Land Administration Quality Assessment: LGAF, DoingBussiness, WPLA UNECE. What next?

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SUMMARY

Quality of land administration almost ten years is estimated by principles and methodology of the World Bank (LGAF, DoingBussiness), WPLA UNECE. In article, the foundation of the further development of such assessment methodology is proposed. Propositions based on land reform horizon. The perspective should be linked with the third stage of land reform: development of "smart" technical land governance systems. Accordingly, quality of land administration has considered from a position of maintenance of efficiency of land governance. Tendencies of such systems development specified. Additional indexes of quality of land administration in maintenance of realization of these tendencies are proposed. On the base of the proposed methodology case study of cadastre systems of neighbor countries (Russia, Belarus and Lithuania) executed. This research makes it possible to generate recommendations for further land administration development.

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1. Land administration quality assessment

There are several techniques of land administration quality assessment: Land Governance Assessment Framework (LGAF) and DoingBusiness of the World Bank, researches of Working Party Land Administration of the UN Economic Commission for Europe (WPLA UNECE).

According to LGAF approach, the assessment of land administration quality contains three indexes: LGI16 "Completeness of the Register", LGI17 "Reliability", LGI18 "Cost-Effectiveness and accessibility of land administration services". Experts carry out the work within land governance quality assessment.

Land administration quality assessment by DoingBusiness methodology ("Registering Property") includes several indexes groups: reliability of infrastructure, transparency of information, geographic coverage, land dispute resolution and equal access to property rights. National experts carry out the assessment annually.

WPLA UNECE also estimates land administration quality. In the overview of 2016 indexes such as coverage, availability of online services, state guarantees, registration and other state fees, registration speed, a type of registration system, types of actions, gender equality applied to assessment (Survey on Land Administration System, 2014).

There are reasons to believe that the accepted approaches for land administration assessment became a little staled in compirison with digital transformation of society coming on. In the segment of land governance and land administration appeared many new technologies: E-governments; multilevel remote sensing of Earth; crowdsourcing and e-participation in e-decision making; big data and cloud computing; geospatial platforms; GNSS; technologies of voluntary geographical information; information modeling of buildings (BIM); mobile telephony; 3D-modeling of property and rights on it; ERP systems of planning and resource management; CRM systems for Real Estate facility-management (R.Tonchovska, 2016**).**

Digital transformation of society attracts reengineering of business-processes in sphere of land resources and reform of cadastral system to provide for them.

2. The reform of cadastral systems

The issue of reformation of cadastral systems objects and functions already been discussed repeatedly in relation with digital transformation of society, introduction of new technologies. In (Daniel Steudler, 2015), it is fairly marked that the traditional cadastre based on surveying and land registration. New challenges makes actual inclusion in cadastral systems new types of objects and

new functions in support of new technologies of land governance and reengineering its business processes. This is a time challenge. Not only protection of the rights and support of taxation, but also sustainable territorial management. M. Gorgan, the representative of FAO, analyzing results of land reforms (M. Gorgan, 2016), specified it in the model that includes three groups of processes. The first group is the distribution of land rights. The second group is creation of land administration systems. The third group is enhancement of land governance according to the 17 goals that established by UN program of sustainable development up to 2030. In achievement of these goals, the special role is given to geospatial information of land administration. The principles of its use formulated in the international Forum declaration in Addis Ababa, 2016.

Let us consider some functions, which, according to authors, it is necessary to enter into cadastral systems for solution of tasks of the third stage of the land reform in conditions of digital transformation of society.

1. *Registration, accumulation and distribution of territorial planning documents, including land consolidation and land readjustment documents.* Relevance of such decision caused by an up-to-date form of these documents. They have today a digital form; can be stored in digital archives of contemporary cadastral systems. These documents based on cadastral data. The possibility of simple access to such documents from unified digital archive through digital cadastral Web-maps promotes creation of the best investment climate in the country and increase in transparency of decision-making. Such cadastral services will promote execution of contemporary land management techniques. For example, such as PILaR of GLTN UN-Habitat.

2. *Property registration based on BIM (buildings information models).* This solution provides archiving of all construction projects of the country in a unified digital cadastral archive while maintaining copyright, access to BIM across cadastral services in all life cycles of buildings (redevelopment, facility management), simplify the creation of 3D-cadastre and registration of 3D-rights.

3. Registration of facts, phenomenon, and events according to geo-monitoring based on cadastral data and remote sensing. Geo-monitoring is the feedback link in the land governance system. The appearance of ultra-high resolution multi-level remote sensing (space and aerial vehicles, drones, mobile-based sensors) allows conducting the administrative inspection of land relations objects without participation of rights holders. Inspection can be carry out with high performance and low cost in cameral conditions. The results may be distribute through the public cadastral Web-maps. Administrative actions action in response can be display through the same interactive Web-maps. As a result, municipal management becomes social accountability.

4. Registration of the creation, modification and termination of underground engineering structures. In principle, the land administration domain model LADM according to ISO19152:2012 provides external registration of spatial data in the *ExtPhysicalUtilityNetwork* class. It is necessary to create a cloud computing system, which should provide the National cadastral system with access to relevant databases via Web-services. Legislation must dictate to utilities owners to maintain such databases. In case of damage of a registered property during the excavation, responsibility for damage should lie on the person carrying it out. If the object is not registered, the owner should bear

the cost to restore utilities. Such a rule successfully is using for a long time in Minsk (the capital of the Republic of Belarus).

5. Registration of events in sphere of urban development activities. This cadastral function should provide regulations of permitting administrative procedures to ensure the urban development monitoring and investment activities in the country. For example, the events of urban development activities include obtaining permits for construction or redevelopment. The cadastre must contain information about the developer, investor, general contractor, construction period, acceptance into operation, etc. Such cadastral function will increase the transparency of land governance and provide monitoring processes on all urban areas. In this case, registration subjects should be local authorities or the authorized government agencies. It makes sense to clarify LADM in ISO19152 standard. It is not a problem to display urban monitoring data on the digital cadastral public Web-maps.

6. Registration of e-public discussion of land governance projects. Such discussions provided for by legislation of all countries and are directly related to land governance. E-participation is seen as part of e-government service. E-participation indices (EPI) are using to measure the quality of e-government. The UN (United Nations E-government Survey, E-Government in Support of Sustainable Development 2016) makes such assessment. Public interactive Wb-cadastre map is an excellent interface for public debates and reflection of its results.

Innovative tool of cadastre should be a unified country geo-spatial platform. This platform is a part of spatial data infrastructure of the country (NSDI). It should fulfill the electronic administrative regulations for e-decisions making. The platform should be used on all government levels together with the population. It is important, that management solutions are producing on the base of the same information for everybody. Part of the NSDI data can be create directly on this geo-spatial platform. Access to NSDI data which are considered by LADM as external classes, may be available at the platform using cloud technologies. The optimal NSDI geo-spatial platform national operator is the operator of the cadastral system.

A cloud SaaS e-services of ERP-cadastral system has a chance to become innovating support for facility management, Cloud SaaS-services are available to an unlimited number of users. In this case, it could be Real Estate managers. ERP-system creation for facility management as a part of cadaster system is possible due to several factors. The first factor means, that the cadastre contains a sufficient description of the registered Real Estate objects (models). The second factor means, that the cadastral model provides the basis for a number of ready-made facility management software, working on cloud technologies. For example, the software package «SAP Real Estate Management».

3. Land administration quality assessment

The purpose of such quality assessment is to give development direction to cadastral system. Contemporary evaluation techniques do not fully satisfy these requirements. Therefore, we propose, in addition to the existing evaluation indexes to enter new LAI indexes/ Some of them are

proposing below. The opportunity of assessment on these indices considered on the examples of neighboring countries: Russia, Belarus, Lithuania and Ukraine.

LAI1. Legal support of spatial data infrastructure. The maximum value of this index is the case when the NSDI is regulating by a special law. According to that index, Russia has the highest rank among the compared countries. NSDI Law adopted there in 2015.

LAI2. Unified geospatial platform is using for territorial governance. The maximum value of the index is under the following conditions: the platform exists, the legislation includes the platform in the NSDI, and platform is using by all the administrative and territorial units of the country.

The highest index rating is in Lithuania. Lithuania has unified geospatial platform www.regia.lt, set up by the cadastral operator "Registers Centre" and successfully used by all municipalities. Russia has a federal structure, so the uniform spatial platform are developing for more than 60 federal entities.

LAI3. Cadastral data integrity. It is reasonable to evaluate the likelihood that the spatial and semantic information is reliable for every particular cadastre object. In our opinion, excellent level of integrity is the probability of accurate records being equal to 0,99 or more.

The State program for registration system development in Belarus up to 2018 has set the goal to increase the level of this index up to 0,95.

LAI4. Cadastral data completeness. In principle, for such assessment is using «coverage» index. In our point of view, this index is insufficiently informative. We suggest estimating the cadastral data completeness by the level of administration of property tax system. The index is maximum, if cadaster fully provides requirements of taxation system, does not demand collecting additional information and ensures functioning of the Real Estate mass appraisal *CAMA* model.

This index did not achieve maximum in the examined countries. The results of research within the project on creation of a new mass Real Estate assessment system in Belarus in the pilot area have shown that almost 20-25% of Real Estate objects are not present in the cadastre. In Estonia, there is almost 97% property in cadastre.

LAI5. BIM are the grounds for Real Estate registration. Introduction of such index stimulates development of digital construction, promotes transition to 3D-cadastre. Index rate depends on a share of capital structures with BIM in a total amount of such objects in the cadastre.

BIM are not yet in the cadastre in the European countries. At the same time, tendencies to this event outlined. For example, in Moscow, BIM projects began used for conducting examinations of construction projects quite recently.

LAI6. Excavations in the country managed by cadastral data. This index accepts the maximum value, if the cadastre provides administrative procedures of permissions delivery for excavation all

over the country and provides data in real time on all underground engineering networks in emergency cases.

The cadastre system of the Netherlands is an example of the best practice in case of that index. In Belarus, separate municipalities, such as Minsk, implement this function.

LAI7. Cadastre provides publicity and transparency of territorial land use planning projects. The index accepts the maximum value, if the public cadastral map contains spatial and semantic data of all registered territorial land use planning documents all over the country, as well as access to these documents in the digital archive.

It is also appropriate to mention Lithuania, where this function implemented in the unified geospatial platform www.regia.lt.

LAI8. Cadastre provides publicity and transparency of administrative inspections of land relations objects. The index assumes the maximum value, if the country has legislation governing administrate survey for objects of land relations, if the public cadastral Web-map contains spatial and semantic information about results of such inspections and the results of appropriate administrative actions. Administrative survey have to be prepared on the base of cadastral data and remote sensing data without participation of landowners or users.

The Russian government in 2015 established a procedure for administrative inspections of objects of land relations based on remote sensing and cadastral data. Administrative surveys submitted to the state agency responsible for the land cadastre maintenance.

LAI9. Cadastre provides e-decisions making, e-consultancy and e-information participation in a land governance purpose. This index should take the maximum value, if interactive public cadastral Web-map supports crowdsourcing with voluntary geographic information VGI, electronic public discussions of territorial development projects and publications of administrative decisions.

According to the United Nations E-government Survey-2016, only 65% of countries have an e-decision making tool nowadays.

LAI10. Cadastre provides the urban development monitoring. This index should take the maximum value, if the public cadastral Web-map contains spatial and semantic information about all development projects all over the country. Urban-planning cadastre of Kiev (Ukraine) performs such function of geo - monitoring using Web-GIS: http://mkk.kga.gov.ua.

4. Expert system for land governance quality monitoring

As far as we know, such systems are absent in the world. Expert system's function is to monitor on a continuous basis the quality, to control its progress; to promote the correct choice of development programs; to ensure the monitoring of land governance decisions made by authorities and so on.

Continuously operating automated expert system has to carry out calculation of key indicators of separate land governance processes in real time and draw conclusions about its quality.

For example, the key indicators can be calculated as follows: the amount of revenue from the land tax, acts of privatization, expropriation, consolidation, readjustment; development and redevelopment, the number of land conflicts, the intensity of property rights redistribution, changes in the cadastral value of real estate and so on. In our point of view, it is reasonably to modify accordingly LADM.

5. Conclusion

Future of cadastre is associated with the expansion of its functions. Cadastre functions should be expand to support modern land governance and continuous monitoring of its quality. To solve this problem we promote creation of three innovative automated information systems as a part of cadastre. The first one is a multilevel management system based on a unified geospatial platform as part of NSDI. The second is an expert automated system for continuous monitoring of land governance quality. The third is an ERP-system providing SaaS services for facility management. In order to motivate the development of the cadastre it rationally to modify its assessment quality indices and update respectively the LADM.

We suggest to include the above proposals to the agenda of the Commission 7 FIG «Cadastre and Land Management» seminar.

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BIOGRAPHICAL NOTES

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