Project e-Space: Building a Digital Platform for Spatial and Urban Planning and Development in Serbia

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Abstract. Besides supporting the general idea and goals of sustainable development in every aspect of a modern life, there are many other reasons for accelerating digitalization efforts within the public sector in Europe. These efforts are also notable in the spatial and urban planning and development domain, where a majority of the European cities and countries following the common policies, strategies and accepted standards (like, INSPIRE, TA2030, Digital Europe, Urban agenda for the EU, ESPON, etc.) have already established or are in development of the different digital databases and platforms for the spatial and urban planning data management, as well as their usage for a various and improved internal and public services provision. The purpose of this article is to present a Project "Improving spatial planning and development in the Republic of Serbia by establishment of e-Space digital platform", i.e. the e-Space project, launched in March 2021 by the Serbian Ministry of Construction, Transport and Infrastructure, which aim is to establish the so-called e-Space digital platform that would support the spatial and urban planning and development process and related services provision in Serbia, both on national and local level. While increasing the efficiency and effectiveness of the public decision-making and territorial/land policy management, this platform should additionally improve, streamline and make more transparent the current spatial and urban planning and development practice in Serbia in general. Thus, starting from the identified problems and obstacles within the spatial and urban planning and development domain in Serbia today, as well as needs of the public sector, businesses and citizens to have easy access to the territorial/land development related information, as well as adequate tool for participation and efficient services provision, the general concept, objectives and main functionalities and components of the future e-Space digital platform have been described in this article. Besides number of the direct advantages that establishment of this digital platform would bring to the domain of sustainable territorial/land management and other domains in Serbia (gender equality, investment, taxation, etc.), it could be assumed that several obstacles still need to be resolved or managed during this project implementation in the coming years.

Keywords: Sustainable development · Public sector digitalization · Spatial and urban planning and development · e-Space project · Serbia

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1 Introduction

In order to support and manage a rapid urbanization and dynamic urban development process, the public administrations on all levels in the European countries are transforming their operating models, increasing at the same time a number and type of channels for public demands receiving as well as the capacities for understanding those various and changing citizens', businesses' and other end-users' needs [1, 2]. One of the dominant approaches to these challenges responding involves digital transformation of the public services and their provisions using the new technologies and their advantages [3, 4].

Relying on the commonly agreed policies, strategies and standards [5–8], a type of public services that is noticeably and increasingly transforming in the recent years in the European cities is that related to the spatial planning and construction domain [4, 34]. Similar to digitalization of the other public administration and service domains, digital transformation of this domain has brought the easier access, lower production costs, shorten times for providing services and overall improved quality of services, like issuance of construction permits, location information provision, etc. [4].

However, mainly due to the lack of funds and lack of staff with necessary skills, not all European cities have reached the same status of digital transition related to the digital solutions implementation for the spatial planning and development and construction [4, 9, 10]. Therefore, setting up of the digital plan registers -or databases- and digitalization of the spatial and urban planning process in some European countries have taken place -also or initially- on the national level [10]. In both local and national approaches to the digital transformation, digital plan databases and digital spatial and urban planning procedures and services are reflecting strongly the specifics of countries' planning practices, while creating capabilities for analyzing the quality of spatial and urban plans, and opening possibilities for understanding digital plan data and digital transformation influence on the spatial and urban development policy management in general [4, 9–12].

In order to reap advantages of the new technologies as well as to respond to growing demands for the transparent, streamlined and truly-participatory spatial and urban planning and development domain in Serbia [13], the Ministry for Construction, Transport and Infrastructure (MCTI) [14] has initiated and launched together with partners the Project "Improving spatial planning and development in the Republic of Serbia by establishment of e-Space digital platform", i.e. the e-Space project. The aim of this project is to digitally transform spatial and urban planning and development process in Serbia by building a centralized –national- digital plan database and digitizing planning procedures, which integrated within the e-Space digital platform with the other relevant databases would improve the efficiency and effectiveness of spatial and urban development decision-making and policy management, both on national and local level [15].

Since the initial project activities has just started in March 2021, namely preparation of the project idea document before a pilot launching, the purpose of this article is to present the general concept of e-Space digital platform and approach to its establishment, and to describe this project foreseen results and significance in light of the current spatial and urban planning digital transformation and related services digital transition in the other European countries.

Thus, the article starts with the overview of a current status related to the digitalization of spatial and urban planning domain in Europe. Afterwards, situation and challenges within the spatial and urban planning and development domain in Serbia today are presented, followed by the chapter introducing purpose, main aim and objectives of the e-Space project. Methods and materials used for the project concept determination are described in the Methodology chapter, after which the assumed project activities, outputs and outcomes are presented in the Expected project results chapter. Finally, the article ends with the Conclusions chapter.

2 Digitalization of Plans Data and Related Services in Europe

In order to grasp the proven advantages of new technologies and, thus, increase efficiency of the industries and production in general, the European Union (EU) has been stimulating implementation of the digital solutions and creation of the digitalization benefits for businesses and citizens in Europe by supporting development of the different e-initiatives (like, e-government, e-health, e-transport, etc.), as well as by providing the clear directions, frameworks, incentives and leadership within its strategic documents [3, 4]. As a result, digital interaction between the individuals and public authorities over the Internet via different digital public services, from searching for the right information to usage of the provided administrative procedures, has been increased significantly, particularly in Northern and some parts of Western Europe comparing to the Eastern and Southern parts of Europe. These discrepancies in the digital transition of public services between the European countries, regions and cities are due to the several common reasons or barriers, which are thus impeding the cohesive and sustainable urbanization and urban development in Europe (Fig. 1).

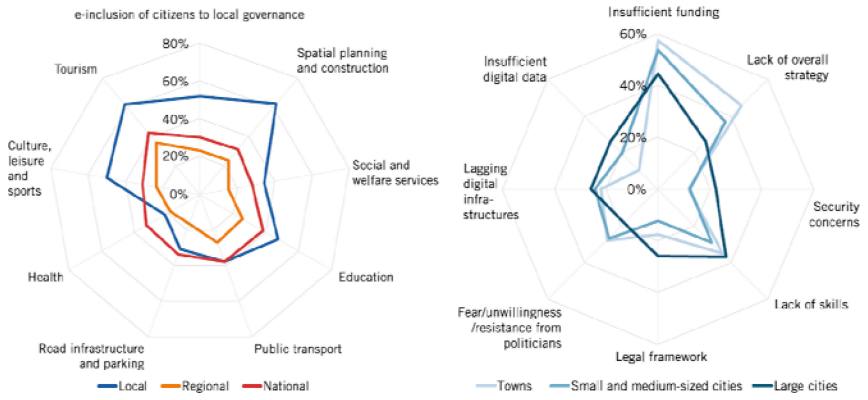
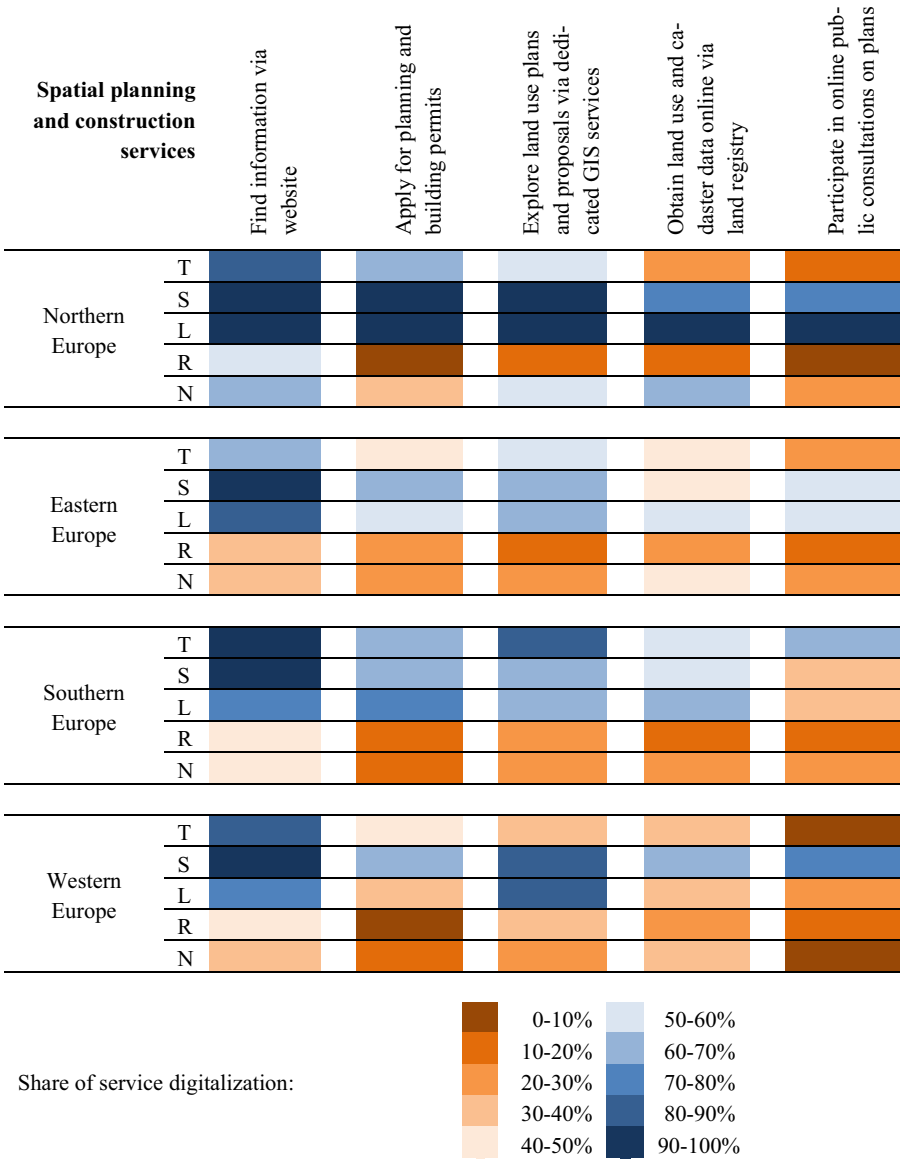


Fig. 1. Share of digitalized public services provided at the local, regional and national levels, by type (left); Factors constraining the digital transition of public services in Europe (right) [4]

Among those commonly provided digital public services by the authorities on different administration levels are those related to the spatial and urban planning and development domain. According to the ESPON survey about the digital transition of cities from

Table 1. Share of digitalized public services related to the spatial planning and construction at the level of towns (T), small and medium-sized cities (S) and large cities (L); at regional level (R) and national level (N) [4]



2017 [4], mentioned digital services were provided mostly on the local levels, where the Northern Europe countries had a higher share of these services provided also on the national level, as observed in Table 1. Among the digital services for spatial and urban

planning and development domain in Europe, services for the online application for construction permits, as well as GIS-based services for accessing the land use information and development proposals, had the high shares. Also, reflecting the existing spatial and urban planning and development practices in different countries, digital public services related to the online public consultations for proposed draft plans as well as public participation in the planning processes in general, have been more advanced in the Northern and Eastern parts of Europe.

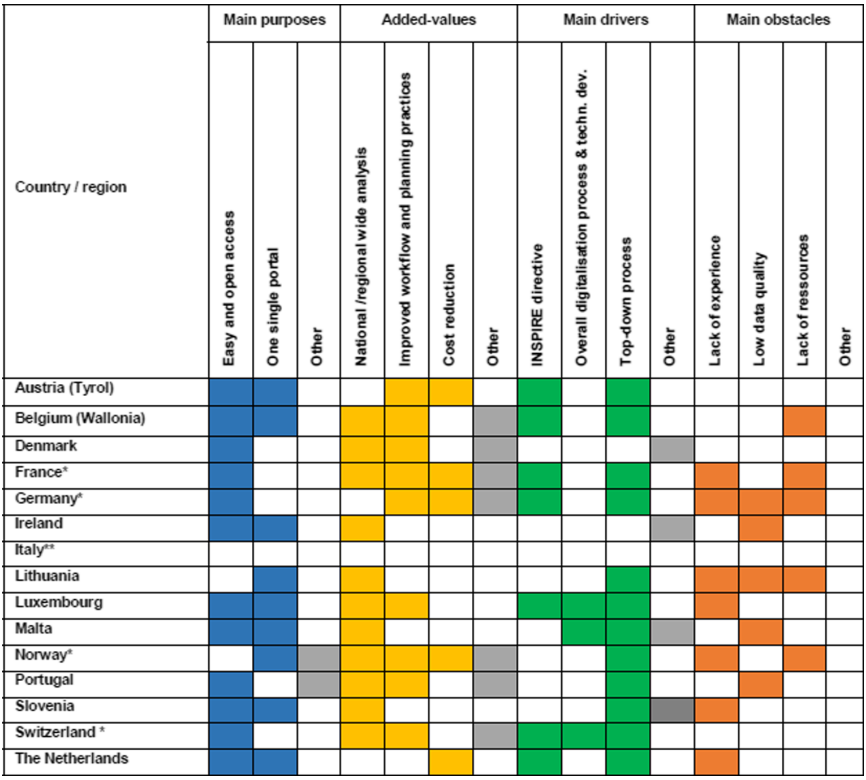


Fig. 2. Overview of the digitalisation process of plan data in 15 cases across Europe [10]

In 2020, the ESPON DIGIPLAN project [10] revealed that digitalization efforts within the spatial and urban planning and development domain in Europe is continuing, while the barriers for digital transition of public services in this domain have still remain prevailingly the same, that is, lack of skills and lack of resources, besides some others, like a low quality of data (Fig. 2). However, despite the identified obstacles, qualitative research about the digitalization of plan data in Europe has stressed some key findings [10]:

– The eagerness of spatial planning actors to provide harmonised and standardised plan data on a digital and open platform from the 2010s onwards;

– An improved workflow and planning practices contributing to cost-reduction;
– Differences in the organisation and publication of digital plan data reflect differences in spatial planning traditions and competences;
– Digital plan data, that have been harmonised and standardised, allows for innovative practises; etc.

Also, in line with the findings related to the need of local level to cooperate and/or look for a support from the national level for digital transition and provision of spatial and urban planning and development services digitally, DIGIPLAN project's interim results emphasize also 1) the national level as one of the main drivers for digitalization of public services, and 2) the centralized -national- digital plan databases role for assessment and improvement of the existing spatial and urban planning practices and plans quality. Further, the interim DIGIPLAN project results confirmed also that the national digital plan databases could provide needed input for a better territorial/land development policy and other sectoral policies creation and management, besides being a valuable tool for spatial analysis performance. Therefore, besides the fact that majority of sustainable land planning and development-oriented activities and services are delivering on the local level, this project highlights the importance of building the national databases for spatial and urban planning and development practice improvement and national-wide sustainable development goals achievement [34].

3 Spatial and Urban Planning Practice and Development Domain Challenges in Serbia

Two decades after the political changes in 2000, and decision of Serbia to set on the path towards European integration, negative legacy of the socialist system within the spatial and urban planning and development domain has been abandoned, but further adaptations towards the contemporary, market-oriented, democratic and transparent spatial and urban planning and land management system need to be completed. These changes should be thus in line with the relevant EU policies and standards and, besides the other things, have to include also requirements for the more integrated urban development [13].

Further, COMPASS report for Serbia [10] stresses a lack of tools for the measurement of plans quality and how successful they are in the implementation, particularly on the local level, as one of issues within the current spatial and urban planning practice in Serbia. Also, the problems include a lack of comprehensive viability study before the plans preparation, as well as a situation when the plans are initiated by the individual investments and not by the strategic development plan for certain area, introducing so-called 'investor urbanism' phenomenon [16]. Other problems identified within the spatial and urban planning and development domain in Serbia include the frequent changes of legal framework and lack of trust in the system; long-lasting issues of informal development; as well as lack of meaningful public dialogue and development stakeholders participation in the early stage of plans preparation.

Regarding digitalization of the spatial and urban plans and planning domain in general, Serbia planning practice is experiencing the same obstacles like the other European countries towards the digital provision of an easy access to plans data and related public

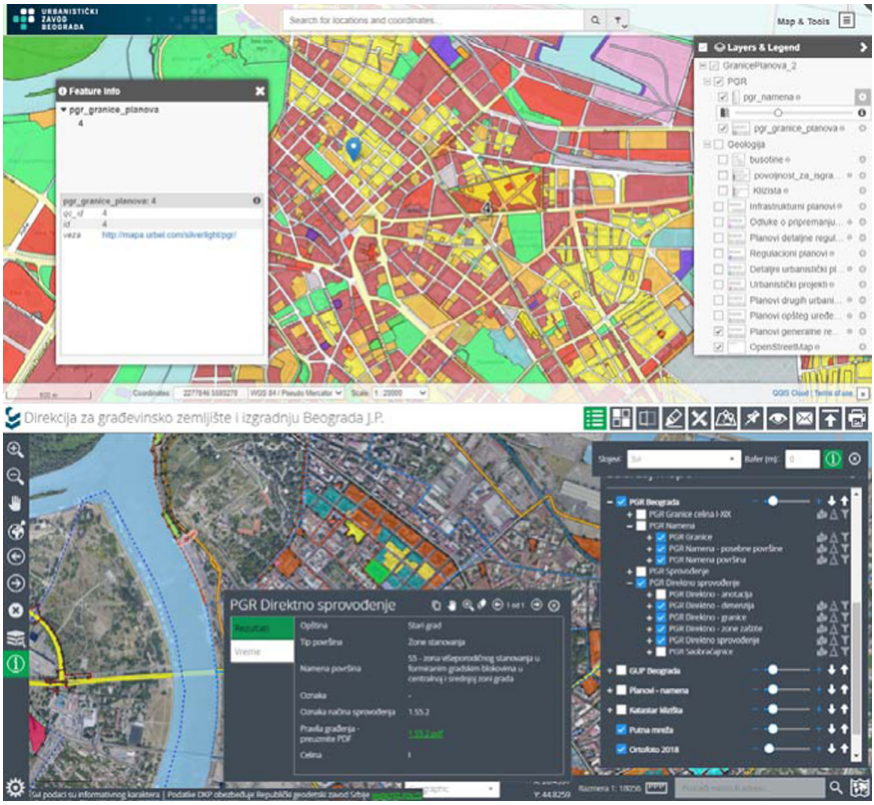


Fig. 3. Access to the urban plans for the City of Belgrade territory is today divided between the two Web GIS platforms with different functions: URBEL for the plans data visualization (up) [19] and BEOLAND for the plans implementation monitoring and urban land development in general (down). [20] These two platforms and their functions would be replaced in future by the e-Space digital platform, as a main national platform for spatial and urban planning

services. Despite the plans are preparing in digital format using the GIS and CAD technologies, plans data generally have low quality, lack standardization and are not open nor easily accessible in vector or digital map formats (.pdf format prevails), both on national and local level (Fig. 3). Also, there is a general lack of staff with the appropriate digital skills and experience, particularly on local level, while the municipalities prevailingly poor still refuse to pool their resources and provide modernized public services in cooperation with the other neighboring cities and municipalities [17]. Finally, related to the need for digital transformation of the spatial and urban planning and development process in Serbia, it should be mentioned that today there are many, sometimes too long, costly and complicated administrative procedures within this domain, which are occasionally hardly applicable in practice and, generally, lack transparency and efficiency required for a timely and informed development decision-making and establishment of an inclusive and participatory planning model.

Therefore, taking into account proven advantages of the new technologies implementation within the other European countries' planning systems and practices [4, 9, 10, 18], planned digital transformation of the spatial and urban planning and development domain in Serbia could directly support changes within the identified 'fields of improvement' [13]:

- The need for stronger market orientation and improved collaboration between public and private sector, as well as protection of the public interest;
- The need for improvement of budget planning;
- The need for better integration of sustainability principles in the formal planning framework; and
- The need for transparent and wide inclusion of all relevant stakeholders in the planning process.

4 Project e-Space: Aim and Objectives

In order to respond to the identified spatial and urban planning and development challenges in Serbia by implementing the proven new technologies' advantages through a digital transformation of this domain, MCTI has launched the Project "Improving spatial planning and development in the Republic of Serbia by establishment of e-Space digital platform", so-called e-Space project [15].

The aim of this Project is to establish the digital platform –named e-Space- as a standardized, reliable and open G2G, G2C and G2B solution for the spatial and urban planning and development process management, based on the relevant international and national data management standards and sustainable development initiatives (like, NUA, Urban Agenda for EU, TA2030, INSPIRE, ESPON, etc.) [15]. In other words, the aim of this Project is a digital transformation of spatial and urban planning and development domain in Serbia, focused on the improvement of its efficiency and effectiveness related to the public decision-making and territorial/land development policy management, both on national and local level (Fig. 4).

Based on the e-Space project aim and scope, the next general objectives have been identified to be reached during the project implementation [15]:

- Development of a national spatial and urban planning data standard, and establishment of the centralized –national- digital plans database;
- Digitalization of the procedures for spatial and urban planning documents preparation/revision, adoption and implementation;
- Establishment of the e-Space digital platform that would include links to the other relevant national databases/registers, development of the advanced geovisualization capabilities and building to the needs adjusted communication tools/channels for the territorial/land development stakeholders;
- Training and building necessary capacities of the spatial and urban planning and development stakeholders; and
- Creating appropriate legal and institutional framework for the Project results sustainability.

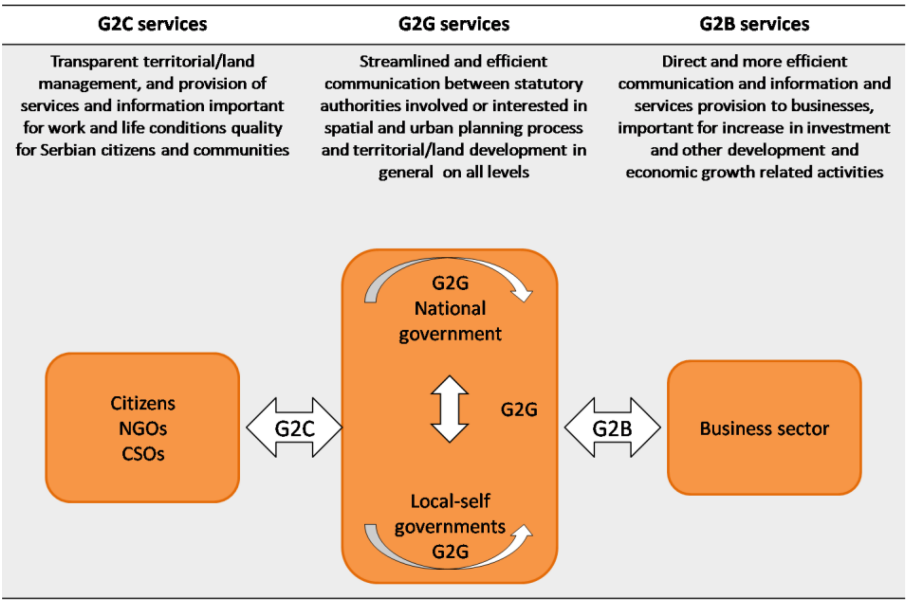


Fig. 4. Project e-Space: expected outcomes

The e-Space project duration is estimated to 3 years (2021–2023), at least for a pilot or initial solution establishment, where the main project partners include: MCTI [14], Republic Geodetic Authority (RGA) [21], National Alliance for Local Economic Development (NALED) [22], Office for information technologies and e-Government (ITE) [23] and, internationally, Lantmäteriet [31] and Swedish International Development Cooperation Agency (SIDA) [32].

5 Methodology

In order to identify a right approach to digital transformation of the spatial and urban planning and development domain in Serbia, and to achieve identified project aim and objectives, MCTI has started from the current challenges within this domain [13, 15, 17]. In parallel, towards creating the appropriate e-Space digital platform concept and solutions for the planned digital transformation, MCTI has analyzed the relevant EU documentation and other materials related to this domain practices and their level of digitalization in the other European countries, trying to identify the common points and best practices valuable for Serbia. This approach has been taken due to Serbia status of the EU candidate country and ongoing negotiation process, on one side, but also due to the confirmed similarity of the European spatial and urban planning systems, which is increasing even more with the digitalization [4, 18, 24].

Although materials related to the digitalization and digital transformation in the spatial and urban planning and development domain are rather scarce (at least in English language), MCTI has based the e-Space digital platform concept and expected project

results on a comprehensive desk study of literature and documentations reading, as well as direct analysis of the digital transformation experiences and results of Sweden and other European countries.

Therefore, approach or methods applied for the e-Space project implementation planning included:

1. Desk research of the INSPIRE Directive and this program related documentations [8], particularly the Annex III Land Use theme specifications and implementation rules [25], which should be adapted and implemented as a national standard for the creation and management of the plan data layer with existing and planned land uses [34]. Also, project partners analyzed the previous national projects and initiatives focused to the land use standardization in line with the INSPIRE requirements [26], as well as current situation and specific needs of the spatial and urban planning and development practice and planning instruments in Serbia [13, 17];
2. Analysis of the best practices presented as a part of the ESPON DIGIPLAN project results [10], which (project) provides a comprehensive insight into the current status of spatial and urban planning practices digitalization level in the several European countries, as well as the overview of a usage of the digital plan data registers today along the ambitions for future;
3. Desk research targeted at collecting data through a direct experience with the already established or developing relevant digital platforms, databases/registers and other e-initiatives in the public sector internationally [10] and in Serbia, like e-Permit [27], e-Government [28], Central Register of Planning Documents (CRPD) [29], and particularly NSDI initiative and its geoportal GeoSerbia [30], and other related Web sites, geoportals and platforms; and
4. Finally, application of a thematic workshop method with Swedish partners [31, 32] for learning about the Swedish national digital platform for a territorial/land development (https://www.lantmateriet.se/en/webb/smartare-samhallsbyggnadsprocess/) and sharing of lessons learnt from this platform establishment.

Finally, since digital transformation includes the various changes and adaptations of an existing system to the selected new technologies solution, the e-Space project planning has assumed necessary socio-technical approach to the spatial and urban planning and development domain transformation in Serbia. This approach should secure optimal usage of the e-Space digital platform and its operating framework from the very beginning; it should provide necessary scalability of the solution needed for its national and local level setting up; and, finally, it should deliver project results that would ensure e-Space digital platform sustainability in the future.

6 Expected Project Results

Based on the project aim, objectives and applied methodology, validation criteria for the e-Space project results have been focused on 1) providing online accessibility and increased quality of the spatial and urban plans data, 2) more economical, participatory, transparent and inclusive spatial and urban planning and development process in Serbia,

as well as 3) enabling sustainable growth and increasing economic activities, both on national and local level [36].

Therefore, the main output of this project, i.e. e-Space digital platform, must include in one place –centralized- all spatial and urban plans in Serbia, and be able to provide on-demand comprehensive information on the existing and planned territorial/land development proposals, potentials and/or limitations on any area or location, to all development stakeholders and interested parties. Also, this assumes that e-Space digital platform should incorporate the relevant digital processes which would support transparency, communication, participation and, particularly, online cooperation between the responsible statutory authorities and other development stakeholders, enforcing thus the national and local development rules and procedures faster, less costly and more accurate (like, issuing of construction permit).

In next three headlines, expected project results and their outcomes are generally presented.

6.1 Centralized Digital Plans Database

In order to overcome identified problems of the spatial and urban plans and planning process in general in Serbia, MCTI has defined the creation of centralized –national- database with the spatial and urban plans digital data as the first activity and result of the e-Space project. Creation of this national digital plans database, which would be a core element and starting point for the e-Space digital platform establishment, would require several outputs to be created:

- National land use dataset specification in accordance with the INSPIRE standards and specific needs of Serbia;
- Spatial and urban plans standardized data and metadata models for the national database creation;
- Off-line templates –i.e. distributed database- for spatial and urban plans data collection and conversion to a standardized data model; and
- Web-based application for spatial and urban plans digital data verification and uploading into the national database.

Results created in this first activity of the e-Space project would allow simple and efficient preparation/revision of the plans, by using the templates with already defined standard land uses and data for each type of the spatial and urban plans; after which the digital plans data quality would be easily verified before they are uploaded into the centralized database. This approach is important for overcoming the identified challenges related to the preparation and management of digital plans data in Serbia, especially the lack of skilled staff and financial resources on the local level.

Besides establishment of the e-Space digital platform, as the major future tool for territorial/land development domain in Serbia, this new national database for digital plans would be an initial element for establishment of both national and local ISs for spatial and urban planning and development (Fig. 5), as prescribed by the Law on Planning and Construction [33]. Compared to the e-Space digital platform that would be oriented towards communication, public services and information provision, the role of these ISs

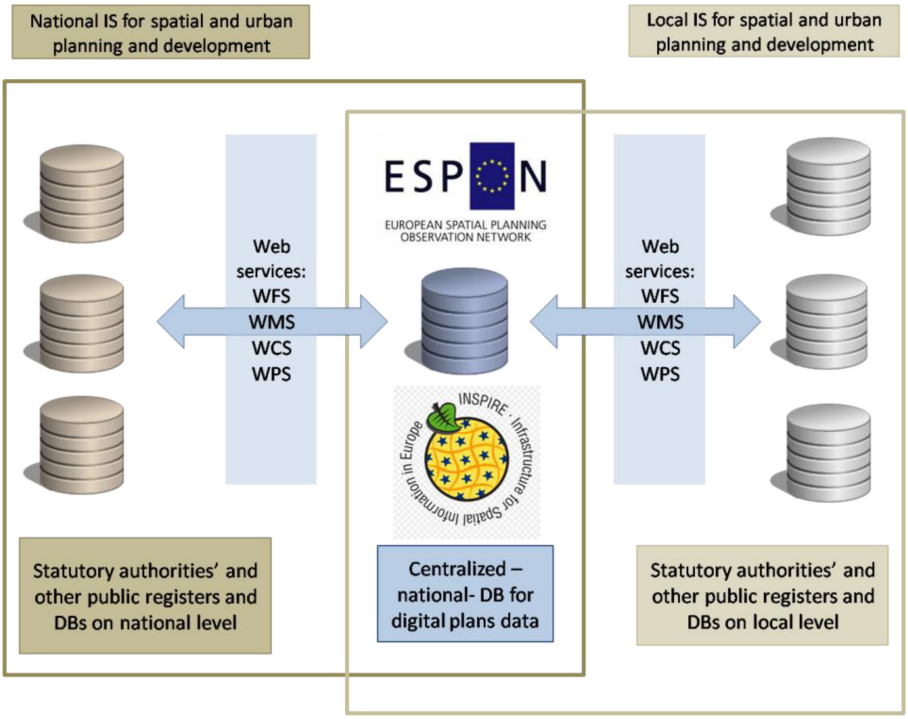


Fig. 5. Centralized digital plans database would be also a basis for national and local information systems (ISs) for spatial and urban planning and development establishment

would be focused on the strategic decision-making as well as planning methodology and plans quality improvement for a better integration of sustainability principles (through different spatial analysis, scenarios development and testing, etc.).

6.2 E-Space Digital Platform

After creating the centralized digital plans database, the next step towards establishment of the e-Space digital platform would include 1) linking this national database with the other relevant databases and registers within the NSDI initiative, and 2) development of a geovisualization application and its integration with the other digital procedures or functionalities that would support and improve the spatial and urban planning and development process and practice in Serbia. Expected functionalities of the e-Space digital platform would include the building of next outputs:

- Web-based module for collecting data and information on the development conditions from the relevant statutory authorities (national and local ones);
- Connection with the national distribution information system for NSDI – Geosrbija 2.0;
- Development of authentication and authorization module with the different user roles for each digital platform functionality;

– Web-based module for e-participation during the early public hearing and the public hearing of draft plans;
– Web-based user interface(s) for services provision and communication between those responsible for the spatial and urban planning and development and 1) relevant statutory authorities and administrations (G2G), 2) private sector or businesses (G2B), and 3) citizens and local communities (G2C) (Fig. 4); and
– Web-based application for the construction permit applications submission and procedure tracking (e-Permit).

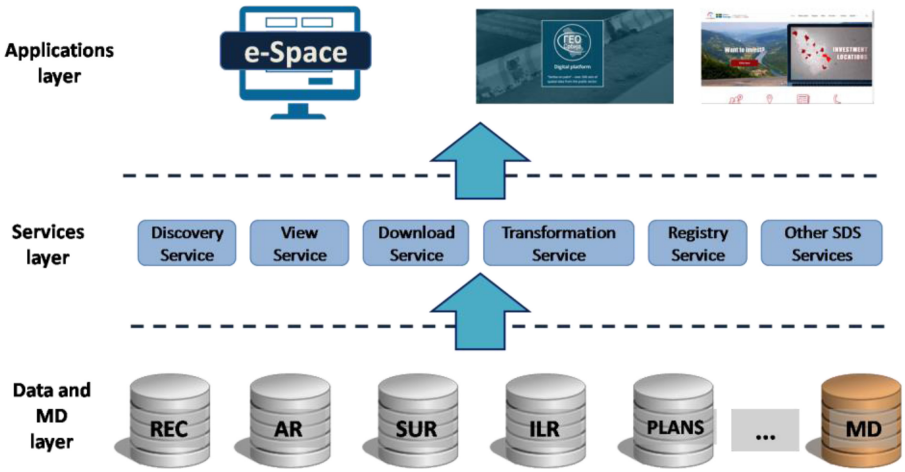


Fig. 6. E-Space digital platform as part of the Serbian NSDI initiative: national plans database would be linked to the other national databases and registers, like real estate cadastre (REC), address register (AR), spatial units register (SUR), investment location register (ILR), etc.

Planned to be developed as a part of the NSDI initiate in Serbia (Fig. 6), digital platform e-Space would rely on this initiative's evolving standards and resources (people, data, services, technologies, procedures, agreements, etc.), and use them for overcoming the previously already identified lack of skills and financial resources within the spatial and urban planning and development domain, particularly on the local level.

In other words, the centralized digital plans database (6.1) along the e-Space digital platform would help in overcoming the general digitalization gap or operations incompatibility between the national and local administrations (top-down), where situation in the other European countries is mainly characterized by building the national plans databases and portals using the bottom-up approach.

Also, comparing to the similar initiatives in Europe, the e-Space digital platform has also ambitious to provide functionalities that are usual for the spatial and urban planning digital portals (like communication, visualization, participation, public hearing, etc.), but also to provide the construction permit service point on one place, i.e. on e-Space digital platform.

6.3 Legal and Organizational Frameworks and Capacity Building for e-Space

Following the emphasized socio-technical approach to the digital transformation of spatial and urban planning and development domain in Serbia, three other project activities would be run in parallel to the previously described expected project results related to the technical solution development (6.1 and 6.2). These three activities would support the technical solution optimal functioning and project results sustainability in future, and they include:

- Legal framework – as part of this activity, the Law on Planning and Construction and its bylaws would be amended to reflect changes introduced by the centralized digital plans database and e-Space digital platform. Also, this new national database and e-Space digital platform solution would be implemented and managed by a separate bylaw that would be based on the knowledge created during the project implementation;
- Organizational framework – assumes establishment of the relevant legal entities structure with their roles, which would delegate clear responsibilities and ownership over data and procedures within the digitally transformed spatial and urban planning and development system in Serbia; and
- Capacity building – activity would include development of the various manuals and other technical documentations for the e-Space model and its components, as well as a number of promotional and capacity building events, directed to the knowledge and skills development of all planning and development stakeholders in Serbia.

7 Conclusions

The main aim of here presented the e-Space project is digital transformation of the spatial and urban planning and development domain in Serbia and establishment of the e-Space digital platform, directed at improvement of the efficiency and effectiveness of public decision-making and management of territorial/land development policy, both on national and local level. This digital transformation will include first standardization and digitalization of the urban and spatial plans and related planning procedures, and then establishment of the e-Space digital platform. The basic structural element of the e-Space digital platform will be thus a newly built national digital plans database, which linked with the other digital databases/registers and supported by the digital procedures and services within the NSDI as well as e-Government and other initiatives in Serbia, would ensure on-line communication and exchange of data and information between statutory authorities, business sector and citizens via e-Space digital platform. Besides these direct results, it is expected that this recently launched 3-year Project will enhance also the quality of planning practice and planning documents in general, creating conditions for overcoming the existing inefficiencies and non-transparency of existing planning process and provision of services for the sustainable territorial/land development and management in Serbia. Additionally, the Project will reduce the number of days and costs for obtaining location requirements and construction permits, which will lead to a better position of the Republic of Serbia on the Doing Business list of the World Bank as well [35].

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