"Spatial Information Matters"

The Strategy for the Development of the
National Spatial Information Infrastructure (NSII) in the
Republic of Kosovo

Kosovo Cadastral Agency (KCA)

DOCUMENT DESCRIPTION

Document Title

Strategy for the Development of the National Spatial Information Infrastructure (NSII) in the Republic of Kosovo

Abstract

This strategy provides an overview of the NSII's vision, mission, and fundamental objectives. It is followed by a brief discussion of the development trends that form the basis of this strategy. Additionally, the strategy outlines key objectives related to spatial information, technology**,** and services, as well as collaboration and structure. Finally, it includes a roadmap detailing the main NSII activities scheduled for the coming years.

Keywords

Kosovo Cadastral Agency (KCA), National Spatial Information Infrastructure (NSII), NSII Strategy, Spatial Data Sharing, Data Driven Development, NSII Governance.

Date

13 October 2023

PROJECT DESCRIPTION

Project Title

Developing NSII Strategy in the Republic of Kosovo

Authority Responsible for the Project

Kosovo Cadastral Agency (KCA)

Content

Definitions and Terminology

Term	Description
Big data	Big data is a term used to describe the management of a massive volume of data that contains substantial information but is too extensive, diverse, and unstructured for traditional methods to effectively extract insights. Through statistical analysis, distributed data processing, and advanced visualization techniques, vast datasets can be analysed in real-time, enhancing decision-making and predictive capabilities. In meteorology, big data has been employed to examine long-term weather observations, simulating the complex interactions of various physical processes that shape our weather.
BIM	Building Information Modelling (BIM) involves creating and managing digital models of buildings. BIM serves as a central element in a collaborative framework involving stakeholders like clients, contractors, electricians, plumbers, maintainers, and government authorities. This collaboration spans from construction through the building's lifecycle, including potential demolition and material recycling. Separate Building Information Models exist for different disciplines (construction, structure, electrical, HVAC, plumbing, etc.), and these models can also be integrated into a multidisciplinary model.
CAD	Computer-aided design, commonly known as CAD, refers to the use of computer software and tools for design and technical drawings. Engineers, architects, and other professionals in fields like building and civil engineering utilize these programs to create detailed designs and plans.
Spatial Information Infrastructure	Spatial information infrastructure serves as the basic framework for accessing spatial information within society. This infrastructure includes data and metadata (documentation), as well as electronic services. It also includes legal, administrative, technical and organizational components, which include coordinate systems and other spatial reference systems for positioning. For the National Spatial Information Infrastructure, in the English language are often used the terms "Spatial Data Infrastructure" (SDI), "National Spatial Data Infrastructure" (NSDI), or "National Spatial Information Infrastructure" (NSII)
Spatial services	The spatial information infrastructure is based on data exchange based on an electronic service standardized by ISO and an application programming interface (NPA). Examples of this are: WMS (Web Map Service), WFS (Web Feature Service), WCS (Web Coverage Service), CSW (Catalogue Service Web).
Intelligent Transport Systems	Intelligent Transport Systems and Services (ITS) refers to a wide range of information and communication technologies used in the transport sector. ITS is a specialized field that is advancing rapidly. It provides considerable potential for advancement in different modes of transportation, benefits for society in general and serves as a market segment for Kosovo's industries.
Interministerial Committee for Land Administration and National Infrastructure for Spatial Information	The committee is an advisory body of KCA related to the development of the national infrastructure for spatial information. It will conduct its activity whenever it is necessary to advise the authority responsible for NSII. The Government of the Republic of Kosovo, upon the proposal of the Minister, determines the composition and responsibilities of the Committee for Land Administration and the National Infrastructure for Spatial Information of the Republic of Kosovo.

INSPIRE	The Infrastructure for Spatial Information in Europe (INSPIRE) is a joint European spatial data infrastructure designed to provide access to publicly managed spatial information. This includes a wide range of data, including details about the natural environment, transport, settlements, population and environmental conditions. The framework for INSPIRE was created by the dedicated EU Directive (2007/2/EC). https://inspire.ec.europa.eu/Themes/Data-Specifications/2892
Open data	Open data are structured information that have been made available so that the data can be read and interpreted by both machines and humans. The data should also have an open license so that it can be easily reused by anyone who wants to use it. The data doesn't necessarily have to be free.
UN-GGIM	The United Nations Committee of Experts on Global Geospatial Information Management, operating under the Economic and Social Council of the United Nations (ECOSOC), is a collaborative effort aimed at common objectives and activities relating to spatial information.The Committee provides guidance on the use and management of spatial information, including contributing to the United Nations' Sustainable Development Goals. For additional details, visit: http://ggim.un.org/
Common components and common solutions	Common components refer to elements within IT solutions that have the potential to be used or reused across multiple IT solutions. Generally, common components serve as basic elements for the creation of electronic services. In the framework of the Digital Agenda 2030, common solutions are recognized as essential measures for increasing efficiency and addressing various requirements within the public sector. The report highlights some strategic principles for these common national components, with the main emphasis on the coordination of their development.
Spatial data	Spatial data include information that directly or indirectly pertain to a specific geographic location or region. The terms spatial information, georeferenced information, location data, and geodata are often used synonymously to describe this type of data.
Working groups (WG) for topics related to IKIH	The provisions of this Administrative Instruction are implemented by all the responsible authorities that are represented in the working groups and other institutions for 'IKIH', defined by Law No. 08/L-010 on Establishment of the National Spatial Information Infrastructure in the Republic of Kosovo. The law provides a directive for the establishment of operational working groups tasked with the coordination of activities relating to the NationalSpatial Information Infrastructure (NSII) between the relevant authorities.
WG for building institutional and legal capacities	The working group for building institutional and legal capacities provides knowledge, professional expertise and opinions for decision-making by the authorities responsible for IKIH.
WG for technical issues, standards, metadata and other services	The working group for technical issues, standards, metadata and other services provides knowledge, professional expertise and opinions for decision-making by the authorities responsible for issues related to NSII.
WG for public relations and communication	The working group for public relations and communication provides knowledge, professional expertise and recommendations for decision-making by the authorities responsible for issues related to NSII.
WG for economic issues	The working group for economic issues provides knowledge, professional expertise and recommendations for decision-making by the authorities responsible for issues related to the NSII.

1. Executive summary

Adoption of Law No. 08/L-010, known as the Law on Establishment of the National Spatial Information Infrastructure in the Republic of Kosovo, marks a crucial cornerstone for advancements in the field of spatial information since its approval in the Assembly in 2022. This legislation is supplemented by five administrative guidelines drafted to guide public initiatives and highlight priorities regarding the acquisition, administration and distribution of spatial information within Kosovo. The foundation of the Strategy of the National Spatial Information Infrastructure (NSII) of the Republic of Kosovo is built on this.

Spatial information is useful and extremely important. Information related to specific spatial locations is important because practically all events occur in specific locations. By improving our understanding of the characteristics of the locations on earth where events occur and their consequences for the people and assets in those areas, we can improve planning, risk management and resource distribution. This, in turn, increases the likelihood of success for new endeavors, reduces the potential for future challenges, and results in tangible financial advantages.

The vision for the National Spatial Information Infrastructure (NSSI) of Kosovo is for harmonized and high-quality spatial information to be available for the formulation, implementation, monitoring, and evaluation of community policies and for citizens to have access to spatial information, either at the local, national or international level. Furthermore, the NSII Strategy also aims to maximize the value of existing spatial information for the public, government, and businesses. It shall provide a sustainable and comprehensive framework to support national and local initiatives and service provision.

The strategy puts its emphasis on three main strategic objectives, such as:
- **Spatial information** - focusing mainly on spatial data within the Kosovo NSII. It provides details on objectives related to collective data contributions through infrastructure, emphasizing accessibility and openness, the national spatial reference system and reporting procedures.
- **Technology and Services** – describes objectives related to ensuring a continuous flow of data, encouragingjoint solutions, maintaining security and quality standards, addressing data acquisition, exploring new dimensions, improving data processing and preparation for future standards.
- **Cooperation**– emphasizes the need for increased coordination and appropriate collaboration for all contributors and users. It also sets out goals related to innovation and research, the development of knowledge and expertise, and highlights several structural parameters.

The NSII strategy will be particularly useful in key areas within the public sector, where the availability of shared and integrated spatial information plays a key role in informed decision-making. These include, among other things, various fields such as urban and rural planning, environmental management, healthcare, education, security, infrastructure development, mining, transportation, crime prevention, insurance, retail sale, energy, analysis of climate change, agriculture, preservation of cultural heritage, tourism, sport, employment and statistical analysis.

Recommended actions:

- Grant approval to the NSII strategy

- Establish a long-term NSII financial programme

- Create Annual Work plans

- Establish a NSII responsible department at KCA

- Establish a NSII web page administered by KCA

- Develop NSII implementation plans for each stakeholder

- Create a Risk Management Framework

- Create and approve of a set of KPIs for monitoring

- Formalise national datum and coordinate system

- Develop data sharing licensing principles

- Conduct training- and education needs analysis

- Enhance the NSII Geoportal

- Establish procedures for setting requirements and specifications according to ISO19131

- Establish a practical guideline or handbook for quality control of NSII approved spatial data and metadata in accordance to INSPIRE and ISO19115 and ISO19157

- Pilot the training material of the practical handbook on quality control

- Adopt and use the data sharing agreement between public sector entities

- Create the NSII Data Policy, included the metadata profile

- Create a knowledge base and best practice studies

- Establish and publish Quality of Service (QoS) standards for the NSII

- Establish routines for EU legislation monitoring

- Create NSII exploitation plan

- Assign owners to each of the INSPIRE themes, annex I, II, and III

- Allocate responsibility for data providers on each of the INSPIRE themes, annex I, II, and III

- Establish an online metadata training and education support

- Conduct online user training on spatial data access and use

- Establish the framework standard and data models for INSPIRE annex I and II

- Produce development plans describing each stakeholder NSII services and infrastructure

- Conduct assessment of quality of services

- Monitor metadata use and INSPIRE compliance

- Establish formal NSII public sector partnerships

- Establish the framework standard and data models for INSPIRE Annex I and III

The NSII Strategy's implementation will be a collaborative undertaking jointly owned by both the central and local government entities within the Republic of Kosovo. Its primary aim will be to connect and harmonize data from diverse origins within a coherent national spatial reference system. This approach will facilitate enhanced cross-organizational processes, encourage extensive sharing, and promote the reuse of data across the public sector and beyond.

The strategy is accompanied by a set of annexes providing substantial background information supporting this strategy document. It is also accompanied by an action plan.

2. Introduction

Adoption of Law No. 08/L-010 on Establishment of the National Spatial Information Infrastructure in the Republic of Kosovo marks a crucial cornerstone for advancements in the field of spatial information since its approval in the Assembly in 2022. This legislation is supplemented by five administrative guidelines drafted to guide public initiatives and highlight priorities regarding the acquisition, administration and distribution of spatial information within Kosovo.

The goal of the NSII Strategy is that effective spatial information for the citizen, combined with other information, translates into prompt emergency services in the right place, knowing the location of local services, avoiding traffic jams, and the ability to manage life better by having access to wider information. For communities, spatial information enables equitable funding for regeneration and enables solutions for problems such as deprivation, crime, and disorder to be tackled effectively and jointly. For local government, spatial information supports partnerships, helps provide better and more efficient public services, and creates efficiency by directly assisting the right resources to the right places; this in turn empowers citizens to be more independent. For the central government, spatial information supports the effective formulation and evaluation of policies; it is indispensable in supporting the approach to climate change, in managing Kosovo-wide emergencies, such as an outbreak of an animal disease or dealing with floods, and in providing critical support to security services.

i.   The Kosovo Cadastral Agency (KCA) is the implementing agency for the spatial infrastructure, and for the last decade, it has worked on the design of strategies for Information Technology (IT) and the National Spatial Information Infrastructure (NSII).

The focus on user needs and actual use has increased. Digital solutions are increasingly being used. The importance of spatial information in society has increased significantly due to these developments. At the same time, the general pressure to solve problems pertaining to the public sector has increased. Also, the demands for a more efficient flow of data are now greater. Access to spatial information is of critical importance to many enterprises and functions in society.

In today's digital age, spatial information is an integral part of everyday life. Professionals and private individuals use these data to visualize physical phenomena and events by adding value to other sources of information. Spatial information is required to meet social challenges, such as climate change, environmental challenges, transportation, resource management, emergency planning, and urbanization. Spatial information is also part of many commercial offerings and is an integral part of the digital services that we all use in our everyday lives.

3. Methodology

The Working Group appointed by Decision no. 7471/23 of 20.12.2023 has carried out a full review of existing strategies, laws, and administrative instructions. Through consultations and discussions, the NSII Strategy was drawn up, the main purpose of which is to guide the development of the NSII until 2028. Through the work plan, the main focus areas for the strategy were defined, with special emphasis on the definition of NSII components. During this process, five main topics were explored in detail, supporting the work on the strategy:

- Defining strategic mission/vision: creation of clarity of purpose, a unified vision of objectives, and naming key stakeholders;
- Presentation of financial issues - Creation of a clearly articulated funding model to enable effective partnership and collaboration, as well as to assess the costs and benefits of implementing the NSII;
- Defining governance structures – Specification of a governance structure that enables effective collaboration and political engagement in order to create a transparent and open environment with defined roles and responsibilities;
- Information and capacity building - Extending the concept of NSII in Kosovo, and building capacities through the engagement of stakeholders and training of KCA staff;
- Providing a roadmap on the implementation of the NSII - A defined project planning with a clear timeline of actions and effective mechanisms for performance monitoring/reporting and risk management.

[1]The following stakeholders are involved in this process:

- Ministry of Environment, Spatial Planning and Infrastructure
- Office of the Prime Minister
- Ministry of Justice
- Ministry of Internal Affairs and Public Administration
- Ministry of Agriculture, Forestry and Rural Development
- Ministry of Local Government Administration
- Ministry of Finance, Labour and Transfers, Property Tax Department
- Ministry of Health
- Ministry of Economy
- Kosovo Cadastral Agency
- Privatization Agency of Kosovo
- Kosovo Property Comparison and Verification Agency
- Kosovo Agency of Statistics
- Emergency Management Agency (EMA)

---

[1]

4. Background

4.1. Vision, mission and primary objectives

Creating value based on spatial information is important, but there is still huge unused potential here. Needs and requirements change over time. The development of technology will also provide new opportunities and applications. In some fields, new needs emerge for data other than those that have been traditionally used. In other fields, data with an even higher level of detail may be required to perform tasks or provide services.

Society needs good, up-to-date data on private and public activities, in all specialized fields and sectors. Data should be available in a way that meets the needs. The data must have known coverage and quality adapted to the needs of different actors, so that they can support their specific applications and be part of the relevant decision-making processes.

A large part of spatial information is collected by public authorities. In addition, a lot of information is also created in the private sector for tasks pertaining to the public sector, through commercial activity or consumer behavior. The rapid digitalization of society and the growing demand raises the question of how the collection, management and distribution of spatial information should be organized.

The Republic of Kosovo has made significant investments in information and spatial technology. In order for Kosovo to remain a leading country in the region and achieve further gains, cooperation between different sectors of society must be expanded and strengthened.
The vision for this strategy is to:

> *The National Spatial Information Infrastructure (NSII) will provide harmonized and high-quality spatial information that is available for the formulation, implementation, monitoring, and evaluation of community policies and for citizens to have access to spatial information, be it at the local, national, or international level.*

The mission of the government sector is to create a technological, institutional, legal and administrative framework for cooperation between organizations that will:
- Comply with the INSPIRE Directive;
- Support e-Governance and institutionalization;
- Integrate geo-information from different sources into one infrastructure;
- Avoid duplication of acquisition, storage and maintenance of spatial data;
- Create effective business processes (to simplify data flow in processes such as spatial planning, emergency service, land registration);
- Meet the needs of stakeholders;
- Promote access, sharing, use and distribution of spatial data;

Maps and location-based information will serve as a guide for creating value and taking better decisions. Therefore, the objectives of the NSII of Kosovo are as follows:

i.   Making available appropriate, harmonized and qualitative spatial information for the purpose of formulation, implementation, monitoring and evaluation of (environmental) policy-making and for the citizen, in accordance with the general principles:
- Data should only be collected once and kept where it can be stored most effectively.
- It should be possible to combine spatial information from various sources across Kosovo and distribute it to multiple users and applications without problems.
- It should be possible to share information collected at one level/scale with all administrative levels; the information should be detailed for thorough investigations as well asfor strategic purposes in general.
- Spatial information needed for good governance at all levels should be readily available and transparent.
- It should be easy to find out what spatial information is available, how it can be used to meet a particular need, and under what conditions it can be obtained and used.

ii.   By establishing cross-sectoral coordination mechanisms from the outset, the initiative aims to ensure that, in the longer term, NSII can be integrated into a broader cross-sectoral National Spatial Information Infrastructure (SIPI), aiming to provide spatial information for the purpose of creating national policies in a wide range of sectors, such as transport, agriculture, etc.

In order to clearly define the roles of the components, it is necessary to clarify the structure and responsibilities of thegovernance of NSII. The following roles can be associated with the main components of the NSII governance framework:

- The executive role is related to the NSII Committee
- The managerial role is related to KCA
- The advisory role is related to the Working Groups
- The role of implementation is related to the activities developed by the partners of NSII, in particular the KCA, which has a central role in the coordination of activities

The strength of the proposed framework is the clear linkage between the various roles and key components of the NSII governance framework. The illustration below presents the general governance structure of NSII in Kosovo.
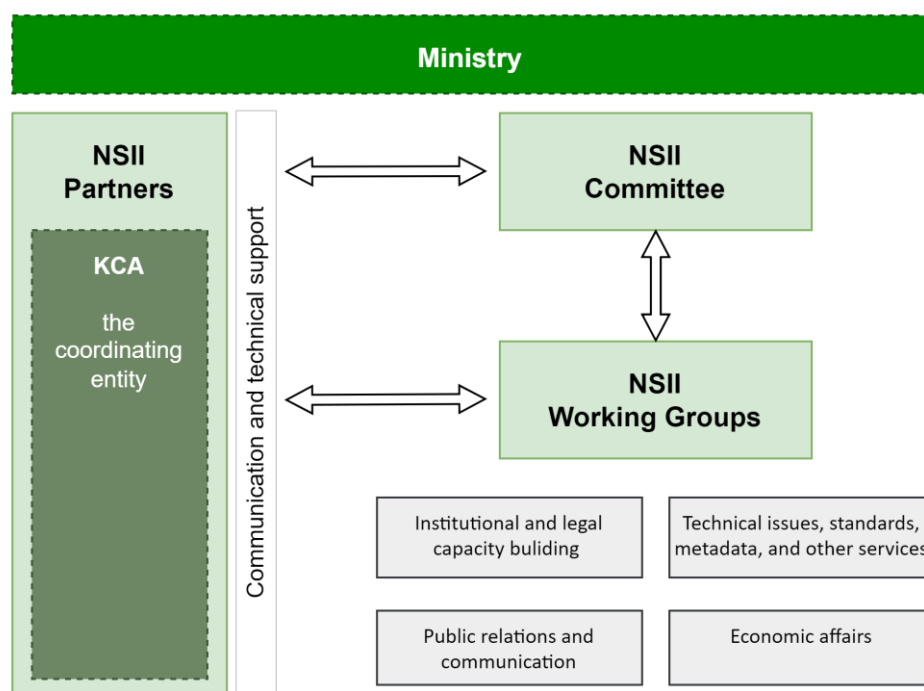
Figure 1: NSII governance structure

The NSII Committee is known as the Interministerial Committee for Land Administration and National Infrastructure for Spatial Information. According to Law No. 08/L-010, this committee serves as an advisory body to KCA, providing guidance on the development of the national spatial information infrastructure.

4.2. Best practices

In 2007, the European Union ratified the INSPIRE Directive, thus laying the foundations for a European Community-wide Spatial Information Infrastructure. This directive describes cooperation and collective solutions for digital services and data exchange. Kosovo has incorporated the principles of the INSPIRE Directive into its Law on Spatial Information. Increasing digitalization in various fields gives rise to new perspectives for collecting, analyzing, and creating knowledge, as well as encouraging information exchange, collaboration, and engagement between stakeholders.

Within the business sphere, spatial information paves the way for increased efficiency, digital creativity, and business growth. Spatial data-based software solutions and services provide significant export prospects for our knowledge-driven sectors. At the same time, global technology and content corporations have emerged as important players, by offering multiple location-based services to the public.

Prerequisites for electronic access to public spatial information

The INSPIRE Directive (2007/2/EC) requires EU member states to make national spatial information available electronically. The directive is also incorporated into Law No. 08/L-010. The directive is a framework directive, in which the most detailed requirements are found in separate implementing directives that, in Kosovo law, have been implemented in regulations in accordance with Law No. 08/L-010. This includes, for example, requirements:

- to make spatial information available electronically with standardized online services for searching, viewing and downloading
- to ensure that spatial data and related services can interact with other data and services
- to document spatial data and related services

The directive is based on the following principles:

- The European infrastructure is built on the national spatial data infrastructures of individual countries
- National infrastructures facilitate
  - that spatial data are stored, made available and maintained at the most appropriate administrative level
  - that spatial data from different sources across Europe can be combined in a unified way and distributed to multiple users and application fields
  - that spatial data collected at one regulatory level may be made available to authorities at other levels
  - that spatial data be made available based on conditions that do not unreasonably limit the broad use of such data

It will be easy to find spatial data, assess whether the data is adequate for the intended purpose, and ascertain the conditions that apply to the use of the data.

The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) emphasizes the importance of a robust spatial knowledge base for achieving the Sustainable Development Goals and other objectives. The Organization of the United Nations has drawn up directives that define how member states should formulate spatial information, including management solutions and infrastructure. The current strategy largely complies with this United Nations initiative.

Currently, spatial information is interrelated with emerging technologies such as Intelligent Transportation Systems (ITS), sensor technologies, and machine learning. This presents various technological opportunities for the automation and intelligent use of spatial information, through the rapid developments that are taking place. However, the acceptance of these innovations must coincide with the readiness to tackle new challenges, such as information security.

Automating workflows based on spatial information will require more strict standards of data integrity and ensuring of the availability and functionality of data. As our continued dependence on data increases, so does our risk; therefore, Kosovo NSII should give priority to basic information security requirements.

Often, there are significant entry barriers to the effective use of spatial information. It is imperative to make dedicated efforts to meet users' demands for services and provide efficient and barrier-free access. Joint solutions and open interfaces that empower third-party providers to create user-friendly services that take advantage of the infrastructure are essential.

Kosovo is in the initial phase of creating the digital infrastructure of spatial information, but the amount of digital information in society is increasing. Spatial information is no exception. Several actors are using a large amount of resources to collect, maintain and analyze spatial information.

Good quality spatial information is a core part of the knowledge base for many processes in society

This means that the use of spatial information will be part of the solution for managing the social challenges of our time:

- **Internationalization**. The Internet, cross-border cooperation, and trade contribute to increased globalization and bring new demands for the adaptation of cross-border data flows and digital services, and this applies to spatial information as well.

- **Geopolitical situation.** The number of incidents is increasing in the regions of Kosovo. National military and civilian experts should be able to interact during certain events. The use of spatial information is of key importance in this point.

- **Emergency planning.** New threats and vulnerabilities emerge. The demands for good emergency planning for serious incidents are increasing, and the ability to oversee crisis situations is becoming increasingly important. Up-to-date spatial information is an important tool for assessing threat situations and the ability to act promptly and appropriately.

- **Climate change and other environmental challenges**. Climate change may cause more and more landslides, floods, and other weather-related natural disasters. The prerequisites for food production and food security are gradually changing. Spatial information is an important element of work with adaptation to climate change and other environmental challenges, including land use planning by municipalities.

- **New business activities.** Agriculture, tourism and renewable biological resources are becoming more and more important for the Kosovar economy.

- **An efficient public sector.** Public administration connects a large part of the resources in society. There is a need to perform tasks more efficiently through digitalization and more efficient ways of working. Spatial data infrastructure directly contributes to improving the efficiency of the public sector. The municipal sector is simultaneously a producer and a user of spatial information. Joint solutions enable regional authorities, municipalities, and central government agencies, such as KCA, to benefit from economies of scale through collaboration. Maintaining and developing a well-functioning infrastructure for the data that is needed will be costly at the same time.

- **Urbanization.** Public services in the cities of the future will be based on advanced three-dimensional data above and below ground, as well as sensors and cameras that monitor traffic, energy consumption, and other environmental factors. Smart cities are characterized by efficient urban planning, a base of the best knowledge in the construction sector, optimization of traffic and energy consumption, and more dynamic

---

dimensioning of tenders. Spatial information is key to this.

- **Sustainable Development Goals.** In autumn 2015, UN Member States adopted 17 Sustainable Development Goals for 2030. The Sustainable Development Goals examinethe environment, economy, and social development in the given context. They apply to all countries and are a guide for global efforts for sustainable development.

Along with the INSPIRE Directive and other EU directives, the Kosovo NSII also reviews the work of the Open Geospatial Consortium (OGC) and ISO/TC 211 Geographic Information/Geomatics.

Best practices of OGC can, for example, describe how standards apply against scenarios or define a profile of a standard to tailor that standard to the requirements of a specific community. The relevant standards for the implementation of NSII in Kosovo at this stage include: Simple Feature Access, Geography Markup Language (GML), Web Map Service (WMS) and Web Feature Service (WFS).

The list of standards from the ISO/TC 211 committee is long. Relevant standards for the implementation of NSII in Kosovo at this stage include: ISO/DIS 19115-1 Geographic information - Metadata - Part 1: Basics, ISO 19131:2007 Geographic information - Data product specifications, and ISO/ DIS 19157 Geographic Information - Data Quality.

4.3. Development trends

4.3.1. Status and trends related to spatial data

Central government and municipalities collect and manage spatial information – This represents the foundation of the national knowledge base in Kosovo. The information is used in various administrative procedures but is also included as part of various public services. Moreover, this information is the basis for value creation in commerce and industry, and everyone benefits from it. Municipalities and the Kosovo Cadastral Agency (KCA) are important contributors, providers of facilities, and users of the knowledge base. They create, develop, partially finance, and maintain detailed spatial data. The recording of administrative data covers most human-made changes to the physical environment. The content of the NSII Geoportal will function as the Kosovar Public Database of Spatial Data and will be used for taking decisions, approving requests, preparing and processing plans in accordance with Law No. 04/L-174 on Spatial Planning [2]and to develop local communities. Among other things, the municipalities use the data in their work for adaptation to the climate, dealing with environmental issues, and protecting interests.

A strong spatial knowledge base is important for developed cities and communities - The construction industry is a multi-billion-euro industry that can achieve more predictability, better engineering support, and more efficient interaction with municipalities through the use of integrated spatial information. The demand for data content in the infrastructure is increasing, and society processes are becoming more and more dependent on reliable data from different sources, often in different fields. The need for regular updates is also increasing, with real-time

---

[2]*http://old.kuvendikosoves.org/common/docs/ligjet/Law%20on%20spatial%20planning.pdf*

updates of data needed in some cases, such as addresses. Often, user expectations for data content and quality exceed what the spatial data infrastructure currently provides. With digital spatial information becoming more widespread in previously unused fields of society, new users will emerge who will require different data and different levels of detail by contributing to the infrastructure with new data. These evolving needs and expectations for data content will put pressure on infrastructure, and thus require efforts to improve data quality.

There is a need to improve the use of collective efforts – These efforts are needed, as obtaining and managing data often involves considerable costs. It is of essential importance to obtain maximum value from these collective efforts through collaboration. Government agencies at the central level have identified specific data requirements within their areas of responsibility and allocated investments accordingly. Municipalities produce data to fulfill their role as service providers and authorities, such as municipal masterplans, detailed technical maps, and bridge networks. To achieve success, effective collaboration must be achieved and collaborative structures put in place to create, manage, and maintain detailed data in a coordinated manner.

Cooperation is reasonable and necessary in social and economic aspects. Furthermore, many international programs focused on environmental and resource monitoring contribute with a significant volume of new data. The importance of international cooperative initiatives is expected to increase in the future. Copernicus, a well-known European program that uses satellites and sensors for environmental monitoring, climate analysis, and civil protection, provides data on land use, changes in vegetation, water quality, weather conditions, air quality, pollution, and greenhouse gases. This includes a significant amount of data that is currently accessible and must be used effectively by imposing new, significant demands on the spatial information infrastructure.

There is a need for greater involvement of actors outside public administration - Educational institutions, such as high schools, universities, and research institutions, together with national and international research and development programs produce valuable data that can contribute to agreement processes and the creation of value. Currently, this information is not easily accessible for reuse. There is a need to create stronger links between the spatial data infrastructure and research data. By including georeferenced research data in Kosovo's shared knowledge base, the spatial data infrastructure can effectively support research in line with the national strategy for sharing and distributing research data. This mutual integration is crucial. NSII should serve as a source of data for research while also facilitating the storage and disclosure of research data related to spatial information.

Private entities play a role in data production – These entities are engaged with central government agencies or municipalities through activities such as development plans, license applications, impact assessments, and environmental assessments. It is essential that these data be integrated into our comprehensive knowledge base on a wider scale. In addition, private companies create databases for specific purposes, which may include comprehensive road maps, topography, and so on. Global groups such as Google, Apple, and Mapping Services Company Here are some notable examples of entities that have undertaken these initiatives. These actors go beyond the use of basic, detailed maps and aerial imagery; they also include three-dimensional terrain models and various thematic information in their systems.

4.3.2. Status and trends related to technology and services

Infrastructure needs further enhancement- Standards play a vital role in infrastructure. Spatial information has relied on national standards since a long time ago. These standardization initiatives must evolve in accordance with the new demands of society, advancements in technology, and new international standards. Harmonized data formats, standardized concepts, and similar aspects are necessary for international cooperation, research, and addressing challenges that include sectors and geographical boundaries.

Kosovo is in its early stages of NSII development but has adopted modern data collection techniques. However, only few stakeholders have established effective processes for producing spatial information. Effective management of information will remain a fundamental requirement for the future of infrastructure. Furthermore, a consistent approach to information security must be established. This includes robust mechanisms for handling classified information within the infrastructure. The Kosovo Cadastral Agency (KCA), as a facilitator, along with the data owners and contributors, are responsible for maintaining confidentiality, data integrity, and the availability of information within the infrastructure.

Integration of infrastructures, data, and services is growing in importance. Spatial information currently shows different levels of integration with existing IT solutions. Addressing the challenge of insufficient user requirements is critical. Global entities are providing more and more services and data in the cloud by improving access and potentially reducing user barriers. However, the emergence of new user platforms and mobile devices gives rise to new standards and user-concentrated service requirements for the infrastructure.

Improving the integration of national infrastructure spatial information with operational processes and user tools is essential. Collaborative infrastructure and solutions must interact with commercial software without problems while remaining acceptable on all platforms. Ensuring fully digitally efficient processes, promoting service innovation, and optimizing the knowledge base are some of the objectives of the infrastructure.

Infrastructure must accommodate new data types and technologies - Spatial data infrastructure must have the ability to manage new data types and larger data volumes. The use of three-dimensional (3D) data for planning and engineering purposes is increasing, with the development of concepts such as computer-aided design (CAD) and Building Information Modeling (BIM). The demand for infrastructure to manage dynamic data (time series) is also increasing. Currently, censors are used for data quality assessment and analysis, including analysis of changes deriving from administrative data collection within organizations.

Also, the growth of Internet-connected devices contributes to a significant influx of censored data. Although this improves the collection of spatial information, at the same time it challenges the storage and processing capacities of the systems. The role of the infrastructure is to enable the widespread use of new opportunities to support decision-making through data analysis and big data. Furthermore, new methods and solutions must be developed to optimally handle sensors and other new data sources within the infrastructure.

4.3.3. Status and trends related to cooperation

Comprehensive knowledge is of crucial importance- Effective use of spatial data infrastructure depends on understanding its opportunities, limitations, and challenges. As technology develops, the

changing landscape of the use of spatial information may face obstacles due to a lack of user experience and the readiness of data providers for the application. The expertise of data producers, managers, innovators, and users will be appreciated. National cooperation is vital to improving expertise in this area, with the education sector playing a central and sustainable role.

Interconnection prevails - Spatial information will exceed its current scope with public data producers from the central government and municipalities. Existing collaborative frameworks cannot automatically adapt to growing demand, new data requirements, complex actor dynamics, and new technological opportunities. Spatial information will progressively support unified digital services that reveal spatial relationships, attributes, activities, and connections. These integrated services are often called "service chains." Ministries should evaluate the services of their sector in the wider context of the offers of other entities and their suitability for building service chains. In the future landscape, specialized spatial models will be interconnected not only nationally but also internationally, thus creating a comprehensive internal and external reality framework. Data flow from public and Internet-connected devices will be used collectively. This coherent data and system landscape requires deeper collaboration between stakeholders and contributors than is currently practiced.

The success of the implementation of this strategy depends on effective collaboration. All stakeholders must work together to ensure the implementation of the strategy. Irrespective of different roles as data owners, collectors, distributors, and service managers, the essence lies in having a common knowledge base and using it. Efficient interaction involves reusing data, services, and solutions. For smaller entities such as municipalities, access to common infrastructure solutions brings economies of scale and effective digital management, which in turn brings benefits to all and ensures robust computer systems and efficient services. Ministries should supervise their respective agencies responsible for sector-specific data.

4.4. Structural parameters

The advancement of NSII in Kosovo is a component of the Government's effort to digitalize and reorganize the public sector. Public entities express considerable interest in this infrastructure. In the framework of the digitalization efforts, returns are expected from investments in the knowledge base. Spatial information aims for broad use, including sectors and administrative levels, by facilitating effective decision-making and knowledge-based management.

Funds for infrastructure come from regular allocations, government fees for public authority actions, and financial support. In the future, greater emphasis should be placed on various forms of co-financing by infrastructure participants. Such agreement-based financing models have often been shown to be effective by promoting ownership of needs and sharing the risk among stakeholders. However, the suitability of these measures as exclusive financing mechanisms for critical social infrastructure remains a consideration. The need for a more detailed examination is necessary to identify funding mechanisms that align with the strategy and provide certainty for all stakeholders.

The primary responsibility for funding spatial data infrastructure continues to rest with the public sector. Collecting, maintaining, and managing spatial data has significant costs, especially for more detailed data. This becomes even more important with the increasing demand for such data due to the digitalization of society. While new data collection methods and technologies increase efficiency, the costs of data collection, maintenance, and management are expected to increase compared with current levels.

Given the critical role of spatial information infrastructure in social functions, securing the necessary funding for new data, ongoing operations, and content maintenance is crucial. Currently, this is provided mainly from the budgets of public sector agencies and less from the cost sharing between the stakeholders who benefit from the investments. Collaborative efforts and joint investments in data programs have proven historically effective in approximating user priorities and optimizing combined resources. However, this may not be a sufficiently predictable structure for the future.

The key point is that the advantages of high-quality data often outweigh the costs. Even though free access to high-level data may be favorable in socio-economic terms, the responsible entity may lack the resources to cover all the costs associated with collecting and maintaining data with sufficient detail or quality.

Government emphasis on open data

Prioritizing open access to public data and its subsequent use aims to provide businesses, researchers, and civil society with access to public sector data by enabling their application in new contexts. Access to open public data is important for society for three main reasons:

- **Enhancing efficiency and innovation** - The exchange of data between enterprises promotes improved interaction, more efficient service development, and improvement of public services.

- **Fostering business growth** - Trade and industry are empowered to create new services, products, and business models by having access to public information.

- **Promoting an open and democratic society** - Access to the foundations of decision-making and the priorities of the public sector provides a clearer understanding of how decisions are implemented and of results of political actions.

All stakeholders in Kosovo who rely on NSII and use its data as a basis for their services need certainty and a long-term perspective regarding data supply and related costs. This need is particularly noticeable for commercial entities, as they depend on economic predictability. Within the spatial domain, licenses that support data reuse will be used, providing value adders, innovators and others with opportunities to create sustainable business models.

Currently, each sector makes mainly autonomous decisions regarding data necessity, update frequency, quality, coverage, etc., within their specific thematic data field. While spatial information increasingly powers cross-sectoral applications and essential social functions, data quality and the demand for new data extend beyond individual enterprises or sectors. A broad description of available data, data requirements, and maintenance needs is extremely important. Next, potential principles and mechanisms for national prioritization of data maintenance, collection of new data sets, and improvement of data quality and interoperability of existing data sets should be explored.

5. Strategic Objectives

The main strategic objectives of this Strategy are:

- Standardization of Spatial Information (SSI)
- Advancement of Technology and Services (ATS)
- Cooperation (B)

5.1. Standardization of Spatial Information (SSI)

Spatial information is the digital connection between location, people, and activities. This information can graphically illustrate what is happening and where, how, and why to show past, present, and possible future knowledge and impact.

The knowledge produced by spatial information is of essential importance for the life of every citizen. In many cases, spatial information is presented on a map.

This strategic objective aims at the standardization of spatial information, which means the identification, collection, digitalization, maintenance, and distribution of this information as much as possible for use among the institutions that produce and use spatial information, as well as being open and easily accessible for wide use by citizens.

5.1.1. SSI1 - Data are known, financially supported and prioritized

Some spatial data serve as a basic element for the entire infrastructure in Kosovo. These core essential data should be further defined in detail, but they should have clear coverage, meet the desired quality standards, be regularly updated, and be easily accessible. In some cases, it may be necessary to create specific sets of data through legislation to ensure their availability and create a sense of predictability by facilitating automated decision-making processes.

Main data sets such as property, building, and address data from the land registry (Cadastre) must be of high quality since many social processes depend on them. It will be essential to establish effective processes and allocate resources for planning, prioritizing, and coordinating data collection, as well as maintaining and improving the quality of these data sets that have priority.

Such data can vary significantly in terms of quality and coverage. Certain data may be tailored specifically to meet the specific needs of certain user groups, while other data may serve some groups with higher requirements. The infrastructure must also support the inclusion of three-dimensional data, dynamic data, historical data, and processed information. Also, it should facilitate the acceptance of new technologies, enabling the use of big data and other

developments. A comprehensive overview of spatial information, including concerned properties and services, should be available through the map directory on the NSIIgeoportal[3].

Substantial volumes of spatial information are obtained through mapping software funded by the public sector as well as research initiatives conducted at universities, colleges, museums, and institutes. Moreover, as part of public development activities, projects, and advisory tasks, both private and public entities are obliged by various laws, regulations, and rules to produce spatial information documentation for activities such as license applications, spatial planning, and construction permit requirements.

This data has tremendous potential as a valuable source of information. However, to ensure effective management and use of this data, it is essential that all involved actors are aware of the respective requirements and ensure that the data is made accessible through the national infrastructure. At the same time, the infrastructure itself must be adapted to accommodate this data content.

Table 1: Indicators for the Specific Objective SSI1

Indicators for the Specific Objective SSI1	Starting point 2023	2024 Objective	2026 Objective
SSI1.1 Existence of a set of data sharing licenses like Creative commons, suitable for use by public sector data providers	No data sharing licenses exists	A simple and usable licensing system for public sector data is established	The licensing system is widely acknowledged and used by the stakeholders
SSI.2 Existence of a list of fundamental datasets with assigned owner	0%	100%	-
SSI1.3 Existence of organisations matched to the INSPIRE themes for which they have responsibility	0%	100%	-
SSI1.4 Existence of framework standards and data models for INSPIRE Annex I and II	0%	20%	40%
SSI1.5 Existence of framework standards and data models for INSPIRE Annex III	0%	10%	20%

[3]http://geoportal.rks-gov.net/en/filimi

5.1.2. SSI2 - Infrastructure facilitates reporting for national and European needs

Kosovar NSII adheres to the basic principles of INSPIRE with respect to the development of spatial data infrastructure. These principles include collecting data only once, storing it where it is most efficient, and enabling the continuous integration of data across different application domains.

Currently, reporting has a tendency to be fragmented, and the potential for more effective digital data collection, adaptation, and distribution through digital platforms remains unused. The national spatial information infrastructure aims to provide relevant data to various sectors of the public domain. Moreover, it will facilitate the correct and efficient coordinated exchange and reporting of data on a global scale for international objectives.

Table 2: Indicators for the Specific Objective SSI2

Indicators for the Specific ObjectiveSSI2	Base 2024	2025 Objective	2029 Objective
SSI2.1. Existence of metadata which is INSPIRE compliant	0%	40%	60%
SSI2.2. Existence of number of datasets and services INSPIRE compliant withpublished standards	0%	20%	40%
SIH2.3. Existence of a set of KPIs for Monitoring	The first set of KPIs for monitoring is described	Progress of the NSII can be monitored and appropriate policy actions taken by the NSII Committee	KPIs are approved by stakeholders

5.1.3. SSI3 –Infrastructure complies with the principles of open data

Making data publicly accessible includes more than simply publishing the data on a website for retrieval. Data must be made available in a way that enables users to understand its value. This means that both the legal aspects of how the data can be used and the technical methods of making the data available (formats and potential programming interface options) must be well described.

Access to public data contributes significantly to innovation, economic development, and transparency in society. Providing access to public data allows businesses, researchers, civil society, and the public sector itself to benefit from information managed by the public sector—to create value, increase efficiency, and increase transparency. The term "public data" includes all types of information held by public entities. Information subject to confidentiality will not be made available for further use.

To ensure that the technical, organizational and legal aspects are prepared for the optimal use of public data, there should be guidelines for organizations that manage public data. Currently, NSII does not have such guidelines.

Table 3: Indicators for the Specific Objective SSI3

Indicators for the Specific ObjectiveSIH3	Starting point 2023	2024 Objective	2026 Objective
SSI3.1 Existence of NSII data policy	No data policy exists	A well communicated data policy included metadata profile, creates clarity for all stakeholders is published	Data policy is adopted by the public and private sector, including academia

Online volunteer efforts and other methods of data collection from the general public pave the way for additional access to data. The infrastructure currently includes some instances of publicly provided data; however, there is potential for improved support. Setting standards for data collection, quality assurance, and modeling is essential to fully utilizing these types of data for the benefit of public administration.

5.2. Advancement of Technology and Services (ATS)

This Strategic objective is aimed at the development of the technical infrastructure that enables the collection, processing, and maintenance of spatial information in one place and enables this information to be distributed through network services in the easiest and fastest way for universal use. This is made possible by using advanced technology as well as creating network services according to the most recent standards in this field.

5.2.1. ATS1 –NSII Geoportal guarantees an uninterrupted flow of data across sectors and levels

In the present scenario, public sector entities exchange and reuse data, but there is room for streamlining data flow. Spatial information can be harnessed more effectively than the current state – across various platforms and with diverse technological means. In the future, commercial stakeholders will demand higher standards for the infrastructure's availability, reliability, and functional interfaces. This arises from their combining of public information with their business models, depending on data accessibility and quality for economic success.

As a result, the technology KCA builds its NSII upon will be enhanced into a national service-oriented architecture with standardized and sought-after interfaces. This evolution will ensure an efficient data flow across sectors and levels. Accessible search and entry solutions will be provided through robust interfaces and integration opportunities.

Table 4: Indicators for the Specific Objective ATS1

Indicators for the Specific ObjectiveATS1	Starting point 2023	2024 Objective	2026 Objective
ATS1.1 Existence of NSII Geoportal	The existing geoportal is subject to improvement	The Geoportal provides tools for users to use the services and enables users to upload their own spatial data, including metadata, to enable the services created	The geoportal is further professionally developed and maintained
ATSH1.2 Existence of a NSII website	No website exists	There is a well-structured website with NSII guidelines and training material	A good maintenance practice has been established
ATS1.3 Existence Quality of Service (QoS) indicators	No QoS exists	A set of indicators factors such as network latency, bandwidth, reliability, availability, packet loss, jitter, and other relevant parameters are standardised	Indicators are discussed, described and updated annually
ATS1.4 Existence of web-based training module	There is no training module	A web-based training module that provides essential support and training to both stakeholders and the KCA, by ensuring that quality control processes are carried out in effective manner.	All stakeholders are familiar with the module and have used it for training purposes
ATS1.5 Existence of an online training material for accessing and using metadata and spatial information	There is no training module	In progress	Included in the web-based training module

The infrastructure must adhere to a system guaranteeing the confidentiality, integrity, and availability of information. Clearly defined principles and responsibilities are essential. Data owners hold individual accountability for preserving information security concerning their data, software systems, and services.

Within the central infrastructure, shared mechanisms, components, and systems should be implemented for information security management. Annual risk assessments are necessary for all systems that exchange data within the infrastructure. Additional information security prerequisites can be found in Kosovar laws and regulations.

5.2.2. ATS2 – Joint solutions for the storage and management of spatial information

Well-made and user-friendly shared solutions can enhance coordinated data management in Kosovo. Public data providers should deliver data via electronic services while upholding expected quality. Reliability in the NSII platform services is crucial for users. Further development of national (central and distributed) storage and management solutions for spatial information is necessary. These solutions should support tasks like impact assessments, license applications, and other processes initiated by the public sector, which may involve private actors too.

Exploring the feasibility of national cloud solutions for spatial information management, adaptation, and sharing is also important. Cloud-based solutions might decrease the need for local alternatives and potentially save costs.

.

Table 5: Indicators for the Specific Objective ATS2

Indicators for the Specific ObjectiveATS2	Starting point 2023	2024 Objective	2026i Objective
ATS2.1 Existence of signed copies of the finalised data sharing agreement exist	No data sharing agreement exist	Data sharing agreement is adopted by some stakeholders	Data sharing agreement is widely adopted, also by private sector

5.2.3. ATS3–Development of infrastructure is oriented to SOA and is prepared for modern data processing.

Modern technologies like sensors and drones have significantly improved data collection in various sectors. Embracing sensor technology offers better data quality, enhanced knowledge, and more efficient data gathering compared to traditional methods like mapping. For instance, data collection can involve the general public through mobile devices.

The supplier industry and data contributors should collaborate on developing methods and initiatives that promote sensor technology's expanded use for efficient data acquisition. An increased reliance on sensors is anticipated to yield a constant stream of geo-referenced data, driving substantial growth in dynamic data within the infrastructure for years to come. However, achieving this requires further infrastructure development to better accommodate such data.

Intelligent connections and analysis of extensive data will underpin fresh insights and streamlined decision-making processes in both public and private sectors. In the future, big data holds the potential for significantly enhancing the utilization of the data within the spatial data infrastructure. Ideally, this would involve integration with other data types like socio-economic

information, social media, and global data. Further examination will be conducted on how to effectively incorporate big data into the infrastructure.

Numerous fields necessitate information that goes beyond the scope of two dimensions. Notably, activities like planning, engineering, and managing underground service lines, as well as energy well drilling, require multidimensional data. For instance, three-dimensional data encompassing engineering specifics, terrain profiles, underground information, volumes, etc., are rapidly evolving. Presently, shared solutions for managing the intricate information present in modern engineering tools like Building Information Modelling (BIM) and computer-aided design (CAD) are lacking. Technology capable of managing such data within the spatial infrastructure, from collection to application, must be assessed, developed, and implemented.

Standards play a crucial role in ensuring a consistent data flow, facilitating integrations, and enabling cross-platform, cross-sector, and cross-domain utilization. The architectural principles and standards that applies for Kosovo i.e., SOA principle and requirements described in the administrative instructions, are applicable to the NSII as well. Both national and international standardization efforts should prioritize forward-looking standards, including the effective integration of sensor technology and novel data capture methods. Moreover, the standards and services within the infrastructure should promote seamless integration with users' existing technological environments. New domain-specific standards that emerges must also be considered. These standards should also allow for integration with various data types.

Table 6: Indicators for the Specific Objective TS3

Indicators for the Specific ObjectiveATS3	Starting point 2023	2024 Objective	2026i Objective
ATS3.1 Number of services developed according to SOA principles and INSPIRE compliant discovery-, view-, download-, transformation-, and invoke services.	0	2	4

5.2.4. ATS4 – Development of the adequate national spatial reference system for accurate positioning

Accurate navigation and positioning services are gaining elevated significance in utilizing spatial information. An essential condition for this involves possessing suitable reference systems for positioning, facilitating users in determining spatial coordinates like latitude and longitude with satisfactory precision and dependability (geodetic spatial reference system). Consistent supervision and updating of this national spatial reference system are imperative.

For all applications, the aim is to provide optimal positioning services aligned with international standards for a robust global geodetic reference system. Elevated precision demands necessitate parallel enhancements in the national spatial reference system.

Table 7:Indicators for the Specific Objective ATS4

Indicators for the Specific ObjectiveATS4	Starting point		2026i

	2023	2024 Objective	Objective
ATSH4.1 Definitive national spatial reference system with all parameters published	60%	80%	100%

5.3. Cooperation (B)

This strategic objective aims at general and genuine cooperation between all actors for the creation and implementation of the National Spatial Information Infrastructure. This cooperation is necessary starting from the Government of the Republic of Kosovo, the responsible ministry, which in this case is the Ministry of Environment, Spatial Planning, and Infrastructure, the Cadastral Agency of Kosovo as the coordinator of the NSII in the Republic of Kosovo, the public authorities that produce and use spatial information, third parties, as well as directly the citizens of the Republic of Kosovo.

5.3.1. B1 – Increasing cooperation and interaction throughout the public sector

Cross-sector collaboration holds significance and has demonstrated substantial advantages within the spatial domain. Successfully implemented NSIIs typically have numerous agencies and enterprises established a tradition of cooperation through financial and technical collaboration structures. Future arenas in Kosovo should maintain the effectiveness of such structures yet necessitate further enhancement to formulate decisions about data content, standards, and collaborative solutions.

It is vital for this collaboration to support municipalities' public obligations toward citizens and their responsibility for critical infrastructure data. Municipalities, together with other public entities, should actively participate in shaping shared infrastructure solutions. Additionally, this collaboration must contribute to secure funding for prioritized infrastructure data. KCA will serve as the facilitator, bearing responsibility for cross-sectoral cooperative structures at the agency level.

.

Table 7: Indicators for the Specific Objective B1

Indicators for the Specific ObjectiveB1	Starting point 2023	2024 Objective	2026i Objective
B1.1. Existence of the responsible NSII department/unit, including central services	A designated team is working for NSII in the KCA	There is more than one year that a responsible unit with sufficient funds, personnel, and good working environments, is operating	The unit works well and good practice has been established
B1.2. Existence of anNSII Annual Work Plan	There is no work plan	Work plans are published and stakeholders participate in the work	A good practice has been established
B1.3. Existence of Risk Management Framework	No framework exists	A Risk Management Framework has been created	A good practice has been established
B1.4 Existence of NSII	Some background	Plan to make the most	The plan is subject

exploitation plan	is found in supporting document of this strategy, Annex B	of the resources, assets, or opportunities to achieve specific objectives or goals is published	to annual discussion and approval by the NSII Committee
B1.5 Existence of separate stakeholder NSII Implementation Plans	0%	20%	100%
B1.6 Existence of development plans describing each stakeholder NSII services and infrastructure to demonstrates that they comply with NSII requirements	0%	20%	40 %

5.3.2. B2 - Development of cooperation model for all contributors and users

The NSII collaboration should more extensively establish broad obligations for advancing the infrastructure. This model should enable sectors and smaller agencies previously uninvolved to join, allowing them to enhance their usage and contribute. The potential for varied terms and membership within the collaboration model should be explored. Defining responsibilities for priority data sets (core data) in the infrastructure is also crucial. For individual data sets in the Kosovar Public Base of Spatial Data, responsibilities will be clarified during the Ministry's regular approval processes for this data base. Numerous sectoral laws mandate work processes dependent on spatial information use. Some even necessitate specific spatial information without comprehensive guidance. When revising such laws, regulations, and rules, clear data quality requirements and responsibility guidelines should be outlined to ensure effective, widespread data utilization.

Enhancing the private sector's contribution to and utilization of the infrastructure is also essential. This collaboration spans various levels: technical solutions, data provisions, and developing new user applications and services. Establishing common platforms for defining responsibilities and coordinating efforts between the public and private sectors will be facilitated.

Table 8: Indicators for the Specific Objective B2

Indicators for the Specific ObjectiveB2	Starting point 2023	2024 Objective	2026i Objective
B2.1. Existence of formal NSII government to government partnerships (G2G)	Some informal contact exists	One partnership established	Three partnerships established

5.3.3.B3 – Broad dissemination of spatial knowledge

Understanding spatial information and methods is vital for implementing this strategy. Facilitating sufficient knowledge and expertise on spatial information within the educational sector requires cross-sector collaboration. This fosters proficiency in utilizing and advancing user solutions rooted in spatial information, promoting innovation and societal value creation.

More innovation and R&D in the spatial area shall contribute to better utilisation of the realm of possibilities. Public and private actors in the infrastructure must cooperate on this. Research communities should also contribute to the development of the infrastructure.

There is a need for research and development in the areas of data capture, efficient data management and technologies for the use of data (data analysis, visualisation, etc.). Spatial innovation and R&D can be facilitated together with the public policy system (research agencies, national innovation agency and others). Actors in the public and private sectors in Kosovo must a greater extent be encouraged to submit joint applications and participate in related national and international research programmes.

Table 9: Indicators for the Specific Objective B3

Indicators for the Specific ObjectiveB3	Starting point 2023	2024 Objective	2026i Objective
B3.1 Training and Education Needs Analysis (TENA) Report and a Training and Education Plan exist	TENA and Training- and Education Plan do not exist	Report and Plan delivered. Further indications would include numbers of people trained courses established	Long-term development of the NSII education is in place at universities
B3.2 Practical guideline/ handbook for quality control of NSII approved spatial data and metadata exists	No guidelines on quality control exists	Published guideline for one dataset	Guidelines for two additional datasets exists
B3.3 Knowledge management system allowing stakeholders to learn as experience exists	No knowledge base is established	A web page with best practice case studies, networks of domain specific expertise and other sources is established	The knowledge base has a well-developed maintenance routine and widely used by all sectors
B3.4 Rate of NSII stakeholder partner's personnel trained	10%	20%	60%

6. Monitoring, reporting and evaluation of implementation

Monitoring, reporting and evaluation of the implementation of strategic documents is defined in Article 16 of the Administrative Instruction (GRK) no. 07/2018 on planning and drafting strategic documents and action plans.

Article 16

Monitoring, reporting and evaluation of the implementation of strategic documents

1. Inter-ministerial coordination structures for strategic documents shall be established in order to ensure regular monitoring of the implementation of strategic documents, including details on the monitoring, reporting and interim reviews and the final evaluation of the implementation of the strategic document.

2. The sponsoring ministry is responsible to continuously monitor the implementation of the approved strategic document and undertake actions, if necessary to ensure timely and effective conduct of the activities set out in the Action Plan.

3. The responsible ministry shall prepare animplementation progress (implementation) report on an annual basis, which shall be completed by the end of the first quarter of the following year, and six-month report on action plan monitoring. The progress report should provide a comprehensive evaluation of implementation and detailed information on:

3.1. Achievements compared to objectives through the indicators set (if applicable, but at least for the two last years);

3.2. Timeline of actions undertaken;

3.3. Use of financial resources;

3.4. Main implementation obstacles;

3.5. Any new factoraffecting implementation;

3.6. Suggested corrective measures, including provision of lacking funds

4. The report shall be approved by the Secretary General of the Ministry responsible for the strategic document and will be discussed by representatives of the main participating institutions under the chairmanship of the SPO for final approval. In the case of unresolved disputes, the matter shall be subject to decision-making at the SPC. The approved final report shall be published.

5. The SPO shall present a comprehensive annual report to the SPC (which will be discussed in advance at SPSG), based on the progress reports mentioned above, on the implementation of all

strategic documents being implemented. If necessary, the SPO may request additional reports from the relevant ministries.

6. In case of any significant problems encountered during implementation or in case of altered circumstances, the responsible ministry shall inform the SPO on due time. The responsible ministry and the SPO, after assessing the situation jointly, shall propose the necessary action to the SPC.

7. Based on the progress reports of the strategic documents, and based on the monitoring system, where necessary, the midterm review / evaluation of the action plans is done. The procedures for drafting and approving revised plans shall be subject to the same procedures set out in this Administrative Instruction for the new initiatives.

8. Within three (3) months after the finish of the deadline of the strategic document implementation, the responsible Ministry submits a final report to the SPO containing the information required in 3.1 to 3.6, an assessment of whether the strategic document objectives have been achieved through the implemented actions as well as proposals for future steps, if necessary for accomplishing them. The final report shall be approved by the Minister and then discussed with the main participating institutions and the SPO prior to submission to the SPC. In case of disagreement, the SPO may submit a parallel assessment to the SPC.

9. Detailed guidelines for the system of monitoring, reporting and evaluating strategic documents including the necessary formats will be provided in the "Manual for Preparation of Strategic Document".

7. Budget impact

This section focuses on the overall cost estimates for implementing the NSII. Firstly, calculation is estimated for the first three years for the strategic objectivesTable 10: Three-year cost estimates of NSII strategic objectives (in euros)

Strategic objective	2024	2025	2026
Standardization of Spatial Information	172 000	181 000	141 000
Advancement of Technology and Services	365 500	663 000	434 000
Cooperation	105,000	41 000	46 000
TOTAL	**642 500**	**885 000**	**621 000**

Experience shows that the dynamics of implementation of information infrastructures requires an understanding of the cost also related to maintenance. The Integrated Geospatial Information Framework (IGIF) and methodology developed by the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) and the World Bank is a valuable source of information on planning and implementing NSII's. The methodology suggests that following principles could apply to the calculation of implementation cost:

- **Life Cycle** –5 years of investment followed by 7 years of use, this is commensurate with the infrastructural nature of the investment but considering the increasing pace of technological change considering any longer period increases uncertainty to unacceptable levels.

- **Inflation** – is assumed to have an equal effect on costs and benefits and neutral in accounting terms, so inflation effects are not considered in the model.

The table below summarises the costs for the strategic objectives for the strategy period 2024-2028. It presents the one-time set-up cost (referring to the costs necessary for the NSII-establishment), and ongoing cost per year (referring to the costs necessary for the NSII-maintenance).

Table 11Life cycle NSII cost estimates of the strategic objectives by categories (in euros)

Strategic objectives as perNSII categories	5 year implementation cost
Strategic Objective – Standardization of Spatial Information	
METADATA	14 750
DATA	225,000
STANDARDISATION	282 500
DATA SHARING	50,000
Strategic Objective - Advancement of Technology and Services	

SERVICES	158 750
INFORMATION TECHNOLOGY	1 025 000
APPLICATIONS	225 750
Strategic Objective - Cooperation	
GOVERNANCE	50,000
CAPACITY BUILDING	57 500
OUTREACH	18 950
PERFORMANCE MANAGEMENT	3000
RESEARCH	0
UNFORSEEN	62 500
TOTAL	**2 173 700**

Based on the information indicated in the table, the estimated total one-off cost for the National Spatial Information Infrastructure in the Republic of Kosovo is around 2.2 million euros. Moreover, the ongoing cost per year is estimated to be around 0.6 million euros. These costs include various aspects such as the creation and maintenance of metadata, data, services, IT infrastructure, standardization efforts, governance, data exchange mechanisms, capacity building initiatives, development of applications, field activities, performance management, research activities, and the calculation of forecasted expenses.

Taking into consideration the duration of 5 years for implementation and 7 years for maintenance, the estimated total cost reaches about 6.2 million euros. You should bear in mind that the cost is usually high in the first years of implementation and falls after the third and fourth years. Comparing the cost estimates of implementing NSII with those of other NSIIs is challenging because of the distinct and individualized context in which they occur during NSII implementation. Each NSII has its own unique circumstances, and the interpretation of what an NSII should include also varies considerably. Therefore, direct cost comparisons between NSII implementations become difficult.

Thebelow table provides an explanation of the cost estimates for each strategic objective and category in relation to potential funding. Please refer to the table for a detailed overview of cost estimates for each category. Additionally, this document includes a review of funding options for funding these activities, along with the rationale behind the cost estimates.

The following financing options have been identified and used:

1. Direct funding from Central Government – directly from citizens and private sector taxes

2. Indirect funding from Central Government – i.e., tax waivers

3. Direct income – sale of products and services (i.e., KCA orthophotos)

4. Sponsorship / advertising (i.e. via geo-portal)

5. Indirect revenue – from products and services related to spatial data, i.e. registration of real estates

6. Partnerships:

    a. Government and joint funding partnerships with donor agencies (i.e., World Bank)

    b. Donor agencies and partnerships with the private sector

    c. Donor agencies, government and private sector partnerships

    d. Partnerships with the international private sector

7. Funding from donors in the form of a "gift"

8. Non-cash private sector contribution, i.e., services such as software development, advertising

9. Special bank / Special loans

Reasoning of cost estimates is highly dependent on local knowledge regarding the anticipated implementation timeline, human resource expenditures, and ICT costs. It is important to note that these estimates should be considered preliminary and be subject to verification through action plans and more accurate calculations.

Table 12: Breakdown of NSII life cycle cost estimates by strategic objectives, categories, sub-categories and funding options (in euros)

ACTIVITIES	5 year implementation cost	Funding option
Strategic Objective – Standardization of Spatial Information		
METADATA	**€14,750**	**1 / 6a / 7**
- Creation of metadata	€9,375	1 / 6a / 7
- Metadata course	€3,125	1 / 6a / 7
- Maintenance of metadata	€0	1 / 6a / 7
- Metadata quality control procedure	€2,250	1 / 6a / 7
DATA	**€288,750**	**1 / 5 / 6a**
- The transformation or adaptation of data in accordance with the INSPIRE implementing rules for all stakeholders	€225,000	1 / 6a
- Harmonisation of data that are not according to INSPIRE and ISO specification	€45,000	1 / 6a
- Data quality control procedure	€18,750	1 / 5 / 6a
STANDARDIZATION	**€282,500**	
- Initiate work on standardisation of spatial data and metadata	€75,000	1 / 6a / 6c
- Develop product specification for core NSII data	€100,000	1 / 6a / 6c

- Develop spatial data quality guidelines	€100,000	1 / 6a / 6c
- Establish an Interoperability Forum	€7,500	1 / 6a / 6c
DATA SHARING	**€50,000**	**1 / 3 / 6a**
- Creation of spatial data sharing tools	€50,000	1 / 3 / 6a

Strategic Objective - Advancement of Technology and Services		
SERVICES	1580 €	1 / 5 / 6a / 6c / 8
- Maintenance of a national Geo-portal (including all network services)	€50,000	1 / 5 / 6a / 6c
- The development of the services prescribed in INSPIRE	€62,500	1 / 6a / 6c / 8
- The maintenance of the services prescribed in INSPIRE	€0.0	1 / 5 / 6a / 6c
- E-commerce service	€31,250	1 / 6a / 6c / 8
- Creation of centralised registry functions	€15,000	1 / 6a / 6c
- Maintenance of centralised registry functions	€0.0	1 / 5 / 6a / 6c
INFORMATION TECHNOLOGY	**€1,025,000**	**1 / 3 / 6a / 6c 7 / 8**
- Investments in IT	€125,000	1 / 6a / 7 / 8
- Network architecture (+ Webservice installation at the stakeholder'slocation)	€75,000 (€250,000)	1 / 6a / 7 / 8
- Hardware	€250,000	1 / 6a / 7 / 8
- Software	€250,000	1 / 6a / 7 / 8
- Data base management	€75,000	1 / 3 / 6a / 6c
- Rents for links	€0.0	1 / 3 / 6a / 6c
APPLICATIONS	**€225,750**	**1 / 5 / 6a / 7 / 8**
- Development/ implementation of Example Use cases	€9,000	1 / 5 / 6a / 7 / 8
- Development/ implementation of pilot applications	€29,250	1 / 5 / 6a / 7 / 8
- Integration of spatial data into e-services	€187,500	1 / 5 / 6a / 7 / 8

Strategic Objective - Cooperation

GOVERNANCE	€50,000	1 / 3 / 6a
- NSII Committee meetings	€25,000	1 / 3 / 6a
- NSII KCA administration	€15,000	1 / 3 / 6a
- Working Groups	€10,000	1 / 3 / 6a
CAPACITY BUILDING	€57,500	1 / 4 / 5 / 6a / 6b / 6d / 6e / 7 / 8
- NSII Training needs analysis	€37,500	1 / 4 / 5 / 6a / 6b / 6d / 6e / 7 / 8
- Stakeholder Engagement workshops	€0.0	1 / 4 / 5 / 6a / 6b / 6d / 6e / 7 / 8
- Delivery of Technical Training	€25,000	1 / 4 / 5 / 6a / 6b / 6d / 6e / 7 / 8
OUTREACH	€18,950	1 / 4 / 5 / 6a / 6b / 6d / 6e / 7 / 8
- Publicity	€6,250	1 / 4 / 6a
- Website	€2,700	1 / 4 / 5 / 6a
- Workshops + conferences	€10,000	1 / 4 / 5 / 6a / 6b / 6d / 6e / 7 / 8
PERFORMANCE MANAGEMENT	€3,000	1 / 6a
- Monitoring and reporting	€3,000	1 / 6a
- RESEARCH	€0.0	1 / 6a
- Research and development and improvements	€0.0	1 / 6a
UNFORSEEN	€62,500	-
- Unforeseen	€62,500	-
TOTAL AMOUNT	€2,173,700	

8. Annexes

The following annexes have been made available at the request of the Kosovo Cadastral Agency (KCA) for more information and detailed analysis carried out during the strategy drafting process:

- Appendix A - Definition of Mission and Strategic Vision
- Appendix B - Finance-related Issues
- Appendix C - Definition of Governance Structures
- Annex D - Outreach and Capacity Building
- Appendix E - Implementation Roadmap

9. Action Plan

The table presented below employs abbreviations as follows:

GLOSSARY	Description
	Financing source
1	DIRECT CENTRAL GOVERNMENT FUNDING – DIRECT FROM CITIZENS AND PRIVATE SECTOR TAXES
2	INDIRECT CENTRAL GOVERNMENT FUNDING – E.G., WAIVING OF TAXES
3	DIRECT REVENUE – SALE OF PRODUCTS AND SERVICES (E.G., KCA ORTHOPHOTOS)
4	SPONSORSHIP / ADVERTISING (E.G., VIA THE GEO-PORTAL)
5	INDIRECT REVENUE – FROM PRODUCTS AND SERVICES RELATED TO SPATIAL DATA E.G., REAL ESTATE REGISTRATION
6	PARTNERSHIPS
6 A	GOVERNMENT AND DONOR AGENCIES JOINT FUNDING PARTNERSHIPS (E.G., WORLD BANK)
6B	DONOR AGENCIES AND PRIVATE SECTOR PARTNERSHIPS
6C	DONOR AGENCIES, GOVERNMENT, AND PRIVATE SECTOR PARTNERSHIPS
6D	PARTNERSHIPS WITH INTERNATIONAL PRIVATE SECTOR
7	DONOR "GIFT" FUNDING
8	PRIVATE SECTOR NON-CASH CONTRIBUTION E.G., SERVICES SUCH AS SOFTWARE DEVELOPMENT, ADVERTISING
9	SPECIAL BANK / SPECIAL LOANS

9.1. Action Plan –Standardization of Spatial Information (SSI)

SIH	Strategic Objective 1 –Standardization of Spatial Information (SSI)				
	Objectives, indicators and strategic and specific actions	**Base values 2024**	**Intermediate objective in 2025**	**2027 Objective**	**Results:**
SSI1	**Specific objective- Data are known, financially supported and prioritized**				
ID	**Objectives, indicators and strategic and specific actions**	**Base values 2024**	**Intermediate objective in 2025**	**2027 Objective**	**Results:**
SSI 1.1	Creation of a set of data exchange licenses such as Creative Commons, suitable for use by public sector data providers	There are no data sharing licenses	A simple and convenient licensing system for public sector data has been created	The licensing system is widely known and used by stakeholders	The established principles for data sharing promote collaboration, efficiency and responsible use of data, thus bringing benefits to organizations, society and individuals.
SSI 1.2	Designing a list of basic data sets with specific owner	0%	100%	100%	All basic data sets identified by KCA have a specific owner.
SSI 1.3	Establishing organizations that comply with INSPIRE themes for which they have responsibility	0%	100%	100%	All data themes described in Annexes I, II and III of INSPIRE have an identified responsible entity.
SSI 1.4	Standardization of framework and data models for Annex I and II of INSPIRE	0%	20%	40%	Product specifications for selected themes as per INSPIRE and SO19131 have been drafted.

| SSI 1.5 | Standardization of framework and data models for Annex III of INSPIRE | | 0% | | 10% | | 20% | Product specifications for selected topics according to INSPIRE and SO19131 have been drafted. | | | |

	Action	Deadli-ne	Budget in EUROs			Source of funding	Leading and supporting institution	Output	Specific document references[4]
			2024	**2025**	**2026**				
SSI1.A1	Creation of NSII data policy	2024	25,000	0	0	1 / 6a	NSII Committee KCA	The data policy has been created	MESPI 11/2 MESPI 13/2
SSI 1.A2	Creation of spatial data and metadata quality control procedure	2025	15,000	6000	0	1 / 6a / 7	KCA	Procedures have been established	MESPI 13/2023 ISO19115 ISO19157
SSI 1.A3	Commencing of standardization of spatial data and metadata	2026	25,000	30,000	10,000	1 / 6a / 6c	NSII Committee KCA NSII Partners	The ongoing standardization work is working well	INSPIRE ISO 19115 ISO19131 OGC MESPI 11/2023 MESPI 13/2023 MESPI 14/2023
SSI 1.A4	Development of product	2026	35,000	30,000	25,000	1 / 6a / 6c	NSII Committee	Product	INSPIRE

[4]Most actions refer to Law No. 08/L-010 on Establishment of the National Spatial Information Infrastructure; therefore they are not repeated in the table.

	specifications for NSII basic data						KCA NSII Partners	specifications for key data sets are available and a routine for producing such documents has been established	ISO 19131
SSI 1.A5	Collection of metadata from key stakeholders	2026	5000	2000	1 000	1 / 6a / 7	KCA NSII Partners	Creating metadata for all relevant stakeholders	MESPI 13/2023
SSI 1.A6	Data transformation in accordance with INSPIRE implementation rules for NSII partners	2026	25,000	100,000	75,000	1 / 6a	NSII Committee KCA NSII Partners	Public sector adapted to INSPIRE requirements for standards, structures, interfaces, etc.	INSPIRE
SIH1.A7	Harmonization of datanot in compliance with INSPIRE and ISO specifications	2026	0	10,000	30,000	1 / 6a	NSII Committee KCA NSII Partners	Five harmonized key data sets	NSII Data policy ISO 10131
	TOTAL		130,000	178 000	141 000				

SSI 2	Specific objective 2 - Infrastructure facilitates reporting for national and European needs				
ID	Objectives, indicators and strategic and specific actions	Base values 2024	Intermediate objective in 2025	2027 Objective	Results:
SSI 2.1	Existence of INSPIRE -compliant metadata	0%	40%	60%	Metadata are associated with a dataset or information source, and these metadata complywith standards and requirements defined by INSPIRE
SSI 2.2	Existence of a number of data sets and services in accordance with published INSPIRE standards	0%	20%	40%	There are numerous datasets and services available that complywith standards specified by INSPIRE

Action		Deadli-ne	Budget in EUROs			Source of funding	Leading and supporting institution	Output	Specific document references
			2024	2025	2026				
SSI2.A1	Creation and approval of a group of TKPs for monitoring	2025	2000	3000	0	1 / 6a	NSII Committee KCA	Monitoring routines are implemented	INSPIRE Annex E
	TOTAL		2000	3000	0				

SSI 3	Specific objective: - Infrastructure complies with the principles of open data				
ID	**Objectives, indicators and strategic and specific actions**	**Base values 2024**	**Intermediate objective in 2025**	**2027 Objective**	**Results:**
SSI 3.1	Existence of NSII data policy	There is no data policy	Publishing of a well-communicated data policy that includes the metadata profile, and creates clarity for all stakeholders	Data policy is adopted by the public and private sector, including academia	A set of guidelines and principles governing the management, exchange, and use of spatial data within the NSII. Typically, the following aspects are addressed: exchange, standards, quality, governance, privacy and security, access, availability, lifecycle management, and coordination.

Action		**Deadli-ne**	**Budget in EUROs**			**Source of funding**	**Leading and supporting institution**	**Output**	**Specific document references**
			2025	**2026**	**2027**				
SSI 3.A1	Creation of NSII data policy	2024	40,000	0	0	1 / 6a	NSII Committee KCA	NSII data policy	NSII Strategy Administrative Instructions
		TOTAL	**40,000**	**0**	**0**				

9.2. Action Plan - Advancement of Technology and Services (ATS)

ATS	Strategic Objective - Advancement of Technology and Services (ATS)				
ATS1	Specific objective - Geoportal of IKIH guarantees an uninterrupted flow of data across sectors and levels				
ID	Objectives, indicators and strategic and specific actions	Base values 2024	Intermediate objective in 2025	2028 Final Objective	Results:
ATS1.1	Existence of NSII Geoportal	The existing geoportal is subject to improvement	The Geoportal provides tools for users to use the services and enables users to upload their own spatial data, including metadata, to enable the services created.	The geoportal is further professionally developed and maintained	An online platform or web-based application that serves as a central hub for accessing, discovering and sharing spatial data and resources related to NSII. It provides easy and convenient access for users to a wide range of spatial information, including maps, satellite images, datasets and other spatial content.
ATS1.2	Existence of NSII website	No website exists	There is a well-structured website with NSII guidelines and training material	A good maintenance practice has been established	An online platform or website dedicated to providing information and resources related to NSII. It serves as a central hub where stakeholders, including government agencies, data providers, researchers and the public, can access information, documentation and tools related to spatial data, infrastructure and policies.
ATS1.3	Existence of the Service Quality Indicator(SQI)	SQI do not exist	A set of indicator factors such as network latency, bandwidth, reliability, availability, packet loss, jitter, and other relevant parameters is standardized.	Indicators are discussed, described and updated annually	SQI indicators that are critical for monitoring and ensuring the quality of spatial data and services, which are essential for various applications across government, business, scientific research and the public.

ATS1.4	Existence of network-based training module	There is no training module	A network-based training module that provides essential support and training to both stakeholders and the KCA, by ensuring that quality control processes are carried out effectively.	All stakeholders are familiar with the module and have used it for training purposes	An online educational resource designed to provide directives, guidance and training related to spatial data, technologies and the use of NSII. These modules are essential tools for building awareness, increasing capacity and fostering collaboration between stakeholders involved in the management and use of spatial data within the NSII.
ATS1.5	Existence of online training material on accessing and using metadata and spatial information	There is no training module	In progress	Included in the web-based training module	Various training materials were added to the web-based training module.

Action		Deadli-ne	Budget in EUROs			Source of funding	Leading and supporting institution	Output	Specific document references
			2025	2025	2027				
ATS1.A1	Improvement of the existing national geoportal (including all network services)	2024	44 000	6000	6000	1 / 5 / 6a / 6c	ACA	Geoportal improved in 2024, maintained in 2025 and 2026	MMPHI 12/2023 Technical specifications
ATS1.A2	Development of electronic commercial services	2026	0	11,000	24 000	1 / 6a / 6c / 8	NSII Committee KCA	Developed platform that facilitates and enables online transactions	Technical specifications
ATS1.A3	Implementation of use case examples and pilot	2025	33 000	11,000	0	1 / 5 / 6a / 7 / 8	NSII Committee KCA	Implementation of use cases and	Administrative instructions

	applications							pilot applications	Technical specifications
ATS 1.A4	Integration of spatial data in electronic services	2026	0	55,000	151 000	1 / 5 / 6a / 7 / 8	NSII Committee KCA	The spatial extension of the central government interoperability project has been implemented	Administrative instructions Technical specifications
ATS1.A5	Creation of a website for IKIH administered by AKK	2024	3 500	0	0	1 / 4 / 5 / 6a	KCA NSII Partners	A specific NSII website has been created	-
		TOTAL	**80 500**	**83 000**	**181 000**				

ATS2	Specific Objective: - Joint solutions for the storage and management of spatial information								

ID	Objectives, indicators and strategic and specific actions	Base values 2024		Intermediate objective in 2025		2027 Objective		Results:	
ATS 2.1	Existence of signed copies of the finalized data exchange agreement	There is no data exchange agreement		The data exchange agreement has been adopted by several stakeholders		The data exchange agreement has been widely adopted, even by the private sector		A legally binding document that describes the terms, conditions, and rules that govern the exchange of data between two or more parties.	

Action		Deadli-ne	Budget in EUROs			Source of funding	Leading and supporting institution	Output	Specific document references
			2024	**2025**	**2026**				
ATS2.A1	Development of data	2024	2000	0	0	1 / 6a	NSII Committee	Licensing system	MESPI 11/2023

							KCA	for public sector data	
	exchange licensing principles								
ATS 2.A2	Creating tools for spatial data exchange	2025	11,000	40,000	5000	1 / 3 / 6a	KCA	Tools needed for data exchange based on the INSPIRE data exchange regulation	MESPI 11/2 MESPI 12/2
		TOTAL	**13,000**	**40,000**	**5000**				

ATS3	Specific Objective - Development of Infrastructure is oriented to SOA and is prepared for modern data processing								
ID	Objectives, indicators and strategic and specific actions	Base values 2024		Intermediate objective in 2025	2027 Objective	Results:			
ATS 3.1	Number of services developed pursuant to SOA principles and INSPIRE-compliant	0		2	4	An architectural approach that emphasizes the design and implementation of software systems as a collection of independent services. Within the context of INSPIRE, some SOA principles are consistent with INSPIRE standards and guidelines.			

Action		Deadli-ne	Budget in EUROs			Source of funding	Leading and supporting institution	Output	Specific document references
			2024	2025	2026				
ATS 3.A1	Investment in basic IT equipment	2026	40,000	55,000	40,000	1 / 6a / 7 / 8	NSII Committee KCA NSII Partners	Basic IT equipment invested for use by 20 NSII key stakeholders	-
ATS3.A2	Investment in network architecture and network service installations	2026	83 000	140,000	83 000	1 / 6a / 7 / 8	NSII Committee KCA NSII Partners	Network architecture for connecting information systems of key stakeholders	-
ATS 3.A3	Investment in hardware and software	2026	110,000	220,000	110,000	1 / 6a / 7 / 8	NSII Committee KCA NSII Partners	Key stakeholder software and hardware are	-

							updates	
ATS3.A4	Investment in database management systems	2025	28,000	55,000	0	1 / 3 / 6a / 6c	NSII Committee KCA NSII Partners	Storing, organizing, retrieving and securely maintaining data within the established database system.	-
ATS 3.A5	Existence of services described in INSPIRE	2026	11,000	45,000	15,000	1 / 5 / 6a / 6c	KCA	Services developed for managing, discovering, viewing, downloading, transforming and referencing as specified in the INSPIRE implementation rules	INSPIRE MESPI 12/2023 Technical specifications
		TOTAL	272,000	515,000	248,000				

ATS4	Specific Objective - Development of the adequate national spatial reference system for accurate positioning				
ID	**Objectives, indicators and strategic and specific actions**	**Base values 2024**	**Intermediate objective in 2025**	**2027 Objective**	**Results:**
ATS4.1	The final national spatial reference system with all published parameters	60%	80%	100%	A national spatial reference system designed to accurately determine positions and locations in Kosovo. It includes specific parameters and standards to ensure uniformity and accuracy in spatial measurements.

Action		**Deadli-ne**	**Budget in EUROs**			**Source of funding**	**Leading and supporting institution**	**Output**	**Specific document references**
			2024	**2025**	**2026**				
ATS4.A1	Existence of a centralized registry of the spatial reference system	2026	0	25,000	0	1 / 6a / 6c	NSII Committee KCA	A centralized registry that manages national spatial reference systems, feature catalogs, and feature concept vocabularies	Technical specifications
	TOTAL		0	25,000	0				

9.3. Action Plan - Cooperation (B)

B	Strategic Objective - Cooperation (B)				
B1	**Specific Objective - Increasing cooperation and interaction throughout the public sector**				
ID	**Objectives, indicators and strategic and specific actions**	**Base values 2024**	**Intermediate objective in 2025**	**2027Final Objective**	**Results:**
B1.1	Existence of a responsible NSII department/unit, including central services	A certain team is working on NSII in KCA	A responsible unit has been operating for more than a year and possesses sufficient funds, personnel and good working environments	The unit works well and good practice has been established	The responsible unit is tasked with coordinating efforts to develop, maintain, and promote NSII, by ensuring that spatial data and technology are used effectively for various applications, including urban planning, environmental management, disaster response, and economic development.
B1.2	Existence of an NSII Annual Work Plan	There is no work plan	Work plans are published and stakeholders participate in the work	A good practice has been established	A strategic document that describes the main activities, projects, and goals to be accomplished within a specific fiscal year or planning period related to the development and management of national or regional spatial information infrastructure.
B1.3	A Risk Management Framework must be in place	No framework exists	A Risk Management Framework has been created	A good practice has been established	Systematic approach to identifying, assessing, and managing risks in various NSII operation aspects, especially in the context of information security and cyber security.

B1.5	B1.4 There must exist an NSII utilization plan	Several further information can be found in the document supporting this strategy, Annex B	The plan to utilize most of the resources, tools or opportunities to achieve specific objectives or goals has been published	The plan is subject to annual discussion and approval by the NSII Committee	A plan setting out strategies and actions to maximize NSII benefits. Focusing on the utilization of infrastructure, spatial information, and associated technologies to support different sectors, stakeholders, and applications.
B1.6	Drafting of NSII implementation plans for specific stakeholders	0%	20%	100%	A plan that serves as a roadmap for achieving the goals and objectives set by the NSII initiative, which typically include improving the management of spatial data, promoting data sharing, and increasing interaction.
B1.7	Drafting of development plans outlining each NSII stakeholder to demonstrate that they comply with NSII requirements	0%	0%	40%	A plan that serves as a roadmap for the systematic development and expansion of spatial information and infrastructure to support various applications, improve data exchange and ensure effective use of spatial information.

Action		Deadli-ne	Budget in EUROs			Source of funding	Leading and supporting institution	Output	Specific document references
			2024	**2025**	**2026**				
B1.A1	Existence of a unit or department responsible for NSII in KCA	2024	0	0	0	-	NSII Committee KCA	An NSII Unit/Department that functions well	Law No. 08/L-010
B1.A2	Cost calculation related to the governance of NSII bodies, such as the NSII Committee and Working Groups	Continuous	15,000	15,000	15,000	1 / 3 / 6a	NSII Committee KCA NSII Partners	Governing bodies that function well	MESPI 10/2023 MESPI 11/2023 MESPI 14/2023
B1.A3	Drafting of the annual NSII work plan	2024	0	0	0	-	NSII Committee KCA	The work plan submitted and approved by NSII Committee	-
B1.A4	Drafting of the first NSII work plan	2024	0	0	0	-	NSII Committee KCA	The utilization plan submitted and approved by NSII Committee	-
B1.A5	Development of NSII implementation plans of stakeholders	2026	0	0	0	-	NSII Committee KCA NSII Partners	Implementation plans published by stakeholders	-
B1.A6	Development of NSII implementation plans of stakeholders	2026	0	0	0	-	NSII Committee KCA NSII Partners	Development plans published by stakeholders	-

| | | TOTAL | 15,000 | 15,000 | 15,000 | |

B2	Specific Objective - Cooperation models suitable for all contributors and users					

ID	Objectives, indicators and strategic and specific actions	Base values 2024	Intermediate objective in 2025	2027 Objective	Results:	
B2.1	Existence of formal NSII government-to-government (G2G) partnerships	Several informal contacts exist	A partnership has been created	Three partnerships have been created	Optimizing the creation, maintenance, exchange, use and reuse of spatial data and services by public authorities in the Republic of Kosovo	

Action		Deadli-ne	Budget in EUROs			Source of funding	Leading and supporting institution	Output	Specific document references
			2024	2025	2026				
B2.A1	Initiating and creating G2G partnerships	2025	5000	5000	1 000	1 / 6a / 6c	NSII Committee KCA	G2G partnership model	-
B2.A2	Existence of an interactiveforum	2026	0	2000	5000	1 / 6a / 6c	NSII Committee KCA	A forum has been created and participants are active	MESPI 14/2023
	TOTAL		5000	7 000	6000				

B3	Specific Objective - Wide spread of spatial knowledge				
ID	Objectives, indicators and strategic and specific actions	Base values 2024	Intermediate objective in 2025	2027 Objective	Results:
B3.1	Existence of Education and Training Needs Analysis(ETNA) Report and Education and Training Plan	ETNA and the Education and Training Plan do not exist	Report and plan have been submitted. Other indications would include the number of courses held and persons trained	The long-term development of NSII education is also done in universities	A systematic report that assesses and identifies the specific education and training needs of employees, members, or target audiences. The purpose of ETNA is to determine what knowledge, skills, competencies, and learning opportunities are required to effectively meet organizational goals or individual development objectives.
B3.2	Existence of the practical guidelines/manual for quality control of spatial data and metadata approved for NSII	There are no quality control guidelines	Guidelines are published for a data set	There are guidelines for two additional datasets	The practical guidelines or manual for quality control of spatial information and metadata approved for NSII are in accordance with INSPIRE, ISO 19115, and ISO 19157. The published guidelines or manual can use the example of a road network and serve as a model when creating guidelines for other data sets.
B3.3	Existence of knowledge management systems that enables stakeholders to learn from experience	No knowledge base has been created	A website with best practice case studies, specific field expertise networks, and other resources has been created	The knowledge base has a well-developed maintenance routine and is widely used by all sectors	A specialized knowledge management system is designed to collect, manage, and disseminate spatial information and knowledge within the NSII context. It serves as a central archive and platform for handling spatial information, metadata, standards, best practices, and other information necessary for the effective management of spatial information infrastructure.
B3.4	Extent of stakeholders staff trained	10%	20%	60%	The extent to which NSII stakeholder personnel receive training on topics relating to NSII

Action		Deadli-ne	Budget in EUROs			Source of funding	Leading and supporting institution	Output	Specific document references
			2024	2025	2026				
B3.A1	Existence of Education and Training Needs Analysis(ETNA) Report	2024	37 500	0	0	1 / 4 / 5 / 6a / 6b / 6d / 6e / 7 / 8	NSII Committee KCA	ETNA report	-
B3.A2	Existence of practical guidelines/manual for quality control of spatial data and metadata approved for NSII	2024	45,000	0	0	1 / 4 / 5 / 6a / 6b / 6d / 6e / 7 / 8	KCA	Practical document published on the NSII website	NSII Data Policy INSPIRE ISO19115 ISO19131 ISO19157
CO3.A3	Providing support for handling and online training for metadata	2026	0	10,000	20,000	1 / 4 / 5 / 6a / 6b / 6d / 6e / 7 / 8	KCA	Online training module to support spatial data producers in creation and discovery of metadata	NSII Data Policy INSPIRE ISO19115
B3.A4	Organization of online user training for accessing and using spatial data	2026	0	0	2000	1 / 4 / 5 / 6a / 6b / 6d / 6e / 7 / 8	KCA	Online training module to support users in accessing the data and knowing how to use it afterwards	NSII data policy INSPIRE

B3.A5	Conducting public awareness raising campaigns, including promotional materials	2025	0	5000	0	1 / 4 / 6a	KCA	Campaign and promotional materials	-
B3.A6	Participation in national and international seminars and conferences	Contin-uous	3000	4000	3000	1 / 4 / 5 / 6a / 6b / 6d / 6e / 7 / 8	KCA NSII Partners	Knowledge exchange	-
		TOTAL	**85,500**	**19,000**	**25,000**				