadastral systems. For instance, two studies produced in New Zealand and Australia have outlined expectations for the future of cadastres (LINZ, 2014 and ICSM, 2014). FIG has also published a study – "*Cadastre 2014 and Beyond*" – with future visions of cadastres. Only research carried out in Finland was identified with similar objectives as the WPLA study; it examined the perceived importance of 21 global megatrends in the context of cadastral systems and the implications for the Finnish cadastral system.

Megatrend analysis

The concept of megatrends has been explained by various authors (e.g. Naisbitt 1981; Mittelstaed 2014). In comparison to regular trends, a combined definition of megatrends is their inevitability, extent of their impacts and duration of time they are evolving. The WPLA agreed to use 11 out of 12 megatrends, defined by the German company Z-punkt in 2018, as the basis for the analysis in this study. The megatrend left out of this study is biotechnical transformation due to its weak relevance to land administration. The application of these megatrends is well justified, for example Krigsholm et al. (2017) use the megatrends defined by the same company. Eight senior international land administration experts were requested to describe possible impacts of these megatrends on land administration and score the megatrends' relevance and comparative importance for land administration (see respondent R1-R8 in the table below).

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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**	

Figure 1: Megatrends ranked by their importance on land administration.

To clarify the content or meaning of each of these megatrends, short characteristics are given in Table 1 below:

Megatrend	Indicator
1 Demographic change	Regional development asymmetries Global population ageing
2 Societal disparities	Increase wealth concentration Intensification of social conflicts
3 Differentiated lifeworlds	Weakening of traditional gender roles New forms of individuality
4 The digital transformation	Digital networking in everyday life New opportunities through "big data"
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 Increasing environmental pollution
8 Decentralised environments	Decentralised organisation Assisted and automated working
9 New political world order	Multipolar world Asymmetrical conflict lines

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10 Global/regional power shifts	Growth of the global middle class
	Increasing influence of non-state actors
11 Urbanisation	Unmanaged urban growth
	Modernisation crisis in municipal infrastructures

Table 1. Megatrends and their brief characteristics (Z-Punkt 2017)

As illustrated in Figure 1, technological and economic megatrends somewhat dominate the ranking while political and especially social megatrends are scored lower. The average scoring by the respective respondents were fairly similar, indicating that there is a shared view on the megatrends' relevance for the land administration sector. Similarly, the scoring for the respective megatrend was relatively equally distributed among the respondents. Where there was a more significant discrepancy, this was partly due to that the trends were interpreted slightly different. The megatrend Differentiated Lifeworlds was for example by some respondents also covering individualization and therefore scored higher than those of other respondents. This overall high degree of consensus statistically strengthens the precision of the probability of the scored relevance of each megatrend relative the land administration sector.

To facilitate the analysis of the megatrends and their importance, they can be divided into five categories using the so called PESTE framework: political, economic, social, technological and environmental megatrends, often applied in future studies (Krigsholm et al. 2017). In the ranking by the expert group, political megatrends (megatrends 8, 9, and 10 in Figure 1) and social megatrends (megatrends 1, 2, and 3) were generally seen less important compared to technological (megatrend 4), economic (megatrends 5 and 6) and environmental (megatrends 7 and 11) megatrends. Previous studies have also proven technological, environmental and economic megatrends to have the most significant impacts on future land administration (Krigsholm et al. 2017; Riekkinen & Krigsholm 2018), although social and political megatrends have certain importance not to be neglected. The experts have given the least important megatrends (10: Global/regional power shifts and 3: Differentiated lifeworlds) to still score almost 4 on a scale 1-10. However, the purpose of this study is to build scenarios for future land administration, by using a scenario cross as described later in this paper. For this purpose, the most important megatrends should be recognized. In this context it should also be noted that since megatrends reflect their time of appearance, they also change in time (Mittelstaedt et al. 2014).

Not surprisingly, digital transformation scored highest among the megatrends. This is a trend which is already affecting all sectors and massive initiatives are taken by the land administration sector to leverage on digitization. Its impact is to a great extent already transforming the sector, from a technical, organizational, legal as well as financial perspective. Since this megatrend will have a significant impact on all future scenarios it will act as a "background" megatrend to this study rather than used to define the scenario cross.

Below are a few samples of the descriptive responses to some of the megatrends:

Business ecosystems:

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- "Enable new ways for land administration, especially due to platform economy and data sharing"
- "Open data and less motivation for citizens to pay for the services. We do not have customers but open data"

Urbanization:
- "A need for better tools for planning (e.g. information in 3D/4D) and to deal with illegal buildings and slums"
- "Leads to increased importance of rights, responsibilities and restrictions affecting land, real estate and infrastructures"

Digital transformation:
- "We are moving into an age where our core business will be delivering 'digital trust'. Digital networks may become so strong that the land agencies may have no added value anymore if they keep operating in the 'classical' way"

Differentiated livelihoods:
- "The shift towards a more liberal direction regarding the perception of the relationship between citizens and public institutions result in that the rights and obligations nowadays start from the individual and it is then for the public institutions to respond to the citizens' preferences"

Decentralized environments:
- "PPP initiatives will grow. Authorities needed only for 'stamps', the role of private companies increases"

Definition of scenario cross and scenarios
There are different approaches to elaborate scenarios. It was agreed that the most appropriate for our study was to apply the so-called scenario cross approach. This approach can be described by referring to a similar scenario use case from Lantmäteriet, the Swedish mapping, cadastral and land registration authority. Lantmäteriet used the scenario cross to better understand how the future spatial and land use planning will be conducted based on the influence of external trends and, consequently, the expected role of Lantmäteriet in that context. Which will be the major processes? Who are the most important actors? Which questions will be the most prominent and ruling for the spatial change of Sweden? Out from analyses of trends the two axes in the scenario cross were determined. The vertical axis defined the influence of the state - will the state have a stronger influence of the spatial planning or will others, like the municipalities and the private sector, take the lead? The horizontal axis defined the regional development - will we face a continued concentration to bigger cities/regions or will the regional development be more balanced. For each quadrant a possible scenario was then elaborated.
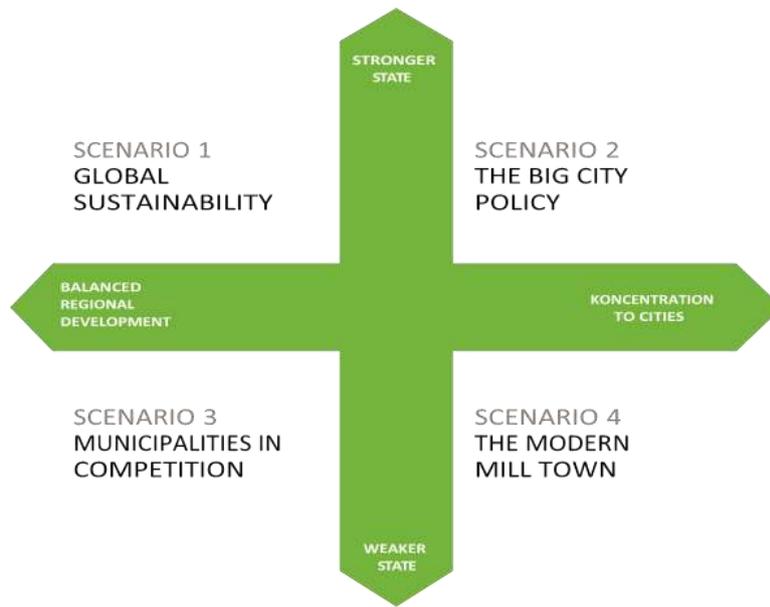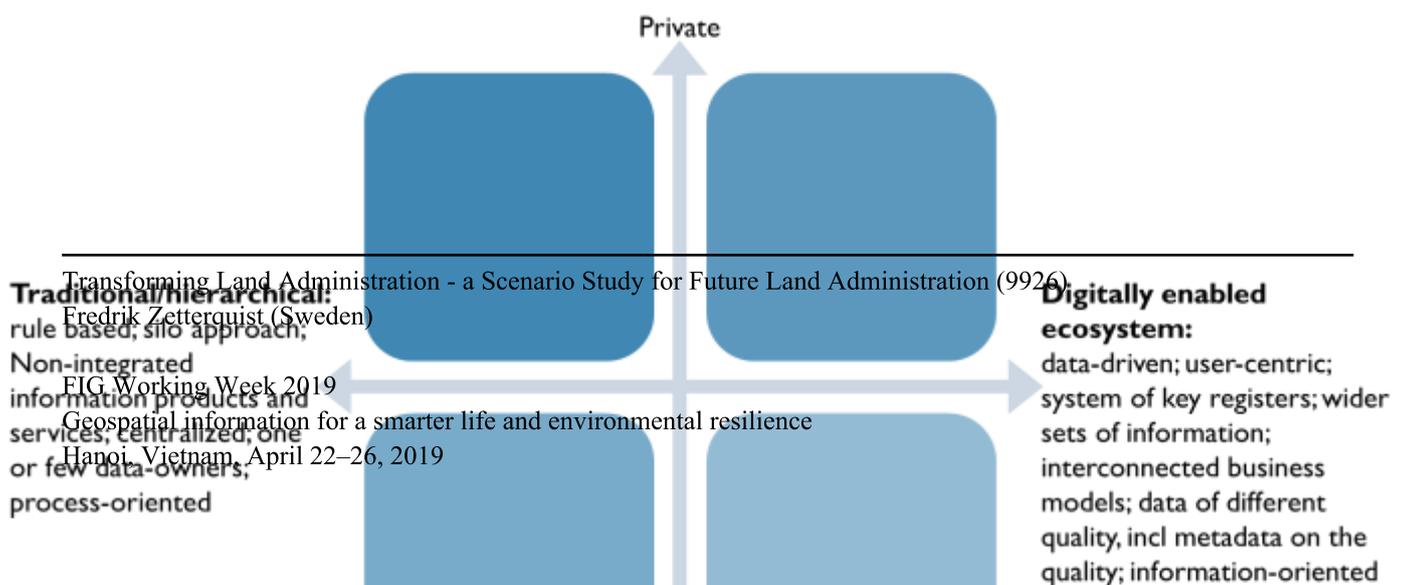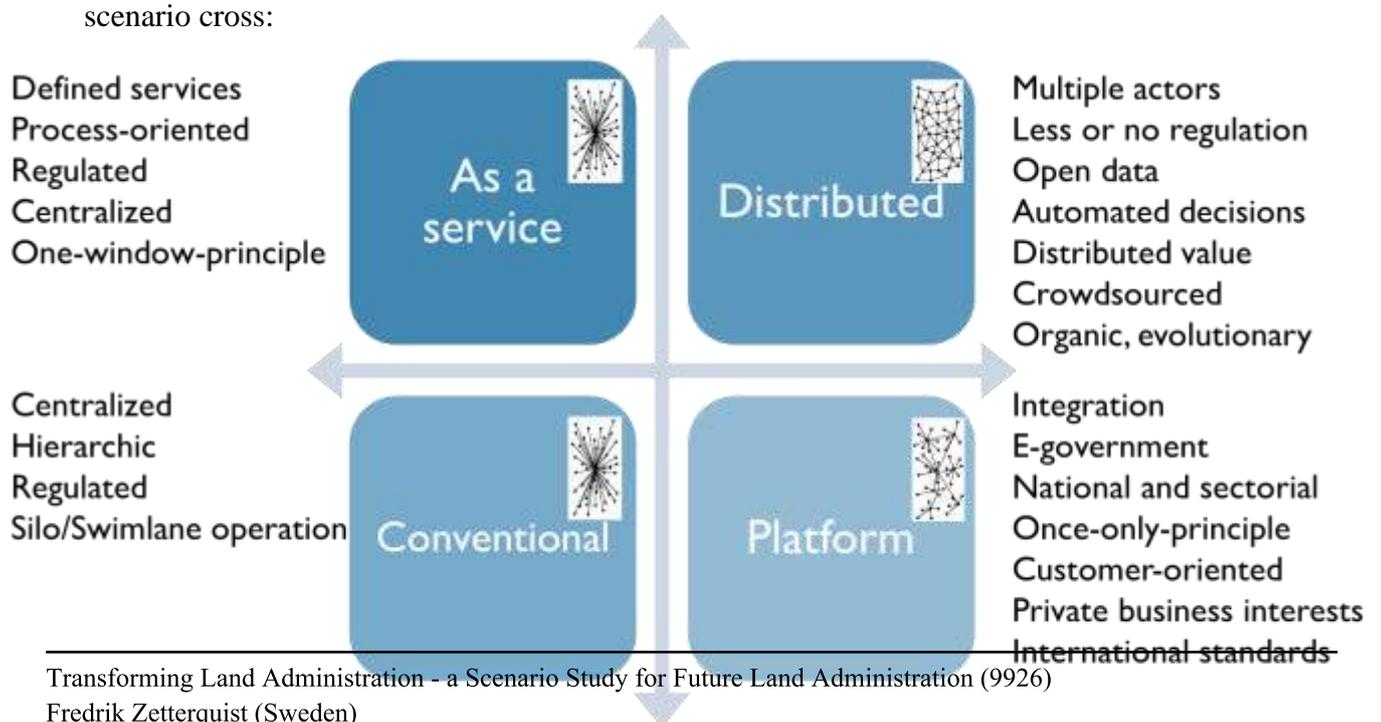
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Figure 2

The conclusions by the expert group on the importance of the megatrends for the land administration systems were used as input for two roundtable sessions on scenario development, organized in Stockholm in June 2018 and in Amsterdam in December 2018. The roundtable first identified a shared point of departure with an overarching importance for member states to consider when responding to the study. This refers to how land agencies *stay relevant/gain relevance, liable and trustworthy*, independently of where they currently define/position themselves in the scenario cross and/or if they intend to move in a certain direction within the cross. The scenario cross was outlined from clustering the 11 megatrends combined with the experts' collective experience. The megatrend *Business ecosystem* was selected to explicitly be part of one of the axes. *Urbanization* and *Digital transformation* are two megatrends that were considered highly affecting all scenarios and therefore could not be used for defining the axes as such but rather used as "influencers" when interpolating the trends to define the scenarios.

The elaborated scenario cross is defined by the horizontal axis representing land administration *governance* with traditional/hierarchical to the outer left and digitally enabled ecosystem to the outer right. The vertical axis defines the responsible actors for land administration *operations* with the upper end representing private and the lower end public actors:

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When adding the four land administration scenarios, we come up with the following complete scenario cross:

Defined services Process-oriented Regulated Centralized One-window-principle	**As a service**	**Distributed**	Multiple actors Less or no regulation Open data Automated decisions Distributed value Crowdsourced Organic, evolutionary
Centralized Hierarchic Regulated Silo/Swimlane operation	**Conventional**	**Platform**	Integration E-government National and sectorial Once-only-principle Customer-oriented Private business interests International standards

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Characteristics of the four scenarios:

"Conventional Land Administration"
This scenario characterizes the most common situation in ECE countries (and beyond) of today. It represents a centralized land administration where functions, operations, services and data are typically managed and governed by the state. It is characterized by a hierarchic organization, top-down management, limited delegation downstream and often limited transparency of the financing of services. Data is captured and updated in a controlled way resulting in authoritative data. Services and processes are regulated in detail. The conditions and performance of professionals, representing both private and public sector, is also strictly regulated. Often several silos are keeping the various data sets, such as buildings, property, parcel, title, address, land use. There is a risk of work redundancy and overlap of information at attribute level. Much of the information products and services are non-integrated. The scenario tends to have system solutions characterized by constraints to evolve, develop new capabilities and meet new expectations. This is particularly true when geospatial data is included which attracts many producers and users and drive applications that require an open and more integrated environment. Expected increased complexities in people-to-land-relations (rights, restrictions and responsibilities) and e-services challenge land administration systems positioned within this scenario. The fact that land administration authorities to an increasing extent are involved in state priorities in the vicinity of their core responsibilities, for example e-government, integration of building and land development processes, spatial data infrastructures, smart cities and climate change initiatives, puts additional pressure on land administration represented in this scenario.

"As-a-service Land Administration"
This represents a scenario where one or a few private sector actors execute the land administration services, or some of them, often through a long-term as-a-service model with the state still governing the data and setting the rules for land administration. The private actor(s) might also be responsible for the technical system and its maintenance. The idea that capital, technology and skills can be leveraged from the private sector to enhance land administration is increasingly gaining traction. Often a private-public partnership (PPP) model is applied with revenue-sharing using for example transaction fees, data/service fees and property tax. Existing use cases are essentially from developed countries where the land registry is operated by private companies (e.g. Western Australia and Ontario in Canada). Several emerging economies (Vietnam, Liberia, Ghana etc.) are now investigating PPP/as-a-service solutions for parts of their services such as the operation of CORS, first registration processes, land registry, valuation for taxation and mortgaging etc. The World Bank has initiated a global PPP consultation to further explore these opportunities.

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"Platform Land Administration"
Land administration is with this scenario executed within a national/sectorial framework which includes several state bodies where each one has its designated functions, responsibilities and defined data sets. Typically, a range of key registers with national data sets (for example cadaster, land registry, business register, mortgage register, statistics, utility register and address register) are included, sometimes within a government cloud. The updating process takes into account all registers and the once-only principle is applied for data capture in order to avoid work redundancy and data duplication and inconsistency. Key identifiers, and not the data content, are exchanged. National architecture of key registers thus overarches agencies and institutions and the updating process embraces all relevant registers and each attribute is linked to a specific custodian, i.e. the authority responsible for the defined data set. This approach facilitates provision of data-centric applications, extended state services with integrated governmental data and automated processing. E-government initiatives are often a driver towards this concept and have a potential to provide economies of scale for the government and at the same time improve sharing of national data sets and capabilities across organization and sector borders for extended integrated public products and services. Inspire can for example be implemented in a more efficient way by this approach.

"Distributed Land Administration"
This is considered the most visionary scenario. It represents an environment with highly automated and multi-stakeholder land administration where the private sector has a large stake and where governance is moving to an ecosystem of technologies, platforms and diverse set of stakeholders. Thus, there is a high level of trust "within the system" which is distributed among the stakeholders, private as well as public. The governance is aligned with distributed liabilities. The services and information products are fully digital. Distributed value chains, e.g. blockchain, are implemented. A set of configurable building blocks (technology and services) are implemented to meet various user requirements and societal needs. This will require extensive cooperation and clear distribution of responsibilities and risks. The widened opportunities of integration of data from multiple providers, including crowd-sourced data combined with an open data policy, will require high degree of standardization and stringent policies on compliance with data privacy and data security regulations. The concept facilitates process automation and transparency and enable a wide spectra of user applications. It will also provide for a built-in evolutionary environment that in a complex context can transform and adapt to new expectations and requirements over time. (e.g. 2D -> 3D, introduce blockchain, AI, Big Data analysis etc.) It has the potential to trigger digital engagements and efficiently leverage digital trust.

4. NEXT STEPS
A third round table will be held in April and dialogue with the ECE member states will follow before the final UNECE report will be compiled, peer-reviewed and submitted for approval in October 2019. It will include the following main sections:

- Guiding principles for development of land administration towards 2035
- Trend analysis
- Scenario analysis and descriptions

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- Self-assessment framework and tools
- Suggested outline for Country strategy report

The long-term aim is to annually tune the scenarios for land agencies as well as other actors in the sector to benefit from up-to-date scenarios supporting them in making appropriate priorities to meet changing expectations and needs. The scenarios will also reflect the contribution to Agenda 2030.

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BIOGRAPHICAL NOTES

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