



REPUBLICGEODETICAUTHORITY

STRATEGIC ACTION PLAN FOR THE NATIONAL SPATIAL DATA INFRASTRUCTURE OF THE REPUBLIC OF SERBIA

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Disclaimer

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EXECUTIVE SUMMARY

This Document presents Strategic Action Plan for National Spatial Data Infrastructure of the Republic of Serbia which will allow it to further implement the Serbian NSDI, which is aligned with the UN Integrated Geospatial Information Framework and EU INSPIRE Directive (NSDI Strategic Action Plan). The comprehensive plan consists of vision and mission statements, defined goals, a series of key actions points, with associated key performance indicators, and an implementation plan and risk management plan.

The vision for the further implementation of the Serbian National SDI is formulated as follows: To establish a value-based “SMART NSDI” that strongly facilitates the access, sharing and use of geospatial data and services, responds to the current and future stakeholders needs for geospatial information, enables application of the most relevant modern solutions, and strengthens the national/regional cooperation and economic development, and enhanced quality living conditions.

The mission for the further implementation of the Serbian NSDI is to implement a modern, advanced, well-equipped, financially stable and sustainable NSDI. To achieve this, it is necessary to conduct a series of measures, actions, and to have a predefined carrier of such actions. Through a re-established national geospatial data centre, integrated and interoperable geospatial data will be developed and used, innovative technologies will be created and enhanced, strongly promoting the usage of geospatial information. Alignment, standardization and harmonization efforts will ensure sound implementation and frameworks necessary for the functioning of the NSDI.

The goals for the NSDI are based on the vision and mission and present the cornerstone for the development of key action points for achieving set goals. There is one main goal defined, followed by five sub-goals by which the main goal shall be achieved.

The main goal is to *‘Implement a modern, advanced, well-equipped, financially stable and sustainable NSDI and re-establish the National Geospatial Data Centre, mandated for dealing with all NSDI related issues in order to create a value-based “SMART NSDI”.’*

There are five sub-goals, and are defined as follows:

‘Strengthen NSDI governing bodies and partnerships through increased institutionalization, co-creation and collaboration among all sectors and an improved governance model, supported with adequate policy documents adopted by the Government.’

‘Improve NSDI financing model, structure and opportunities and achieve alignment of the NSDI legal framework with international regulations, policies and global agendas and develop licensing and pricing policies.’

‘Invest in improvement and promotion of geospatial data integration, usage and management for decision making, economic development, innovation purposes and development of new information systems.’

‘Enhance geospatial data standards conformance, interoperability, harmonization and security while avoiding and removing data, software and service duplication.’

'Build capacities for all relevant NSDI actors and stakeholders, on all levels, invest in formal education for acquiring necessary knowledge and skills and develop communication and engagement on the NSDI level.'

The Action Plan presents Key Action Points (KAP) to achieve the defined vision, mission and goals in accordance with the nine NSDI Strategic Pathways of the UN-GGIM IGIF (Governance & Institutions, Policy & Legal, Financial, Data, Innovations, Standards, Partnerships, Capacity & Education, and Communication & Engagement). Each of the identified KAPs includes a General Recommendation, Current Action(s), Future Action(s), and a set of relevant Key Performance Indicators (KPI).

Through the Implementation Plan (IP), a timeframe and financial framework are provided for each KAP defined within the Action Plan, prioritized based on importance and relevance for the NSDI, and grouped according to the nine NSDI Strategic Pathways of the UN-GGIM IGIF. The financial framework provides information regarding total amount of investment needed for each KAP and planned funding source for each respective KAP. Investments can also be capital, recurrent or both, which is also defined within the IP. The timeframe is laid out as a Gantt Chart, covering a 5-year period, and provides information on the duration and period foreseen for each KAP.

The developed Risk Management Plan (RMP) contains a thorough risk analysis providing a precise mitigation strategy, dealing both pre-emptively and in a mitigating way towards risk probability and impact. RMP contains a total of 21 key risks, two key risks identified per each of the pathways and KAPs defined within, while three additional key risks are defined, which are directly related to the NSDI in the broadest sense. Most identified key risks are in the "Significant" level of effect while only one "Critical" level risk has been identified and two "Tolerable" risks on the contrary. Two critical risks were identified and they relate to obstacles in re-establishing the National Geospatial Data Centre and to issues in building, improving and maintaining capacities in all NSDI Actors and Stakeholders. Following the critical risks, few significant risks border the critical level and they are related to negative shifts in governmental policies and lack of interest or involvement of NSDI Actors and Stakeholders regarding the NSDI implementation and prioritization. Such risks are also risks relating to issues causing data duplication and software/service purchase and lack and issues regarding new e-conveyancing/distribution systems of geospatial data for innovation purposes.

The Action Plan, Implementation Plan and Risk Management Plan shall jointly form the core of the future NSDI Strategy. With the core defined, the NSDI Strategy can enter the legal procedure of drafting and adopting policies by the Parliament of the Republic of Serbia. Other parts of this NSDI Strategic Action Plan, as well as previous deliverables developed within the Study of the Socio-Economic Benefits Study of National Spatial Data Infrastructure Impact on the Society in the Republic of Serbia, shall be utilized as well in the future drafting of the NSDI Strategy pursuant to the Serbian legislation.

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1 INTRODUCTION

This Strategic Action Plan for the National Spatial Data Infrastructure (NSDI Strategic Action Plan) of the Republic of Serbia is the follow-up of the Geospatial Alignment Report (GSA Report) and the Report on the Socio-Economic Benefits Study of the Serbian NSDI (Benefits Study Report). The NSDI Strategic Action Plan is strongly aligned with the Integrated Geospatial Information Framework of the United Nations and INSPIRE Directive of the European Union. The Action Plan includes KAPs for each of the nine IGIF strategic pathways (Pathways) and KPIs. In addition, it also includes key risks and risks mitigation measures as well as an investment plan. This Plan forms the foundation for the Strategy report dealing with the further implementation of the NSDI.

1.1 Context

1.1.1 Structure

The structure of the NSDI Strategic Action Plan is broken into 5 chapters.

The first introductory chapter presents multiple topics that provide a contextual backstory to the development of the AP, trying to answer the question why the Republic of Serbia is developing an NSDI action plan. In addition, it presents the current state-of-play of the Serbian NSDI. As such, the content of this chapter forms an excellent starting point for defining the vision, objectives and allocating actions for the future implementation of the NSDI.

The current state of NSDI in Serbia is provided, through a baseline assessment of Global Spatial Data Infrastructure Diagnostic Tool (NSDI Diagnostic Tool) previously piloted in Serbia followed by a brief overview of the alignment to the current policy drivers and identified socio-economic benefits of the NSDI in the Republic of Serbia. As such, links are made with the GSA Report, the Benefits Study Report and this Strategic Action Plan.

The second chapter lays out the aimed Vision of the further implementation of the NSDI of the Republic of Serbia jointly with key objectives. In order to achieve the stated vision and its objectives, KAPS are presented that need to be undertaken which are presented in detail in following chapter.

Chapter 3 is the core of this NSDI Strategic Action Plan and is the foundation for the further implementation of the Serbian NSDI. KAPs are identified and defined for each of the nine Pathways. Each KAP includes descriptions about the General Recommendation, presentations of the Current Action, Future Action and KPIs.

Chapter 4 includes the Implementation Plan and Risk Management Plan. These Plans include the nature of the expenditure and timescales for each KAP and do also refer to the main associated risks, risks mitigation measures and an investment plan.

In the final chapter 5, the main conclusions of the NSDI Strategic Action Plan are presented. The conclusions form the foundation for the NSDI Strategy and define the key steps for the further implementation of the Serbian NSDI.

1.1.2 Methodology

In its largest part, the methodology used for drafting this Strategic NSDI Action Plan was based on the IGIF proposed methodology for developing the document. Certain adaptations were made, however, still relying to the tools proposed to be used.

For the purposes of conducting an initial baseline assessment, the **NSDI Diagnostic Tool** as single integrated tool was used. The use of this tool provides an assessment of the “as is” position of geospatial information and spatial infrastructure in the country including policy, financial, human capacity and technical perspectives. The diagnostic tool was applied for assessing the NSDI status in 2017 as well as 2019.

For the purposes of building a prioritized, cost-justified roadmap for the Serbian NSDI, three analytical tools are used as proposed by the IGIF guidelines. These tools are the NSDI GSA Report tool, the NSDI Benefits Study Report tool and the NSDI Actions Development tool. The three tools are used to construct an impact assessment and the core part of the NSDI Strategic Action Plan which is the chapter 3, Action Plan. The **NSDI GSA Report tool** is used to relate Government’s strategic objectives and international commitments to specific spatial use cases and prioritize them based on how they support and accelerate achieving these objectives. This tool was fully applied for the Serbian NSDI in November 2020. The **NSDI Benefits Study Report tool** delivers an assessment of the economic business case for investment in SDI from both qualitative and quantitative perspectives. It was fully applied for the Serbian NSDI in February 2021 mainly based on the outputs of the two tools outlined above. The **NSDI Actions Development tool** builds on the previous deliverables to create a sustainable roadmap for NSDI, presented as a series of interdependent policy interventions and implementation projects. This report is the output from this analytical tool. The NSDI Strategic Action Plan in combination with the analytical deliverables will form the basis for the NSDI Strategy. After the Strategy is approved, the work will commence to identify sources of funding, commencing the further implementation of the NSDI itself. Individual actions will also need to be specified in greater detail to support the implementation.

1.2 Current State-of-Play in the Republic of Serbia

1.2.1 Baseline Assessment

In 2017, a joint World Bank and FAO team, actively supported through involvement of the RGA, piloted the NSDI Diagnostic Tool in Serbia.

The scoring was done for eight particular fields:

- Policy & Strategy score: 75
- Governance Arrangements score: 86
- Legal score: 71
- Accessibility & Technical Infrastructure score: 95
- Socio-Economic Impact score: 20
- Capacity Development score: 50
- Use of NSDI score: 38
- Data:
- Core Data 1 Score: 89
- Core Data 2 Score: 70
- Overall Score score=**64**

In 2019 an assessment of the “as is” position of geospatial information and spatial infrastructure in Serbia was done by using a refined and upgraded version of the NSDI Diagnostic Tool. The scoring is done in accordance with the framework of the nine Pathways:

- Governance score: 100
- Policy & Legal score=90
- Financial score=71
- Data score=91
- Innovation score=75
- Standards score=75
- Partnerships score=80
- Capacity & Education score=81
- Communication & Engagement score=81
- Overall Score score=**83**

Comparing the results from these two scorings (2017 and 2019) we conclude that the Serbian SDI has improved over the years and has further developed strengths, but has also certain weaknesses remaining which should be targeted in order to maximize the possibility of achieving the full benefits of NSDI.

Strengths:

The Republic of Serbia continuously makes significant progress in the field of NSDI leadership and attains strong government mechanisms and political endorsement. Moreover, it has consistent institutional mandates and an established cooperative data sharing environment through a common understanding of the value of geospatial information by emphasizing the role and responsibilities of the NSDI Actors and Stakeholders for achieving effective NSDI.

The Republic of Serbia almost finished full legal transposition of the EU INSPIRE Directive and its implementing rules. The NSDI links with the Open Data policy and e-Government policies and aims to implement a modern concept of NSDI platform for data distribution via a new, updated and modernized national geoportal. Relevant laws and policies in force allow for the application of new technologies and enable innovative and creative use of geospatial information and services. Stakeholders in Serbia, which strongly rely on geospatial data and services, have a high level of awareness regarding the strengths of using NSDI. Key data supply chains have been established for acquiring, integrating and publishing geospatial information allowing data custodians to provide access to their datasets via NSDI. Finally, core datasets are widely available forming the basis that NSDI is well used.

Weaknesses:

The main weakness of the Serbian NSDI is related to no long-term and sustainable NSDI funding, therefore continuous financial support needs to be acquired for achieving a sustainable implementation of NSDI and its practices. The necessary financial support needs to be justified by better understanding the value proposition of the NSDI.

Although significant progress in the field of NSDI leadership has been made, NSDI leadership still has space for further improvement. Therefore, additional effort is needed to further strengthen NSDI leadership in order to actively engage and promote NSDI management with collaborative, multi-stakeholders' approaches between the public, private, academia and NGO sector.

Finally, administrative and institutional capacity building is still desperately needed among NSDI Actors and Stakeholders as well as the stakeholders' commitment to achieve better interoperability based on INSPIRE implementation rules and open data standards.

1.2.2 Strategic Alignment to Policy Drivers

The analytical tool GSA Report was fully applied in November 2020. The associated report identifies the Serbian Government's key priorities regarding the implementation of the current and future NSDI based on an extensive review of geospatially related key policy documents and relevant international commitments.

The key Policy Drivers¹ regarding the implementation of the Serbian NSDI refers to National Development Agenda, National Strategic Priorities, National Transformation/Reform Programmes,

¹ Terms such as key Policy Driver, key Thematic Policy Area, key Economic Sector and key NSDI Actor and Stakeholder are to be interpreted as they are defined within the GSA Report.

Trading/Economy, European Union (EU) accession process, Disaster Risk reduction, Environment / Climate Change, Innovation and Community expectations. Each of these key Policy Drivers is described in detail in the GSA Report.

These policy drivers further refer to the following key Thematic Policy Areas: Economic & Financial Affairs, Public Administration Reform & e-Government, Spatial Development, Safety, Agriculture, Environment, Transport & Energy, Health, and Tourism & Culture. Each of these key Thematic Policy Areas are described in detail and linked with the identified key Policy Drivers.

In addition, the Study also identified the key Economic Sectors that play a key role in the implementation of key Thematic Policy Areas in which the Serbian NSDI is used, those being: Agricultural Productivity, Construction & Urban Planning, ICT & Telecommunications, Banking & Insurance, Energy & Mining, Transportation, Real Estate Business, Tourism, Health Care, Education, Environmental Management and Public Safety & Security. A miscellaneous economic sector was also identified covering multiple key Thematic Policy Areas.

The results show that numerous policy documents and international commitments can be relevant for the implementation of NSDI. The results also indicate a wide range of key Thematic Policy Areas (and associated economic sectors) that could benefit from a strong NSDI. At the end, the results also illustrate that numerous actors and stakeholders do have the potential to strongly benefit from NSDI implementation.

1.2.3 NSDI Socio-economic Benefits Assessment

The Study aimed to identify the current and future situation of the NSDI from the perspective of the key NSDI Actors and Stakeholders by studying the Socio-Economic Benefits Study of National Spatial Data Infrastructure Impact on the Society in the Republic of Serbia. Through the combination of a successful online survey with additional interviews, it was possible to identify the socio-economic benefits of the Serbian NSDI.

Despite that there is no full consensus about the meaning of NSDI, the socio-economic benefits of the Serbian NSDI are manifold and applicable in multiple thematic policy areas. The key Thematic Policy Areas in which NSDI data and services are applied refer to environment and spatial development. Areas such as agriculture, public administration reform & e-government, tourism & culture and transport & energy also appear as important thematic policy areas for which the NSDI resources are used. This all indicates that the current Serbian NSDI facilitates a wide range of relevant thematic policy areas.

Experienced organizational as well as societal NSDI benefits of the current Serbian NSDI were identified. Improved data quality, meeting the legal requirements and increased efficiency are considered as the key organizational NSDI benefits. The natures of these benefits strongly refer to workflows efficiencies, time savings and expenditure reductions. It was possible to present several benefits in quantitative terms in multiple policy areas, however, it appeared to be impossible to scale up these benefits to a higher level due to the different contextual settings. Cost and time savings are

considered as the key societal NSDI benefits, but process simplifications and higher transparency are also considered as important societal benefits from the surveyed organizations' perspective.

In addition, organizational as well as societal NSDI benefits of the future Serbian NSDI were identified. These future NSDI benefits appear to be rather similar as the ones identified for the current NSDI. Besides customer satisfaction and risk reduction, the main organizational NSDI benefits for the future NSDI are improved data quality, increased efficiency and meeting the legal requirements. Cost and time savings and process simplifications are considered as the key societal benefits of the future NSDI. These results indicate that the NSDI Actors and Stakeholders are still not fully aware of the numerous opportunities that the Serbian NSDI could bring.

The further development of the current Serbian NSDI has a cost price. However, the associated costs are not heavily experienced by the NSDI Actors and Stakeholders as they mainly see the benefits. Aligned with other international NSDI studies, this strongly indicates that the NSDI benefits are (significantly) higher than the costs. The NSDI costs mainly refer to human capacity, software licenses and additional datasets. Concerning is that the costs are mainly covered by the state budget and that there are very limited financing alternatives for covering the costs. This indicates that the Serbian NSDI heavily relies on the support of the Serbian state.

This report also aimed to identify the benefits made from the recent investments made in the context of NSDI. Digital cadastral data and acquisition of satellite imagery appear to be the most experienced investments. Other relevant investments refer to the improved buildings register, improved address register, and the mobile application of cadastral data.

The study also focused on the NSDI benefits in regard to EU Accession requirements. These benefits appear to be more societal than organizational in nature, and beneficial for meeting the legal requirements, (disaster) risk reduction, developing effective decisions and policies, process simplifications and (public) transparency. All these benefits could positively contribute to the fulfilling of the EU Accession requirements. In addition, the recent investments in digital cadastral data, satellite imagery, buildings and addresses data do also positively contribute to achieve the EU Accession requirements. Finally, it appears that NSDI have (still) limited impact on the climate change adaptation and mitigation.

As a preparation for the NSDI Strategic Action Plan, the results of this socio-economic benefits study showed that Serbian NSDI could be better exploited in relevant decision making processes for a wide range of thematic policy areas and enhance the economic development. In addition, the NSDI resources are still limitedly applied for innovative purposes. Finally, it would be welcomed to strengthen partnerships between the NSDI Actors and Stakeholders from the different sectors, and strengthen the building of relevant human capacity.

2 VISION

2.1 Vision and Mission Statement

These terms are often used by organisations to provide a description of what they aspire to achieve in the mid to long-term future. Goals and objectives are sometimes summarised into a mission statement and/or a vision statement. Other organisations begin with a vision and mission and use them to formulate goals and objectives. All of these aspects then should therefore be considered together. Regarding the further implementation, the Serbian NSDI should be considered alongside the Goals.

A vision describes a view of the perfect situation that might eventually be achieved “in an ideal world” whereas the mission more describes the day-to-day activities and processes needed to achieve the vision. A Vision statement defines the purpose or broad goal and can remain the same for decades if well designed. The mission statement should guide the actions of the organisation(s), spell out the overall goal, provide a sense of direction, and guide decision-making. It provides the framework or context within which strategies are formulated.

The concepts are used in the case of National Spatial Data Infrastructures (NSDIs) to describe an ideal scenario in the future (vision), and the practical measures that have to be taken to get to that situation (mission). As with a business it is essential to have a clear idea of the vision of where we are trying to get to, as well as a clear understanding of the measures that need to be taken to get there.

Vision:

The vision for the Serbian National SDI is formulated as follows:

‘To establish a value-based “SMART NSDI” that strongly facilitates the access, sharing and use of geospatial data and services, responds to the current and future stakeholders needs for geospatial information, enables to apply the most relevant modern (smart) solutions, strengthens the national/regional cooperation and economic development, and enhanced quality of living conditions.’

Mission:

The mission of the Serbian National SDI is formulated as follows:

‘To implement a modern, advanced, well-equipped, financially stable and sustainable NSDI. To achieve this, it is necessary to conduct a series of measures, actions, and to have a predefined carrier of such actions. Through a re-established Centre for Geospatial Data Management, integrated and interoperable geospatial data will be developed and used, innovative technologies will be created and enhanced, strongly promoting the usage of geospatial information. Alignment, standardization and harmonization efforts will ensure sound implementation and frameworks necessary for the functioning of the NSDI.’

2.2 Goals

In order to achieve the defined vision and mission statements as presented above, a main goal for the further implementation of the Serbian NSDI is defined. The main goal is complemented by sub-goals and together they represent the future, desired, results which the NSDI Actors and Stakeholders envision, plan and commit to achieve. These goals are defined as follows:

Main goal

'Implement a modern, advanced, well-equipped, financially stable and sustainable NSDI and re-establish the National Geospatial Data Centre, mandated for dealing with all NSDI related issues in order to create a value-based "SMART NSDI".'

The current National Geospatial Data Centre (Centre), which is the central point within the Serbian NSDI, made significant contribution and efforts in the establishing of the NSDI in the Republic of Serbia. It has carried out numerous actions which rank Serbia rather high in the global SDI scene. However, the Centre faces numerous limitations and issues which are necessary to solve and remove. Apart from the mentioned, the current model of the NSDI in Serbia is limiting in further development and progress. In order to fully overcome these issues and gaps, the Centre should be re-established and mandated in dealing with issues within the NSDI related to governance, legal and policy frameworks, financial possibilities, geospatial data creation, usage, e-conveyancing/distribution, maintenance and security, standardization and harmonization, innovation, partnerships, capacity building and education, communication and engagement.

Sub-goals

'Strengthen NSDI governing bodies and partnerships through increased institutionalization, co-creation and collaboration among all sectors and an improved governance model, supported with strong policy documents adopted by the Government.'

A NSDI Council exists, however its performance needs to be improved in order to strengthen institutional mandates and to gain greater political and financial endorsement. Council meetings should be organised more regularly and additional stimulations need to be made to bring members of the NSDI Council to become more committed. In addition, specific working groups should be established for solving specific issues within the NSDI. The existing NSDI governance model should be extended as well, achieved by institutionalizing private companies, academia and NGOs, and by bringing the model to a more trusted governance approach while ensuring higher levels of transparency and building of trust in governmental institutions.

Partnerships and cooperation is established among most NSDI Actors and Stakeholders, however, inner-sectorial and multi-sectorial partnerships and cooperation needs to be further strengthened. Specific attention is needed towards the local self-governments, in order to better facilitate the geospatial demands and needs of the Serbian municipalities. Lastly, the general public has already been included in the Serbian NSDI, however, there is significant room for improvement for promoting their inclusion through crowdsourcing activities.

'Improve NSDI financing model, structure and opportunities and achieve alignment of the NSDI legal framework with international regulations, policies and global agendas and develop licensing and pricing policies.'

It is strongly recommended to establish a financing model and a structure for the NSDI that is complemented with sound licensing and pricing policies. The model should cover a wide range of issues and opportunities relating to management, financing, partnership, policies, resource management, and capacity building. In addition, the NSDI should be capable of dealing with taxation issues as well, bringing significant income and cost reduction to the financial system of Serbia. Since taxation issues are a long-time and expensive issue for the state and its people, it is important to find the first-most approach the solving of these and similar issues to best showcase the benefits of the NSDI and its potential.

It is also important to develop an environment within which a policy of widespread use of geospatial information can be developed and duplication of effort is prevented as well as a reduction of administrative costs is made. This can be achieved through the development of a NSDI Strategy. Additionally, regardless of the existing legal and policy framework, it is important to maintain alignment with, and to follow-up and update, with current and future relevant international regulations/policies and global agendas.

'Invest in improvement and promotion of geospatial data integration, usage and management for decision making, economic development, innovation purposes and development of new information systems.'

Given that the potential of usage of geospatial information for decision making processes and economic development has not been fully reached so far, it is recommended to better exploit geospatial data in relevant decision making processes of the public and/or private sector as well as the overall economic development of the public and/or private sector. This can be achieved through efforts in seeking further opportunities and possibilities regarding the open data concept, and other similar concepts, as well as providing assistance and support to other governmental and local institutions needs to be provided through integration of non-geospatial data with geospatial data.

Geospatial data should stimulate, contribute and provide innovation as it has noticeable impact within innovation processes in the Serbian NSDI. If these innovations would be manifested through practical implementation of ideas and new information systems which result in new geospatial data or services, or improvements in existing geospatial data or services then a significant boost in innovations, and therefore benefits, would be recorded in the Serbian NSDI.

'Enhance geospatial data standards conformance, interoperability, harmonization and security while avoiding and removing data, software and service duplication.'

References to relevant practice standards and compliance mechanisms that enable legal, data, semantic and technical interoperability and continuous investments regarding data interoperability by using EU interoperability efforts as reference need to be made. Harmonization efforts need to be continued regarding the harmonization of geospatial data sets according to relevant international standards as well, and overall sound and standardized security of the whole NSDI needs to be

established and improved. Additionally, standardised procurement policies for geospatial data, software and services needs to be established and usage of open-source software needs to be examined, as an alternative for property-owned/commercial software.

Through such standardization, interoperability and harmonization efforts, numerous issues regarding unnecessary costs, inefficiency of data, loss of trust in the public sector and the NSDI, data collection duplication, software and/or services purchase duplication and incompatibilities, can all be easily removed, mitigated and prevented in the future.

'Build capacities for all relevant NSDI Actors and Stakeholders, on all levels, invest in formal education for acquiring necessary knowledge and skills and develop communication and engagement on the NSDI level.'

Insufficient and/or depraved capacities of numerous public sector entities are yet another long-time and expensive issue which the Serbian Government faces. Financial capacities are the biggest issue the public sector faces, followed by human and technical capacities, which is why it is crucial to make significant contributions to the strengthening of capacity building for all relevant NSDI Actors and Stakeholders. Specific attention is needed towards the local self-governments in this regard, in order to build and strengthen capacities in regard to (N)SDI and GIS developments on the municipal level. Additionally, there are insufficient educational programs for obtaining knowledge and skills necessary for the NSDI, especially for further improvements and modernization efforts of the NSDI. Lastly, a specific strategy focusing on NSDI communication and engagement is lacking as well, currently, these topics are dealt with on an *ad hoc* basis following scattered provisions in the legal framework.

Overcoming these gaps could greatly benefit the NSDI and the public sector. The possibilities would be made broader and progress could be achieved at a faster pace. Attracting other sectors and citizens towards the NSDI is crucial and can be achieved through promoting existing use cases of added value produced by usage of geospatial data and services.

3 ACTION PLAN

In the previous chapter, the vision and mission statements for the further implementation of the Serbian NSDI were set in addition to goals that the NSDI Actors and Stakeholders envision, plan and commit to achieve. This chapter systematically presents Key Action Points (KAPs) to achieve the defined vision, mission and goals in accordance with the nine Pathways of the UN-GGIM IGIF (Governance & Institutions, Policy & Legal, Financial, Data, Innovations, Standards, Partnerships, Capacity & Education, and Communication & Engagement). The identified KAPs are the outcome of the use of the NSDI Diagnostic tool, NSDI GSA Report tool, NSDI Benefits Study Report tool, and NSDI Actions development tool.

Each of the identified KAPs are presented in the following manner:

- **General Recommendation (GR):** A short and generic description of the recommended action contributing to achieve a Goal as stated in the previous chapter 2 – These general recommendations are derived from the Baseline reports, GSA report, NSDI Benefits Study Report in combination with the defined vision and mission statements and objectives.
- **Current Action:** A short description of current actions being undertaken, or having been recently completed, which (partly) achieve the general recommendation goal in a larger or lesser amount. Current actions which are currently being undertaken can easily be considered as future as well as they are continuous activities regardless;
- **Future Action:** Actions which are planned to be undertaken in the future in order to achieve goals defined. These can be either descriptive and general actions or specific actions strictly defined. The future actions would serve as a guiding basis for developing the NSDI Strategy; and
- **Key Performance Indicators (KPI):** Each KAP should contain measurable indicators which shall demonstrate how effectively the KAPs are being implemented by tracking performance of activities which are planned for achieving envisaged goals. Certain KAPs might show difficult to monitor through a KPI, leading to certain KPIs being defined in a more general and broader method.

3.1 Governance and Institutions

The focus of the associated KAPs refer to the goals to strengthen the NSDI governance and institutionalisation.

Significant actions regarding Governance & Institutions Pathway have already been undertaken within the Serbian NSDI resulting with clear governance, strong leadership, institutionalized structure and a rather clear value proposition. KAPs for this pathway aim to additionally strengthen the NSDI Council (KAP G&I1), institutionalize additional sectors (such as the private, academia and NGO sectors) in the NSDI governance model (KAP G&I2), and re-establish the National Geospatial Data Centre in a modernized, advanced, fully equipped and financially stable way (KAP G&I3).

3.1.1 Key Action Point G&I1 – Strengthen the NSDI Council

General Recommendation

The NSDI Council exists and is operational, however its performance needs to be improved in order to strengthen institutional mandates and to gain greater political and financial endorsement. The NSDI Council meetings should be organised on a more regular basis and additional stimulations need to be made to enforce members of the NSDI Council to become more committed. In addition, Working Groups of the NSDI Council should be established for specific professional advanced tasks related to the further implementation of the NSDI allowing that their work can be more effective and better contribute to NSDI Council's activities.

Current Actions

The Directive Specific Implementation Plan for INSPIRE (DSIP) is being developed with the aim to define and allocate roles and responsibilities of INSPIRE stakeholders by:

- Setting milestones and actions of the implementation;
- Organizing NSDI Council meetings; and
- Forming a new NSDI Council based on new or old representatives of council members.

Since all members of the NSDI Council, as NSDI subjects, are simultaneously INSPIRE stakeholders, according to the DSIP, through this action, the NSDI Council members will have their roles and responsibilities defined and allocated.

Future Actions

- Adopting new NSDI Council work rulebook; and
- Establishing specific Working Groups supporting the NSDI Council in various topics.

Key Performance Indicators

- NSDI Council rulebook adopted;
- Organisation of at least two annual NSDI Council meetings held in accordance with adopted rulebook;

- At least one Working Group of the NSDI Council established in accordance with adopted rulebook; and
- Percentage of all NSDI members attending each NSDI Council meeting should be at least 51%.

3.1.2 Key Action Point G&I2 – Institutionalize Private Sector, Academia and NGOs in NSDI Governance model

General Recommendation

Existing NSDI governance model should be extended by institutionalizing private companies, academia and NGOs so that they are included in the overarching NSDI governance model. Such extension contributes to a more trusted governance approach ensuring higher levels of transparency and building of trust in governmental institutions as it is strongly recommended to strengthen the involvement of the academic sector and the private sector in (public) policy development processes and innovation programmes.

Current Actions

- Cooperation agreements and data sharing agreements with some private companies and NGOs exist and are operational. These agreements are based on a bilateral basis; and
- Existing individual cooperation agreements between the RGA and several universities.

Future Actions

- Promoting active participation of the stakeholders from the private sector, academia and NGOs in the NSDI; and
- Incorporate private companies, academia and NGOs in the NSDI governance model through formal and informal mechanisms of participation.

Key Performance Indicators

- Established governance model for NSDI which envisages participation of the private sector, academia and NGOs;
- Participation of private companies, academia and NGOs in the NSDI is regulated through appropriate legal acts; and
- Representatives of private companies, academia and NGOs from at least three key Economic Sectors are institutionally embedded in the NSDI Governance model.

3.1.3 Key Action Point G&I3 – Re-establish the National Geospatial Data Centre

General Recommendation

The existing National Geospatial Data Centre needs to be re-established into a national geospatial data centre, with regional reach, which is institutionalized through an overarching NSDI governance model. Overall improvement of implementation of the NSDI in Serbia, can only be achieved through

a modern, advanced, equipped and financially stable centre. This centre would serve as a managerial body facilitating the NSDI Council, NSDI Working Groups and all NSDI Actors and Stakeholders while also being the carrier of the legal and policy framework of the Serbian NSDI, through certain legislative (proposing and drafting NSDI related legal acts) and monitoring activities. With necessary and sufficient financial stability assured, the centre should create a geospatial environment which would enable all NSDI Actors and Stakeholders to create, maintain and distribute geospatial data in an efficient and standardized way, while simultaneously providing a foundation for innovative activities and incentives. The centre should also be able to assist in strengthening partnerships and cooperation activities of various actors from various economic sectors, bringing them together and stimulating co-creation and other activities of promotional, educational and capacity building nature. This independent centre needs to be borne out of the RGA since the current formal NSDI coordinator is established within the RGA.

Current Action

- A Government Working Group is formed for re-establishing the National Geospatial Data Centre. Representatives of the Government, RGA and representatives of relevant NSDI Actors and Stakeholders are involved in the Working Group as members.

Future Actions

- Defining Terms of Reference (ToR) for successful re-establishment of the National Geospatial Data Centre on the national level for coordinating and managing all issues related to geospatial data management and usage in the public and private sector, serving as the competent authority for monitoring and implementing all key relevant information systems which are of national importance for these purposes; and
- Incorporating the geospatial component in all key relevant information systems of the state within the identified key Economic Sectors.

Key Performance Indicators

- Terms of references are defined setting the basis for re-establishing the National Geospatial Data Centre which deals with issues related to governance & institutionalization; and
- Geospatial component incorporated in crucial state information systems within at least two identified key Economic Sectors.

3.2 Policy and Legal

The focus of the associated KAPs refer to the goals related to strengthen the NSDI legal and policy framework(s).

Significant actions regarding regulatory framework have already been undertaken resulting into a rather strong relevant legal and policy framework (including accountability and data protection issues). However, additional efforts are needed to better align policies with international ones. KAPs for this pathway guide to the adoption of the NSDI Strategy (KAP P&L1), alignment with international policies/regulations in particular with the INSPIRE Directive (KAP P&L2) and United Nation Sustainable Development Goals (1 and 11 especially) (KAP P&L3), and to draft and monitor relevant regulations and policies through a competent national geospatial data centre (KAP P&L4).

3.2.1 Key Action Point P&L1 – Adopt the NSDI Strategy

General Recommendation

In order to further improve the Serbian NSDI, it is important to develop an environment within which a policy of widespread use of geospatial information can be developed and duplication of effort is prevented as well as a reduction of administrative costs is made. The NSDI Strategy should contain references and connections with all relevant and important actions laid out in this Strategic NSDI Action Plan. All this would be conducted in the terms of the further development of e-Government in Serbia. Adoption of a new overarching NSDI Strategy will be the key point for further implementing such an environment for achieving the set goals.

Current Action

- Drafting of a new NSDI Strategy as direct follow-up of this Strategic Action Plan. Part of the strategy shall include KPIs that are formulated in a SMART (Specific, Measurable, Attainable, Relevant and Timely) way.

Future Actions

- Approving the final version of the new NSDI Strategy by the NSDI Council including a monitoring performance mechanism; and
- Collecting official opinions (for commentary and revision) from relevant state authorities necessary for approval by the NSDI Council.

Key Performance Indicators

- Draft of the developed NSDI Strategy;
- Approval of the NSDI Strategy by the NSDI Council; and
- Monitoring of the implementation progress of the NSDI Strategy by the National Geospatial Data Centre is established and conducted.

3.2.2 Key Action Point P&L2 – Align with Relevant International Policies and Regulations

General Recommendation

Regardless of the existing legal and policy framework, it is important to maintain alignment with, and to follow-up and update, with current and future relevant EU and other international regulations/policies (e.g. such as EU Directive on Open Data and PSI, follow-up of EU INSPIRE Directive, EU Data Strategy, and the Tallinn and Berlin Declarations on E-Governance). Firstmost, it is necessary to transpose the relevant INSPIRE Implementing Rules into National legislation which are still absent and remaining to be fully transposed into national legislation.

Current Actions

INSPIRE Directive is almost fully transposed in Serbian legal framework and the Serbian NSDI Law in force provides legal provisions which oblige the RGA, as National Contact Point, to monitor and report INSPIRE Directive implementation and to follow-up on NSDI development and trends on international level, as well as on international policies and regulations which are relevant to the Serbian NSDI.

Other current activities are:

- Drafting of the by-law on the Implementing Rule dealing with Data and Service Interoperability;
- Drafting of the by-law on the Implementing Rule dealing with Network Services;
- Drafting of the by-law on the Implementing Rule dealing with Data Sharing;
- Identifying relevant institutions as the INSPIRE stakeholders; and
- Identifying the relevant INSPIRE stakeholders for each of all the listed INSPIRE Data Themes (except for III.5 Human Health and Safety).

Future Actions

- Draft amended Law on NSDI made;
- Full legal transposition of INSPIRE Directive to be achieved through adoption of absent INSPIRE Implementing Rules;
- Establishing list of INSPIRE stakeholders responsible for each INSPIRE Data Theme (including the defining of the lists of INSPIRE responsible stakeholders for Annexes I – III); and
- Continuation of systematic and regular monitoring and reviewing of relevant international policies/regulations by the National Geospatial Data Centre and informing the NSDI Council about these key developments.

Key Performance Indicators

- Draft of Amendments of the Law on NSDI is drafted and approved by NSDI Council;
- Absent INSPIRE Implementing rules are adopted as by-laws by the Government, previously approved by NSDI Council; and
- INSPIRE stakeholders are identified as responsible relevant institutions and responsible per each listed INSPIRE Data Themes (except for III.5 Human Health and Safety).

3.2.3 Key Action Point P&L3 – Align with United Nation’s Sustainable Developing Goals, with Special Reference to the Formalization of Informal Settlements and Objects

General Recommendation

The Government of the Republic of Serbia makes continuous efforts to achieve alignment with the UN SDGs in as greater measure as possible. The NSDI is a crucial and vital part of the Government’s efforts for achieving this alignment as it can help increase the pace, efficiency and quality of this task. With this in mind, it is crucial to further strengthen the link between the NSDI and the UN SDGs in order for the NSDI to significantly contribute to achieving the SDGs for Serbia. More specifically, efforts need to be made regarding alignment with SDG Target 1.4 and SDG 11, when considering the Policy & Legal Pathway, by increased attention in dealing with the formalization of informal settlements and objects built outside the formal system of laws and regulations ensuring land tenure, legal ownership and safe, resilient structures. Informal objects have been an open issue in the Republic of Serbia for decades, having a major impact to the economy which can be seen through uncollected property taxes, damages and dead capital (estimated 28 Billion EUR of “dead” capital is “locked” with such informal objects which cannot be subject to regulated market conditions).

Current Actions

- Participating on international UN-GGIM events;
- Cooperating with the statistical office of Serbia regarding reporting activities for the purposes of monitoring activities in Serbia which aim to achieve alignment with the UN SDGs;
- Participating as implementation partners in national and international projects with the objective to contribute to a better alignment of the NSDI with UN SDGs;
- Enforcing the Law on Legalization of Objects;
- Registry of objects exists and access is enabled to Local Self-Governments (LSG), which is utilized in the process of formalization of informal objects; and
- Cooperating with competent authorities (LSGs, companies dealing with surveying and geodetic work, RGA – Cadastres, Ministry of Construction, Transport and Infrastructure) dealing with the formalization procedure.

Future Actions

- Making reference to the SDGs in the NSDI Strategy (Clarifying the topics as well as the approaches how the NSDI could contribute to Serbia's SDGs achievements);
- Promotion of influence of NSDI for the successful implementation of projects in Serbia which aim to align to the UN SDGs;
- Further enhancing collaboration with Statistics Office to strengthen the link;
- Making reference in the NSDI Communications Plan;
- Enhance usage of Registry of objects for remaining LSGs which do not use the registry;
- Drafting of Amendments of the Law on Legalization of Objects; and
- Developing technical solutions for formalization in accordance with UNECE regulations.

Key Performance Indicators

- SDG reference made in NSDI Strategy;
- SDG reference made in NSDI Communications and Engagement Plans;
- Increased number of LSGs using Registry of objects;
- Draft of Amendments of the Law on Legalization of Objects is drafted; and
- Development of technical solutions aligned with UNECE regulations in relevant field.

3.2.4 Key Action Point P&L4 – Draft and Monitor Relevant Policies and Regulations through a competent national geospatial data centre

General Recommendation

The NSDI legal and policy framework in place enables the availability, accessibility, application, management and usability of geospatial information, and is, nonetheless, necessary to be further improved. The NSDI of the Republic of Serbia should have a strong and robust legal and policy framework which can be efficiently achieved through the re-establishment of the National Geospatial Data Centre. The centre would deal with proposals of drafts and the monitoring of implementation of relevant legislation and policies with the aim to address current legal and policy issues and to further enhance the frameworks already in place.

Current Actions

- A Government Working Group is formed for re-establishing the National Geospatial Data Centre which would, among other, deal with legal and policy issues. Representatives of the Government, RGA and representatives of relevant NSDI Actors and Stakeholders are involved in the Working Group as members;
- Existing legal framework is almost fully in place with the Law on NSDI and by-laws regarding monitoring & reporting as well as metadata are in force;

- Drafting of amendments to the Law on NSDI as well as by-laws regarding data and service interoperability, network services and data sharing; and
- Developing numerous relevant policies related to geospatial information management².

Future Action

- Defining Terms of Reference (ToR) for successful re-establishment of the National Geospatial Data Centre for coordinating and managing, on the national level, of all relevant legal and policy issues related to geospatial information management and alignment with national and international legislation, policies and standards.

Key Performance Indicators

- Terms of references are defined setting the basis for re-establishing the National Geospatial Data Centre which deals with issues related to policies and regulations.

² See GSA Report.

3.3 Financial

The focus of the associated KAPs refer to the goals to strengthen financial situation of the Serbian NSDI.

Significant actions regarding NSDI financial issues have already been undertaken or are taking place. RGA and other NSDI Actors and Stakeholders have already developed strong financial partnerships within as well as beyond the public sector. The Study aimed to identify key investment points and to boost the recognition of the defined benefits-realization milestones. However, still further actions need to be undertaken to ensure sustainable NSDI funding through the re-establishment of the National Geospatial Data Centre (KAP FIN1), improve the NSDI financing model and structure (KAP FIN2), develop licensing and pricing policies (KAP FIN3), and improve and enhance real estate taxation methods based on geospatial data (KAP FIN4).

3.3.1 Key Action Point FIN1 – Ensure Sustainable NSDI Funding Through Re-established National Geospatial Data Centre

General Recommendation

The Law on NSDI states that the NSDI Stakeholders³ shall provide funds necessary to perform their duties as part of the further implementation and maintenance of the NSDI. In accordance with the Law on NSDI, the funds needed for joint activities (national geoportal, network services, etc.) shall be provided by the budget of the Republic of Serbia, as well as donations and other sources of financing. However, these funds have proven to be extremely low which prevent all NSDI Actors and Stakeholders to achieve full potential and implementation in the NSDI. Funds were mainly found in alternative, secondary sources of financing. In order to further implement the NSDI which can be sustained and maintained in the longer term, and to achieve an understanding of the implementation costs and ongoing financial commitment necessary to manage and achieve the defined goals of this document, it is crucial to have sustainable and sufficient funding for all activities necessary for the full and efficient implementation of the NSDI covering all the relevant NSDI Actors and Stakeholders. The ideal solution for this KAP is to mandate the re-established National Geospatial Data Centre that will be intensively dealing with securing the financial resources.

Current Action

- A Government Working Group is formed for re-establishing the National Geospatial Data Centre. Statutory changes would allow for greater budget and financial security of such an authority in the NSDI.

Future Actions

- Defining Terms of Reference (ToR) for successful re-establishment of the National Geospatial Data Centre, on the national level, for coordinating and managing all financial

³ The law mentions stakeholders/actors from state/public domain who directly or indirectly contributes to the performance of the NSDI. They are included under the term NSDI Actor, as defined in the GSA Report.

issues related to geospatial data management and usage in the public and private sector and with more financial support from the Government; and

- Allocating a long-term budget and strengthening the financial capacities for NSDI implementation of all NSDI Actors and Stakeholders, as defined in the state budget section, in order for them to successfully execute their necessary duties and commitments.

Key Performance Indicators

- Terms of references are defined setting the basis for re-establishing the National Geospatial Data Centre which deals with issues related to financing of the NSDI;
- Financial capacities of at least two NSDI Actors and Stakeholders are increased; and
- A five-year long budget for the further implementation and maintenance of the NSDI is allocated.

3.3.2 Key Action Point FIN2 – Improve NSDI Financing Model and Structure

General Recommendation

Through experience of the existing Centre of Geospatial Data Management, within the RGA, and especially based on the results from the Benefits Study Report, it is evident that a need exists within the NSDI sector (public and private especially) for a more improved, enhanced, standardized, sustainable and modernized NSDI financing model and a structure which meets the needs of the geospatial data and services users and providers. In order to further implement and maintain the NSDI in this direction, it is strongly recommended to establish a model covering a wide range of issues and opportunities relating to management, financing, partnership, policies, resource management, and capacity building. This action is closely linked to the re-establishment of the National Geospatial Data Centre and should be conducted jointly and correspondingly.

Current Action

- A Government Working Group is formed for re-establishing the National Geospatial Data Centre. Statutory changes would allow for greater flexibility in conducting business and organizing operations of such an authority. Moreover, a NSDI Business model project is currently running in parallel with this socio-economic benefits study. This comprehensive business model covers a wide range of relevant business issues.

Future Actions

- Drafting of a statutory act by Government Working Group which would allow greater flexibility in conducting business and organizing operations of the re-established National Geospatial Data Centre;
- Approving of the draft statutory act by the NSDI Council; and
- Implementing approved statutory act of re-established National Geospatial Data Centre based on a clear implementation roadmap.

Key Performance Indicators

- Terms of references are defined, setting the basis for re-establishing the National Geospatial Data Centre with drafted statutory act changes regarding conduct of business and operations;
- Approved draft statutory act by the NSDI Council; and
- Implementation of approved statutory act based on implementation roadmap.

3.3.3 Key Action Point FIN3 – Develop Licensing and Pricing Policies

General Recommendation

Complementing KAP FIN1 and KAP FIN2, this KAP aims towards the establishment of a sound licensing/pricing policy for the provided NSDI data and services (taking into account open data and making reference to Creative Commons as possible copyright licenses). It is necessary to identify the feasibility of licensing and pricing within the not-yet-defined models under the abovementioned KAPs and to align the policies with those models. Based on the available financial and operational capacities, policies should not burden the budget nor be less than the amount necessary for ensuring quality and availability of data and necessary for maintenance and cost recovery.

Current Actions

- Drafting of the by-law on the implementing rule dealing with data sharing; and
- Apply a simple licensing policy for using and publishing geospatial data of the government (e.g. Creative Commons).

Future Actions

- Draft of the by-law on the implementing rule dealing with data sharing made;
- Establishing a more standardized, modern and financially sustainable model for licensing and pricing for the data and services offered by the NSDI;
- Transposing the EU Directive on Open data and PSI (Reuse) to unlock the potential of government data for the society; and
- Developing Service Level Agreement (SLA) model for the “Open Data” concept.

Key Performance Indicators

- Draft of the by-law on the implementing rule dealing with data sharing submitted for approval by the Parliament;
- Standardized, modern and financially sustainable model for licensing and pricing for the data and services offered by the NSDI established;
- SLA for the “Open Data” concept developed;
- Transposed EU Directive on Open Data and PSI (Reuse) into Serbian national legislation; and

- At least two more NSDI providers offer to open their geospatial data made available through the national geoportal.

3.3.4 Key Action Point FIN4 – Improve and Enhance of Real Estate Taxation Methods Based on Geospatial Data

General Recommendation

Taxation issues exist in Serbia for decades, and while the Government has taken numerous efficient actions throughout the years in order to solve the issues and improve the taxation system in general, certain unsolved issues still exist. Such an issue e.g. are uncollected property taxes, for which is estimated that the Republic of Serbia loses over 127 Million EUR per year. This issue exists and is caused by another issue on informal objects, which are present in a significant amount in Serbia. The goal should be to make all such assets registered and transferable in order to include these assets in the taxation system facilitated by the NSDI. One of the recognized investment points for facilitating the NSDI is the establishment of an efficient and transparent information system for the purposes of real estate taxation and further development of the mass evaluation model. It is necessary to undertake activities on valuation and real estate taxation, which would enable fiscal consolidation, reduce the fiscal deficit and strengthen local self-governments.

Current Actions

- Established price registry for collecting information regarding realized transactions on the real estate market;
- Collecting of necessary data for establishing mass evaluation model and for updating and maintaining the price registry is being conducted; and
- Institutions and organizations which use the price registry are connected and co-operate successfully.

Future Actions

- Establishing an information system for real estate taxation which is facilitated by the NSDI through geospatial data and services; and
- Developing a pilot model for the mass evaluation model, based on geospatial data, as a basis to reform the associated tax policy.

Key Performance Indicators

- Information system for real estate taxation which is facilitated by the NSDI is established; and
- Developed pilot model for mass evaluation.

3.4 Data

The focus of the associated KAPs refer to the goals to strengthen the NSDI-Data provision, e-conveyancing/distribution and management.

Significant actions regarding data in the NSDI have already been undertaken resulting into strong databases for most of the INSPIRE data themes. Clear custodianship guidelines for geospatial data acquisition and management exist and a strong data supply chain and straightforward procedures for organizing, integrating and delivering geospatial data from multiple sources are present. Given the nature of the subject, continuous efforts in maintenance and improvement need to be made. With this in mind, further actions need to be undertaken to improve the geospatial data usage and management for decision making and economic development (KAP DATA1). Investments in promoting the usage of geospatial data (KAP DATA2) followed by a better integration of non-geospatial data with geospatial data (KAP DATA3) and the re-establishment of the National Geospatial Data Centre dealing with data issues (KAP DATA4) should also strengthen the performance the NSDI in Serbia.

3.4.1 Key Action Point DATA1 – Improve Usage of Geospatial Data for Decision Making and Economic Development

General Recommendation

Numerous geospatial databases have been already created, however the potential of geospatial information for decision making processes and economic development has not been fully reached so far. Therefore, it is recommended to better exploit geospatial data in relevant decision making processes of the public and/or private sector as well as the overall economic development of the public and/or private sector.

Current Actions

- Raising awareness of the existence of the national geoportal of the Serbian government towards various actors from various economic sectors; and
- Information demonstrating the socio-economic benefits of geospatial data in decision-making processes and for boosting economic development is collected⁴.

Future Actions

- Designing new business processes in the public sector making use of geospatial data; and
- Developing new innovative and improving existing NSDI services based on all created and available data sets.

⁴ See Benefits Study Report.

Key Performance Indicators

- Increase in users of the national geoportal from the public sector and non-public sector by 20% compared to 2020 statistic;
- Increase in usage of network services (view and download services) of the national geoportal from the public sector and non-public sector by 20% compared to 2020 statistic; and
- Transposed EU Directive on Open Data and PSI (Reuse) into Serbian national legislation.

3.4.2 Key Action Point DATA2 – Promote the Usage of Geospatial Data

General Recommendation

The European Union adopted several regulations and policies promoting the use of (geospatial) data (see e.g. INSPIRE Directive, Open Data and PSI Directive, and EU Data Strategy). It is strongly recommended to apply these regulations and policies in Serbia.

Current Actions

- Established NSDI Law conform INSPIRE Directive;
- Transposing most INSPIRE Implementing Rules into national legislation; and
- Transposing the EU Directive on Open Data and PSI (Reuse) to unlock the potential of government data for the society.

Future Actions

- Transposing the EU Directive on Open Data and PSI (Reuse);
- Setting up SLA for the “Open Data” concept; and
- Exploring the opportunities and implications of the EU Data Strategy for Serbia.

Key Performance Indicators

- Transposed INSPIRE Implementing Rules into national legislation;
- SLA for the “Open Data” concept set up; and
- Transposed EU Directive on Open Data and PSI (Reuse) into Serbian national legislation.

3.4.3 Key Action Point DATA3 – Integrate Non-Geospatial Data with Geospatial Data

General Recommendation

Assistance and support to other governmental and local institutions needs to be provided through integration of non-geospatial data with geospatial data for processing, usage and distribution of data regarding numerous activities under various key thematic policy areas within the territory of Serbia. This integration could be the basis for numerous innovations and enhance the geospatial data uptake for better evidence-based decision-making, stimulate economic development and achieve the Sustainable Development Goals.

Current Action

- Integrating statistical data of the Statistical Office of the Republic of Serbia with geospatial data.

Future Actions

- Using statistical data, which is integrated with geospatial data, for the 2022 Census (processing, usage and distribution of data); and
- Exploring which non-geospatial data should be integrated with geospatial data in order to achieve higher levels of NSDI benefits and usage.

Key Performance Indicators

- Integrated non-geospatial data and geospatial data utilized for the 2022 Census; and
- Inventory of possible use cases related to the integration of non-geospatial data with geospatial data.

3.4.4 Key Action Point DATA4 – Re-establish National Geospatial Data Centre to deal with Data Issues

General Recommendation

From results of the Benefits Study Report and practical experience in cooperation with the public, private and other sectors, an observation can be made that actors and stakeholders from these sectors do not fully grasp and understand the nature and potential of geospatial data and the NSDI as a whole. Issues arise when it comes to usage and maintenance of data, e.g. many governmental institutions, due to lack of capacities (financial, human and/or technical), are able to maintain only a small set of data. Meanwhile, a full territorial data coverage is needed. With this in mind, it is highly recommended to re-establish the National Geospatial Data Centre dealing with data issues such as geospatial data management, custodianship, supply chains, e-conveyancing/distribution, curation and delivery, throughout the NSDI, including all NSDI Actors and Stakeholders and all relevant key Economic Sectors.

Current Action

- A Government Working Group is formed for re-establishing the National Geospatial Data Centre which would, among other things, deal with data issues. Representatives of the Government, RGA and representatives of relevant NSDI Actors and Stakeholders are involved in the Working Group as members.

Future Actions

- Defining Terms of Reference (ToR) for successful re-establishment of the National Geospatial Data Centre, on the national level and with regional potential, for coordinating and managing all data issues related to geospatial data management and usage in the public and private sector; and
- Incorporating the geospatial component in all key relevant information systems of the state within key Economic Sectors.

Key Performance Indicators

- Terms of references are defined setting the basis for re-establishing the National Geospatial Data Centre which deals with issues related to data within the NSDI; and
- Geospatial component incorporated in crucial state information systems within at least two identified key Economic Sectors.

3.5 Innovation

The focus of the associated KAPs refer to the goals to strengthen the innovation aspect of the NSDI.

Significant actions regarding Innovation have already been undertaken resulting into a technologically advanced level of the NSDI, improved and simplified processes, promoted innovations and closing of the digital divide. Innovation requests continuous attention, efforts and implementation. Bearing this in mind, further actions need to be undertaken to further enhance the usage of geospatial data for innovation purposes (KAP INNO1). Investments in further development of relevant information systems (KAP INNO2 and INNO4) should also be made and tailored incentives should be offered (KAP INNO3) in order to strengthen the performance of this pathway.

3.5.1 Key Action Point INNO1 – Enhance Usage of Geospatial Data for Innovations

General Recommendation

Geospatial data has noticeable impact within innovation processes in the Serbian NSDI, however, room is open for geospatial data to stimulate, contribute and provide innovation. Repeatedly, the unused full potential of geospatial data is not fully recognized and/or utilized. This is the reason why it is necessary to promote more data uptake within the NSDI in order to enhance the geospatial data usage for innovation purposes. These innovations should be manifested through practical implementation of ideas which result in new geospatial data or services, or improvements in existing geospatial data or services. Such actions would significantly boost the geospatial data usage for innovations in the Serbian NSDI.

Current Actions

- Updating and upgrading geospatial data which is already made accessible through the current national geoportal; and
- Motivating actions are undertaken in order to make data accessible as open data.

Future Actions

- Drafting an innovation strategy for geospatial data and services; and
- Transposing the EU Directive on Open Data and PSI (Reuse) into Serbian legislation.

Key Performance Indicators

- Drafted innovation strategy for geospatial data and services; and
- Drafted legal act containing transposition of EU Directive on Open Data and PSI (Reuse) into Serbian legislation.

3.5.2 Key Action Point INNO2 – Improve e-Conveyancing/Distribution of Geospatial Data for Innovation Purposes

General Recommendation

In relation to KAP INNO 1, the usage of geospatial data for innovations needs to be distributed and facilitated through specific services/systems where NSDI data providers e-convey/distribute their data. Additionally, geospatial data and services allow to unlock the existing potential that has not been exploited so far. The full potential and benefits of the exploitation and distribution of geospatial data and technology as part of the NSDI needs to be showcased and made evident. Inspired by improved e-conveyancing/distribution of geospatial data, innovations can be created which lead to new geospatial data and/or services.

Current Actions

- Updating and upgrading of the current version of the national geoportal;
- Law on Disaster Risk Reduction and Emergency Management in force and a government regulation for determining obligations of subjects within the disaster risk reduction system regarding the creation of a disaster risk register and data collection is adopted;
- Cooperation and data sharing exists between the RGA and competent authorities (Ministry of Agriculture) regarding IACS, as the tool for managing and controlling payments to agricultural holdings;
- Legal provisions and obligations of the RGA to establish and maintain a national geoportal and an information system for infrastructure cadastre system exist; and
- Pilot project for establishing a national register of investment maps for the territory of 11 piloted local self-governments is in progress.

Future Actions

- Creating a detailed architectural design for upgrading the existing distribution system;
- Developing and launching a new, upgraded and more comprehensive national geoportal, which would be the innovative national distribution platform for all geospatial data and public sector services as well as a platform for critical applications and systems related to geospatial data;
- Establishing national register of investment maps for the creation, maintenance and monitoring of investment locations for the territory of the Republic of Serbia complemented with a platform for stakeholder communication and decision making, as well as a long-term sustainable cooperation with local self-governments and governmental institutions responsible for spatial data;
- Establishing and maintaining the technical infrastructure for access and use of data of established disaster risk register which contains data relevant for risk management in the

Republic of Serbia based on existing legal framework. Continuation of collecting and recording disaster loss data for the Desinventar database;

- Establishing and developing a new information system for infrastructure cadastre system by improving the utility cadastre system and digitalizing utility plans and their entry in the alphanumeric database and improving the line cadastre information system;
- Supporting improvement of spatial planning and development in the Republic of Serbia through digital transformation of the domain of spatial planning and development for improving the efficiency and effectiveness of decision making and better management of the spatial development policy, on national and local level, facilitated by establishing a digital platform; and
- Strengthen the further development of the land parcel identification system, as a geographic information system which allows other IACS components to geolocate, display and spatially integrate data, of which those components are composed, based on aerial or satellite imagery.

Key Performance Indicators

- Detailed architectural design for upgrading the existing distribution system created;
- New, upgraded and more comprehensive national geoportal is established and launched;
- Disaster risk register which contains data relevant for risk management in the Republic of Serbia established and collecting and recording disaster loss data for the Desinventar database continued;
- National register of investment maps for piloted local self-governments successfully established and basis for national level roll-out is prepared and stable;
- Established information system for infrastructure cadastre system;
- Spatial planning and development is digitally transformed, spatial development policy is improved and relevant digital platform is established, on national and local level; and
- Land parcel identification system is strengthened and fully established, followed with Geospatial Aid Application.

3.5.3 Key Action Point INNO3 – Offers on Incentives for Innovation through National Geospatial Data Centre

General Recommendation

Bearing in mind the untapped potential and benefits of geospatial data and services for decision making and economic development, the incentives for innovation of the Government, the academia and private sector are at a very low level. Moreover, most stakeholders are frequently not informed about relevant uptakes. This is expressed by numerous NSDI Actors and Stakeholders and incentives for innovation should be provided for using governmental geospatial information at all levels and in

all sectors (e.g. see research grants / structure funds). The re-established National Geospatial Data Centre could be the platform for informing as well as offering innovation incentives for relevant NSDI Actors and Stakeholders.

Current Actions

- A Government Working Group is formed for re-establishing the National Geospatial Data Centre which would, among other things, deal with innovation issues. Representatives of the Government, RGA and representatives of relevant NSDI Actors and Stakeholders are involved in the Working Group as members; and
- Existing and past innovation programs have been applied to establish several geospatial services (e.g. national geoportal).

Future Actions

- Defining Terms of Reference (ToR) for successful re-establishment of the National Geospatial Data Centre, on the national level, for monitoring and promoting all government incentives related to geospatial data in the public and private sector and informing all NSDI Actors and Stakeholders on innovation opportunities; and
- Increase in promotional activities regarding innovation programs with a focus on development of geospatial related technologies and services.

Key Performance Indicators

- Terms of references are defined setting the basis for re-establishing the National Geospatial Data Centre which deals with innovation issues; and
- Establishment of at least two new innovation programs with a focus on further development and advancement of geospatial related technologies and services.

3.5.4 Key Action Point INNO4 – Develop Specific Information System for Land Consolidation Purposes

General Recommendation

It is strongly recommended to create an information system ensuring quick and efficient realization of professional supervision over the execution of geodetic work in the field of land consolidation. Creation of such a system needs to be achieved in an objective and impartial manner, through automatic control of submitted documentation in digital format.

Current Actions

- Amendments to the legal framework regulating land consolidation; and
- Adopting Rulebook on the Content, Procedure of Preparation and Adoption of the Consolidation Program.

Future Actions

- Amendments to the legal framework dealing with land consolidation are drafted; and
- Introducing new information system for supporting the implementation of consolidation which would shorten implementation time, ensure continuity in implementation, create opportunities for e-insight, etc. while enabling definition and automation of professional supervision over the execution of geodetic works.

Key Performance Indicators

- Amended legal framework for land consolidation is in place; and
- Launch of an operational new information system as a facilitator for land consolidation.

3.6 Standards

The focus of the associated KAPs refer to the goals to strengthen the legal, data, semantic and technical interoperability.

Significant actions regarding standards have already been undertaken to strengthen the legal, data, semantic and technical interoperability. However, still further actions need to be undertaken to further enhance geospatial data standards conformance (KAP STAN1), interoperability and harmonization (KAP STAN2). Additional investments need to be taken to better avoid data duplication and software/service purchase duplication (KAP STAN3), to enhance security of relevant information systems (KAP STAN4) and to stimulate Open Source Software (KAP STAN5). In order to tackle all the important NSDI standardization issues, the re-establishment of the National Geospatial Data Centre would be essential (KAP STAN6).

3.6.1 Key Action Point STAN1 – Enhancing Standards Conformance of Geospatial Data

General Recommendation

The level of standardization of the NSDI in Serbia is at a decently high level, however, additional efforts need to be made in strengthening geospatial data standards conformance with international standards. References to relevant practice standards and compliance mechanisms that enable legal, data, semantic and technical interoperability need to be made to assist in the further enhancement of standards conformance of geospatial data and services.

Current Actions

- International standards such as ISO and OGC for key geospatial data sets and services are applied (e.g. national geoportal); and
- INSPIRE data themes specifications are in progress of implementation.

Future Actions

- Strengthening links with Open Geospatial Consortium (OGC) to be better informed/involved with the latest international standardisation issues;
- Linking with EU Data Strategy and Digital Europe program;
- Expanding compliancy of all datasets of RGA and all other relevant data providers of the NSDI; and
- Promoting strong incentives for applying (inter)national standards.

Key Performance Indicators

- Degree of data compliancy according to INSPIRE Implementing Rules on Monitoring & Reporting;
- Membership of the National Geospatial Data Centre in the OGC; and

- Application of EU Data Strategy and Digital Europe program in relevant standardization policies.

3.6.2 Key Action Point STAN2 – Improve Interoperability and Harmonization of Geospatial Data

General Recommendation

Continuous investment needs to be made regarding data interoperability through efforts by using the European Interoperability Framework (EIF) and the European Interoperability Reference Architecture (EIRA) as reference. Harmonization efforts need to be continued regarding the harmonization of geospatial data sets according to INSPIRE specifications and other relevant international standards as well.

Current Actions

- Drafting a government regulation regarding interoperability in accordance with the INSPIRE implementing rules;
- Creating and publishing of metadata according to the INSPIRE implementing rules on metadata;
- Harmonizing RGA geospatial data according to the INSPIRE implementing rules on data specifications (e.g., Ten data sets of the RGA are harmonized in accordance with INSPIRE Implementing Rules); and
- Defining data model based on INSPIRE specifications.

Future Actions

- Continuous improvement of interoperability and harmonization of all geospatial data sets in accordance with INSPIRE, EIF and EIRA for strengthening interoperability;
- Continuous maintenance of the metadata catalogue for all data sets for which relevant NSDI Actors and Stakeholders are responsible as defined by Law on NSDI;
- Adopting a standard at national level for all INSPIRE annex themes, and harmonize all the relevant data sets accordingly;
- Continuous defining of data model(s) based on INSPIRE specifications; and
- Preparation of permanent URI model for various services of all governmental institutions.

Key Performance Indicators

- Degree of INSPIRE compliance of data sets of the core data themes according to INSPIRE implementing rules on monitoring & reporting
- Degree of Compliancy of metadata according to INSPIRE implementing rules on monitoring & reporting;

- Degree of Compliancy of spatial data of responsible NSDI Actors and Stakeholders according to INSPIRE implementing rules on monitoring and reporting;
- 15 defined data model(s) according to the INSPIRE specifications; and
- Permanent URI model for various services of at least two governmental institutions prepared.

3.6.3 Key Action Point STAN3 – Prevent Data Duplication and Software/service purchase duplication

General Recommendation

There are numerous examples of data collection duplication and software and/or services purchase duplication within the NSDI and other aspects of the Government in Serbia, which all lead, most importantly, to unnecessary costs and inefficiency of data and services as well as loss of trust in the public sector and the NSDI. In order to achieve a more advanced level of the NSDI and to achieve highest levels of beneficial usage of the NSDI, it is crucial to prevent and remove such duplications, as well as to assure that data distributed through the NSDI is the sole, trustworthy, valid and reliable data while data created and distributed outside the NSDI is invalid and unofficial. The solution can be achieved by mandating a policy regarding a standardised procurement specification for geospatial data, software and services in order to avoid and clear data collection duplication and software and service purchase duplication. This way, the aforementioned issue can easily be removed, mitigated and prevented in the future.

Current Action

- Relevant spatial data sets, software and services of the relevant INSPIRE stakeholders are identified (except for III.5 Human health and safety).

Future Actions

- Establishing a List of all INSPIRE stakeholders with defined responsibilities for each of the INSPIRE data themes of Annexes I, II and III; and
- Establishing a sound procurement policy (through partnerships) regarding data, software, services on national level.

Key Performance Indicators

- Established list consisting of all INSPIRE stakeholders with defined responsibilities for each of the INSPIRE data themes of Annexes I, II and III; and
- Established sound procurement policy regarding data, software, and services on national level.

3.6.4 Key Action Point STAN4 – Enhance Security of Information Systems

General Recommendation

Given that network and information systems and services play a vital role in the modern society, their reliability and security are essential to economic and societal activities, and in particular the functioning of national governments and the private and public sector. National information security tools and capacities need to be improved and enhanced. A Cybersecurity platform for the technical infrastructure of the NSDI, in accordance with international standards, should be established in order to improve security of propriety ownership data, spatial graphical and alpha numeric data, national security in relation to the infrastructure cadastre data and the NSDI as a whole.

Current Action

- Existing plan for e-Security for the national geoportal (early detection of IT incidents for protection of the RGA national geoportal from external and internal attacks); and
- Analysis of the existing security baseline conducted resulting in several use cases relating to penetration testing and security monitoring.

Future Actions

- Developing a Strategy for Geospatial Information security for the period until 2023;
- Assessment of the current situation of information security and gap analysis followed by coverage of the basic needs of information security;
- Establishing an improved, enhanced and modern ICT Security Baseline based on latest international practice and standards; and
- Establishing ICT Security Basic Reactivity (automated and manual).

Key Performance Indicators

- Adopted Strategy for Geospatial Information security approved by the NSDI Council;
- Assessment of current situation and gap analysis of the information security and basic needs coverage conducted;
- Established improved, enhanced and modern ICT Security Baseline based on latest international practice and standards; and
- Establishing ICT Security Basic Reactivity (automated and manual).

3.6.5 Key Action Point STAN5 – Stimulate Open Source Software

General Recommendation

Stimulate the use of open-source software as an alternative for property-owned/commercial software. Open-Source Software (OSS) is a type of computer software in which source code is released under a license in which the copyright holder grants users the rights to use, study, change, and distribute the software to anyone and for any purpose. The advantage of the use of OSS is the independence of property-owned/commercial software vendors (and the associated costs).

Current Action

- While all the other INSPIRE stakeholders are generally relying on commercial software (ESRI, MS SQL, ORACLE), the RGA is switching to open-source technology/software (Geonetwork, Geoserver, Mapserver, PostgreSQL/PostGIS).

Future Action

- Stimulating the usage of open source software by making references in the new NSDI strategy and offering demonstrations of using open-source software.

Key Performance Indicators

- Reference of the usage of Open-Source Software is made in the new NSDI Strategy; and
- At least two more INSPIRE Stakeholders are using of Open Source Software.

3.6.6 Key Action Point STAN6 – National Geospatial Data Centre competent for Standardization Issues

General Recommendation

Standardization is an important component of the NSDI. By introducing sound, stable and constructive standards at national level, numerous existing incompatibility issues, which directly or indirectly effect economic development negatively and/or even bring financial loss, would be solved. It is crucial to standardize geospatial data creation, processing, distribution, usage and maintenance at different administrative levels. It is of significant importance to: achieve higher levels of standards conformance, interoperability and harmonization of geospatial data; ensure software and service compatibility; improve security of information systems; prevent data/software/service duplication, and solve other issues related to standardization. It is strongly recommended to re-establish the National Geospatial Data Centre dealing with such standardization issues.

Current Action

- A Government Working Group is formed for re-establishing the National Geospatial Data Centre which would, among other, deal with standardization issues. Representatives of the Government, RGA and representatives of relevant NSDI Actors and Stakeholders are involved in the Working Group as members.

Future Action

- Defining Terms of Reference (ToR) for successful re-establishment of the National Geospatial Data Centre, on the national level, for managing and coordinating all government standardization efforts related to geospatial data in the public and private sector and solving all NSDI standardization issues.

Key Performance Indicators

- Terms of references are defined setting the basis for re-establishing the National Geospatial Data Centre which deals with standardization issues.

3.7 Partnerships

The focus of the associated KAPs refer to the goals to promote partnerships in the context of the further implementation of the Serbian NSDI.

Significant actions regarding partnerships have already been undertaken to strengthen cross-sector cooperation, industry partnerships, community participation and international collaboration. However, still further actions need to be undertaken to strengthen partnerships within and between key Economic Sectors (KAP PAR1), to promote co-creation (KAP PAR2), and collaboration with local-self-governments (KAP PAR3).

3.7.1 Key Action Point PAR1 – Strengthen Partnerships and Cooperation within and between Key Economic Sectors

General Recommendation

Strengthening sectorial partnerships/cooperation within, as well as between, partners of the identified key Economic Sectors is crucial for the successful advancement of the Serbian NSDI in a modern and efficient way. Cooperation and partnerships between the NSDI Actors and Stakeholders within, and between, key Economic Sectors are lacking and it is hard to imagine a fully successful NSDI without inner-sectorial and multi-sectorial cooperation and partnerships.

Current Actions

- Cooperation agreements and data sharing agreements with various governmental institutions, private companies, academia and NGOs exist and are operational. However, these agreements are based on a bilateral basis; and
- A Government Working Group is installed for re-establishing the National Geospatial Data Centre dealing with partnership issues.

Future Actions

- Raising awareness and promoting benefits of using geospatial data and services through the NSDI, based on cooperation and partnerships which exist within and between key Economic Sectors;
- Establishing an overarching agreement framework within the NSDI to serve as basis for signing cooperation and other agreements, within and outside the NSDI, between NSDI Actors and Stakeholders, and with third parties; and
- Incorporating the geospatial component in all key relevant information systems of the state within key Economic Sectors.

Key Performance Indicators

- Raising awareness and promotional activities conducted through at least one national campaign, or, through an increase in 20% of new third party signatories;
- Established overarching NSDI agreement framework including all relevant parties; and
- Geospatial component incorporated in crucial state information systems within at least two identified key Economic Sectors.

3.7.2 Key Action Point PAR2 – Promote Co-Creation Activities of Geospatial Data

General Recommendation

Crowdsourcing activities have proven to be extremely beneficial and contributing when applied appropriately. This is why further promotion efforts should be made regarding relevant co-creation activities and programs, with citizen participation, dealing with the co-creation of geospatial data and services as an alternative way to develop sustainable public services delivery.

Current Actions

- Address data register exists which is based on crowdsourcing, as a way to collect address data from and by citizens; and
- House numbers data register exists which is based on crowdsourcing, as a way to collect house numbers from and by citizens.

Future Action

- Promoting efforts increased regarding crowdsourcing by increasing awareness on added value and associated limitations;
- Finding more practical use cases where crowdsourcing has potential;
- Promoting and regulating co-creation activities in public service developments; and
- Exploring the liability issues of co-created data and services and developing safeguards.

Key Performance Indicators

- At least 2 national geospatial core datasets in accordance with the Law on NSDI are partly created/maintained by co-creation
- One promotion campaign demonstrating the added value and limitations of co-creation conducted; and
- Regulations drafted allowing involvement in co-creation activities for the development of relevant public services.

3.7.3 Key Action Point PAR3 – Improve Cooperation with Local Self-Governments

General Recommendation

Cooperation between NSDI and local self-governments (LSG) needs to be further strengthened in order to better facilitate the geospatial demands and needs of Serbian cities and municipalities, regarding the management of geospatial data and services. Existing levels of cooperation are at a medium level in general, as levels of cooperation between the NSDI and LSGs vary based on the will of LSGs to cooperate and due to LSGs varying in levels of economic development. The Standing Conference of Towns and Municipalities (SKGO) is one of the NSDI Actors and Stakeholders, holding an important role of being the representatives of all LSGs in Serbia.

Current Actions

- Organizing workshops by RGA with participants from local self-governments; and
- Setting up Individual agreements for access to RGA data with individual local self-governments.

Future Action

- Developing a strong partnership model, embodied through an overarching partnership agreement, through NSDI council with inclusion of all local self-governments through the SKGO.

Key Performance Indicators

- Established partnership between NSDI and SKGO based on adopted overarching partnership agreement for involvement of local self-governments.

3.8 Capacity and Education

The focus of the associated KAPs refer to the goals to build capacity in the context of the further implementation of the Serbian NSDI.

Significant actions regarding capacity and education have already been undertaken to raise awareness of NSDI and to strengthen the formal education, entrepreneurship and professional workplace training. However, still further actions need to be undertaken to build capacity for all relevant NSDI Actors and Stakeholders and to enlarge the availability of necessary knowledge and skills (KAP CAP&EDU1). Moreover, it is also important to invest in formal education (KAP EDU&CAP2) as well as Lifelong Learning courses/trainings (KAP EDU&CAP3) and capacity building of local self-governments (KAP EDU&CAP4).

3.8.1 Key Action Point CAP&EDU1 – Build Capacity of all relevant NSDI Stakeholders

General Recommendation

Major gaps regarding capacities have been observed at most NSDI Stakeholder during the making of the DSIP for the implementation of the INSPIRE Directive. Nonetheless, capacities, human, financial, technical and other, are a long-lasting issue which most governmental institutions face in Serbia. Efforts in building and strengthening capacities are constantly made at all levels of the public sector. It is crucial to make additional contributions to the strengthen capacity building for all relevant NSDI Stakeholders by which individuals and organizations obtain, improve, and retain the skills, knowledge, tools, equipment, and other resources needed to conduct their NSDI jobs competently.

Current Action

- Sharing knowledge, skills and experiences among relevant institutions in Serbia;
- Trainings within program for professional development of the National Academy for Public Administration of Serbia is defined ("For an efficient government and better public services through NSDI"); and
- Providing support on ad hoc basis when the RGA is approached by NSDI Stakeholders when using services provided by the RGA.

Future Actions

- Defining training programs for professional development relevant to the NSDI for the private and NGO sector;
- Conducting a needs-assessment for each NSDI Actors and Stakeholders' group (government institutions, private sector entities, NGOs etc.);
- Stimulating sharing of knowledge and skills relevant to NSDI by responsible NSDI Stakeholders towards other NSDI Actors and Stakeholders and starting to develop capacities for the practical implementation of knowledge and skills; and

- Assisting with building capacities (human and technical) at all relevant NSDI Actors and Stakeholders.

Key Performance Indicators

- At least one training program for professional development relevant to the NSDI for either private and NGO sector; and
- At least one needs-assessment is conducted for at least one NSDI Actors and Stakeholders group.

3.8.2 Key Action Point CAP&EDU2 – Invest in Formal NSDI Education

General Recommendation

On the academic level, there are insufficient educational programs for obtaining knowledge and skills necessary for the NSDI, especially for further improvements and modernization efforts of the NSDI. Therefore, it is recommended to make additional efforts in achieving a better balance between societal NSDI needs and supply from the academia sector (e.g. by the Universities, high schools etc.) in all relevant sciences which the NSDI requires (e.g. legal sciences, geoinformatics sciences, economy sciences, etc.).

Current Action

- Inventory of the NSDI needs and academic/educational/training offerings (see e.g. Erasmus+ BESTSDI, GEOBIZ projects with participations of Universities of Belgrade and Novi Sad etc.).

Future Action

- Analysing the gap between societal NSDI needs and supply from the academia sector resulting in proposals on how to minimize and remove the gap; and
- Promotion of relevant NSDI formal education to the public, private and NGO sectors and the citizens.

Key Performance Indicators

- Gap assessment regarding the balance between societal NSDI needs and supply from the academia sector; and
- At least one promotional event of new and available NSDI related formal educational programs in cooperation with at least one faculty with such a program.

3.8.3 Key Action Point CAP&EDU3 – Invest in Lifelong Learning Programs

General Recommendation

Invest in Lifelong Learning by offering a range of relevant technological and non-technological trainings leading to ongoing pursuit of knowledge for NSDI development reasons. Therefore, it not only enhances social inclusion, active citizenship, and personal development, but also self-sustainability, as well as competitiveness and employability. So far, the number of Lifelong Learning opportunities are still low in the context of the NSDI in Serbia.

Current Action

- Existing trainings within program for professional development of the National Academy for Public Administration of Serbia ("For an efficient government and better public services through NSDI"); and
- Organizing Workshops by the National Geospatial Data Centre for NSDI professionals.

Future Action

- Setting up a strategy, or dedicating part of NSDI Strategy, for promoting and sustaining Lifelong Learning within the NSDI and allocating a budget for Lifelong Learning programs.

Key Performance Indicators

- At least one Lifelong Learning program in the field of NSDI is available; and
- Established strategy, or dedicated part of NSDI Strategy, for promoting and sustaining NSDI Lifelong Learning (including allocated budget).

3.8.4 Key Action Point CAP&EDU4 – Assist Capacity Building of Local Self-Governments

General Recommendation

The local self-governments (LSG) in the Republic of Serbia vary significantly in terms of size, economic development and capacities (human, financial, technical etc.). Similar to the issue of governmental institutions at national level, local self-governments face identical issues at local level. It is paramount to provide assistance and support to the local self-governments in building and strengthening capacities in regard to (N)SDI and GIS developments. A crucial partner in this process is the Standing Conference of Towns and Municipalities, given their role and respect earned among municipalities and a long-lasting healthy cooperation with NSDI Actors and Stakeholders.

Current Action

- Setting up Individual agreements on access of RGA data and cooperation with each individual LSG for SDI/GIS development purposes;
- Capacity building projects where LSGs are beneficiaries of project outcomes where RGA is implementing partner; and

- Organizing workshops at RGA tailored for LSGs.

Future Action

- Drafting an overarching agreement regarding access to geospatial data and services, covering all individual LSGs, for adoption by the NSDI Council; and
- Assisting and supporting capacity building and strengthening for updating and using geospatial data and services for the needs of LSGs and the development of local SDI/GIS for decision making and economic development.

Key Performance Indicators

- Establishment of an overarching agreement regarding access to geospatial data and services, covering all individual LSGs, adopted by the NSDI Council;
- 10% increase in local SDI/GIS in LSGs attained / number of active users in NSDI from LSG increased.

3.9 Communications and Engagement

The focus of the associated KAPs refer to the goals to promote communications and engagement in the context of the further implementation of the Serbian NSDI.

Significant actions regarding communications and engagement have already been undertaken to identify the NSDI Actors and Stakeholders, to integrate engagement strategies, to develop NSDI strategies and to monitor/evaluate the progress of the Serbian NSDI. However, still further actions need to be undertaken to improve communications and strengthen NSDI Actors and Stakeholders' engagements. Investments need to be made to develop a strong NSDI Communication Plan (COM&ENG1), to promote the added value of NSDI (COM&ENG2), and to re-establish the National Geospatial Data Centre covering issues related to NSDI communications and engagement (COM&ENG3).

3.9.1 Key Action Point COM&ENG1 – Develop NSDI Communication & Engagement Strategy

General Recommendation

It is strongly recommended that the NSDI should implement a specific strategy focusing on NSDI communication and engagement, taking into account the needs of different actors and stakeholders, NSDI and non-NSDI (see, e.g. politicians, policy makers, ICT-developers, data managers, etc.) and so different messages need to be communicated and different engagements have to be made to the different stakeholders. Therefore, it is essential to set up a strategy that defines a model of communication among NSDI Actors and Stakeholders as well as a model for engagement of the NSDI Actors and Stakeholders.

Current Action

- Undertaking a Survey on the satisfaction of users as part of the DSIP development; and
- Holding interviews with NSDI Stakeholders regarding the needs of developing DSIP.

Future Action

- Establishing communication and engagement plan for NSDI, taking into consideration DSIP recommendations;
- Organizing relevant events on a regular basis (e.g. two workshops per year, one conference per year); and
- Updating the National geoportal website with news, activities and promotions on a regular basis.

Key Performance Indicators

- Established engagement and communication plan;
- At least one organized event related to the progress of the Serbian NSDI on the national or regional level; and

- Updated national geoportal website with NSDI related news, activities and promotions.

3.9.2 Key Action Point COM&ENG2 – Promote the Added Value of Geospatial Information Usage

General Recommendation

Numerous use cases exist which make visible the added value produced by usage of geospatial data and services. It is necessary to demonstrate such cases showing the added value of using the NSDI in society (public, private, academia and NGO sector and among citizens) and its key Economic Sectors through a compiled list and made visible through adequate communication channels. Moreover, use cases need to be specified demonstrating what the added value of the further implementation of the Serbian NSDI is for the NSDI Actors and Stakeholders and non-NSDI actors and stakeholders. Demonstrating the cases have likely a more convincing power to actively contribute to the further NSDI implementation.

Current Action

- Collecting and describing use cases as part of the Benefits Study; and
- Raising awareness about INSPIRE Directive transposition.

Future Action

- Compiling use cases into a report and webpage as part of the national geoportal website; and
- Demonstrating the use cases to a wide range of potential actors and stakeholders.

Key Performance Indicators

- Compiled list of relevant NSDI use cases created and updated on the national geoportal website;
- Specification of three example use cases of how the improved NSDI will be used; and
- Demonstration of use cases in three NSDI events.

3.9.3 Key Action Point COM&ENG3 – Re-establish National Geospatial Data Centre to deal with Communications and Engagement Issues

General Recommendation

It is highly recommended to re-establish the National Geospatial Data Centre dealing, which could even have regional reach, which would be mandated and capable with dealing with communication and engagement issues throughout the NSDI, including all NSDI Actors and Stakeholders and all relevant key Economic Sectors. The Centre could facilitate to develop and monitor the Communications and Engagement plans, to communicate with the NSDI Actors and Stakeholders about relevant information that need to be shared, and to support engagement activities with relevant NSDI Actors and Stakeholders.

Current Action

- A Government Working Group is formed for re-establishing the National Geospatial Data Centre which would, among other, deal with communication and engagement issues. Representatives of the Government, RGA and representatives of relevant NSDI Actors and Stakeholders are involved in the Working Group as members.

Future Action

- Defining Terms of Reference (ToR) for successful re-establishment of the national geospatial data centre, on the national level and with regional potential, for coordinating and managing all communication and engagement issues related to geospatial data management and usage in the public and private sector.

Key Performance Indicators

- Terms of references are defined setting the basis for re-establishing the National Geospatial Data Centre which deals with issues related to communication and engagement within the NSDI.

4 IMPLEMENTATION

4.1 Implementation Plan

In this subchapter, an implementation plan is developed for the purposes of further developing the NSDI Strategy and to provide guidance in the further implementation and improvement of the NSDI in the Republic of Serbia.

The Implementation Plan, laid out in the table hereinafter, consists of Implementation Tasks(Task), which are based on the KAPs defined in Chapter 3. The Tasks are grouped under their respective Pathway and are prioritized as either low, medium, high or very high priority. Tasks of the highest priority should be undertaken as soon as possible, provided that circumstances for undertaking the task exists. Tasks marked with highest priority are: Re-establish the National Geospatial Data Centre; Adopt the NSDI Strategy; Draft and Monitor Relevant Policies and Regulations through a competent national geospatial data centre; Ensure Sustainable NSDI Funding Through Re-established National Geospatial Data Centre; Improve NSDI Financing Model and Structure; and Improve e-Conveyancing/Distribution of Geospatial Data for Innovation Purposes. These Tasks can be considered as a certain precondition for the successful and efficient implementation of the NSDI.

The financial aspect of the IP aims to provide predictions regarding Total Investment Costs (Costs) needed for the implementation of each Task. Bearing in mind that the Tasks were identified based on the KAPs in Chapter 3, the financial aspect reflect on, but doesn't limit to, future actions defined under each KAP. Costs are not always easy to determine, depending on the nature of the Task and the available information from relevant NSDI Actors and Stakeholders. Tasks related to technology oriented Pathways (Data, Innovation and Standards) are relatively easy for determining their Costs, however, they are also the most expensive Tasks. These Costs are also accompanied often with Recurring Costs due to maintenance needs, however, also accompanied with future Capital Costs which are a challenge to precisely estimate at this point. On the other hand, certain Tasks which relate to Pathways such as Governance and Institutions, Policy and Legal, Partnerships and Capacity and Education, where most activities are of continuous nature, are more challenging when attempting to precisely foresee the Costs. In such cases, either an approximation of costs is made based on parallel practice and previous experience or the Costs are yet to be defined (TBD). As a third group of Costs, there are Tasks present which demand no Costs as financial resources are not necessary for their implementation.

Each foreseen Cost is set to be as either Capital, Recurrent (R) or both (C&R). Capital (C) Costs are one-off costs while Tasks defined to have Recurrent (R) Costs have the need for continuous funding, on a yearly basis and/or beyond the 5-year period which the IP covers. Tasks defined with both types of Costs are tasks with the need of a one-off larger amount of cost followed by recurring, usually maintenance, costs on a yearly basis and/or beyond the 5-year period which the IP covers. Finally, each Cost is connected to a relevant planned funding source, which is either the Government Budget or International Project – Grant, Donation, Loan based projects with various international funding entities (World Bank, EU IPA funds, Sida, UNDP, EBRD etc.). Finally, the lifecycle cost of each Task is complemented with a timeframe. The timeframe covers a 5-year period, presented through an

integrated Gantt Chart with planned start and end dates for each Task. Numerous tasks are continuous, meaning that these Tasks shall be undertaken beyond the period covered by this NSDI Strategic Action Plan and future NSDI Strategy.

Finally, in the Comments part of the IP, additional information is laid out when complex Tasks are the subject and when a Cost is yet to be defined. It is also important to note that the amounts presented in the IP are estimates based on collected knowledge from the Study, experience of the RGA, nature of the Task and the available information provided by relevant NSDI Actors and Stakeholders.

Table 1. Implementation Plan

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Risk Management

The risk analysis approach used in this project is aimed at identifying the risks in a structured way, the risk owner, providing a mitigation strategy and evaluation. Through the analysis of the defined goals for the Serbian NSDI, the defined KAPs, the IP and the current state-of-play in Serbia, relevant key risks were identified as described below. Each identified key risk has a reference which is based on the nine Pathways⁵, as well as a group of risks referring to the NSDI as a whole. Risk owners for the initial, first, year of the implementation of this NSDI Strategic Action Plan have also been identified. The identified risk owners are the NSDI Council, National Geospatial Data Centre and the NSDI as a whole, including all NSDI Actors and Stakeholders.

The mitigation strategy consists of both preventive and mitigating measures. This ensures that identified risks can be handled pre-emptively and post-consequentially, meaning that little space is left for unforeseen consequences and damages to the implementation of the NSDI. The risk owner should tend to constantly ensure preventive measures are implemented as to prevent the risk from occurring, minimalizing its probability and therefore its impact to the NSDI. In cases when the risk does occur, even if preventive measures were implemented, the impact can be reduced through mitigating measures defined in the RMP, undertaken by the risk owner and/or NSDI Actors and Stakeholders.

An evaluation of the risks and mitigation strategy are a crucial part of this RMP and the attributes used are the impact on the NSDI and its goals in case the risk occurs, with relevant value, and, the probability of occurrence of envisaged risks, with relevant value.

Further, risk probability and impact are valued in the following manner:

Value (low to high)	Probability	Impact
1	Very Low, the probability of the risk occurring is very low	Insignificant, creates some interference in reaching the objectives
2	Low, the probability of the risk occurring is low	Slight, creates minor difficulties in reaching the objectives
3	Moderate, the probability of the risk occurring is moderate	Obvious, difficult to reach the objective, obstacles exist yet still can be tackled
4	High, the probability of the risk occurring is considered high	Serious, very difficult to reach the objectives, serious obstacles exist which are difficult to tackle

⁵ Risks which refer to the IGIF Strategic Pathways are derived from the KAPs per each of the pathways laid out in Chapter 3.

5	Very high, the probability of the risk occurring is considered very high	Critical, reaching objective becomes critically challengeable, serious efforts must be made
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Table 2. Valuation of risk probability and impact

When evaluating the mitigation strategy, as opposite to the risk probability and risk impact, the total value of risk probability and effect is calculated as the sum of the risk probability and impact and if the risk occurs, its levels can be:

1 – 3 = Tolerable
4 – 6 = Significant
7 – 10 = Critical

When a risk’s level is tolerable, the risk owner should carefully monitor the implementation of activities to which the risk relates to. Tolerable risks are of low probability and impact, however, no space should be left for chances of their occurrence as they can still have impact on the implementation of activities.

When a risk’s level is significant, caution should be paid to activities to which the risk relates to. Risks at this level need to be handled duly, both pre-emptively and post-consequentially in order to lower probability and reduce risk impact.

When a risk’s level is critical, it is crucial to invest additional efforts into the defined preventive measures in order to lower the risk probability as much as possible. The impact of a risk at this level will, most possibly, severely hinder the implementation of the NSDI Strategic Action Plan and create hard-to-overcome challenges and obstacles. In cases when the risk does occur, it is necessary to implement mitigating measures as soon as possible in order to reduce the impact as much as possible.

The risk analysis should be reviewed on an annual basis, closing risks from the previous year and opening new risks for the upcoming year, all depending on the needs for the following year of the implementation of the NSDI. Collectively, each element described above form the RMP for the purposes of successfully implementing and ensuring sound and quality continuation of implementation of the NSDI in Serbia.

The RMP consists of a total 21 identified key risks, 7 of which are evaluated to be at a ‘Tolerable’ level, 12 at a ‘Significant’ level and 2 to be at a ‘Critical’ level. Overall, the mitigation strategy consists of sound measures, with a strong accent on prevention, resulting in numerous and strong preventive measures to be undertaken by risk owners. Mitigating measures are often hard to identify in a specific manner, due to unforeseeable circumstances in the future. Mitigating measures serve as basis for mitigating actions and should be undertaken with adjustments, considering circumstances and opportunities which exist at the moment of risk occurrence. An overview of the RMP for the year 2021, based on the risk analysis, has been done and is presented in the table below.

Identification				Mitigation strategy		Evaluation				Date of last review	Date of next review
Risk Ref.	Risk Description	Risk Owner	Open / Closed	Preventive measure	Mitigating measure	Risk Probability	Risk Impact	Score	Previous Net Score		
						1 Low - 5 High					
NSDI R-1	Negative shifts in governmental policies regarding NSDI prioritization	NSDI Council	Open	Ensure sufficient support from the Government through involvement of the Government; NSDI council operational and promotes NSDI prioritization; Strong and sound model of NSDI established within re-established National Geospatial Data Centre	Continue and increase efforts of acquiring support from the Government through demonstration of use cases and international cases	2	4	6	N/A	N/A	Q1 2022
NSDI R-2	Lack of interest or involvement of NSDI Actors and Stakeholders in the NSDI implementation	NSDI Council	Open	Awareness raising activities and improvement of communication and cooperation; NSDI council operational and stimulates interest and involvement; Strong and sound model of NSDI established within re-established National Geospatial Data Centre	Continue and increase efforts of raising awareness, improving communication and cooperation	2	4	6	N/A	N/A	Q1 2022
NSDI R-3	Re-establishment of the National Geospatial Data Centre not commenced/stopped	NSDI	Open	Ensure sufficient support from the Government through involvement of the Government and adoption of strong and sound terms of references for setting the basis for re-establishing the National Geospatial Data Centre	Continue in efforts of acquiring support and revise and amend terms of references	2	5	7	N/A	N/A	Q1 2022

G&I R-1	NSDI Council faces operational and/or organizational issues regarding Council work and NSDI implementation	NSDI Council	Open	Ensure sufficient support from the Government through involvement of the Government; Promotion of activities; Adoption of strong and sound rulebook for the work of the Council	Revise and amend rulebook for the work of the Council and adopt amended rulebook	1	2	3	N/A	N/A	Q1 2022
G&I R-2	Private Sector, Academia and/or NGOs are not fully or even partially institutionalized within the NSDI Governance model	NSDI Council	Open	Promotion of active participation of the stakeholders from relevant sectors within the NSDI; Incorporate private companies, academia and NGOs in the NSDI governance model through formal and informal mechanisms of participation	Continue and increase efforts of raising awareness, improving communication and cooperation; Further incorporate missing NSDI Actors and Stakeholders for successful functioning of the NSDI governance model; Improve mechanisms of participation	2	2	4	N/A	N/A	Q1 2022
P&L R-1	Alignment with NSDI relevant international policies and regulations is not achieved	NSDI	Open	Systematic and regular monitoring and reviewing of relevant international policies/regulations and informing the NSDI Council about these key developments	Identify issue cause, and depending on nature of the issue (financial, technical, human capacity etc.) raise awareness of the issue to the Government and promote capacity enhancement	1	2	3	N/A	N/A	Q1 2022
P&L R-2	Alignment with UN Sustainable Developing Goals is not achieved fully or even partially	NSDI	Open	Make reference to the SDGs in the NSDI strategic documents; Promotion of influence of NSDI for the successful implementation of	Continue and increase efforts of promotion of influence of NSDI for the SDG implementation in Serbia; Continue and increase efforts of improving collaboration and	1	2	3	N/A	N/A	Q1 2022

				projects in Serbia which aim to align to the UN SDGs; Enhancing collaboration with Statistics Office	establishing new forms of collaboration						
FIN R-1	NSDI financing model and structure is not improved and sustainable NSDI funding is not ensured	NSDI	Open	Adoption of strong and sound terms of reference for setting the basis for re-establishing the National Geospatial Data Centre for coordinating and managing all financial issues; Long-term budget allocated and financial capacities strengthened; Strong and sound statutory act of re-established National Geospatial Data Centre based implemented.	Increase efforts in raising awareness and promotion of importance of NSDI for the Government, citizens and economy; Revise and amend terms of references and/or statutory act	2	3	5	N/A	N/A	Q1 2022
FIN R-2	Licensing and pricing policies not adopted or are not efficient	NSDI Council	Open	Standardized, modern and financially sustainable model for licensing and pricing for the data and services offered by the NSDI established; Relevant international policies and regulations transposed	Exploring the feasibility to implement the Creative Commons copyright licenses for the geospatial data and services; Promotion of the “Open data” concept; Develop SLA for the “Open data” concept	2	2	4	N/A	N/A	Q1 2022
DAT A R-1	Decline in quality and amount of data and data usage for decision making and economic development	National Geospatial Data Centre	Open	New business processes in the public sector making use of geospatial data adopted; New innovative and improved existing NSDI services, based on all created and available data sets, established;	Increase efforts in raising awareness and promotion of importance of improving existing NSDI services and introducing new, innovative, services for the Government, citizens and economy;	2	3	5	N/A	N/A	Q1 2022

				Relevant international policies and regulations transposed	Improve business processes						
DAT A R-2	Geospatial data and non-geospatial data not fully or even partially integrated in a sound and efficient manner	National Geospatial Data Centre	Open	Integration of geospatial data with statistical data for the 2021 Census and other activities (processing, usage and distribution of data); Other non-geospatial data integrated with geospatial data	Revise and amend terms of references of the National Geospatial Data Centre for coordinating and managing all data issues related; Increase efforts of data integration and awareness raising of importance of data integration	2	3	5	N/A	N/A	Q1 2022
STAN R-1	Data duplication and software/service purchase duplication issues persist and hinder NSDI implementation	NSDI Council	Open	Links with Open Geospatial Consortium (OGC) Strengthened and links established with relevant international policies regarding data; Compliancy of all datasets of RGA and all other relevant data providers of the NSDI expanded and responsibilities for INSPIRE data themes defined; Strong incentives for applying (inter)national standards applied; Sound procurement policy (through partnerships) regarding data, software, services on national level established	Revise and amend terms of references of the National Geospatial Data Centre for managing and coordinating all government standardization efforts; Revise and amend procurement policy	2	4	6	N/A	N/A	Q1 2022
STAN R-2	Data interoperability and	National Geospatial Data Centre	Open	Interoperability and harmonization of all geospatial data sets in	Continuous improvement of interoperability and	1	2	3	N/A	N/A	Q1 2022

	harmonization not achieved			accordance with international policies improved; Standard at national level for all INSPIRE annex themes adopted and all relevant data sets harmonized accordingly; Permanent URI model for various services of all governmental institutions prepared	harmonization of all geospatial data sets; Continuous maintenance of the metadata catalogue for all data sets as defined by Law on NSDI; Continuous defining of data model(s) based on INSPIRE specifications						
INN OR-1	e-Conveyancing/Distribution of geospatial data for innovation purposes is unavailable, of low quality or inadequate for innovative purposes	National Geospatial Data Centre	Open	Innovation strategy for geospatial data and services adopted and relevant international policies/regulations transposed; Adoption of strong and sound terms of reference for setting the basis for re-establishing the National Geospatial Data Centre for coordinating and managing all financial issues; Terms of references of the National Geospatial Data Centre for monitoring and promoting all government incentives related to geospatial data defined	Revise and amend terms of references of the National Geospatial Data Centre for monitoring and promoting all government incentives related to geospatial data; Increase efforts in promotional activities regarding innovation programs with a focus on development of geospatial related technologies and services	2	4	6	N/A	N/A	Q1 2022
INN OR-2	New information systems for e-Conveyancing/Distribution of	National Geospatial Data Centre	Open	Detailed architectural design for upgrading the existing distribution system created;	Increase efforts in promotional activities regarding innovation programs with a focus on development of	1	4	5	N/A	N/A	Q1 2022

	geospatial data are undeveloped or underdeveloped			Launching a new, upgraded and more comprehensive national geoportal developed and launched; New information systems for geospatial data e-conveyancing/distribution established; Amendments to the legal framework dealing with land consolidation are adopted	geospatial related technologies and services; Increase efforts of development of new information systems for e-conveyancing/distribution of geospatial data and awareness raising of importance of developing such systems						
PAR R-1	Partnerships and cooperation within and between economic sectors relevant to the NSDI is not established, strengthened and maintained	NSDI Council	Open	Overarching agreement framework within the NSDI to serve as basis for signing cooperation and other agreements established; Geospatial component incorporated in all key relevant information systems of the state	Raising awareness and promoting benefits of using geospatial data and services through the NSDI; Finding more practical use cases where crowdsourcing has potential; Promoting and regulating co-creation activities in public service developments	1	1	2	N/A	N/A	Q1 2022
PAR R-2	Lack of interest or involvement of Local Self-Governments in the NSDI implementation	NSDI Council	Open	Strong partnership model, embodied through an overarching partnership agreement, through NSDI council with inclusion of all local self-governments through the Standing Conference of Towns and Municipalities developed	Continue and increase efforts of raising awareness, improving communication and cooperation; Continue and increase efforts of acquiring support from the Government and Standing Conference of Towns and Municipalities	1	2	3	N/A	N/A	Q1 2022

CAP & EDU R-1	Capacities, on all levels, are not built, improved and maintained in all NSDI Actors and Stakeholders	NSDI Council	Open	Training programs for professional development relevant to the NSDI defined; Needs-assessment for each NSDI Actors and Stakeholders' group conducted; Overarching agreement regarding access to geospatial data and services, covering all individual LSGs adopted	Stimulating sharing of knowledge and skills relevant to NSDI and increase in efforts for developing capacities for the practical implementation of knowledge and skills; Re-conduct of needs-assessment for each NSDI Actors and Stakeholders' group	3	4	7	N/A	N/A	Q1 2022
CAP & EDU R-2	Lack of relevant and sufficient educational programs for the NSDI	NSDI	Open	Gap analysis between societal NSDI needs and supply from the academia sector resulting in proposals on how to minimize and remove the gap; Promotion and sustainability of Lifelong Learning within the NSDI and allocated budget for Lifelong Learning programs part of strategic document within NSDI	Promotion of relevant NSDI formal education to the public, private and NGO sectors and the citizens; Revise and amend reference to Lifelong Learning in strategic document(s)	3	1	4	N/A	N/A	Q1 2022
COM & ENG R-1	Communication and Engagement Strategy undeveloped or underdeveloped	NSDI Council	Open	Communication and engagement plan for NSDI established; Organization of relevant events; Update of the national geoportal website with news, activities and promotions on a regular basis.	Revise and amend engagement and communication plan and adopt amended plan; Revise and amend terms of references of the National Geospatial Data Centre for coordinating and managing all communication and engagement issues related to geospatial data	2	1	3	N/A	N/A	Q1 2022

COM & ENG R-2	Promotional efforts regarding added value of geospatial information usage and NSDI benefits inefficient and low response	NSDI	Open	Ensure maximum reach through adequate communication channels of a compiled list of relevant NSDI use cases (media, website, events etc.); Compiled use cases presented on webpage as part of the national geoportal website;	Compile updated/new list of relevant NSDI use cases and consider other, additional communication channels and target groups; Demonstrating the use cases to a wide range of potential actors and stakeholders.	3	2	5	N/A	N/A	Q1 2022
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Table 3. Risk Management Plan

5 CONCLUSIONS

The presented methodology, as described in Chapter 1, which was utilized for the creation of this document proved to be a strong foundation for creating the NSDI Strategic Action Plan. By utilizing a combination of a suite of tools in the methodology, such as the NSDI Diagnostic Tool, NSDI GSA Report Tool, NSDI Benefits Study Report Tool and NSDI Actions Development Tool, a strong and precise strategic action plan is prepared and ready to assist in the further implementation and development of the NSDI in Serbia.

The presented vision and mission statements are the result of a detailed and thorough analysis of needs and gaps within the NSDI made during the Study. Knowledge, experiences and input was taken outside of the Study as well, in order to get a broader picture as possible which would help define such statements in the best manner possible. Through the defined goals, the vision and mission statement should be easily achieved as they are laid out in more detail in the defined Key Action Points.

The defined KAPs present the core achievement of this document, as they are key starting points and guides for the NSDI implementation and development in the future. They also embody the end goals which the NSDI in Serbia should thrive for in the following years. A total of 35 KAPs have been defined for the nine Pathways. The implementation of each of the KAPs shall be further ensured through the NSDI Strategy. Since the NSDI Strategy shall be prepared in accordance with the Serbian law regulating the planning system, additional legal and systematic support for these activities is guaranteed. The NSDI Strategy shall be made in accordance with the Serbian legal framework for adopting policy documents, since such a strategy is a policy document which will be adopted in formal procedures by the Parliament. It is important to note that the development of the NSDI strategy, based on the KAPs and IP laid out in this document, needs to follow the determined provisions of the Serbian law which regulated the planning system. To further ensure the successful implementation of the NSDI through defined KAPs, an implementation plan and risk management plan have been prepared as part of this document. These two plans will also be included in the NSDI Strategy, complementing the KAPs laid out as measures for achieving set goals.

Involvement of NSDI Actors and Stakeholders had a significant contribution to the development of the NSDI Strategic Action Plan, as well as other documents developed within the Study. The main limitation of the followed approach was the limited involvement of all NSDI Actors and Stakeholders in the process of identifying KAPs. It would have been welcomed and more time saving if a series of meetings were organised wherein the suggested actions were discussed during the preparation of the NSDI Strategic Action Plan itself. Due to COVID-19 pandemic restriction and rules, it appeared not feasible to set up such meetings on larger scale in person, in order to achieve full, active and timely involvement.

The main lesson learned refers to the acknowledgment that the preparation of a strategic action plan is only the start of a long-term program dealing with the formulation of a strong and robust Strategy for the further implementation of the NSDI. Another lesson learned refers to 'thinking ahead', more precisely being pro-active, as needs and associated technologies are continuously evolving.