

Development of Cadastral Information System in Correlation With Nsdi in Kosova

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Key words: Land Administration, Cadastre, KCLIS, NSDI, Kosova.

SUMMARY

This is a summary on the article of developments on Kosova Cadastre Land information System and in the framework of the National Spatial Data Infrastructure (NSDI) for Kosovo. The article explains the latest developments in these issues in Kosova, based on “the project development of advanced Kosovo Cadastre Land Information System” and on the register of Imovable Property Rights. The purpose of the project itself is to supplement Immovable Property Right Register. First deliveries of this Project, namely cadastre information for three municipalities, are expected to be handed over by the end of this year.

Cadastre activities in Republic of Kosova Cadastre nowadays, have enormously accelerated in order to speed up secure and accurate updating of cadastral information production. The works are ongoing in Land and Building Cadastre field.

Kosovo Cadastre Land Information System (KCLIS) has started to develop on analogue cadastre database produced/established since the beginning of the last century. Process of transition from analogue cadastre data to digital cadastre data in Kosova, experienced various challenges related to data accuracy, homogeneity and reliability. Incorporation of KCLIS data into the NSDI facilitates use of the data by various users. At the same time, KCLIS provides possibility to analyse quality of data in use, and entering of new data of equal quality into the System.

The rationale behind setting up the Kosova Land Administration Inter-Ministerial Committee is to, above all, upgrade data quality and to utilise the same data for sustainable economic system in Kosova. Republic of Kosova, as independent country, was supposed to get a first loan from the World Bank. The purpose of this loan was, and still is, to reconstruct and develop Cadastral System in Kosova. Kosovo Cadastral Agency (KCA) will implement this Project. An efficient, effective and transparent Cadastre Register can contribute to fighting poverty, unemployment and to open new perspectives for economic development. The KCA is responsible for the development of the legal framework and the coordination of its implementation relating to the cadastre and other matters concerning the land information system in Kosovo. The KCA's areas of competence are mainly geodesy, surveying, geographical information systems, real property registration, mapping and legal issues related to land administration. Analysis of existing legislation that is touching the NSDI and a carefully designed set of amendments to take away hindrances to build the NSDI is very important. The existing legislation consists of different elements that are touching NSDI and carefully explaining in this article.

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1. INTRODUCTION

Abbreviations:	
GTZ	Gesellschaft für Technische Zusammenarbeit
IPRR	Immovable Property Rights Register
KCA	Kosovo Cadastre Agency
KCLIS	Kosovo Cadastre and Land Information System
MCO	Municipal Cadastre Office
NSDI	National Spatial Data Infrastructure
RECAP	Real Estate Cadastre Project

Highly increasing demand for cadastral information and for exchange of information between KCA, Republic of Kosova citizens and all stakeholders, has urged Kosova Government to apply (for the first time as independent country) with the World Bank for a loan, for the purpose of reconstruction and development of Cadastral System. Main purpose of Real Estate Cadastral Project (RECAP) is to develop Cadastre Information System for Land Administration in the country. Achieving of these objectives, will make great impact on sustainable economic development by providing better living conditions for all Kosova citizens, irrespective of religion, gender or ethnicity, see Minutes of Inter-Ministerial Committee Meeting, held in GTZ offices Prishtina, on 29 September 2010.

Development of Cadastral System, pursuant to envisaged standards, has positive impact on improvement of social welfare and country's economy in general. This is exactly the rational behind Kosova Government decision, namely to give high priority to development of Land Administration and the vision for the Cadastre (Kaufmann, Steudler, 1998). Such support is not only oriented in day-to-day politics, but is also mandatory for long-term implementation, which is directly linked and relevant to country's standards values of democracy. One of the basic human rights is property right. Property right in Kosova, can be clarified and acquired only through cadastre and by a certain cadastral system built up in compliance with best European practices, which in turn provides viable and secure property market as well as favourable conditions for various investments.

The stakeholders' activities, related to land, should fit to land administration and land management needs. For this purpose, the Kosova Land Administration Inter-Ministerial Committee has been established and was put in motion in Kosova. Its supporting role of further development of Cadastre along with viable land administration policy in country, has as objective establishment and updating of National Spatial Data Infrastructure (NSDI). Pursuant to

these requirements and developments, there is already expressed willingness of donors, such as the World Bank, Norway, Germany and Sweden to support these efforts. Coordination of international and local experience, professionalism and transparency and the aim to implement the works correctly, have resulted in significant and advanced progress of Land Administration projects, which also comply with European standards. (Eurogeographics, 2007)

2. ANALYSIS OF THE CADASTRAL DATA IN KOSOVA

Thorough analyses of cadastral data, in analogue and digital form, for 25 cadastral zones (WorldBank Project, 2007) and for some other cadastral zones, has shown that this data does not reflect a real situation on the ground. Therefore, inconsistency between graphical and textual databases is partly due to irregular maintenance of cadastre and partly due to missing documents, which were taken away by Serbia during a war in Kosova, and which are still in Serbia (Meha, 2004; Meha, 2007). This situation in Cadastral Information System requires acceleration of cadastral data updating activities. KCA and municipal cadastral offices should engage and make efforts to increase cadastre regular maintenance capacities, by undertaking additional activities through cadastral information reconstruction in order to:

1. complete ownership data on real (immovable) properties pursuant to the real situation on the ground, figure 1.
2. reconstruction of real property data in order to implement deliveries of other projects such as property tax, land utilisation planning, infrastructure development, land consolidation, state-owned and municipality-owned real properties, figure 2.



Figure 1. Cadastral documentation fully consistent with the ground situation (red lines).



Figure 2. Orthophoto and cadastral data (yellow lines) base for land management and administration

Reconstruction of cadastral information is essential for systematic registration of cadastral information in cadastral model, as well as for cooperation with international donors' community. For operational cadastral model in general, relevant manuals and administrative instructions, within a legal framework, have been drafted, such as:

- *“Operational Manual on Cadastre Reconstruction“*,
- *“Operational Manual on Building Cadastre Construction“*,
- *“Operational Manual on Data Quality Control“*,
- *“Guidelines on Cadastre Reconstruction and Buildings Committee“*

Manuals and other legal guidelines definitely clarify data collection, quality control and compliance with data standards set for in textual part registered in IPRR-KCLIS. Afore mentioned manuals and guidelines, provide sufficient clarifications for immovable property rights registration as a final target for clarifying property relations.

3. DEFINITION AND CHARACTERISTICS OF KCLIS IN KOSOVA

3.1 Definition of KCLIS

Establishment of a new Immoveable Property System should be preceded by new legislation, as it was case with KCLIS. However, due to existence of unclear issues and risks when implementing a Project, questions emerge from various points of views as to: how the concept of this System should be formed, which are preparations for its implementing, how prepared is a local staff for this System, how and when will testing and implementing take place?

Another set of questions concerns meeting of requirements: will this System really satisfy various users (mainly KCA and MCO's, other stakeholders groups (various national and private agencies), and will this System meet requirements for accurate and guaranteed immovable (real) property information?

KCLIS has been defined by the Law on Cadastre No 2003/25, in the articles 1.2, 1.3 and 2.8.

Art. 1.2: “The Official Register consists on register of all recorded data on land, buildings, parts of buildings, cadastral plans and the whole cadastral set of forms with purpose of Land Information System, it shall support the administrative, legal, economic and scientific purposes.”

Art. 1.3: “The cadastral surveying shall collect and verify the data for the Kosovo Cadastre and the Cadastre and Land Information System of Kosovo (KCLIS). It shall secure the basis for the immovable property rights by the creation of land parcels, buildings and part of buildings and the determination of their boundaries.”

Art. 2.8: “Land information system is a system for acquiring, processing, storing and distributing information about land in textual and graphical databases, and **Kosovo Cadastre and Land Information System - KCLIS:** KCLIS is a system for acquiring, processing and distributing the textual and graphical data on land.”

Law no. 2002/05 on the Establishment of an Immovable Property Rights Register defines IPRR as the following: “The Immovable Property Rights Register (hereinafter the “Register”) is hereby established as a mechanism to implement and validate immovable property rights in Kosovo under the Applicable Law.” From IT point of view, the mechanism to implement and validate immovable property rights and set of functional requirements for an IT application that operates with KCLIS data.

3.2 Characteristics of KCLIS

KCLIS is the Kosovo Cadastre Land Information System. Primary role of KCLIS is to assure the immovable property rights in Kosovo. KCLIS embraces KCA and MCOs. KCLIS serves the management of both graphical and textual data. KCLIS integrates the office routines, the sales of data, additional services that relates to cadastre, functions for more effective management, security, IT support.

Fundamental requirements:

- KCLIS is first of all a legal system
- KCLIS satisfies the needs of the Kosovo society
- KCLIS matches to the IT standards
- KCLIS is a cost effective IT system
- KCLIS development approach is flexible

3.3. Functionality of KCLIS in Kosova

Kosovo Land Cadastre Information System (KCLIS) had been designed to provide general basis for Land Administration (Braun, 2010)). It will replace existing Immovable Property Rights Register (IPRR), by providing more secure, powerful, efficient and advanced system.

KCLIS is dynamic System developed by KCA, and is extendable in order to meet citizens needs related to their properties. The KCA is responsible for the development of the legal framework and the coordination of its implementation relating to the cadastre and other matters concerning the land information system in Kosovo. The KCA's areas of competence are mainly geodesy, surveying, geographical information systems, real property registration, mapping and legal issues related to land administration.

On the one hand, KCA has control over MCOs, including defining operating manuals, supervision, conducting, on the other hand provides services such as training, managing development projects, technical support, IT helpdesk, etc.

The KCA is the main institution responsible for the overall coordination and execution of Cadastre-related development project.

The MCOs fall under the authority of the Municipalities. MCOs carry out the day-to-day registration duties. The MCOs are the administrators of these two inter-linked IPRR and KCLIS laws. Municipalities who are in charge of MCOs have broad autonomy. Based on the *Status*, Municipalities shall have full and exclusive powers, insofar as they concern the local interest, while respecting the standards set forth in the applicable law in the following areas: local economic development; urban and rural planning; land use and land development; implementation of building regulations and building control standards; local environmental protection; provision and maintenance of public services and utilities, including water supply etc. KCLIS in general has been developed from two components: textual database component and graphical database component. Textual database component consists of owner's data and the area of cadastral unit (parcel). Parcel area, in textual database, is calculated according to then existing ways and instruments the parcel had been surveyed. Parcel area calculated and adjusted by this survey was considered as original area. Then this parcel area was registered in parcel's owner register and was considered to be the legal area. The owner has his/her own parcels, by the area set by the law, registered in relevant document all the time. This relevant document is called Possession List till 2003, and now is called Certificate. Each and every owner has one Certificate of his/her parcels in one cadastral zone.

Second KCLIS component are maps, which in digital system are called Graphical Part. Geodetic surveying for production of cadastral maps have been done through classical terrestrial methods or aerial-photogrametry surveying. From these surveys, cadastral maps of 1: 500, 1: 1000 or even 1: 2500 scale have been produced, depending on urban or rural area. In Kosova, during the period 2000-2004, transition from analogue maps to digital maps took place according to the following process: scanning – geo-referencing – vectorisation – control and approval. ITF files had been produced as well. ITF is been created and read by GeosPro module, which is installed within GeomediaProfessional. ITF files provide high data/records security while maintenance and updating is easier. Creation of ITF files is done based on programming language Interlis,

which provides the area of each parcel, so called parcel's technical area, the boundary of cadastral zone, all points classified by codes that comply with the legal framework.

The difference between legal and technical area always exists, due to errors accumulated out of all cadastral maps production processes, ranging from surveys or measurements up to graphical data in digital form. During the process of cadastral information production, survey or measurement of parcels' areas takes place of course, and there are differences between two areas as mentioned above. Explanations specified above rightfully bring to dilemmas:

- how can these areas be adjusted, or which area should prevail in the document?
- which parcel area should remain registered?
- when can corrections of the areas in Immovable Property Rights Register take place?

Cadastral reconstruction can provide answers on dilemmas set forth, by making consistent textual data with graphical data in IPRR.

4. STAKEHOLDERS SURVEY ON USE OF KCLIS

Two-month research of KCLIS stakeholders has been done to reveal a need and clarify future development of KCLIS. The purpose of this survey was also to find dependency of the stakeholders on products listed in KCA's and MCO's Cadastral Information Systems. The survey included 24 various stakeholders and took place during a period August-September 2010. Considerable part of the stakeholders has used a limited number of data so far. Development trends require increase of variety of cadastral information in conformity with demands of the stakeholders. Out of research/survey of the stakeholders requirements for cadastral data, the following was found:

- buildings and parts of the buildings registration data
- data of cadastral information reconstruction
- IPRR/KCLIS up-to-date data
- request for supervision and inspection of MCO's regarding data quality (secure and accurate)
- request for spatial data from GIS System,
- making operational property market through cadastral,
- making operational and coordinating KCLIS with Address Register and Property Value Register.

Consistency of existing data with actual situation on the ground as well as completion of Buildings and Parts of the Buildings Register in Kosova wide towns is the most influencing component of property transactions between various natural persons and legal entities. Commercial Banks, in few cases, reject applications of different businesses and household families for loans, since clients cannot register their properties that would serve for mortgaging. Negative impact was noticed in privatisation process as well, which has affected attracting of foreign investments in privatisation process.

Land Market, being one of most significant factor of economic development, has imposed to KCA to be focused in meeting of stakeholders' requests, meaning to provide accurate, up-to-date

and secure property data and to provide warranty for them. There is ongoing Building Cadastre project, registration of the buildings and parts of the buildings. This Project is funded by the World Bank.

Results of this survey reveal that data has direct impact on:

- implementing of Government projects,
- development of private business,
- public companies regarding implementation of development projects,
- development of road infrastructure,
- central and local level spatial planning.

Sustainable Cadastral Data shall be taken into consideration only if managed well, if secure and accurate and in accordance with Commission Regulation, (CR 2009). The data delivering should fulfil requirements and those are good as the technology and professionals behind it.

5. DEVELOPMENT OF KCLIS IN THE FRAMEWORK OF NSDI FOR KOSOVA

5.1 Framework of analysis

The building of the KCLIS is a very important building block for the emerging NSDI in Kosovo. By using the general concepts on NSDI's that are developed, the development of the KCLIS can be optimized and less problems have to be overcome in the future when new building blocks are created.

In Laarakker en Windanaya (2010) a framework was developed to look at organisations that are working together to build an NSDI. Basis for the analysis is the diagram of Henderson and Venkatraman (see figure 3). An organisation has a business strategy in which its functions and objectives in society or in the market are defined. To implement this strategy, business processes are designed. These business processes are supported by IT-systems and tools. In organisations that are dealing with land information this can be GIS-systems, GPS equipment, spatial data bases, network-systems, etc. The IT-systems are developed based on business needs. However this development has to be done with a strategic IT-view, for reasons of efficiency (re-use of developed components), sustainability (can systems be maintained in the future?) and innovation (what are the future needs of customers and which IT-developments can support those needs?). Business strategy and IT-strategy have to be aligned. Primarily IT has to make what the Business wants, but there can also be constraints, in budget, capacity, available technology etc. Business- and IT-strategy affect each other mutually (Bree 2008).

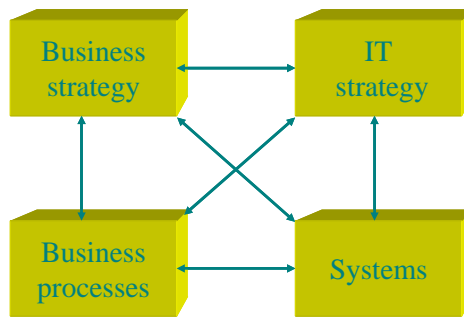


Figure 3: Business-IT alignment (Henderson and Venkatraman)

When the strategy of an organisation is starting to focus on the chain in which it is operating, that organisation has to look at those other organisations in the same way it looks at its own organisation. Operating in the chain means that business processes of multiple organisation have to be aligned (see figure 4).

Coordination mechanisms are necessary to get a sustainable cooperation. Business processes are supported by the participating organisations and in the field of IT-systems, interoperability is being created. When organisations are knot together like that, it will influence both business and IT strategy. For sustainability of the cooperation in the chain, it is therefore necessary that IT strategy is also aligned with the IT-strategy of other organisations, leading to a common architectural reference framework. Organisations have to discuss on high strategic level the common elements of their operations.

The discussion between the organisations on all fields of Business-IT alignment is also influenced by many internal and external factors as can also be seen in figure 4.

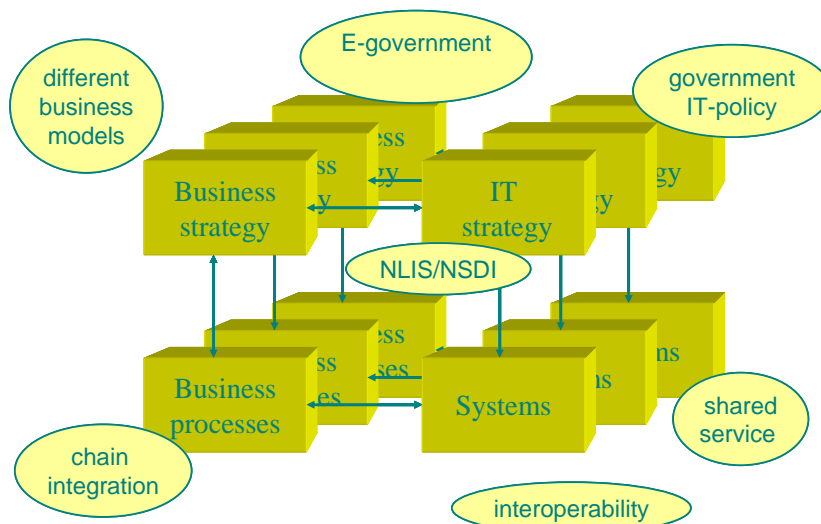


Figure 4: Inter-organisational cooperation and external influences

A problem can be that cooperating organisations are working with different business models, one asking fees for services and the other being financed from central budgets. Their plans have to fit within general government policy on electronic government or IT. At the system level technological developments are important. Decisions have to be taken on standards, information models and other architectural issues to create interoperability, both technical and semantic. And a more detailed assessment of chain integration can be done, sometimes concluding to a change of mandates of the participating organisations.

5.2 Analysis of Kosova NSDI

The model can be used to analyse the situation of the NSDI in Kosovo.

Business Strategy

The alignment of the business strategies of the organisations that are working together to build the NSDI has to be done by the Kosova Land Administration Inter-Ministerial Committee that should take the lead.

On high political level the Kosovo government has decided that Kosovo, based on its ambition to be a member of the EU, will take the European regulations as a starting point for its Laws. This makes the Inspire guideline, the guideline on Public Sector Information and other EU guidelines important guiding principles for the development of the NSDI in Kosovo.

A more detailed overview of the existing legislation that is dealing with the NSDI is given in next chapter.

An extra challenge for Kosovo is to deal with the highly decentralised government structure. Due to the political situation the municipalities have given big autonomy with respect to the cadastre, the property register and other registrations that are relevant for the development of the NSDI. The relationship between local and national levels of government has proven to be very important for the development of NSDI's in other countries. This is valid for both the operational and strategic relationship.

Business processes:

Basic philosophy of an NSDI is that information is collected once and used multiple. Kosovo has many projects going on in which geographic information is needed. So users are looking for this information and if they cannot find it, they will start producing it themselves. Since many datasets in Kosovo are still being built up, this is a risk.

The staholder analysis as described in chapter 4, gives a clear picture of the existing and future information needs both with respect to cadastral data and other geographic data. The stakeholders give high priority to cadastral data as a fundamental dataset that should be available. The stakeholder survey is producing the information necessary for the Kosova Land Administration Inter-Ministerial Committee to set joint priorities for the production of cadastral and other data. This will reduce the risk of double data capture and an effective use of available funds possible.

For many governmental business processes, the municipalities in Kosovo will be the front office.

The level of education in the municipalities is an issue.

Inspire defines a number of services that should be available in the member states. It is important to consider these services from the beginning because they will require certain specifications to all the designed systems.

IT strategy

The stakeholder survey also gives valuable information to develop a joint IT strategy for the NSDI. It is important to get a national e-government strategy in place that will set the specifications for an aligned IT strategy for the participating organisations. In the stakeholder analysis a solid base for Service Oriented Approach was concluded.

Systems

The stakeholder analysis has made an inventory of systems that are used by the different stakeholders. This is an important first step to create the needed interoperability between the systems of all the participants and users of the NSDI's.

But the stakeholder analysis also brought up questions about metadata, data standards etc. that have to be decided upon. In the next chapter this issue is discussed from a legal perspective.

6. SOME LEGAL ISSUES OF THE KOSOVA NSDI

6.1. Introduction

The possibility to design an integrated strategy for the NSDI is very much influenced by the legislation that is in place. Government organisations by their very nature are law oriented and strategies that are conflicting with existing legislation therefore have little chance on success. Analysis of existing legislation that is touching the NSDI and a carefully designed set of amendments to take away hindrances to build the NSDI are very important. A number of issues with respect to the legislation in Kosovo can be raised that have to be carefully considered. This analysis is based on the results of a review of the cadastral legislation in Kosovo so cannot give a complete overview of NSDI-related legal issues.

6.2. Analysis

The existing legislation consists of different elements that are touching NSDI. A number of issues are mentioned below.

Law on Cadastre

The Law on Cadastre in Kosovo is regulating the creation of cadastral units for land, buildings, apartments and utilities. The operational responsibilities for creating cadastral units lie with the municipalities. KCA has regulative and supervision power and executes some shared service activities like building the computer systems for the municipalities. Important element in the review of the Law on Cadastre is the division of responsibilities once a national computer system

is in place. How does the operational responsibility of municipalities fit in a system with clients logging in a national system?

The Law on Cadastre defines also the building registration. In the review of the law an important element is the synchronisation of two processes: the property registration of a building that is necessary for transfer of property and mortgaging and the process of building license and use license that is necessary for an adequate spatial planning and building administration. The first process needs a building registered before the construction has started for mortgage purposes; the second wants a final registration after the issuing of the use license.

The Law on Cadastre gives responsibility for first order National Reference System to KCA and for the lower order to the municipalities and gives responsibility to make orthophoto's to the KCA.

An interesting regulation in the Law on Cadastre is the obligation that all government agencies have to use the cadastral information in their processes. It is a strong statement underpinning the NSDI-principle of one-time collection.

The Law on Cadastre also contains regulations on a utility cadastre, including the obligation for constructors to check the cadastre before they start digging.

The stakeholder analysis is raising the point of the fees that are asked for cadastral services. The fees are an important source of income for the municipalities. KCA is financed from central budgets. It is important to have an integrated vision on all fees that are asked for information that is produced in the framework of the NSDI.

Law on Agriculture

This law is creating the obligation for the minister of agriculture to produce an agricultural land use register and a farm register. The Law defines Farms as parcels of land that are used for agricultural purposes. A farm may be owned by an individual, by a family, by a community or a cooperative.

When building up the agricultural land use register, it is important to solve issues of technical and semantic interoperability with the cadastre and immovable property register. The Law on Cadastre creates the obligation to register type of use of every parcel. Important NSDI-issue is the synchronisation of this attribute with the agricultural use. The Law on Agriculture also has a land-oriented definition of a Farm. This has to be consistent with regulations in the Property Law but there is also a relation with terminology in the Business register.

The ministry of agriculture has legal access to all cadastral data. Important regulation will be whether it is the individual MCOs that have to provide the data or the KCA. KCA has to provide the ortho photos.

The law on Agriculture also contains regulations on the publicity of the data in the registers. It is important to have a shared vision on publicity of data in all the laws mentioned in this section.

Law on construction

The Law on Construction is containing a definition of building that is, as can be understood, construction oriented. But since the registration of buildings is done in the cadastre, there is an issue of semantic interoperability. The process interoperability was already discussed before.

The Law on Construction also defines the Owner of a building. This could be left to the Property Law and related registration law.

Law on spatial planning:

This law defines a cadastral plot. Synchronisation with the Law on Cadastre is important.

The Law has several regulations with respect to the publicity of the spatial plans and regulative plans and prescribes the setting up of national databases for this. Since for certain spatial plans the cadastral parcel is the basic unit it is important to design the planning and cadastral databases in a coordinated way.

Law on local self government:

As said before Kosovo has a strongly decentralised administration. In any country in the world, the municipalities are essential for the building of an NSDI, for Kosovo this is even extra the case. Municipalities are closest to the citizens, they have the highest need for detailed spatial information but are also collecting vast amounts of spatial information that by reuse through an NSDI can contribute to economic development of the country.

7. CONCLUSION

The stakeholder analysis as was executed by KCA brought valuable information about both the opinion on the cadastral services as rendered by KCA and the MCO's but also about important aspect how to go forward with the NSDI. It is necessary to make the cadastral parcels and identifiers available, as part of the NSDI, through the Geoportal. The leadership of KCA in developing the NSDI seems to be well supported but it is very important to continue the relationship with the stakeholders, both through the Kosova Land Administration Inter-Ministerial Committee but also through more operational platforms for an exchange of information between different national agencies and municipalities. And it will be hard work to implement all the necessary elements for the NSDI.

The stakeholder analysis has made an inventory of systems that are used by the different stakeholders. This is an important first step to create the needed interoperability between the systems of all the participants and users of the NSDI. The relevant legislation needs careful analysis and amendments to support these developments.

But the stakeholder analysis also brought up questions about metadata, data standards etc.

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