THE REPUBLIC of TURKEY

THE MINISTRY of ENVIRONMENT and URBANIZATION

GENERAL DIRECTORATE of GEOGRAPHIC INFORMATION SYSTEMS

INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK OF TURKEY

CHAPTER 1.1 Analytical Studies for Integrated Geospatial Information Framework of Turkey

CHAPTER 1.2 Overarching Strategic Framework for Integrated Geospatial Information Framework of Turkey

CHAPTER 2 Implementation Guide for Integrated Geospatial Information Framework of Turkey

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Strategy and Action Plan Matrix for Integrated Geospatial Information Framework of Turkey

United Nations Integrated Geospatial Information Framework - Matrix of Relations on Strategy and Action Plan for Integrated Geospatial Information Framework of Turkey

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EXECUTIVE SUMMARY

Geospatial information is critically important to plan, implement, and monitor any activity concerning economic, environmental, social, and community development. Therefore, countries now develop more and more approaches, create systems, and establish infrastructure for the acquisition and management of geospatial information in an interoperable manner. With this in mind, Turkey has taken systematic and comprehensive actions since early 2000s to establish the National Geographic Information Systems of Turkey (TUCBS) as a national spatial data infrastructure. As a result of the aforementioned actions, a national integrated geospatial information management framework has been developed that take into account not only domestic but also international requirements and expectations, and respond to administrative, technical, legal, technological, and financial needs. This framework is based on the main strategic approaches adopted under the United Nations Integrated Geospatial Information Framework (IGIF). United Nations Integrated Geospatial Information Framework (UN IGIF) is hereinafter referred to as United Nations IGIF .

United Nations IGIF is a fundamental roadmap composed of 3 parts developed in cooperation with the United Nations and the World Bank. Billed as ***Overarching Strategic Framework***, the part one describes why geospatial information and its management in an integrated manner are imperative for all stakeholders especially decision-makers involved in the process for the acquisition and use of geospatial information. In this sense, the Overarching Strategic Framework is an important instrument that can also serve as a training document.

The part two of the United Nations IGIF covers main components and strategies to be followed that are critically important to provide, share, and manage geospatial information in an interoperable way to avoid duplications and waste of resources for the public interest. ***The Strategic Pathways of the United Nations IGIF*** are the main references for Turkey with regards to the development of the TUCBS and maturity of the National Geospatial Information Strategy and Action Plan of Turkey. 9 strategic pathways of the United Nations IGIF are (1) governance, (2) policy and legal, (3) financial, (4) data, (5) innovation, (6) standards, (7) partnerships, (8) capacity and education, and (9) communication and engagement. The strategic pathways, which are associated with one another, offer main elements and activities to be carried out to provide sustainable and monitorable geospatial information management. The main objective of the strategic pathway of *governance* is to form a sustainable will that safeguards the development and implementation of a national geospatial information framework in line with an overarching national leadership mechanism. The strategic pathway of *policy and legal* emphasizes how imperative national priorities, policies, and legal instruments are for the effective geospatial information management.

The main theme of the *financial* strategic pathway is to gain insight into benefits of any investment in geospatial information management, and development of financial models to make benefits sustainable, and associate them with national priorities and needs. It is beyond question that investments should be made in geospatial information and its management. It is important for all stakeholders to know about the benefits of such an investment in environmental, social, economic, and cultural aspects. The strategic pathway of *data* sets requirements for the acquisition, exchange, curation, and management of data. To make effective use of ever-growing technologies and geospatial information collection methods, it is imperative to have a good understanding of requirements set under the strategic pathway of *innovation*, and take measures to put them into effect. The strategic pathway of *standards* describes the priorities about the establishment and implementation of standards for data and metadata in particular while the strategic pathway of *partnerships* focuses on the importance of collaborations with organizations and agencies with a defined set of competencies and their necessity for the sustainability and effectiveness of geospatial information management. The strategic pathway of *capacity and education* sets requirements for the identification and improvement of the capacity of all stakeholders who are both producers and users, and provision of training for them as a part of geospatial information management while the strategic pathway of *communication and engagement* sets expectations about sustainable communication and engagement.

The part three of the United Nations IGIF highlights the need to draw up ***Country-Level Action Plans*** for the establishment of an integrated geospatial framework based on the strategic pathways exemplified in detail for practices in the part two (Strategic Pathways of the United Nations IGIF). The action plans vary by priorities of countries, state policies, main needs and requirements, legal status, and even social, cultural, and environmental circumstances. Therefore, each country should address the strategic pathways in line with their own circumstances and priorities, and draw up their country-level action plans accordingly.

From this point of view, the main objective of this document is to make an assessment of the steps taken by Turkey to develop the Integrated Geospatial Information Framework of Turkey to achieve the Sustainable Development Goals set by the United Nations for our collaborative future in accordance with the United Nations IGIF, and present a National Geospatial Information Strategy and Action Plan of Turkey that would promote the implementation of the United Nations IGIF strategies. In this regard, this document consists of 3 chapters as explained below.

- *TUCBS Overarching Strategic Framework and Roadmap In Compliance With the United Nations IGIF*: This chapter sets forth how geospatial information technologies are supposed to be used by umbrella organizations for the settlement of social problems as emphasized in the main strategies of the United Nations IGIF, and this constitutes the upper-scale structure of the Integrated Geospatial Information Framework. In this chapter, our overarching strategic framework is described in a way to explain the United Nations Sustainable Development Goals, respective data themes, organizations that create data for data themes, the national GIS, and respective strategic actions. Integrated geospatial information management is extremely important to achieve a great deal of economic, environmental, and social goals. Without geospatial data and such a framework, it is impossible to properly and effectively achieve economic, social, and environmental goals.
- *Implementation Guide In Compliance with the United Nations IGIF:* This guide offers general information on 9 strategic pathways explained in the United Nations IGIF guide in line with the Overarching Strategic Framework and Roadmap set out in the first chapter, and some major actions taken in Turkey. In other words, this chapter reviews the **Strategic Pathways of the United Nations IGIF**, and introduces the actions taken in Turkey in comparison to the strategic pathways, and offers critical actions recommended to be taken in years to come in an effort to fully achieve the strategies. From this perspective, this chapter can be described as a main reference such as the ***"United Nations IGIF Summary Report on Turkey"***, which indicates how and to what extent the Strategic Pathways of the United Nations IGIF have been implemented in Turkey. The tables presented in this chapter show the current state of Turkey in terms of each pathway of the United Nations IGIF through the country-level actions taken thus far, and offer actions recommended to be taken under the United Nations IGIF to establish a more sustainable, inclusive, and mainstreamed structure. Last but not least, the actions taken under TUCBS in Turkey based on the strategic pathways of the United Nations IGIF are presented in a Business Schedule/Timetable through association with the strategic pathways by years.
- *Matrix In Which the Agencies and Organizations and Performance Indicators Are Designated for the Actions in the National Strategy and Action Plan In Compliance with the United Nations IGIF:* This chapter offers a country-level action plan compatible with the *TUCBS Overarching Strategic Framework and Roadmap*, and *the Strategic Pathways of the United Nations IGIF* based on the National Geospatial Information Strategy and Action Plan of Turkey published in the Official Gazette No. 31171 of June 30, 2020. The matrix provided in this chapter shows (a) indicators, (b) custodian and (c) collaborative organizations, (d) status of achieving goals/indicators for 2021 to 2023 (planned, achieved, remaining, completion rate),

(e) phase and (f) the strategic pathway of the United Nations IGIF for the goals, objectives, and actions set out in the National Geospatial Information Strategy and Action Plan of Turkey. Within this framework, there are 3 phases concerning the action plan: "*Creating and sharing geospatial data in line with the standards*, *building analytical capacity for geospatial data*, and *resolution of geospatial data-based problems* and *contribution to social life*. In addition, this is the part where action cards are drawn up for all actions, and descriptions of actions, results of situation analyses, and performance indicators are shown.

When the strategic pathways of the United Nations IGIF are compared to the actions taken in Turkey, it is safe to say that many actions have been taken and joined by stakeholders under 9 strategic pathways, and the process is ongoing. Some leading actions and pilot practices such as development of standards, establishment of geospatial data exchange platforms, actions to improve primary legislations, publication of data definition documents and custodianship matrices, and implementation of innovative projects are not only important for Turkey but also exemplary for many other countries. However, some major steps await to be taken for the acceleration of efforts to mature financial models, promotion of innovative initiatives for geospatial information technologies, identification of the capacity of stakeholders, provision of training capabilities at various levels, securing communication and effective dissemination, and implementation of a sustainable monitoring mechanism. These steps will be important initiatives to make great contributions to all of us to achieve the 2023 vision and goals of Turkey.

PREFACE

The United Nations Integrated Geospatial Information Framework states that such a framework is extremely important to achieve many economic, environmental, and social goals including those expected to be achieved under the sustainable development goals, and highlights the fact that the economic, social, and environmental goals cannot be properly and effectively achieved without geospatial information and such a framework. Associating this programme with 17 sustainable development goals and turning it into a strategic framework will contribute to the achievement of all environmental, economic, and social goals. This provides organizations mandated to achieve economic, environmental, and social goals with a strategic framework and an action plan to make effective use of geospatial information technologies for adaptation/access to the sustainable development goals.

Under the United Nations IGIF, our main strategy for the Integrated Geospatial Information Framework of Turkey is to build capacity for the effective use of geospatial information technologies as a part of the National Geospatial Information System of Turkey (TUCBS) in cooperation with all organizations in Turkey, standardize and mobilize all procedures, mainstream the use of such technologies as a decision support system, and achieve the sustainable development goals. As a result of achieving the national strategic objectives such as

- building settlements that do not pose an environmental threat and a risk for disasters,
- taking effective decisions for climate action,
- making effective use of national resources, energy generation capacity and mine sites,
- achieving food, water, and energy security in the short, medium and long term through actions including mainstreaming of effective agricultural practices,
- improving our transportation and urban infrastructure,
- handing down our natural and cultural heritage to the next generations,
- effectively managing urban transformation efforts,
- protecting forests and other natural assets,
- improving the quality of education across the country,
- building a healthier society,
- achieving strategic objectives for our national security, promptly identifying threats to the national security, and taking effective measures,
- mainstreaming the domestic and national technologies, and improving our global competitiveness,
- strengthening the infrastructure for smart cities,

- securing energy efficiency,
- and making sure that all public and private organizations provide effective and high-quality services to citizens,

it will be possible to take inventory of all strategic data and information, quickly and effectively analyze them, and immediately take effective decisions as a result of analyses.

We are of the view that the Integrated Geospatial Information Framework of Turkey will help deliver strategic messages, which are constructed in a way to involve top-level implementing and legislative umbrella organizations of geospatial information systems (GIS), to all private companies, municipalities, universities, and public agencies and organizations. We hope that these messages will turn into actions and services to help Turkey achieve the sustainable development goals, and the goals for 2023, 2053, and 2071 following the widespread use of GIS under the TUCBS.

Geospatial Information System Council of Turkey

This document, which is titled as the Integrated Geospatial Information Framework of Turkey, consists of three main chapters, and two annexes. The chapters are as follows:

- CHAPTER 1.1 Analytical Studies for Integrated Geospatial Information Framework of Turkey
- CHAPTER 1.2 Overarching Strategic Framework for Integrated Geospatial Information Framework of Turkey
- CHAPTER 2 Implementation Guide for Integrated Geospatial Information Framework of Turkey
- CHAPTER 3 Strategy and Action Plan for Integrated Geospatial Information Framework of Turkey - Action Cards
- **ANNEXES**
    - Strategy and Action Plan Matrix for Integrated Geospatial Information Framework of Turkey
    - United Nations Integrated Geospatial Information Framework - Matrix of Relations on Strategy and Action Plan for Integrated Geospatial Information Framework of Turkey

The analyses, which are the first one of the three chapters, explain the requirements of the United Nations Integrated Geospatial Information Framework, and offer insight into sectoral actions, strategies, and action plans of Turkey in line with the framework. In addition, this is the chapter that covers the breakdown of the nine main strategic pathways associated with the sectoral actions taken in Turkey in the part two of the Solving the Puzzle of the UN Framework. The second part of the first chapter provides the overarching strategic document that the UN Framework describes as part one for country-level actions. The strategic framework is built on the national needs and circumstances in line with the sustainable development goals of the United Nations (UN) as a prospective framework, including overarching strategic messages intended to resolve social problems by means of geospatial information technologies. Offering an approach that takes national circumstances, priorities, and perspectives into account, the first chapter will explain why geospatial information management is a critical element of the national development move in line with the sustainable development goals of the United Nations. This chapter, which is one of the three chapters of the document, is constructed for a wide range of umbrella organizations such as the Ministries and the CoHE.

The Implementation Guide for the Integrated Geospatial Information Network of Turkey, which is the second chapter of the document, describes the strategic pathways necessary to shape the action plan under the framework set at the first stage under nine themes designated by the UN.

The actions taken in line with the strategic pathways have been largely taken as a part of the Geospatial Information Systems of Turkey under the guidance of the General Directorate of Geographic Information Systems of the MoEU. However, the actions that were targeted and yet failed to be taken are also covered as recommendations.

The final chapter of the document is where the performance indicators are shaped in compliance with the United Nations IGIF based on the first and second chapters, and the Strategy and Action for the Geospatial Information Systems of Turkey are described in cards associated with goals. To organize the cards, three phases, which are designated for the effective use and dissemination of geospatial information across the country, are associated with the actions. The phases are as follows:

- Phase 1. Creating and Sharing Geospatial Data In Line With the Standards
- Phase 2. Building Analytical Capacity for Geospatial Data
- Phase 3. Resolution of Geospatial Data-Based Problems and Contribution to Social Life to Achieve the Sustainable Development Goals.

As a part of the annexes, the action cards set out in the third chapter are turned into the Matrix of Strategy and Action Plan for the Integrated Geospatial Information Framework of Turkey, and another matrix is added to analyze its relations with the IGIF strategic pathways.

Of the phases, the phase 3, which is intended to derive a positive contribution from geospatial information, is the focal point that all efforts to disseminate geospatial information technologies must reach. At this point, the UN's Sustainable Development Goals are a focal point for the phase 3. In this sense, we hope that this document will serve as a guide for Turkey's national development move.

General Directorate of Geographic Information Systems

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PROJECT TEAM

First & Last Name	Profession	Master's Degree	PhD
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Prof.Dr. Saye Nihan Çabuk	Landscape Architect	1. Landscape Architecture/2. Remote Sensing and Geographic Information Systems	Landscape Architecture
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Dr. Hakan Uyguçgil	Mining Engineer	Mining	Mining/Geostatistics
Dr. Muammer TÜN	Geophysical Engineer	Physics	Geophysical Engineering
Dr. Emrah Pekkan	Geological (Hydrogeological) Engineer	Geological (Hydrogeological) Engineer	Geological (Hydrogeological) Engineer
Dr. Müzeyyen Anıl Şenyel Kürkçüoğlu	Urban Planner	Urban Planning	Urban and Regional Planning
Dr. Burcu Yılmazel	Computer Engineer	Computer Engineering	Computer Engineering/Computer Software
Dr. Onur Kaplan	Civil Engineer	Civil Engineering	Civil Engineering
Dr. Gordana Kaplan	Survey Engineer	Survey Engineering	Remote Sensing and Geographic Information Systems
Ayhan Kavşut	Urban Planner		
Ezgi Sarmusak	Urban Planner		
Fulya Battal Şamiloğlu	Geophysical Engineer	Computer Engineering	
Instructor Serhan Tuncer	Art Historian	Remote Sensing and Geographic Information Systems	Art History (cont.)
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Instructor.Dr. Dilek Küçük Matcı	Industrial Engineer	Post Graduate in the Department of Industrial Engineering	Remote Sensing and Geographic Information Systems
Research Assistant Dr. Nuri Erkin Öçer	Physicist	Aerospace Engineering	Remote Sensing and Geographic Information Systems
Research Assistant	Physicist	Physics	Geophysical

First & Last Name	Profession	Master's Degree	PhD
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Zeynep Ortakavak	Geographer	Remote Sensing and Geographic Information Systems	Political Science and International Relations (cont.)
Serhat Sarı	Industrial Designer	Remote Sensing and Geographic Information Systems	Remote Sensing and Geographic Information Systems (cont.)
Merve Demirtaş	Urban Planner	Remote Sensing and Geographic Information Systems (cont.)	
Gökben Adana Karaağaç	Business Manager	Financing	Remote Sensing and Geographic Information Systems (cont.)
Erdem Yurdakul	GIS Specialist, Statistician	Remote Sensing and Geographic Information Systems	Remote Sensing and Geographic Information Systems (cont.)
Bilge Bingül	Geological (Hydrogeological) Engineer	Remote Sensing and Geographic Information Systems	Remote Sensing and Geographic Information Systems (cont.)
Emir Balkan	Physicist	Physics	Geophysical Engineering (cont.)
Fırat Erdem	Survey Engineer	Survey Engineering/Remote Sensing and Geographic Information Systems	Remote Sensing and Geographic Information Systems (cont.)

WORK PACKAGE 1.	ANALYSIS	DR. MUAMMER TÜN
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WORK PACKAGE 7.	DEVELOPMENT OF PROMOTIONAL MATERIALS	PROF.DR. ALPER ÇABUK
WORK PACKAGE 8.	COMPILATION OF REFERENCES	PROF.DR. SAYE NİHAN ÇABUK

FIRST CHAPTER: ANALYSES AND OVERARCHING STRATEGIC FRAMEWORK

According to the UN, the United Nations IGIF is a major component of any national framework to boost productivity, improve economic development, promote sustainable development, make plans for the effects of nation-wide events such as natural disasters, and respond to them. The scope and priorities of the United Nations IGIF must also be compatible with existing national political and policy elements, and a country's strategic goals. While security, e-government, adaptation to the climate change, and land management clearly stand out in this respect, one has to associate the improvement of social resilience, reduction of disaster risks, emergency response and management, and food, water, and energy security, agriculture, transportation, and urban welfare with geospatial information. This is the only way to take unerring and effective decisions and offer solutions.

Therefore, the importance of standardized and accurate creation, inventory, and analysis of geospatial information stands out in such efforts. Their success usually depends on circumstances concerning geospatial information technologies in different organizations, their preparation, maturity, and compatibility.

1.1. Analysis of the United Nations IGIF

Under the United Nations IGIF, our main strategy is to build capacity for the effective use of geospatial information technologies as a part of the TUCBS in cooperation with all organizations in Turkey, standardize and mobilize all procedures, mainstream the use of such technologies as a decision support system, and achieve the sustainable development goals.

The widespread use of geospatial information technologies by all of our organizations under the UN Sustainable Development Goals will make it possible to achieve sustainable development, improve the resilience of our society and cities against natural disasters and climate change, secure food, water, and energy supplies, identify threats to our national security and stability and take counter measures against them, provide infrastructure for smart cities, achieve energy efficiency, make effective use of our mineral ores and energy resources, help all public and private organizations provide effective and high-quality services to citizens, use our forests and natural assets in a balance of effective conservation and utilization, make nation-wide high-quality healthcare and education actions sustainable and effective, improve our transportation and urban infrastructure, hand down our natural and cultural heritage to the next generations,

and take effective actions of urban transformation, and also enable to monitor such actions in an a effective fashion.

If geospatial information technologies are widely disseminated among all of our organizations under the Strategy and Action Plan for the National Geospatial Information Framework of Turkey revised in line with the United Nations IGIF, it will be possible to take inventory of all strategic data and information necessary to achieve the aforementioned national strategic goals, and analyze all of them in an accelerated and effective way, and take effective decisions as quickly as possible as a result of such analyses.

The most important component of the three-stage process, which is constructed under the United Nations IGIF, is undoubtedly the first stage where the mission, vision, strategic goals, and actions are put forth. The three-stage process is presented in Figure 1 and Figure 2.

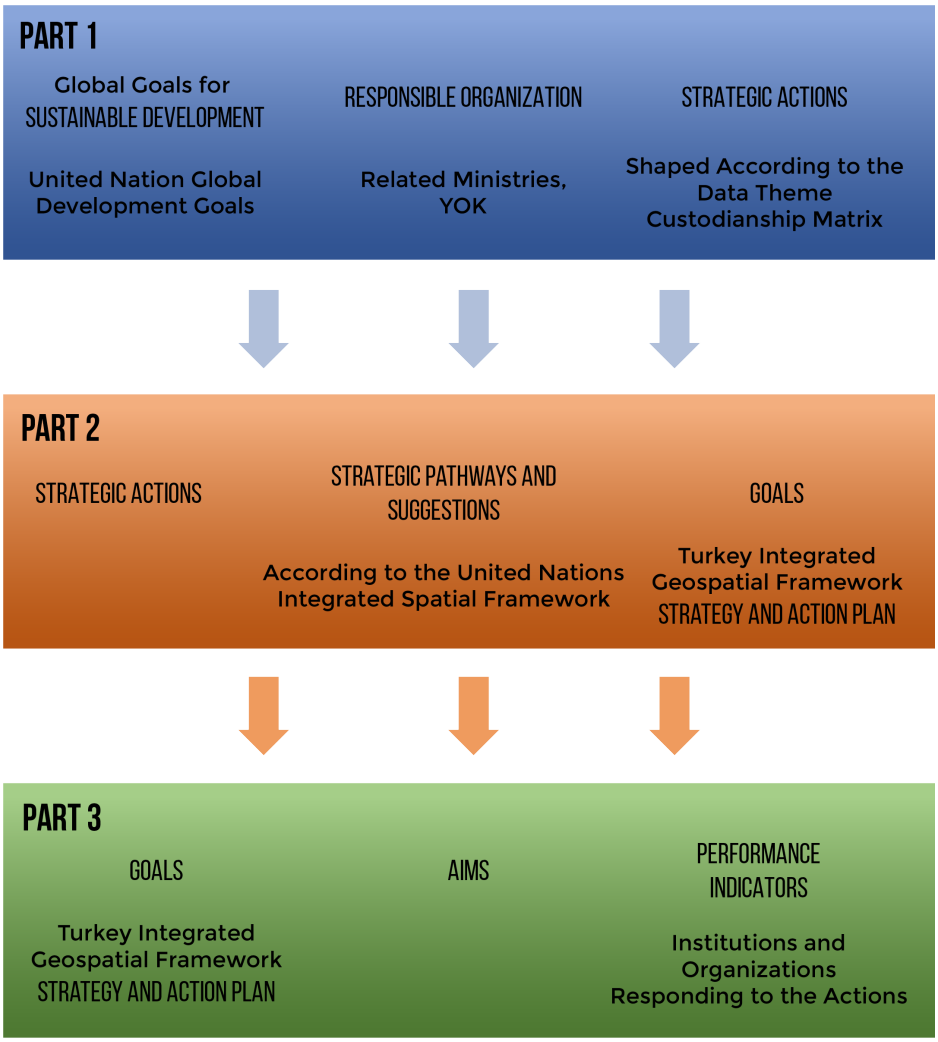

Figure 1.*Three-Stage Process*

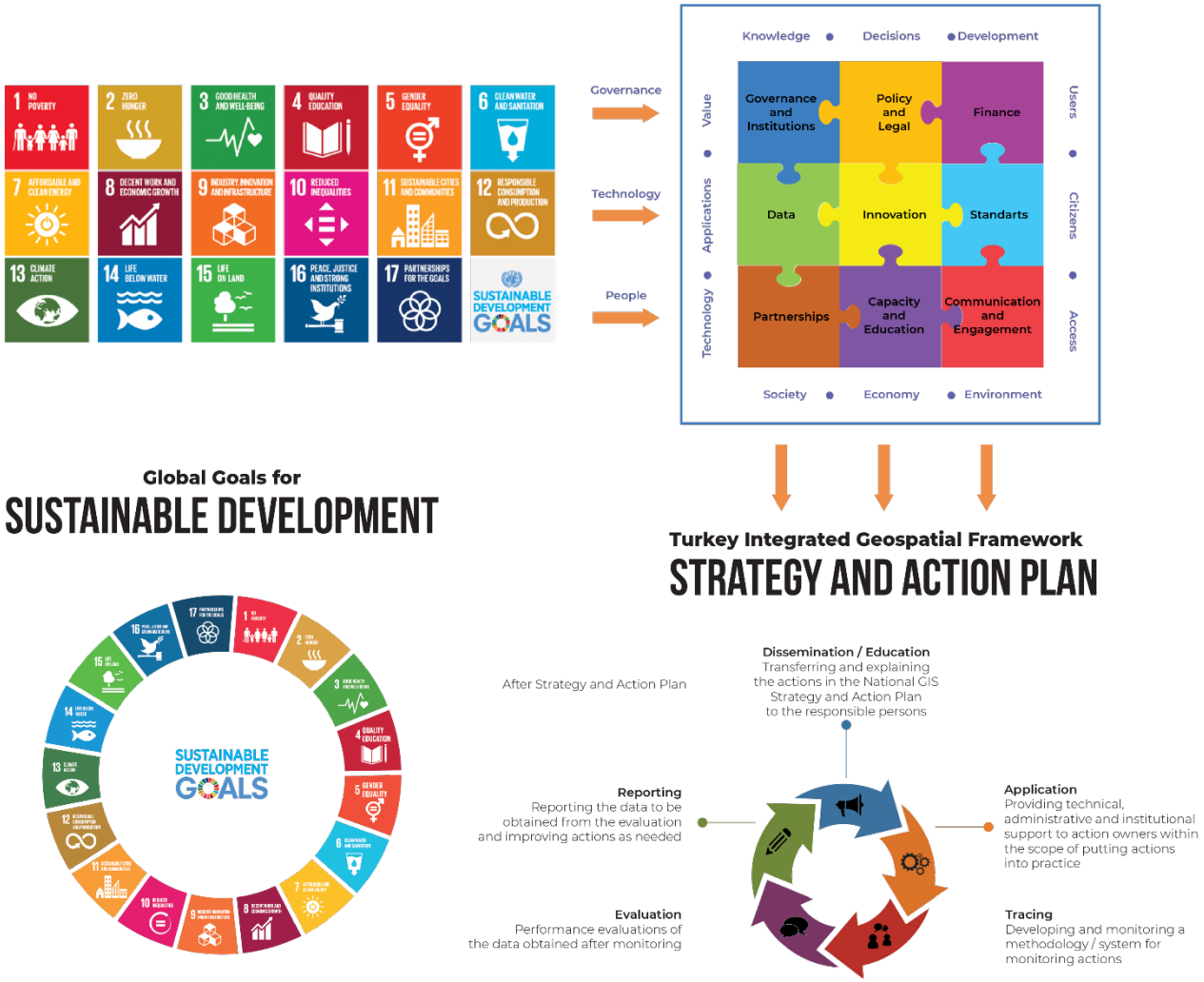

Figure 2.*Three-Stage Process (Cont.)*

1.1.1. Description of the Strategic Pathways of the United Nations IGIF, and Solving the Puzzle for Turkey

Spatial data and/or data that can be associated with space play a central role in many processes ranging from development of national policies and decisions to their implementation by various organizations and stakeholders at the local and sectoral levels. In this age of information, the goals and objectives of the countries and their actions planned to achieve them are correlated to the creation, exchange, and use of geospatial information in a convenient, up-to-date, accurate, and high-quality fashion. Geospatial data and geospatial data management are of critical priority and importance to achieve the Sustainable Development Goals. That is how social welfare, economic development, and environmental sustainability can be achieved, and a common interest can be generated for all.

The fact that various organizations, agencies, and sectors create geospatial data in a duplicated way under different standards, and this causes waste of time and resources, and most importantly poses a challenge to achieve interoperability is a commonly-raised issue. Therefore, countries try to create and strengthen their national spatial data infrastructure to devise accurate policies, strategies, and decisions, and effectively manage resources and technology. However, both the establishment of an effective and sustainable geographic data infrastructure, and its management in an overarching framework at the national level require the adoption of integrated strategic approaches and policies. From this point of view, the United Nations IGIF has been developed as a guiding programme to allow for more effective management of spatial data infrastructure.

Any programme to be developed to establish integrated geospatial information management requires multidimensional, correlated, improvement-driven, inclusive, and participatory processes. It is, beyond any doubt, a challenge to identify needs and take actions accordingly. At this point, the Implementation Guide of the United Nations IGIF has set 9 main strategic pathways to facilitate the process for countries (**Error! Reference source not found.**3). Each strategic pathway is described in a way to cover principles, key actions, auxiliary instruments for the completion of actions, outputs, and main outcomes that are necessary to achieve 4 main objectives, and the direct and indirect relations of each strategic pathway with other strategic pathways are laid out.

The United Nations IGIF states that such a framework is extremely important to achieve many economic, environmental, and social goals including those expected to be achieved under the sustainable development goals, and highlights the fact that the economic, social, and

environmental goals cannot be properly and effectively achieved without geospatial information and such a framework. Associating this programme with 17 sustainable development goals and turning it into a strategic framework will contribute to the achievement of all environmental, economic, and social goals. This provides organizations mandated to achieve economic, environmental, and social goals with a strategic framework and actions to make effective use of geospatial information technologies for adaptation/access to the sustainable development goals. Figure 4 presents the Strategic Framework of the United Nations IGIF that serves as an implementation guide.

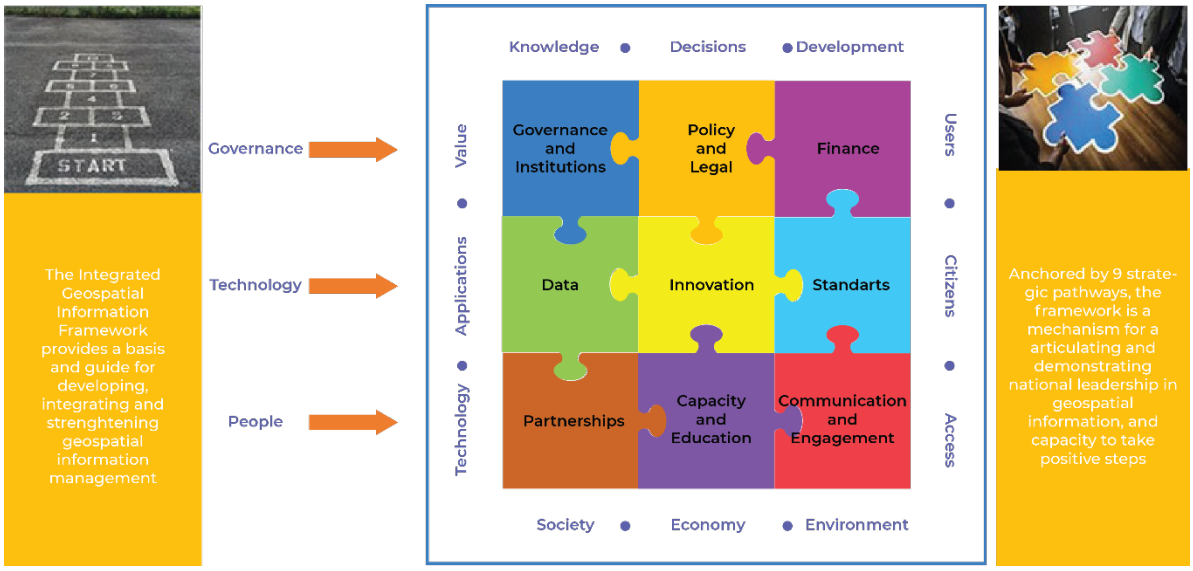

Figure 3.*Framework for the Strategic Pathways of the UN Integrated Geospatial Information Framework*

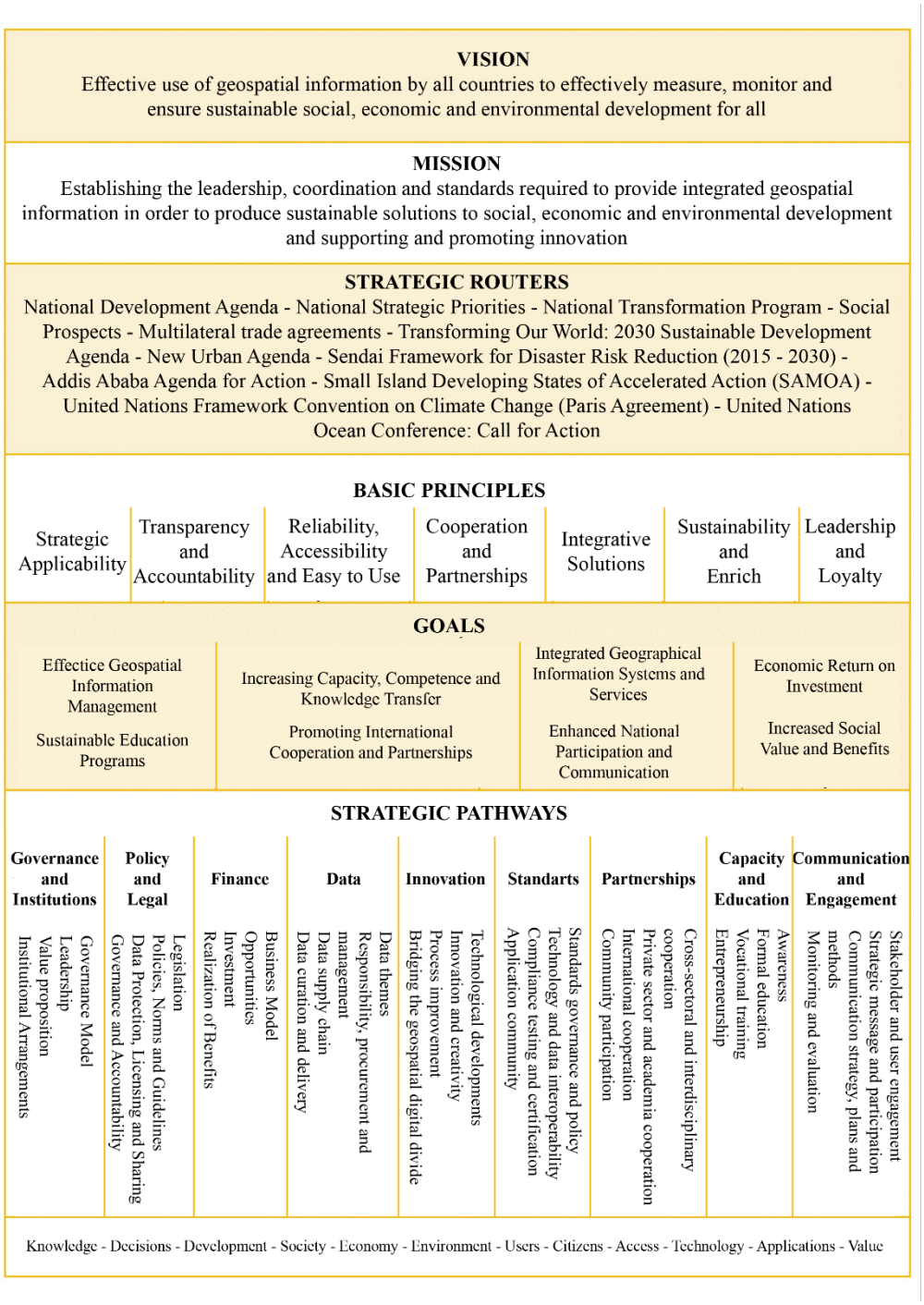

Figure 4.*Implementation Guide for the United Nations IGIF*

This analytical part of the document summarizes what is presented in the Implementation Guide for the United Nations IGIF under each strategic pathway. It is recommended to view the *Implementation Guide* to have more and comprehensive information about the actions needed to be taken under the United Nations IGIF, and to create a roadmap in compliance with the United Nations IGIF.

Governance

Governance strategy of the United Nations IGIF (SP1: Governance)

Good governance is the first step to adopt and implement the approach of management of geospatial information based on country-level policies and actions as a fundamental requirement for any practice. Governance at the national, local, and sectoral levels requires the creation of an environment based on cooperation and stakeholder engagement among public and private organizations, and the introduction of an inspiring, decisive, and robust guiding[1] mechanism. This will make it easier for all levels including public and private sectors to internalize efforts of geospatial information management and help parties become a part of the process. Good governance helps deal more easily with problems, alignment requirements, and challenges concerning integrated geospatial information management.

The demands of the public and private sectors for the creation and use of geospatial data/information grow to a steady extent. However, there could be problems related to the actuality, accuracy, quality, and duplication of geospatial information harnessed in many lines of work. From this point of view, it is important to set main requirements for governance and institutional arrangements, define main responsibilities about geospatial information, and establish partnerships in order to create a well-functioning spatial data infrastructure. Change should be managed, and roles for data sharing should be well-defined, and approaches to achieve a national geospatial information vision should be designated. In this respect, the objective of governance is to *attain political endorsement, strengthen institutional mandates and build a cooperative data sharing environment through a shared vision and understanding of the value of an Integrated Geospatial Information Framework, and the roles and responsibilities to achieve the vision.*

The governance strategy has 4 main elements. Described as **governance model, leadership, institutional arrangements**, and **value proposition**, these 4 key elements provide guidance to strengthen engagement and commitment necessary to establish an integrated geospatial information framework at the national level.

The **governance model**, which is the first element, is about responsibilities concerning geospatial information, and dissemination, coordination, management, and monitoring of responsibilities. The governance model sets local, national, regional, and global partnerships in

[1]The concept billed as "leadership" under the United Nations IGIF is considered to be an inclusive, integrative, and guiding mechanism and process for the nation-wide adoption of the Geospatial Information Strategy. Therefore, our national approach is to offer guidance to improve the leadership effectiveness of each agency and organization in line with their competencies, powers and responsibilities. In this sense, the main mechanism to offer high-level guidance is the National Geospatial Information System Council of Turkey.

geospatial information, and policies, guidelines, and measures for the effective collection, management, exchange, organization, and use of geospatial data.

Leadership is the second key element. Leadership should be established to formulate and sustain a national geospatial information management strategy, develop a country-level action plan for implementing the Integrated Geospatial Information Framework, and create a governance process for assuring effective management responsibilities for the enterprise.

Value proposition of geospatial information is another critical element to attain political endorsement. In this regard, the economic benefit of the integrated geospatial information should be measured, monitored, and communicated to national priorities.

Last but not least, **institutional arrangements** should be put into effect to define roles, responsibilities, and relations across organizations for the management of geospatial data. This could help establish structural and legal basis to be able to manage an organization in a sustainable manner.

It is recommended to adopt the following strategic pathways under these 4 key elements:

- **Forming the Leadership** An important first step in forming the leadership is to establish *a Governing Board, a Council, and an Advisory Body* made up of data producers, administrators, and users and mandated for geospatial information management. This mechanism should provide leadership to implement and sustain the integrated geospatial information framework, and guide strategic planning and decision-making processes for geospatial information management practices. In addition to a Governing Body, an independent *Geospatial Coordination Unit* could be established and mandated to coordinate all actions concerning the integrated geospatial information framework and represent all governmental departments and be accountable to the Ministry that it is situated within. Last but not least, *Specialist Working Teams*, which are made up of subject matter experts, should be involved in the leadership mechanism to offer recommendations to the Geospatial Coordination Unit and the Governing Body.
- **Establishing Accountability:** A governance model should be rolled out to establish accountability. The *governance model* should be designed in a way to bring all national and local administrations and relevant parties, share geospatial information, improve cross-agency business processes, and adopt data standards and interoperable systems. The model should encourage stakeholder engagement and innovation, reduce data duplication across the public and private sectors, and maximize the use of geospatial data at the national and local

levels. The roles and responsibilities of each institution should be defined, and communication and sharing channels should be designated.

- **Setting Direction:** The action of setting direction includes *strategic alignment* and definition of the Geospatial Information Management Strategy accordingly. The strategic alignment actions are intended to identify the most important country-level actions for geospatial information management and align them. At this stage, the first course of action is to define geospatial information management activities, projects and programmes that will deliver a nation's strategic priorities. This will make it possible to avoid data duplication, and waste of effort and resources. The main output of the strategic alignment actions is the Geospatial Information Management Strategy. The establishment of the Geospatial Information Management Strategy is the first major step to set the vision, mission, goals, and objectives.
- **Creating A Plan of Action:** Once the Geospatial Information Management Strategy is established, a *Change Strategy* should be adopted to facilitate the development of Country-Level Action Plans. The Change Strategy is intended to show how the geospatial information management practices applicable in the country should be changed. To drawn up in line with the Change Strategy, the Country-Level Action Plans should inform tasks that will assist to achieve the designated goals and objectives.
- **Tracking Success:** To track success, regular *monitoring and evaluation* mechanisms should be established to facilitate the achievement of the goals. This mechanism enables to define persons and organizations mandated to create and sustain integrated geospatial information, set reporting methods and procedures, and implement successful integrated geospatial information management practices. *Success indicators* must be absolutely established to track success.
- **Deriving Value:** The question why governments need integrated geospatial information to derive value should be answered. The value of the investment and effort put into geospatial information is explained by a *Value Proposition Statement*. The Value Proposition Statement should be clear and concise, addressing problems that would benefit from having integrated geospatial data and analytical capabilities.

Among the outputs of the actions to be taken under the Strategic Pathway of Governance could be the Governing Board, Geospatial Coordination Unit, Specialist Working Groups, Geospatial Information Management Strategy, Change Strategy, Country-Level Action Plans, monitoring and evaluation framework for action plans, success indicators, Geospatial Value Proposition, and evaluation of socio-economic benefits.

Figure 5 shows a process flow chart drawn up for the Strategic Pathway of Governance. SP1: Governance framework is summarized in Table 1 in terms of key elements, actions, and outcomes.

Figure 5. *Roadmap for the governance strategy*

Table 1.*SP1: Main Structure of Governance*

ASPECT	STRATEGIC PATHWAY	KEY ELEMENTS	ACTIONS	DELIVERABLES
GOVERNANCE	**SP1: GOVERNANCE** ***Objective:*** *Attain political endorsement, strengthen institutional mandates and build a cooperative data sharing environment through a shared vision and understanding of the value of an Integrated Geospatial Information Framework, and the roles and responsibilities to achieve the vision.*	**Governance Model** *It should be based on a National Geospatial Information Strategy, and facilitated by governing bodies responsible for aligning and supporting policies and laws affecting the acquisition, creation, management, use, and dissemination of geospatial information.* **Leadership** *Leadership should be established to formulate and sustain a national geospatial information management strategy, develop a Country-level Action Plan for implementing the Integrated Geospatial Information Framework, and create a governance process for assuring*	**1. Forming the Leadership** • *Governing Board* • *Geospatial Coordination Board* • *Specialist Working Teams*	• ***Governing Board*** • ***Geospatial Coordination Board*** • ***Specialist Working Teams***
			2. Establishing Accountability • *Governance Model*	• ***Accountability mechanisms under defined roles and responsibilities***

		effective management responsibilities for the enterprise. **Value Proposition** *Integrated geospatial information should be measured, monitored, and associated with national priorities including citizen and societal benefits.* **Institutional Arrangements** *Roles and responsibilities across organizations should be defined for the geospatial information management.*	**3. Setting Direction** • *Strategic Alignment* • *Geospatial Information Management Strategy*	• ***Geospatial Information Management Strategy***
			4. Creating A Plan of Action • *Change Strategy* • *Development of the Country-Level Action Plan*	• ***Change Strategy*** • ***Country-Level Action Plan***
			5. Tracking Success • *Monitoring and Evaluation* • *Success Indicators*	• ***Monitoring and Evaluation Framework and Success Indicators for actions under the Action Plan Roadmap***
			6. Deriving Value • *Value Proposition Statement*	• ***Geospatial Information Value Proposition and Socio-Economic Value Assessment***

Policy and Legal

Policy and legal strategy of the United Nations IGIF (SP2: Policy and Legal)

Robust policies and legal frameworks are essential to institute effective, efficient and secure management and exchange of geospatial information - nationally and sub-nationally. Policies and legal frameworks have major impacts on other strategic pathways to develop programmes and plan actions for integrated geospatial information management. Whether they are binding or not, policies and legal instruments directly or indirectly affect how geospatial information is collected, used, stored, and distributed. Effective policies and legal frameworks can help manage geospatial information in a way to provide public good and effectively lead to desired outcomes.

Geospatial data enable citizens, organizations and governments to have access to up-to-date and reliable information to support decision-making processes. However, it needs to be anchored by well understood and agreed policies and legal frameworks. In this sense, the objective of the policy and legal strategic pathway is to *address current policy and legal issues by improving the policies and laws associated with and having an impact on geospatial information management*.

The policy and legal strategic pathway has 4 main elements. Described as **legislation, policies, norms and guides, data protection, licensing and sharing, and governance and accountability,** these 4 key elements are main areas of action required to implement policies and legal frameworks for geospatial information and proactively keep pace with technological change.

Legislation, which is the first element, is the whole set of laws and regulations that provide the legal framework in which geospatial policies must operate. These laws and regulations may be specific to geospatial information or closely related. The legislation is binding.

Policies, norms and guides are typically guiding/aspirational and relatively easy to develop and adopt. They are non-binding elements of a policy and a legal framework, and they include proven practices that provide good direction for strengthening geospatial information management.

Data protection, licensing and sharing address how geospatial information is used and shared, and they are usually designated by instruments such as agreements, treaties, data sharing agreements or licenses. The use of such instruments helps define legal limitations on geospatial information management.

Governance and accountability are policy and legal boundaries within a country or jurisdiction that engenders effective management and use of geospatial information and leads to

good governance, effective implementation and accountability. Governance enables to establish a robust policy and legal framework, provide compliance mechanisms required for effective and efficient integrated geospatial information management, and name organizations to be responsible to implement and sustain the integrated geospatial information framework.

It is recommended to adopt the following strategic pathways under these 4 key elements:

- **Providing Leadership:** An independent *Review Group* (or an equivalent body) should be established to review, assess, and understand the country's existing policy and legal framework. The Review Group would recommend or decide what policy and legal additions or changes are needed to create an integrated geospatial information network. It is essential for this group to include legal practitioners and processionals. This group should work in tandem with the Governing Board and Geospatial Coordination Unit mentioned in the SP1, and bring together stakeholders to create an inventory of policies and laws that impact geospatial information management.
- **Assessing Needs:** An effective and robust policy and legal framework requires a good review, assessment and understanding of the environment within which the policies and laws will operate. To create an integrated geospatial information framework, one should consider the current geospatial information management practices, evolving technologies, user requirements, and what changes are required to be made to reach the desired outcome. When *reviewing and assessing* the existing policy and legal framework, it is a must to consider and understand the geospatial ecosystem, the laws impacting geospatial information management, the legal system, policy instruments, types/forms of geospatial information, the way in which geospatial information is used, the laws and policies and how they balance risks and benefits, the changing geospatial technology landscape, and the changing societal and personal norms. Once the policy and legal framework is reviewed, assessed and understood, and the legal inventory is completed, it is necessary to conduct *an analysis of the gaps and opportunities* to systematically determine policy and legal needs with respect to the integrated geospatial information framework. The needs arising from the analysis can lead to solutions that strengthen the integrated geospatial information framework. Once the gaps and opportunities analysis is completed, the Review Group can identify requirements to improve the current policy and legal framework in cooperation with other boards mentioned in the SP1, and establish a sound and enabling policy and legal framework. The respective stakeholders should be included in the process.
- **Addressing Opportunities:** When the policy and legal framework is established, both binding and non-binding instruments should be considered. While some of these instruments

can be used in both the public and private sectors, others are applicable only to one sector. It is important to understand the role of each instrument, their strengths and weaknesses, and how they apply within their national circumstances, history, culture, and legal requirements. To design and develop, the focus should be on designating a lead organization, who would be responsible for data creation and management, what the sectoral needs/provisions and financial management issues would be. One of the actions to be taken in this process is to *share and disseminate* data with third parties. How data would be shared and disseminated should be designated in this scope, and any confidential matter should be considered. National policies, sectoral guidelines, a memorandum of understanding, a data sharing agreement, a license agreement or a piece of legislation are among the instruments that can enable to share data. Data sharing arrangements should not be too restrictive. Open data policies are important. In addition, *license agreements* can also serve as legal instruments.

- **Future-Proofing:** Geospatial information and technologies rapidly change and evolve. Associated policies and legal framework impact and are impacted by these new technologies. Therefore, it is necessary to understand their potential benefits well, and make sure that policies and legal framework are easy to be adapted to innovations/future. The Review Group plays an important role to make sure that the policies and legal framework are *future-proof*.
- **Addressing Coherence:** By setting *intellectual property rights*, some issues arising between data providers and users should be clarified. This should be clarified at the national level as uncertainty about data property rights would have a negative impact on geospatial information management. In addition, arrangements should also be made about *data protection and privacy*. *Liabilities* about data should be designated as a part of policies and legal framework. In the similar vein, data confidentiality (*sensitive information*) is also important in terms of nationally confidential issues. Restrictive laws and policies should be established for geospatial data collection and use concerning national security wheres overly restrictive attitudes should be avoided.
- **Delivering Compliance:** The implementation of the integrated geospatial information framework should consider the effectiveness of the current legal and policy framework, the impact that it has on existing arrangements, infrastructure, practices, products and services, the impact arising from new technologies and user requirements, and changes that must be made to reach the desired goals and outcomes as a part of an *impact assessment*. It is important to develop an accompanying Compliance Strategy when designing a policy.

Figure 6 shows a process flow chart drawn up for the Strategic Pathway of Policy and Legal. SP2: Policy and legal strategy is summarized in Table 2 in terms of key elements, actions, and outputs.

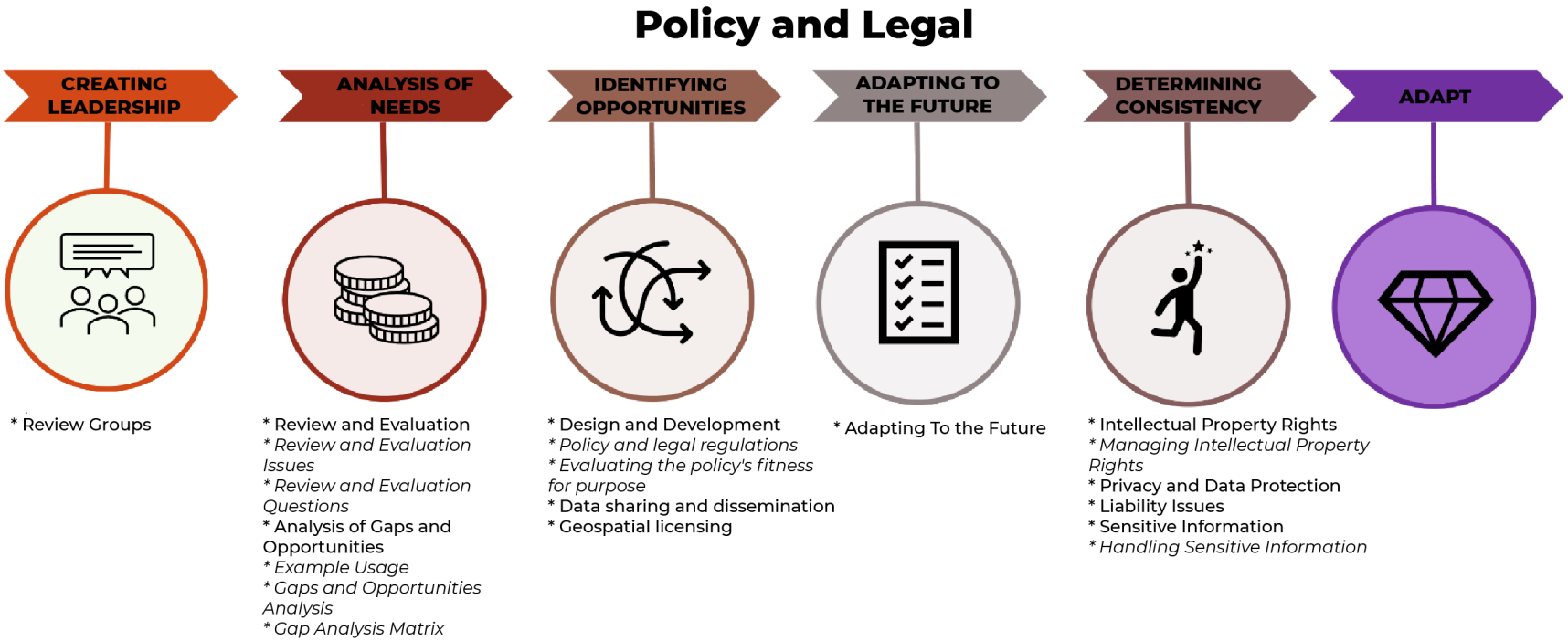

Figure 6. *Roadmap for the policy and legal strategy*

Table 2.*SP2: Main Structure of Policy and Legal*

ASPECT	STRATEGIC PATHWAY	KEY ELEMENTS	ACTIONS	DELIVERABLES
GOVERNANCE	**SP2: POLICY AND LEGAL** ***Objective:*** *To address current policy and legal issues by improving the policies and laws associated with and having an impact on geospatial information management.*	**Legislation** *Legislation is the whole set of laws and regulations that provide the legal framework in which geospatial policies must operate. These laws and regulations may be specific to geospatial information or closely related.* **Policies, Norms, and Guidelines** *Policies, norms and guides are typically guiding/aspirational and relatively easy to develop and adopt. They include proven practices that provide good direction for strengthening geospatial information management.*	**1. Forming the Leadership** • *Review Groups*	• ***Policy and Legal Review Group (or an equivalent body) and agreed terms of reference***
			2. Needs Analysis • *Review and Assessment* • *Analysis of Gaps and Opportunities*	• ***Outputs for the review and assessment of the legislation, policy, and the legislative framework (an inventory of policies, şaws, and regulations etc.)*** • ***Analysis of gaps and opportunities (materials, tabletop exercises, analysis matrix, etc. to conduct analyses)***

		Data Protection, Licensing, and Sharing *They address how geospatial information is used and shared, and they are usually designated by instruments such as agreements, treaties, data sharing agreements or licenses. The use of such instruments helps define legal limitations on geospatial information management.* **Governance and Accountability** *They are policy and legal boundaries within a country or jurisdiction that engenders effective management and use of geospatial information and leads to good governance, effective implementation and accountability.*	**3. Addressing Opportunities** • *Design and Development* • *Data Sharing and Dissemination* • *Geospatial Information Licensing*	• ***Assessments of impacts of policies and legislation*** • ***Assessment of current legal and policy environment, whether it is sound and enabling enough to promote the highest and widest use of geospatial information***
			4. Future-Proofing • *Future-Proofing*	• ***Review of personal, social, economic, and technological advances, developments, and norms.***
			5. Addressing Coherence • *Intellectual Property Rights* • *Privacy and Data Protection* • *Liability Concerns* • *Sensitive Information*	• ***Addressing and clarifying intellectual property rights, privacy and data protection, custodianship, and sensitive information.***
			6. Delivering Compliance • *Impact Assessment* • *Compliance Strategy*	• ***Impact assessment of policies and legislation*** • ***Assessment of current legal and policy environment, whether it is sound and enabling enough to promote the highest and widest use of geospatial information***

Financial

Financial strategy of the United Nations IGIF (SP3: Financial)

Financial governance, planning, management, and investments are required to achieve sustainable integrated geospatial information management. Investment will typically be realized when governments can see evidence that geospatial information will deliver social, environmental, and economic benefits. Investment in geospatial information management is framed in terms of a business case. The business case answers the questions why the investment is important and what benefits the country derives from its implementation. In addition to a business case, it is necessary to build a robust and sustainable business model.

There is a need to establish various partnerships and strengthen the relations to finance investments to be made under the United Nations IGIF: The objective of the strategic pathway of finance is *to establish long-term investment programmes that enables to respond to financial plans, and societal, environmental and economic demands for geospatial data to establish and maintain geospatial information management.*

The financial strategy has 4 main elements. Described as **business model, opportunities, investment and benefits realization**, these 4 key elements enable to strengthen, support, and sustain the integrated geospatial information management process over the longer term just like all financial arrangements.

Business model facilitates the wider use of integrated geospatial information, is compatible with the government's fiscal policy and funding approaches, and implemented through a financial plan.

Opportunities techniques and methods for aligning integrated geospatial use cases with national strategic and policy objectives to identify opportunities, partnerships, investment priorities, and benefits.

Investment is a business case that justifies funding and investment. The funding and investment include the strategic case (why now), economic case (quantified benefits), commercial case (customers and partners), financial case (funding sources), and the financial management strategy.

Benefits realization is a plan to reliably evaluate, measure, and monitor the complete life cycle of the implementation of the integrated geospatial information framework (IGIF). This plan/process includes the key performance indicators that form the basis for impact assessment and quantification.

It is recommended to adopt the following strategic pathways under these 4 key elements:

- **Setting Direction:** A governing board or a similar leadership mechanism is required to establish *financial governance*. This mechanism would have the responsibility and oversight for the financial aspects of a national geospatial information program. This would include receiving and approving financial reports, audited accounts, and any independent reports from internal or external audit and review. The financial management process should be led by a senior/high-level financial manager. The financial manager should report on the financial arrangements, management, and status of the program on at least an annual basis, and make recommendations to the governing board for financial governance decisions including funding and investments. Financial policies and guidelines should be prepared for integrated geospatial information management in cooperation with a specialist group, and they should be reviewed and revised as appropriate, and made sure that they adhere to the national policy and legal framework. This will also provide *accountability*.
- **Situational Assessment:** *The current situation and operational environment* should be reviewed, assessed, and understood well. To understand the financial and policy environment within which geospatial information management operates, there is a need to analyze *the current business model*. This should require considering policies and guidelines that need to be in compliance with fiscal policies and legal mandates, institutional arrangements and relationships, maturity of the geospatial information markets and associated providers of products and services, government's responsibilities for geospatial products and services, organization's level of financial independence, governance structure to support the implementation of the integrated geospatial information framework, and the implementation environment influencing outcomes. In addition, a robust *data framework and policy* is required. Geospatial information should be openly available and accessible. The provision of open data should not have cost or financing implications within the United Nations IGIF. Geospatial data should be used for public good and duplications should be avoided.
- **Financial Plan:** *A desired business model* should be developed after analyzing the current situation. This model should focus on the value and financing of the geospatial information management. The business model should be driven national priorities, national needs, and related societal, environmental, and economic benefits. *A financial plan* should be developed in line with the business model. The financial plan should include budgetary documents. It is recommended to make 5-year or 10-year estimations. Financial planning is linked to the geospatial information management strategy, its goals, objectives, its acceptance, and its implementation.

- **Case for Investment:** *A socio-economic cost-benefit analysis* (impact assessment) is recommended to be conducted in this process. The United Nations IGIF is an important component to make plans for economic development, sustainable development, and natural disasters. Policy makers and programme managers should evaluate the benefits of policy changes of investments *A business case* is a rationale for the investment made based on the needs and benefits of integrated geospatial information activities. Then investment opportunities should be evaluated and the *investment should be appraised*. Annual budgets should be prepared for the integrated geospatial information management programme.
- **Sources of Funding:** The provision of integrated geospatial information management requires *funding*. It can be funded by a variety of sources. Aligning financial and investment plans with national priorities, current needs and national circumstances increases the likelihood of ongoing government support. In addition, the scope and priorities of the integrated geospatial information framework should also be aligned with the current national political and policy drivers, and *strategic objectives* of the country.
- **Deriving Value:** All plans, investments, and commitments designated during implementation at all stages should be able to clearly show how benefits realization will be achieved and measured. This requires a *Benefits Realization Plan*. A socio-economic analysis defines the expected benefits. The Country-level Action Plan includes milestones for implementing the United Nations IGIF. Plans, methods, and messages suitable to communicate the actions and financial benefits to the parties and *inform* them should be identified.

Figure 7 shows a process flow chart drawn up for the Financial Strategic Pathway. SP3: Financial strategy is summarized in Table 3 in terms of key elements, actions, and outputs.

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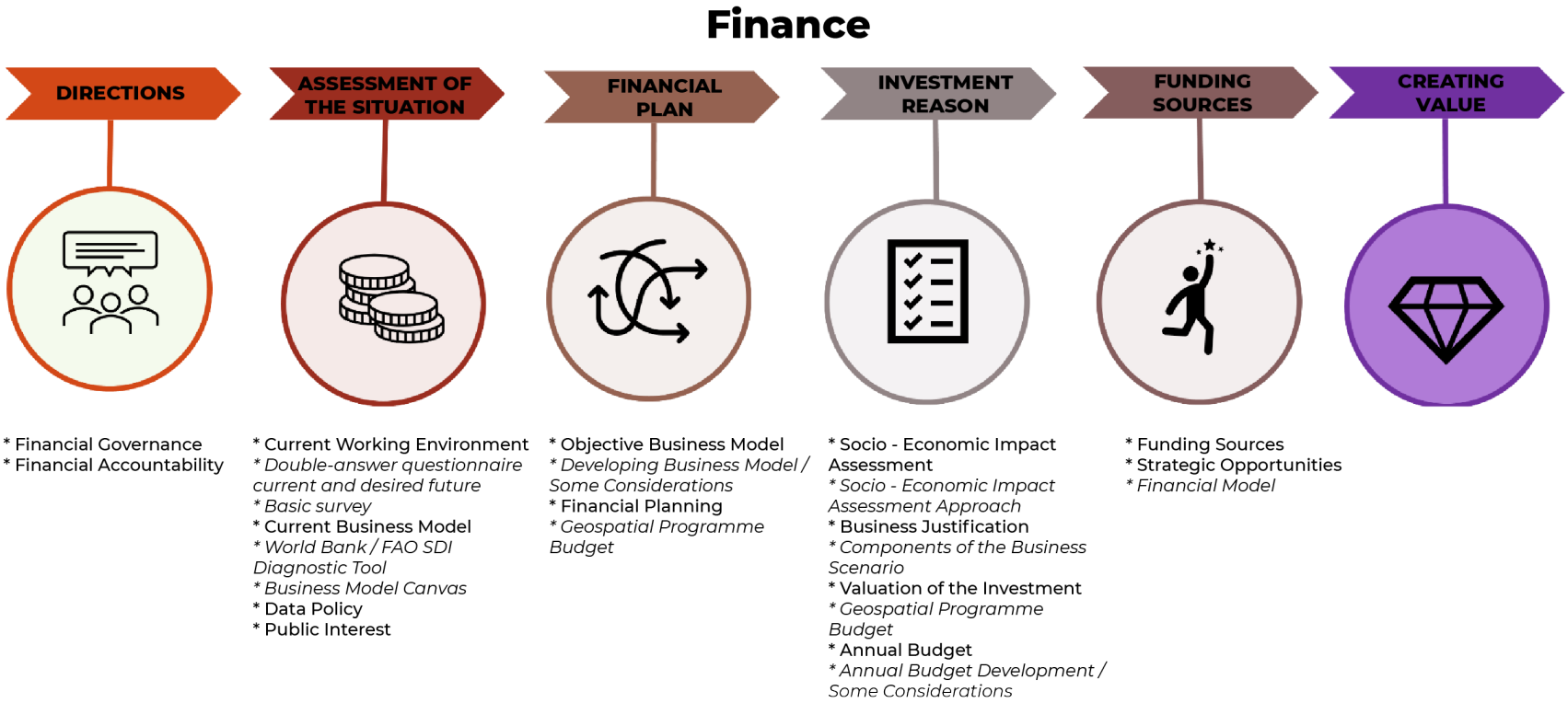

Figure 7. *Roadmap for the financial strategy*

Table 3.*SP3: Overall Structure for the Financial Strategic Pathway*

ASPECT	STRATEGIC PATHWAY	KEY ELEMENTS	ACTIONS	DELIVERABLES
GOVERNANCE	**SP3: FINANCIAL** ***Objective:*** *To establish long-term investment programmes that enables to respond to financial plans, and societal, environmental and economic demands for geospatial data to establish and maintain geospatial information management.*	**Business Model** *Business model facilitates the wider use of integrated geospatial information, is compatible with the government's fiscal policy and funding approaches, and implemented through a financial plan.* **Opportunities** *Opportunities techniques and methods for aligning integrated geospatial use cases with national strategic and policy objectives to identify opportunities, partnerships, investment priorities, and benefits.* **Investment** *Investment is a business case that*	**1. Setting Direction** • *Financial Governance* • *Financial Accountability*	• ***Financial Arrangement and Management Plan***
			2. Situational Assessment • *Current Operating Environment* • *Current Business Model* • *Data Policy* • *Public Good*	• ***Situational Assesment and Analysis***

		justifies funding and investment. The funding and investment include the strategic case (why now), economic case (quantified benefits), commercial case (customers and partners), financial case (funding sources), and the financial management strategy. **Benefits Realization** *It is a plan to reliably evaluate, measure, and monitor the complete life cycle of the implementation of the integrated geospatial information framework (IGIF). This plan/process includes the key performance indicators that form the basis for impact assessment and quantification.*	**3. Financial Plan** • *Desired Business Model* • *Financial Planning*	• ***Business Model for the Management of the Integrated Geospatial Information Framework*** • ***Financial Plan***
			4. Case for Investment • *Socio-economic Impact Assessment* • *Business Case* • *Investment Appraisal* • *Annual Budget*	• ***Socioeconomic Impact Assessment*** • ***Investment Appraisal*** • ***Annual Budget***
			5. Sources of Funding • *Sources of Funding* • *Strategic Opportunities*	• ***Strategic Opportunities Assessment***
			6. Deriving Value • *Benefits Realization* • *Communicate Benefits*	• ***Benefits Realization and Communication Plan***

Data

Data strategy of the United Nations IGIF (SP4: Data)

Geospatial data is the foundation on which many organizations base effective decisions. It is used in policy development and in the provision of government services. The growth in the amount, variability, and availability of data requires organization of geospatial data. Geospatial data is used across every market and industry sector, and every organization creates geospatial data. Therefore, these processes should be managed in a way to provide consistency, completeness, quality, accuracy, security and effective use.

However, many countries face challenges to establish integration for the widespread and effective use of geospatial data by different sectors, organizations, and users. Therefore, the objective of the strategic pathway of data is to *enable data custodians to meet their data management, sharing and reuse obligations to government and the user community through the execution of well-defined data supply chains for organizing, planning, acquiring, integrating, curating, publishing and archiving geospatial information.*

The data strategy has 4 main elements. Described as **data themes, custodianship, acquisition and management, data supply chains, and data curation and delivery,** these 4 key elements provide an environment where innovation, and pioneering research and development can thrive.

National priority and fundamental geospatial **data themes**, and the datasets that fall within each of these themes are relevant to a broad range of applications and hence, end-users have a recurring need for this information. **Data themes** should be organized to be adapted to national strategic and statutory needs in alignment with geospatial data themes supported/determined through global consultation and consensus.

Custodianship, acquisition, and management can provide acquisition, management, maintenance and dissemination of fit-for-purpose geospatial information.

Data supply chains refers to the flow of geospatial information from one organization to another. In a supply chain, each node (custodian organization) should add value for data before transferring information to another node (e.g. data update). To secure geospatial information, interlinkages should be developed for cooperative data sharing and integration.

Data curation and delivery enables enduring accessibility and value of data for broader usage across all sectors. From this point of view, data curation and delivery is the art of maintaining the value of data and delivering it to end users in a way it can be visualized and used.

It is recommended to adopt the following strategic pathways under these 4 key elements:

- **Getting Organized:** 3 specific actions to be addressed for the strategic pathway are *data framework, data inventory, and dataset profiles*. *Data framework* offers a methodology to have access to and use a country's geospatial, statistical and other data. The data themes are elements to group geospatial datasets in each classification category. The themes make it easy for users to locate information and are important to structure and enable machine-readable data catalogues so that information can be located easily by search engines. The data framework records data theme descriptions in a way that makes it easy for users to understand what data is available within the theme, and the purpose for which it can be used. Data themes particularly fundamental data themes should be considered when developing a Geospatial Information Management Strategy. Conducting an inventory of all geospatial data and information held by institutions provides a valuable means for a country to fully understand the extent of its national data holdings. The *data inventory* should record elements such as the spatial data format, accuracy, ownership, coverage, and datum. This information can then be incorporated into the data framework. Dataset profiles are created from the information collected during the data inventory, and often incorporated into a data catalogue, and they improve the availability and use of geospatial information.
- **Planning for the Future:** At this point, there are 2 specific actions: *Data gap analysis* and *data theme road map*. *A data gap analysis* is required to address the gaps in geospatial information capacity and identify strategies accordingly. A data gap analysis should involve a broad stakeholder group. A SWOT and PEST analysis can be conducted as a method. Goals are generally documented in the Geospatial Information Management Strategy. The data theme road map is a document that includes major milestones required to reach the desired outcomes and close the capacity gaps. The data theme road map is a powerful strategic tool to coordinate cross-organization activities.
- **Capturing and Acquiring Data:** Geospatial information is collected in various formats. There are various methods for capturing new datasets, as well as enhancing and maintaining existing datasets. The best method to *capture data* varies by countries. Geospatial information can be expensive, and data can be overlapped and duplicated. A national data acquisition programme should be established to provide coordination between organizations and producers for a strategic investment and use of geospatial sources.
- **Managing Data Sustainably:** *A data custodianship policy and guidelines* are guiding documents about responsibilities of custodians for the management of information products. Guidelines are generally based on experience and include good best practices. A data custodianship policy also eliminates duplication when capturing and maintaining geospatial information. Implementing *data governance* leads to improved productivity and efficiency in

capturing and updating data. The data governance model is different from the model described in SP1. The governance model is designed to institute cooperation and alignment of decisions while *the data governance model* is focused on how each data set is to be implemented at the organizational level. *Data management plans* provide consistency in geospatial data management practices within agencies and across management levels. The main factors taken into account for data management plans are custodianship, knowledge management, security, quality and accessibility. *Metadata* describes the origin of geospatial data. Data custodians are accountable for the release/delivery of information. However, *data release guidelines* should be developed on what can be lawfully released in line with the the national interests (open access, restricted, confidential etc.). The digitalization of data has brought about the need for secure *data storage and retrieval systems*.

- **Maintaining Accurate Positioning:** Global *geodetic infrastructure* is required to establish and maintain accurate positioning. The Global Geodetic Reference Framework (GGRF) is a prerequisite for the accurate collection, integration and utilization of all geospatial data as it allows the interrelationship of measurements taken anywhere on the Earth and in space. Geodetic infrastructure allows users to precisely determine locations/coordinates on the Earth, and to measure changes to the Earth's surface over time.
- **Data Integration:** This has 4 specific actions. As the first one, *geospatial and statistical integration* enables to associate demographics, economic and environmental statistics with a geographic location. Developed by the UN, the Global Statistical Geospatial Framework (GSGF) facilitates the integration of statistical and geospatial data. The resulting data can then be integrated with statistical, geospatial, and other information to support local, national, regional, and global development priorities and agendas. Associating data with a geographic location is also crucial for data integration. *Geocoding and aggregation* should be conducted to do so. Geocoding is used to link statistical data at a micro level such as linking household data to a building whereas aggregation is used at the macro level to represent a generalized interpretation of statistics. *Data supply chains* should be defined and organized in a way to provide duplicated data creation. *A data supply chain strategy* is used to formalize data sharing, invoke supply chain partnerships, and establish service level agreements between organizations. Last but not least, *data interoperability* is crucial to achieve integrated data supply chains. Interoperability depends on the use of data in community-agreed standards.

Figure 8 shows a process flow chart drawn up for the Strategic Pathway of Data. SP4: Data strategy is summarized in Table 4 in terms of key elements, actions, and outcomes.

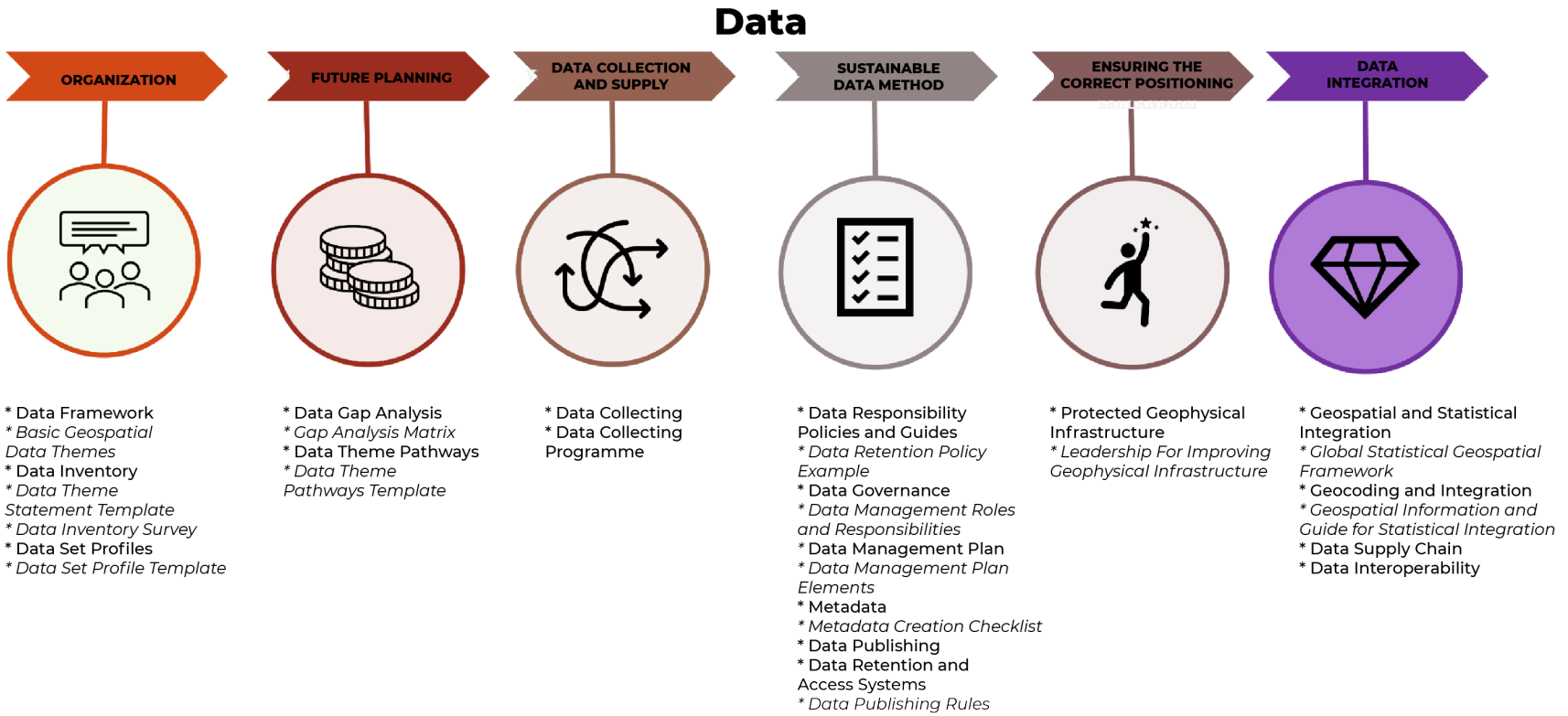

Figure 8. *Roadmap for the data strategy*

Table 4.*SP4: Overall Structure for the Data Strategic Pathway*

ASPECT	STRATEGIC PATHWAY	KEY ELEMENTS	ACTIONS	DELIVERABLES
TECHNOLOGY	**SP4: DATA** ***Objective:*** *To enable data custodians to meet their data management, sharing and reuse obligations to government and the user community through the execution of well-defined data supply chains for organizing, planning, acquiring, integrating,*	**Data Themes** *End users have a recurring need for fundamental geospatial data themes, as well as application-specific and socio-economic themes. Data themes with national priority should be organized in a way to adapted to national strategic and statutory needs in alignment with fundamental geospatial data themes determined through global consultation and consensus.* **Custodianship, Acquisition, and Management** *Responsibilities should be defined for the acquisition, management, maintenance and quality of the information. Geospatial data*	**1. Organization** • *Data Framework* • *Data Inventory* • *Dataset Profiles*	• ***Data Framework*** • ***Data Inventory*** • ***Data Profiles and Metadata***
			2. Planning for the Future • *Data Gap Analysis* • *Data Theme Roadmap*	• ***Data Gap Analysis*** • ***Data Theme Roadmap***
			3. Capturing and Acquiring Data • *Data Capture* • *Data Acquisition Programme*	• ***National Data Capture and Acquisition Programme***

		should be acquired and managed based on these responsibilities. **Data Supply Chain** *To secure geospatial information, interlinkages should be developed for cooperative data sharing and integration.* **Data Curation and Delivery** *An information resource should be established for broader usage across all sectors to provide enduring accessibility and value of data.*	**4. Managing Data Sustainably** • *Custodianship Policies and Guidelines* • *Data Governance* • *Data Management Plan* • *Metadata* • *Data Release* • *Data Storage and Retrieval Systems*	• ***Custodianship Policies and Guidelines*** • ***Data Governance and Management*** • ***Data Release, Storage and Retrieval Systems***
			5. Maintaining Accurate Positioning • *Maintained Geodetic Infrastructure*	• ***Maintained Geodetic Infrastructure***
			6. Integrating Data • *Geospatial and Statistical Integration* • *Geocoding and Aggregation* • *Data Supply Chains* • *Data Interoperability*	• ***Geospatial and Statistical Integration*** • ***Geocoding and Aggregation*** • ***Data Supply Chains and Interoperability***

Innovation

Innovation strategy of the United Nations IGIF (SP5: Innovation)

Digital transformation, emerging technologies and associated innovation and creativity have become major industry disruptors and compelling enablers in the broader information sector. Many sectors and public organizations need more geospatial information the creation and use of which exponentially becomes faster, more diverse, complicated, and more available. At this point, it is crucial to set innovation strategies to strengthen the national geospatial information management, quickly respond to the demand for geospatial information, and reap the dividends of digital transformation. Therefore, the innovation strategy is at the centre of the nine strategic pathways of the integrated geospatial information framework.

In this sense, the objective of the innovation strategy is "*to leverage the latest cost-effective technologies, innovations and process improvements so that governments, businesses and academia, no matter their current situation, may leapfrog to modern geospatial information management systems and practices*."

The actions needed to be taken for innovation and creativity include 4 key elements. Described as **technological advances, innovation and creativity, process improvement**, and **bridging the geospatial digital divide**, these elements are guidelines to create innovative opportunities that would promote continuously-improved technologies and processes, and help countries quickly bridge the geospatial digital divide.

The first element is **technological advances**. Current and new technological advances should be used to bridge the geospatial digital divide and achieve overarching and sustainable development goals. Given that geospatial information plays a role in strengthening economic development and environmental sustainability, one can understand how important technologies and methods to improve the geospatial information management, sharing, and usage are.

The second key element is **innovation and creativity**. To generate economic growth, science and technology should be stimulated through digital transformation strategies, policy and legal instruments, innovation centers, and research and development.

Another critical element of innovation is **process improvement**. Existing processes should be identified, analyzed and improved to achieve efficiency, productivity gains and new products and services.

Finally, the geospatial digital divide should be bridged through a combination of technological developments, data, supportive policies and legal frameworks, financial commitments, stakeholder engagement, partnerships and capacity building.

These 4 elements are underpinned by principles that can be adopted by each country to promote innovation and creativity. These principles are put into practice through strategic actions that stimulate the use of the latest cost-effective technologies, innovation, creativity and process improvements to deliver and strengthen participation and commitment to achieving the United Nations IGIF. The strategic pathway actions recommended to be adopted under the fundamental elements are listed below.

- **Geospatial Information Framework:** *An Innovation Group* (or a similar body) should be established to continuously monitor, review, and assess the latest cost-effective technologies, innovations, and process improvements to benefit from them. This group could be one of the specialist working teams described in the SP1. Directly reporting to the Geospatial Coordination Unit, the Innovation Group should guide the development of the Geospatial Digital Transformation Strategy. Once a Geospatial Digital Transformation Strategy and Plan are set, it is recommended to form cross-functional teams to implement the plan. The Innovation Group should identify the country's level of maturity of technological infrastructure. To this end, the United Nations IGIF *Technology Maturity Index* can be used as a guide. The technology maturity index can be used to form a consensus on the current deployment of information technology, to stimulate discussion towards a high-level roadmap, and to further understand the responsibilities for innovation. The Innovation Group is a key stakeholder in the development of the Geospatial Information Management Strategy. It should advocate process improvements and innovations that are *strategically aligned* to the priorities of government from an economic, social and environmental perspective.
- **Identifying Innovation Needs:** The first action needed to be taken to identify innovation needs is to *monitor trend*s. The Innovation Group should review and monitor current trends, technologies and innovative developments as a whole for geospatial information management. Monitoring trends is useful to determine the level of technology maturity, strategic alignment, and needs. *A technology needs assessment* enables to determine where innovative approaches are needed the most to close the gaps in terms of geospatial information management capabilities. The assessment process typically includes scoping, inventory, a policy review, data needs assessment, and risk assessment.
- **Transformation Roadmap:** Data should be digitally transformed and *modernized*, and efficient and effective methods should be adopted to do so. Many countries now transform their data by modern methods rather than conventional ones. To do that, it will be useful to draw up *a transformation roadmap*. *Modern data creation methods* should be adopted to both transform data and create new data. The potential to capitalize on the true value of the

nation's geospatial information assets can be limited because data storage and access is generally managed in closed systems of government. To eliminate such limitations, many countries now *mobilize infrastructure* systems such as cloud-based storage systems.

- **Culture of Innovation:** Generally focusing on technological needs and process improvements, *a Geospatial Digital Transformation Strategy* should complement country-level action plans and be aligned with the Geospatial Information Management Strategy. A Digital Transformation Plan makes it easier to coordinate and visualize activities in terms of interoperability, economies of scale, capacity needs, policy and regulatory needs, procurement efficiency and monitoring and evaluation. *Creating an innovation culture* in an organization is as important as the latest cost-effective technologies, process improvements, and business practices being implemented. The elements that play a role in creating an innovation culture are leadership, strategy, structure, organizational culture, and innovation culture.
- **Operationalizing Innovation:** The flow of technology and information among people, enterprises, and institutions is a key component of the innovation process, and this flow is referred to as *the national innovation system*. National innovation systems are key drivers for economic growth and productivity improvement. The objective of *innovation programmes*, which are a subset of a national innovation system, is to develop, find out new ways of doing business and make them viable. Supported by national geospatial information agencies, geospatial innovation and entrepreneurship can be driven by the creation of *innovation hubs and programs* aiming to support new and emerging start-ups in the geospatial sector. *Process improvement* is a task of identifying, analyzing and improving existing business processes, methods, and standards of quality. Organizational readiness is one of the main factors to consider when improving a process.
- **Innovation Ecosystem:** The fundamental impediments that must be overcome to *bridge the geospatial digital divide* are digital access, digital adoption, digital value, data ecosystem, geospatial information technologies, and geospatial information policies. The implementation of an integrated system-of-systems approach in reliable, secure and scalable platforms and data hubs will assist countries in their efforts to address national priorities and achieve the Sustainable Development Goals.

Figure 9 shows a process flow chart drawn up for the Strategic Pathway of Innovation. SP5: Innovation strategy is summarized in Table 5 in terms of key elements, actions, and outcomes.

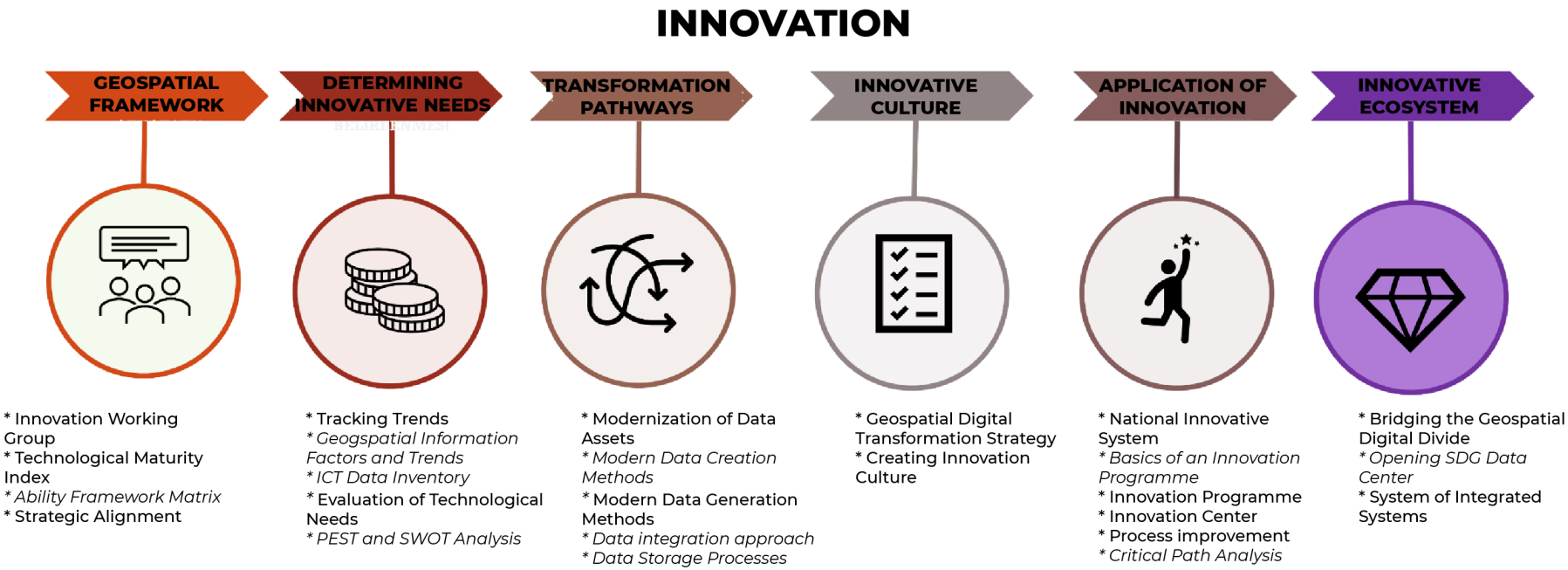

Figure 9. *Roadmap for the innovation strategy*

Table 5.*SP5: The overall structure for the Innovation Strategic Pathway*

ASPECT	STRATEGIC PATHWAY	KEY ELEMENTS	ACTIONS	DELIVERABLES
TECHNOLOGY	**SP5: INNOVATION** ***Objective:*** *to leverage the latest cost-effective technologies, innovations and process improvements so that governments, businesses and academia, no matter their current situation, may leapfrog to modern geospatial information management systems and*	**Technological Advances** *Current and new technological advances should be used to bridge the geospatial digital divide and achieve overarching and sustainable development goals. Technologies and methods to improve the geospatial information management, sharing, and usage are important for economic and environmental development.* **Innovation and Creativity** *To generate economic growth, science and technology should be stimulated through digital transformation strategies, policy and legal instruments, innovation centers, and research and development.*	**1. Geospatial Information Framework** • *Innovation Working Group* • *Technological Maturity Index* • *Strategic Alignment*	• ***Innovation Working Group*** • ***Technological Maturity Matrix*** • ***Strategic Alignment***
			2. Identifying Innovation Needs • *Monitoring Trends* • *Technology Needs Assessment*	• ***Monitoring Trends and Technological Needs***

		Process Improvement *Existing processes should be identified, analyzed and improved to achieve efficiency, productivity gains and new products and services.* **Bridging the Geospatial Digital Divide** *The geospatial digital divide should be bridged through a combination of technological developments, data, supportive policies and legal frameworks, financial commitments, stakeholder engagement, partnerships and capacity building.*	**3. Transformation Roadmap** • *Modernizing Data Assets* • *Modern Data Creation Methods* • *Enabling Infrastructure*	• ***Modernizing Data Assets*** • ***Enabling Infrastructure***
			4. Innovation Culture • *Geospatial Digital Transformation Strategy* • *Building an Innovation Culture*	• ***Geospatial Digital Transformation Strategy*** • ***Building an Innovation Culture***
			5. Operationalizing Innovation • *National Innovation System* • *Innovation Programmes* • *Innovation Hubs* • *Process Improvement*	• ***Innovation System and Programme*** • ***Innovation Hubs*** • ***Process Improvement***
			6. Innovation Ecosystem • *Bridging the Geospatial Digital Divide* • *Integrated System of Systems*	• ***Bridging the Geospatial Digital Divide*** • ***Integrated System of Systems***

Standards

Standards strategy of the United Nations IGIF (SP6: Standards)

Geospatial data integration and interoperability require consensus-based standards. Standards provide the critical architecture by which data can be discovered, collected, published, shared, stored, combined, and applied. The application of standards facilitates the management and sharing of geospatial information by government sources, the private sector, academia and citizens, and among each other. Standards support a more adaptable process for the application of geospatial information for policy.

For effective national geospatial information management, compliance mechanisms of international and national standards should be characterized as a whole. A national, inclusive governance process and policy environment are essential to assure consistent usage of standards and to promote local, regional, and international compatibility.

Standards are an agreement between providers, regulators and consumers. Standards provide rules, guidelines and characteristics that enable connection between systems, data, people, hardware, software and procedures. Standards reduce effort, time and cost of implementing technologies, improve return on investment, and minimize the effort needed to add new capabilities.

In this sense, *the strategic objective of the standards is to enable an efficient and consistent approach for different information systems to be able to discover, manage, communicate, exchange and apply geospatial information for a multitude of uses, improved understanding and decision making.*

There are 4 key elements that drive the process to make standards an integral part of the geospatial information management. Described as **standards governance and policy, technology and data interoperability, compliance testing and certification, and community of practice**, these elements are guidelines to share information based on integrated geospatial data and locations within powers, ensure data and technology interoperability, and develop and adopt standards of best practices and compliance mechanisms.

The standards governance and policy is intended to ensure that the benefits of standards can be maximized through coordinated governance and coherent policies. Standards, which are a key component of geospatial governance and policy at the national level, require an efficient governance model inclusive of relevant stakeholders, and a commitment to assess, establish, and maintain a common standards framework.

The second key element is **technology and data interoperability**. Data interoperability is the integration of different types of datasets and services acquired from different sources. This should enable different technologies, systems, and geospatial data to operate together seamlessly, and provide flexibility to benefit from new technological instruments and new geospatial information sources more rapidly.

Another key element of standards is **compliance testing and certification**. One should leverage testing, measurement and certification processes to assure proper implementation of standards.

A Community of Practice is a group of people who share skills, knowledge and experiences based on the implementation of standards. A community of practice also accelerates the realization of benefits of standards and interoperability by sharing proven and standards-based good practices among entities.

These 4 key elements are put into effect by various strategic actions that enable and strengthen the implementation of the integrated geospatial information framework. The strategic pathway actions recommended to be adopted under the fundamental elements are listed below.

- **Setting Direction:** Geospatial information standards can be successfully implemented through *a standards governance framework* supported by a national policy and governance model. The Geospatial Governing Board (SP1) should set overall policies and strategies for the use of standards across governmental organizations, coordinate awareness-raising activities, and recommend policies for the adoption of endorsed standards. It is also recommended to make sure that the Geospatial Information Coordination Unit (SP1) and the Specialist Working Groups (SP1) are involved in the governance structure. To understand why standards are required, awareness should be raised at all levels of government and among the private sector and academia to adopt a standards-based approach for geospatial information management. There are several types of standards relevant for integrated geospatial information management. These standards could be domain-specific, as well as specific to general geospatial information or technological applications. *Strategic goals* should be defined to adopt the standards framework.
- **Understanding National Needs:** The current situation should be understood to identify needs for interoperability at the national level. To do that, *a baseline survey* is conducted for organizations that create geospatial information, add value, and uses geospatial information. While the objective of the survey is to gather information about the current geospatial standards ecosystem in a country, it is an important part of the Needs Assessment and Gap Analysis as information gathered helps to understand gaps in current capabilities. *A*

standards inventory is used to understand any national profiles of international standards in use. For efficiency, the standards inventory should be conducted at the same time as the data inventory (SP4). *A standards needs assessment and gap analysis* is conducted once an agreement is reached on the strategic goals and current situation among the national stakeholders.

- **Planning for Change:** The adoption/implementation of a country-level *action plan* requires generic project planning activities aligned with major national programmes. The main considerations of the planning process in terms of standards are what, when, by whom, at what cost, and what funding is needed to be done, and what the relations are with other initiatives and activities, and what to be done for capacity building. The roles, structures, and processes should be defined for organizational governance through *institutional arrangements*.
- **Taking Action:** Once an agreement on the goals and roadmap is reached, one can proceed with the *implementation* of country-level action plans. When applying technology and data standards, it is recommended that countries adopt the Standards Guide and the Companion Document. Maintaining an inventory of data and associated technical standards, document metadata (SP4), establishment of geospatial information management functionality, determination of compliance with standards, adoption of common geospatial terminology, determination of standards for semantic mediation, and deployment of information technologies and test environment are key steps that all countries need to take. For the establishment of the standards governance framework, raising awareness among project teams across government and relevant national stakeholders is essential. This requires *communication and engagement*. Besides making the public aware of the national plan, communication is also of vital importance at the operational level. The barriers to implementing standards can be reduced by policy and/or legislation supportive of standards, awareness raising and education. Roles and responsibilities should be identified to overcome barriers to the implementation of standards and reduce the risks (*risk assessment*).
- **Ongoing Management:** Technological advances can inexorably change organizational structures, work flows and business models. Geospatial information standards should be periodically updated. Therefore, a standards review programme should be established. *A standards review program* be coordinated by the Geospatial Coordination Unit or at an organization level can be used to review data standards and technical specifications. *A community of practice* can enable to share good practices and accelerate the process of strengthening geospatial information management and the realization of benefits. Universities should be encouraged to ensure the inclusion of up-to-date geospatial standards

training and education as part of their overall geospatial management and information technology curriculum. *Capacity building* underscores a consistent approach to standards compliance to enable data management, sharing and reuse.

- **Achieving Outcomes:** The development of *a system of compliance* is useful to make sure that organizations implement the nationally or internationally endorsed standards that promote data sharing and use, and to verify that technology products and services are compatible with the required standards. ISO geospatial standards include self-evaluation resources that can be useful. OGC offers freely accessible on-line test procedures. It is important to have a Benefits Realization Plan (SP3) and establish *success indicators* to gauge whether benefits are realized or not. Success indicators measure benefits and define what evidence will be used as the basis.

Figure 10 shows a process flow chart drawn up for the Strategic Pathway of Standards. SP6: Standards strategy is summarized in Table 6 in terms of key elements, actions, and outcomes.

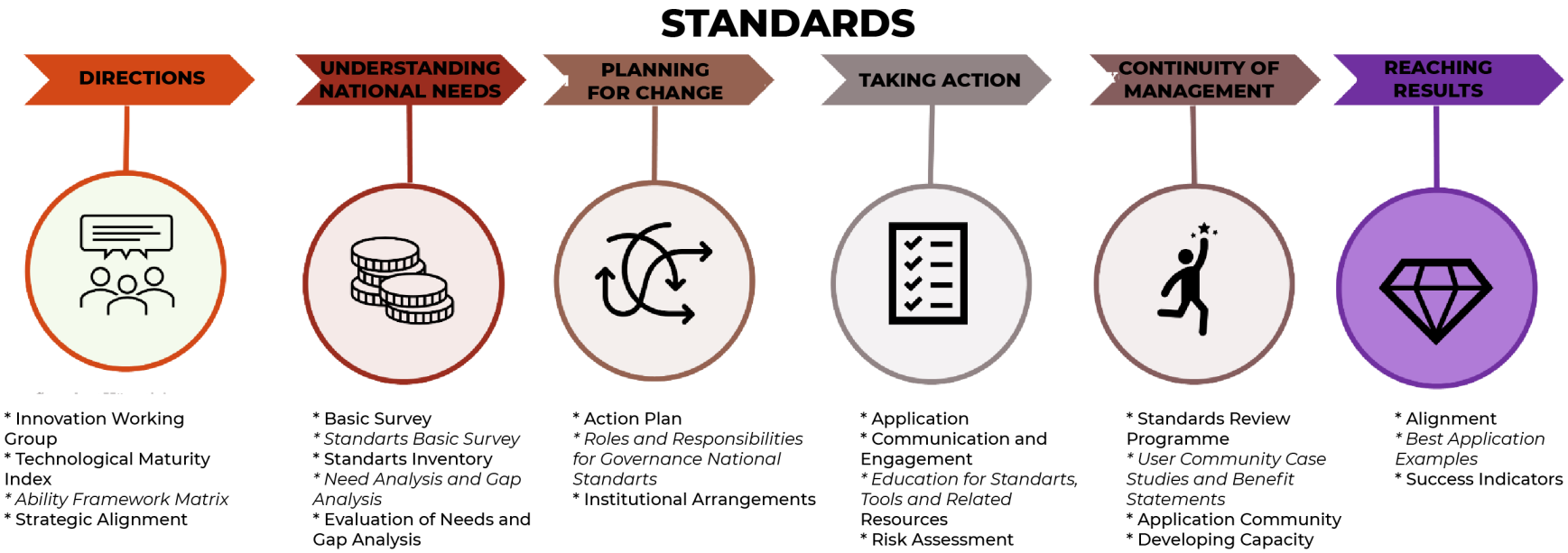

Figure 10. *Roadmap for the Standards Strategy*

Table 6.*SP6: Overall structure for the Standards Strategic Pathway*

ASPECT	STRATEGIC PATHWAY	KEY ELEMENTS	ACTIONS	DELIVERABLES
TECHNOLOGY	**SP6: STANDARDS** ***Objective:*** *It is to enable an efficient and consistent approach for different information systems to be able to discover, manage, communicate, exchange and apply geospatial information for a multitude of uses, improved understanding and decision making.*	**Standards Governance and Policy** *This is intended to ensure that the benefits of standards can be maximized through coordinated governance and coherent policies. Standards, which are a key component of geospatial governance and policy at the national level, require an efficient governance model inclusive of relevant stakeholders, and a commitment to assess, establish, and maintain a common standards framework.* **Technology and Data Interoperability** *Data interoperability enables to integrate different types of datasets and services acquired from different sources. This should both enable different technologies, systems, and geospatial data to operate together*	**1. Setting Direction** • *Standards Governance Framework* • *Standards Awareness* • *Strategic Goals*	• ***Standards Governance Framework*** • ***Raising Awareness About Standards*** • ***Strategic Goals***
			2. Understanding National Needs • *Baseline Survey* • *Standards Inventory* • *Needs Assessment and Gap Analysis*	• ***Standards Baseline Survey*** • ***Standards Inventory*** • ***Needs Assessment and Gap Analysis***

		seamlessly, and provide flexibility to benefit from new technological instruments and new geospatial information sources more rapidly. **Compliance Testing and Certification** *One should leverage testing, measurement and certification processes to assure proper implementation of standards.* **Community of Practice** *The community of practice shares proven and standards-based* *good practices among entities. This accelerates the benefits of standards and interoperability.*	**3. Planning for Change** • *Action Plan* • *Institutional Arrangements*	• ***Action Plan including Institutional Arrangements***
			4. Taking Action • *Implementation* • *Communication and Engagement* • *Risk Assessment*	• ***Implementation and Communication of Standards***
			5. Ongoing Management • *Standards Review Programme* • *Community of Practice* • *Capacity Building*	• ***Standards Review Programme*** • ***Standards Community of Practice*** • ***Standards Capacity Building Programmes***
			6. Achieving Outcomes • *Compliance* • *Success Indicators*	• ***Compliance Programme*** • ***Success Indicators for Benefits Realization***

Partnerships

Partnerships strategy of the United Nations IGIF (SP7: Partnerships)

The strategic pathway of partnerships indicates that partnerships that bring different but complementary skills, experiences, knowledge, and resources are key elements to bring out and strengthen effective and sustainable geospatial information management, coordination, and leadership. Partnerships allow for coordination of policies and strategies and their implementation. Such joint efforts leverage the maximum potential from resources, avoid redundant and overlapping investments, exploit synergies, and introduce a culture of sharing.

In this sense, the strategic objective of partnerships is "*to create and sustain the value of geospatial information through a culture based on inclusion, trusted partnerships and strategic alliances that recognize common needs, aspirations and goals, towards achieving national priorities and outcomes"*.

The partnerships strategy includes 4 key elements. Described as **cross-sector and interdisciplinary cooperation, private sector and academia collaboration, international collaboration, and community participation**, these elements promote effective partnerships among public and private sectors, and non-governmental organizations and enable to understand and appreciate unique strengths and advantages that each organization brings to the partnership.

The first element is **cross-sector and interdisciplinary cooperation**. In many cases, cooperation requires enhancing the capacity of partner organizations for mutual benefit. Partnerships that draw people together from multiple disciplines to examine and redefine problems from various perspectives in search of solutions based on a new understanding of complex situations should be established.

The second element is **private sector and academia collaboration**. Cooperation should be established with educational and research institutions to benefit from their scientific, technical, research and learning capacity, and user expectations, needs, and demand should be addressed. Public-private and civil society partnerships that enhance technological and market-driven innovation should be established.

The third element is **international collaboration**. International and regional collaboration should be established to pursue common interests and support cross-border solutions. Countries should develop partnerships leveraging their respective integrated geospatial information management to accomplish transboundary, regional or global objectives and outcomes.

The final key element for the strategic pathway of partnerships is **community participation**. Community participation in geospatial information initiatives and projects should be ensured to

provide tangible outcomes that consider individual and societal interests to seize opportunities and overcome challenges.

The 4 key elements are intended to create and sustain the value of geospatial information through a culture based on trusted partnerships and strategic alliances that recognize common needs and aspirations, and national priorities. The key elements of the strategic pathway of partnerships include the following strategic pathway actions.

- **Understanding Partnerships:** *The needs for partnering* typically fall into 5 categories of partnership: (1) Data partnerships for enhancing the collection, updating, integration, storage, and maintenance of existing or new datasets, (2) capacity development to develop competencies and skills and enable knowledge transfer, (3) technology and system integration to pool technological resources, develop geospatial data analytics capabilities, improve access to data and acquire high-end software otherwise not available, (4) advisory and governance to develop the policy, standards and norms necessary for strengthening geospatial information management capabilities and (5) research and innovation projects through collaborations with end-users that address end users, environmental, economic and societal issues and promoting the best, highest and widest use of geospatial information. *Types of partnership* include cross-sector partnerships, public-private partnerships (joint ventures), community partnerships, collaborations, strategic alliances, integration of services, donor partnerships, funding alliances, and grant matching.
- **Evaluating Opportunities:** *A geospatial-related partnership/collaborative venture* includes 8 steps: (1) establishing the selection criteria for the specific partnership being considered, (2) identifying potential partners, (3) conducting preliminary research and fact finding, (4) considering a 'Request for Information' and 'Request for Proposal', (5) evaluating options and identifying operational implications; (6) preparing a resource impact assessment and financial analysis, (7) conducting negotiations and formalizing the partnership; and (8) implementing governance and a communication plan. Prior to identifying potential partners, it is important to establish the *selection criteria*.
- **Identifying Potential Partners:** Potential partners can be found at all levels (international, regional, national and local). As a starting point, it would be advisable to carry out a stakeholder identification and analysis exercise. Once the potential partners are identified, the next stage is to conduct a *preliminary research* before bringing them to the table. At this point, available publications (newsletters, websites, annual reports, strategic plans, reports etc.) can be reviewed. Preliminary screening allows better understanding and improves confidence of the potential partners identified. A request for proposal can be used to initiate

the partnership process. Depending on national circumstances, and in particular with regards to the private sector, there may be mechanisms that allows the government to seek information without making a commitment. This includes a Request for Information and a Request for Proposal to learn about different organizations' capabilities, resources or offerings. Another option is to schedule an invitation that allows the organization to exchange information with relevant stakeholders. The next step can be the conclusion of *an initial engagement* to plan what organizations want to partner in and the conditions on how they want the relationship to proceed. If the initial engagement with the private sector does not meet the organization's requirements, it is recommended to suspend the procurement process before any commitment is put in place. More effective communication will help to clarify interests and lead to more successful partnerships.

- **Selecting Partners:** Potential partners are evaluated against the selection criteria. "To what extent does the potential partnership contribute to the geospatial information management, what are potential weaknesses, what is the probability of successfully implementing a partnership with this entity, and what is the opportunity cost of not pursuing a partnership?" These are the questions to be answered. There is also the need to assess *the potential operational implications* of the intending partnership. The next step is to conduct *a financial analysis* to define the resource requirements (personnel, equipment, technology, logistics etc.).
- **Formalizing Partnership:** When establishing a partnership/collaborative venture between two or more parties, it is important to have a clear, defined and agreed understanding of the aims and objectives as well as the roles, responsibilities and obligations of all partners, and it has to be mutually beneficial and agreeable. Any *agreement* needs to be defined at an early stage when setting up the partnership. One should accommodate changes as the partnership or venture evolves. Formalizing a partnership is dependent on trust and consensus, negotiations and compromises. It requires regular and open *communication*. Therefore, an open communication protocol should be established at an early stage. Norms and *governance structure* provide partnering individuals and groups with practical suggestions to manage conflicts and reach decisions. Collaborations work most effectively when the partners have shared values and principles, and when they meet each organization's missions and goals. Each partner should also understand the other's mission, goals and priorities.
- **Managing Partnership:** *Reporting and accountability* is crucial to the smooth running of collaborations and partnerships. A collaborative work plan can be used to identify tasks, time frames, measurable outcomes, accountability and shared responsibilities. As partnerships and collaborative ventures often span a number of years, it is important to document the process,

the history and the culture of the collaboration. Technology can be used to bring partners closer together, integrate processes and maintain strong relationships. In addition, regular *review and evaluation processes* should be established to measure the inputs, outputs, outcomes, and impacts. They could be about finance, stakeholders, processes, and sustainability. The process for transitioning and concluding a partnership should also be conducted at the stage when the partnership is formalized.

Figure 11 shows a process flow chart drawn up for the Strategic Pathway of Partnerships. SP7: Partnerships framework is summarized in Table 7 in terms of key elements, actions, and outcomes.

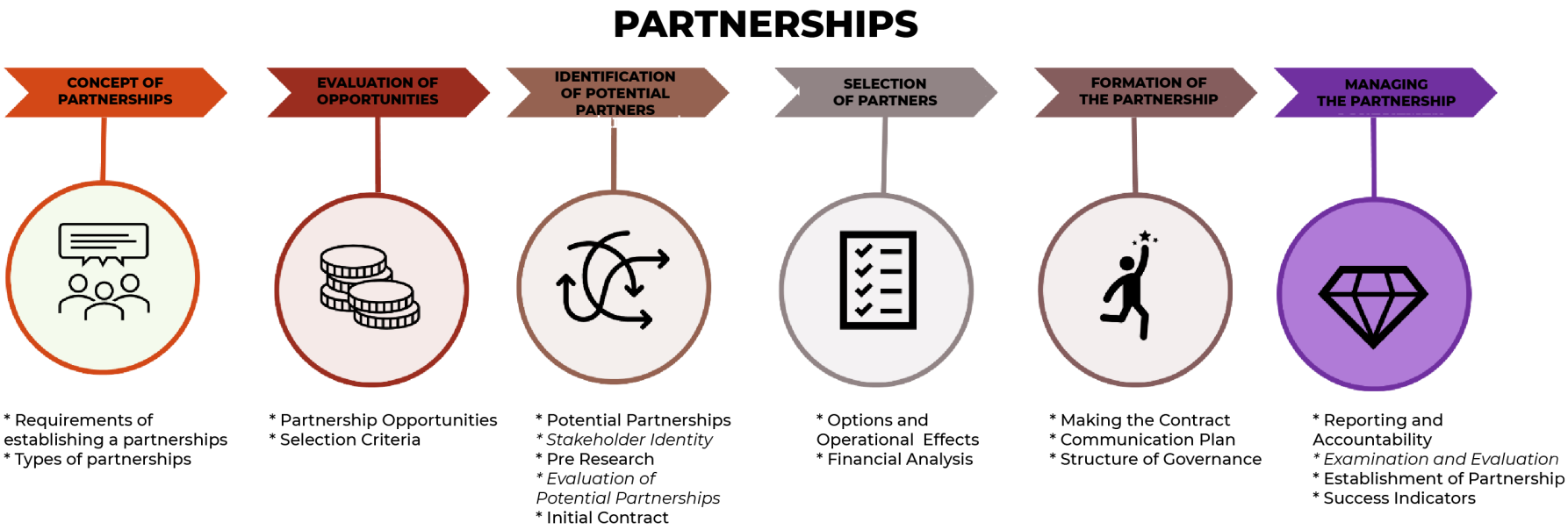

Figure 11. *Roadmap for the Partnerships Strategy*

Table 7.*SP7: Overall structure for the Partnerships Strategic Pathway*

ASPECT	STRATEGIC PATHWAY	KEY ELEMENTS	ACTIONS	DELIVERABLES
PEOPLE	**SP7: PARTNERSHIPS** ***Objective:*** *To create and sustain the value of geospatial information through a culture based on inclusion, trusted partnerships and strategic alliances that recognize common needs, aspirations and goals, towards achieving national priorities and outcomes.*	**Cross-Sector and Interdisciplinary Cooperation** *In many cases, cooperation requires enhancing the capacity of partner organizations for mutual benefit. Partnerships that draw people together from multiple disciplines to examine and redefine problems from various perspectives based on a new understanding of complex situations should be established.* **Private Sector and Academia Collaboration** *Cooperation should be established with educational and research institutions to benefit from their scientific, technical, research and learning capacity, and user expectations, needs, and demand should be addressed. Public-private and civil*	**1. Understanding Partnerships** • *Need for Partnering* • *Types of Partnership*	• ***Need for Partnering (Addressing gaps of the partnership and deciding how to contribute to the development of capabilities)*** • ***Types of Partnership (Evaluating partnerships)***
			2. Evaluating Opportunities • *Partnership Opportunities* • *Selection Criteria*	• ***Establishing selection criteria to identify potential partners***
			3. Identifying Potential Partners • *Potential Partners* • *Preliminary Screening*	• ***Findings From Preliminary Research and Fact-Finding Into Potential Partners***

		society partnerships that enhance technological and market-driven innovation should be established. **International Cooperation** *International and regional collaboration should be established to pursue common interests and support cross-border solutions. Countries should develop partnerships leveraging their respective integrated geospatial information management to accomplish transboundary, regional or global objectives and outcomes.* **Social Engagement** *Community participation in geospatial information initiatives and projects should be ensured to provide tangible outcomes that consider individual and societal interests to seize opportunities and overcome challenges.*	• *Initial Engagement*	
			4. Selecting Partners • *Options and Operational Impacts* • *Financial Analysis*	• ***Assessment of the Options Available and Operation Implications*** • ***Outcomes of the Financial Analysis***
			5. Formalizing Partnership • *Establishing Agreement* • *Communication Plan* • *Governance Structure*	• ***Partnership Agreement (including its governance structure and communication plan)***
			6. Managing Partnership • *Reporting and Accountability* • *Review and Assessment*	• ***Review and Evaluation Process (including success indicators)*** • ***Concluding a Partnership***

Capacity and Education

United Nations IGIF Capacity and Education Strategy (SP7: Capacity and Education)

Enduring capacity development and education programs to be developed as a part of the capacity and education strategic pathway help sustain the value and benefits of the integrated geospatial information management for the longer term. Education, training, continual development, and lifelong learning are important to improve human resource capacities and capabilities for governments, organizations, communities and individuals. Capacity development and education programs must be country-driven, address needs, and reflect national sustainable development strategies and priorities.

In this sense, the objective of the capacity and education strategy is *"to raise awareness, build and strengthen knowledge, competencies, skills, instincts, processes,and innovative entrepreneurship for organizations, communities and individuals to utilize geospatial information to the fullest.*"

The capacity and education strategy includes 4 key elements that guide engagement and commitment for countries to establish their integrated geospatial information frameworks. Described under the titles of **awareness, formal education, professional training, and entrepreneurship**, these elements are based on strengthening skills, abilities, processes, and resources of communities and individuals.

Awareness is the first element of the capacity and education strategy. Awareness should be raised in organizations, governments, and communities to promote the principles, values, needs and benefits of geospatial information. This may include courses, online courses, and outreach programs involving different interest groups, communities and individuals. Leadership is key to raise awareness. Awareness is achieved formally through education and training programs and informally through observation and hands-on experience.

The second element is **formal education**. Formal education provides a reliable basis to understand concepts of geography and geographic science. Integrated geospatial information management requires an early start to understand geospatial information. Formal education programs can be delivered by trained and qualified teachers in schools and higher education institutions, providing scholarships, sponsorships and internships. They improve competencies, skills, and instincts about geospatial information management and practices through knowledge, science, and technology.

Professional training, which is another key element, is an intensive and hands-on experience to gain skills. It promotes lifelong learning and development needed to sustain geospatial

information management. It also aids the adoption and adaptation new and emerging paradigms, technologies and methods. Knowledge and know-how can be developed and shared among organizations such as through on-the-job training, exchange visits, and fellowship programs. Being able to apply new methods and gain practical experiences plays an important role in not just new knowledge and skills earned but also in development of professional networks.

The final key element is **entrepreneurship**. Innovative and creative applications, design and launch of start-ups, and operating new business ventures enhance the capacity in vibrant and growing digital economies underpinned by geospatial information. As entrepreneurship is risky, it is important for governments to support and stimulate entrepreneurship. Within this context, innovation programs such as public-private partnerships, learning and mentoring programs can be established.

The strategic pathway actions are defined to achieve the elements of the capacity and education strategy. The actions about how to achieve the desired outcomes are presented below in a sequential step-by-step structure.

- **Setting Direction** The governance model for integrated geospatial information management requires multidisciplinary and multi-sectoral participation, effective and transformational leadership, supportive institutional arrangements and a clear value proposition that is appreciated broadly. Under the governance model, capacity and education activities should be conducted through a Specialist Working Group. *The Capacity and Education Working Group* designs and develops strategies and programs that promote and improve competencies, skills, education, training, continual professional development, and lifelong learning to improve capacities for governments and organizations. The Working Group acts in line with the Capacity Development and Education Strategy and its Implementation Plan (coordination, steering, implementation, monitoring, and evaluation), guides capabilities and education of stakeholders and partners, coordinates initiatives with other Specialist Working Groups, monitors innovations and trends, and makes recommendations to the Geospatial Coordination Unit or the Governing Board. It is important to understand the capabilities, learning and awareness needs of the *target groups* (researchers, academics, IT staff in public organizations, entrepreneurs, professionals, decision-makers, NGOs, etc.) and capacity scanning matrices should be conducted in line with their needs.
- **Assessing Needs:** *Knowledge, skills, and resources* should be identified to examine the current situation. This is the entry point for the needs assessment and gap analysis to establish existing national knowledge and skills, and this can be used at a later date to monitor progress towards achieving the desired capacity levels and broader development

goals and objectives. A matrix can be formed to provide an inventory of knowledge, skills, and resources, and list knowledge and skills about geospatial information. *Assessments and analyses* can be conducted to develop capabilities and identify gaps in capabilities. A capacity scanning matrix can be formed for assessments to be conducted at an early stage. The assessment is an ongoing process and can become more detailed. The assessment and analysis can be conducted in two ways – an incremental approach or a gap analysis approach. The incremental approach starts by identifying the existing capacity. However, the gap analysis starts with a set of defined criteria that reflects an ideal situation. The method chosen will depend on the nation's context and institutional setting.

- **Considering Alternatives:** *A Capacity Development and Education Strategy* is a forward-looking document that sets out how capacity development and education programs support and strengthen the integrated geospatial information management. The strategy defines desired transformations that will empower individuals, leaders, organizations, and societies. The strategy addresses specific needs and conditions of the country, and reflects national sustainable development strategies and priorities. An inclusive and participatory strategy development and consultation process is important. The participation of key stakeholders is essential in securing support for the implementation of the strategy. Therefore, target groups should be identified at an early stage and the strategy should be developed in cooperation with the target groups. The strategy is a communication tool for facilitating and driving change. The goals defined as a part of the strategy should be anchored to national development priorities and capacity outcomes. Analyses can be conducted about capacity development and education environment through a stakeholder workshop. Of them, the PEST analysis considers the political, economic, social, and technology issues that may have a positive or negative impact on capacity development and education programs while the SWOT Analysis identifies strengths, weaknesses, opportunities, and threats in relation to current and future programs.
- **Planning for Action:** There are several capacity development and education *approaches* related to integrated geospatial information management, and they can be implemented either simultaneously or consecutively. Regular and formalized review processes are required so that programs can be adjusted as capabilities grow and/or the context changes. Capacity development may include the formulation of enabling policies and laws. *An implementation plan* is used to schedule capacity development and education activities and provide an overall structure for the programme. The sequencing of activities is important for geospatial information management. From time to time, education programs need to undergo a *review* by by an Academic Program Review Committee. An academic program review

typically includes the review of course content for vocational, technical, undergraduate, and graduate programs, teaching and learning methodologies and outcomes, scholarship and research productivity, quality of learning and working environment, as well as the overall administrative and organizational structure. *Outreach Activities* provide capacity development to those who might not otherwise have access to educational services.

- **Taking Action:** *A community of practice* is a group that shares concerns, problems, beliefs and desires for integrated geospatial information management and deepens their knowledge and expertise by mutual interactions. *Innovation hubs and incubators* promote the use of geospatial information, and support the capacity development of users and entrepreneurs. Innovation hubs are social community workspaces that provide an environment for knowledge sharing among researchers, academics, business and industry experts, and government leaders. Incubators support small-scale entrepreneurs, and create a favorable atmosphere for innovative start-ups to develop their ideas into products and services. *Geospatial industry challenges* are commonly developed by educational institutions working in collaboration with governments and organizations. It is recommended that geospatial information technologies are taught in primary and secondary *schools*. Globally, there are few schools with access to GIS software. *Scholarships* help to cover the rising costs of education. Programme-specific scholarships increase education and capacity in geospatial sciences. *Internships* provided by a workplace mentor or senior can help train students and support their development in communication and time management.
- **Assessing Value:** *Monitoring and evaluation* activities can hep identify the contributions of capacity development and education programs to individual, community, and organizational performance. The results of the evaluation are used to make adjustments to programs or to decide if the programme in its current format should continue. In capacity development, it is difficult to measure some results such as communication skills, time management, and policy reforms, and they are often prerequisites for capacity results such as technical geospatial competencies. One of the simplest methods to monitoring and evaluating results is to determine success indicators. Success can be measured in terms of achieving the goals specified in the Capacity Development and Education Strategy.

Figure 12 shows a process flow chart drawn up for the Strategic Pathway of Capacity and Education. SP8: Capacity and Education framework is summarized in Table 8 in terms of key elements, actions, and outcomes.

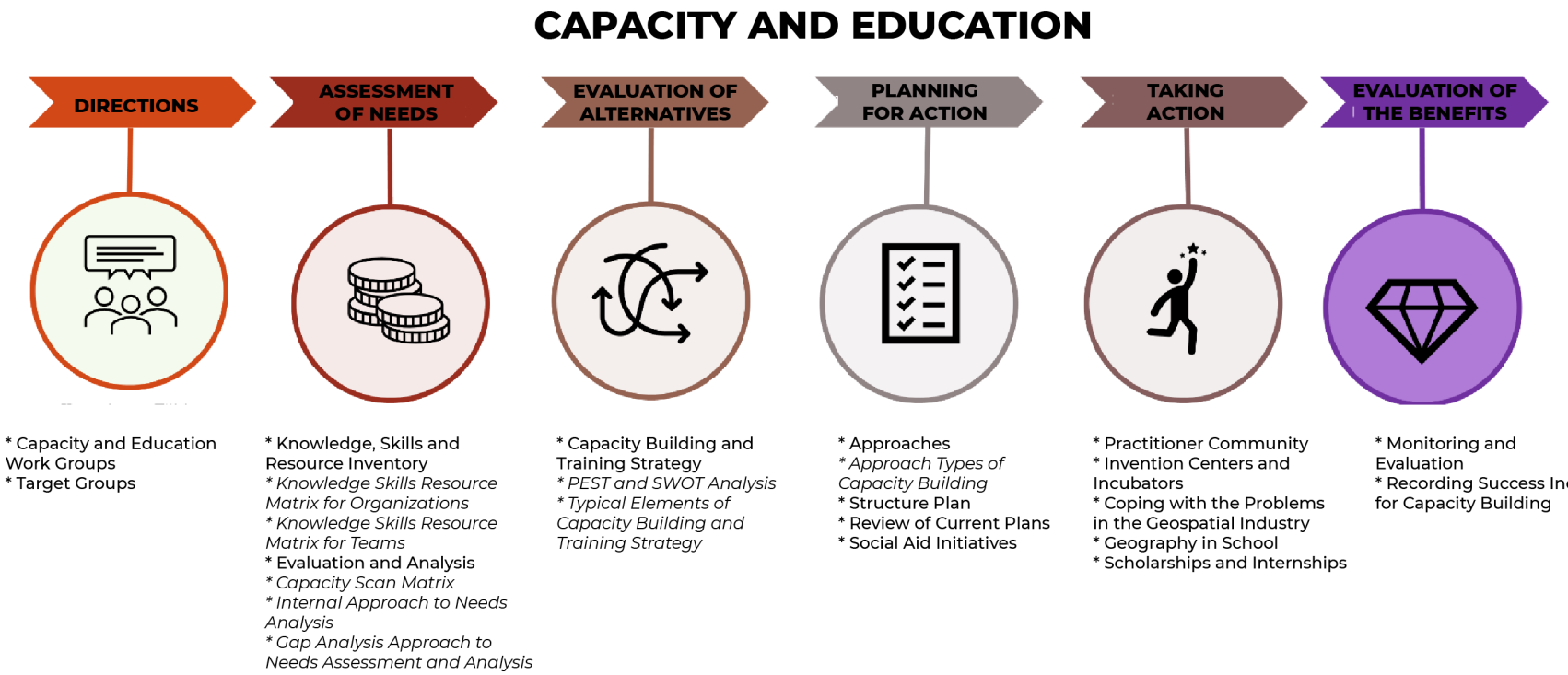

Figure 12. *Roadmap for the capacity and education strategy*

Table 8.*SP8: Overall Structure for the Capacity and Education Pathway*

ASPECT	STRATEGIC PATHWAY	KEY ELEMENTS	ACTIONS	DELIVERABLES
PEOPLE	**SP8: CAPACITY AND EDUCATION** ***Objective:*** *To raise awareness, build and strengthen knowledge, competencies, skills, instincts, processes,and innovative entrepreneurship for organizations, communities and individuals to utilize geospatial information to the fullest.*	**Awareness** *Awareness should be raised in organizations, governments, and communities to promote the principles, values, needs and benefits of geospatial information.* **Formal Education** *Integrated geospatial information management requires an early start to understand geospatial information. Formal education programs can be delivered by trained and qualified teachers in schools and higher education institutions, providing scholarships, sponsorships and internships.* **Professional Training** *Professional training is about up-skilling and hands-on experience. It promotes lifelong learning*	**1. Setting Direction** • *Capacity and Education Working Group* • *Target Groups*	• ***Inventory of Geospatial Knowledge, Skills, and Programs***
			2. Assessing Needs • *Inventory of Knowledge, Skills, and Resources* • *Assessment and Analysis*	• ***A Capacity Needs Assessment and Gap Analysis***
			3. Considering Alternatives • *Capacity Development and Education Strategy*	• ***Capacity Development and Education Strategy***

		and development needed to sustain geospatial information management. It also aids the adoption and adaptation new and emerging paradigms, technologies and methods. **Entrepreneurship** *Innovative and creative applications, design and launch of start-ups, and operating new business ventures enhance the capacity in vibrant and growing digital economies underpinned by geospatial information. As entrepreneurship is risky, it is important for governments to support and stimulate entrepreneurship. Within this context, innovation programs such as public-private partnerships, learning and mentoring programs can be established.*	**4. Planning for Action** • *Approaches* • *Implementation Plan* • *Reviewing Existing Programs* • *Outreach Initiatives*	• ***Review of Geospatial Education Programs*** • ***Capacity and Education Implementation Plan***
			5. Taking Action • *Community of Practice* • *Innovation Centers and Incubators* • *Geospatial Industry Challenges* • *Geography in Schools*	• ***Geospatial Innovation Hubs and/or Small Business Incubators*** • ***A Roadmap/an Implementation Plan to Promote Geospatial Awareness and Literacy***
			6. Assessing Value • *Monitoring and Evaluation*	• ***Capacity and Education Monitoring and Evaluation Framework and Outcomes***

Communication and Engagement

United Nations IGIF Communication and Engagement Strategy (SP9: Communication and Engagement)

Communication and engagement develops and sustains effective, trusted and collaborative relationships with stakeholders. Commitment, mutual understanding, cooperation, collaborative work, and communication are essential to successfully implement the integrated geospatial information framework among stakeholders. Successfully undertaken, it can persuade stakeholders to invest in geospatial information and its applications, raise their awareness and have them provide support.

The objective of the strategy is *to ensure effective communication and engagement to enhance and deepen participation and contributions from all stakeholders and at all levels*.

Communication and engagement programs undertaken to create commitment, mutual understanding, and cooperation among stakeholders for the successful delivery of an integrated geospatial management framework have 4 key elements: **Stakeholder and user engagement, strategic messaging and engagement, communication strategy, plans and methods** and, **monitoring and evaluation**.

The first element is **stakeholder and user engagement**. The national integrated geospatial information management has various stakeholders. Therefore, it is necessary to set priorities and manage expectations. Stakeholder and user engagement is an element to identify and develop relationships and alliances with advocates, partners, users and third parties. Different stakeholders and users provide different perspectives and expertise for the process. Stakeholders and users should be identified at an early stage and their level of interest, expectations, importance and influence should be analyzed. Stakeholders play an important role in collecting, managing, disseminating and sharing geospatial information, and using it for a range of services and applications.

Strategic messaging and engagement develops national geospatial branding. It enables stakeholders, users, and communities to make meaningful contributions to the geospatial information management process, decisions, and activities by clear, succinct, and compelling messages to all constituents and audiences. Engagement strategies take current and future needs of stakeholders into account, and provide them with opportunities. Integrated engagement strategies involve proactive and ongoing communication, and foster partnerships, collaboration and inclusive decision-making in geospatial information management. This is how countries can

involve individuals, organizations and other groups in policy and program development, raise awareness, and generate momentum.

The third key element is **communication strategy, plans, and methods**. This element sustains the stakeholder engagement, communication channels, and information flows. Stakeholder communication and engagement should be incorporated into the governmental culture and its main functions.

The fourth and final element is **monitoring and evaluation**. Individuals and community groups should be involved in geospatial information initiatives and projects to help them seize opportunities and solve their problems. This will lead to tangible benefits that will be favorable to both the broader community and individuals.

Communication and engagement elements are put into effect by a series of strategic activities. The activities that provide guidance in practice are listed as follows:

- **Providing Leadership:** The first step to stakeholder and user engagement is the development of *an engagement strategy*. The strategy identifies and prioritizes key stakeholders. The strategy should also describe the methods and programs for engagement and information sharing, and the resources and responsibilities to implement the engagement activities, and explain how stakeholder feedbacks will be managed. An independent communication and engagement *Steering Group* or working group can be established to guide the stakeholder communication and engagement. Strengthening integrated geospatial information management is a complex, large, and long-term work and requires coordinated and concentrated efforts for enduring results. The independent Steering Group develops strategies together with the Governing Board and/or the Geospatial Coordination Unit. One of the key responsibilities of the Steering Group is to keep in touch with the stakeholders to communicate the messages for implementing the integrated geospatial information framework. *Internal communication* is a key function for staff who take part in the successful implementation of the integrated geospatial information framework.
- **Understanding Opportunities:** To strengthen integrated geospatial information management, goals and priorities need to reflect the needs of society and interest groups, and not merely the needs of government organizations. Stakeholder identification is intended to identify all parties likely to be affected by the process both positively and negatively, directly or indirectly. The list of stakeholders can include politicians and policy-makers, government organizations, UN agencies, national organizations, non-governmental organizations, geospatial information users, scientific institutes, universities, research centers, private

sector, volunteer groups, consumers, and citizens. *A stakeholder analysis* is performed to understand the relationships, and any complexities that may exist between the stakeholders and the integrated geospatial information management. It is performed to understand the influence of stakeholders on the process, their interests, and how they can be best engaged in the process.

- **Setting Direction** A *policy platform* is initiated by advocacy groups and it sets priorities that are in need of governmental support. The advocacy groups to implement the IGIF may include professional and practitioners' associations, open data groups, and industry councils. Such a platform may not necessarily apply to all countries. A *geospatial brand* is a tool tool to improve the level of understanding and appreciation for nationally integrated geospatial information management, and by which awareness, value and benefits are communicated. One of the most significant impediments to the development of national spatial data infrastructure is the lack of understanding of the value and benefit of geospatial information. Standardized concepts, graphics and terminologies all help create the "geospatial information". *Strategic messages* are also used to enhance communication and engagement just like slogans or taglines commonly used in advertising. The most commonly used strategic message for geospatial information is "collect once and use many times", and this means that the most value from collecting geospatial information is maximized through as many uses as can be possible.
- **Creating A Plan of Action** A *communication strategy* describes challenges of geospatial information management, considerations in addressing these challenges, choices that are made, key drivers of those decisions, communication objectives, resources, and evaluation criteria. A communication strategy poses the questions of "what", "why" and "who" while a communication plan gives information on "when" and "how". The communication plan is used to sustain open communication channels with stakeholders, and includes the level of impact that changes to nationally integrated geospatial information management will have on stakeholders, how much influence and contribution stakeholders have on changes, what particular geospatial information resources are important to stakeholders and for what purposes, and at what point stakeholders would be involved in the process. There is no one single correct communication and engagement method. Each method has its own benefits, limitations and risks. The selection of the method varies by circumstances, opportunities, time, skills, and budgetary limitations. *Communication methods* are classified according to objectives.
- **Monitoring Progress:** *Review and evaluation* ensure monitoring of achievements towards attaining effective communication and engagement goals. They identify the success

indicators, reporting mechanisms, suggestions, and feedback mechanisms. Effective review and evaluation includes identification and documentation of feedbacks and best practices. The first step in the evaluation process is to decide what to measure. Best practices can be used for benchmarking purposes. Stakeholder surveys can enable to gain information about stakeholder's opinions, knowledge, understanding and attitudes. In addition, they are used to identify what stakeholders think of resultant products and services, or about the effectiveness of the geospatial brand or strategic messages. Survey topics may include information access, data content, data quality, use and usability and legal issues such as licensing and data reuse.

- **Communicating Value:** It is important to communicate the benefits of geospatial information as they come to fruition. To this end, social, economic, environmental, political benefits analyses are needed, and the outcomes of any socio-economic impact assessment of integrated geospatial information management contributes to the stakeholder and user engagement. National stakeholder surveys should also include *lessons learned*.

Figure 13 shows a process flow chart drawn up for the Strategic Pathway of Communication and Engagement. SP9: Communication and engagement framework is summarized in Table 9 in terms of key elements, actions, and outcomes.

Figure 13. *Roadmap for the communication and engagement strategy*

Table 9.*SP9: Overall Structure for the Communication and Engagement Pathway*

ASPECT	STRATEGIC PATHWAY	KEY ELEMENTS	ACTIONS	DELIVERABLES
PEOPLE	**SP9: COMMUNICATION AND ENGAGEMENT** ***Objective:*** To ensure effective communication and engagement to enhance and deepen participation and contributions from all stakeholders and at all levels.	**Stakeholder and User Engagement** *The national integrated geospatial information management has various stakeholders. Therefore, it is necessary to set priorities and manage expectations. Stakeholder and user engagement is an element to identify and develop relationships and alliances with advocates, partners, users and third parties.* **Strategic Messaging and Engagement** *It enables stakeholders, users, and the society to offer significant contributions to the geospatial information management process, decisions, and activities. Engagement strategies take current and future needs of stakeholders into account, and provide them with opportunities.*	**1. Providing Leadership** • *Engagement Strategy* • *Steering Group* • *Internal Communication*	• ***Stakeholder or User Engagement Strategy***
			2. Understanding Opportunities • *Stakeholder Identification* • *Stakeholder Analysis*	• ***List of identified stakeholders and their contact information*** • ***Report of a stakeholder analysis exercise***
			3. Setting Direction • *Policy Platform* • *Geospatial Brand* • *Strategic Messages*	• ***A copy of the Policy Platform*** • ***Geospatial brand and strategic messages designed to communicate and engage stakeholders and users***

		Communication Strategy, Plans and Methods *This element sustains the stakeholder engagement, communication channels, and information flow. Stakeholder communication and engagement should be incorporated into the governmental culture and its main functions.* **Monitoring and Evaluation** *Individuals and social groups should be involved in geospatial information initiatives and projects to achieve concrete results in consideration of both social and individual interests.*	**4. Creating A Plan of Action** • *Communication Strategy* • *Communication Plan* • *Communication Methods*	• ***A Communication Strategy (including information on communication solutions)*** • ***A Communication Plan (including methods of engagement, resources allocated and internal communication section)***
			5. Monitoring Progress • *Review and Evaluate* • *Stakeholder Surveys*	• ***A Review and Evaluation Plan (including stakeholder surveys and defined goals)***
			6. Communicating Value • *Benefits Analysis* • *Lessons Learned*	• ***Benefits Analysis*** • ***Lessons Learned and Best Practices***

1.1.2. Actions Taken in Turkey In Line With the Strategic Pathways of the United Nations IGIF

The demand for information has grown across the world starting from 1990s, and the provision of information in accurate, rapid, and up-to-date formats on digital platforms has become an essential requirement. As a result, the initiatives to build an information society have quickly taken effect in many countries in a way to promote economic development and competitiveness. One of the major initiatives is e-Europe, which was adopted in a session of the Council of Europe held in Helsinki in 1999 to "*transform Europe into an information society*". e-Europe has set main expectations and goals to promptly make sure that the young population in particular is set for the digital age, and provide them with participatory and inclusive e-activities. The aim of the Lisbon Strategy, which was adopted in 2000 in Lisbon on the occasion of the European Commission meeting, can be described as "*being the most competitive and dynamic knowledge-based economy in the world*", and this process was followed by developments such as e-Europe 2002 Action Plan adopted in 2000, e-Europe 2005 Action Plan, 2020 European Information Society for Growth and Employment, 2016-2020 e-Government Plan, and Europe 2020 Strategy.

The intensive efforts exerted to keep up with the digital age in Europe also laid the foundations for the EU candidate countries to go on a journey similar to what is called e-Europe+ following the Council of Europe Conference of Ministers held in Warsaw in 2000. e-Europe+ has helped candidate countries to make actions plans that enable them to underpin themselves in terms of economic development, modernization, and competitiveness, and act in line with the EU. The main objective of these plans is to define a process where internet access is rapid, affordable, and easy for everyone, and infrastructure is built to grow into an information society, and projects in compliance with the EU acquis are carried out. As a candidate country to join the EU, Turkey became a party to e-Europe+ in 2001.

The inclusion of Turkey in e-Europe+ is a major milestone for the start of a more inclusive and coordinated *"shift into an information society"* instead of some efforts exerted and yet failed to identify digital needs and develop the nation-wide infrastructure starting from 1990s. The action plans drafted under the e-Turkey Project kicked off by 13 working groups for the adaptation of e-Europe+ in Turkey could not be put into effect. Instead, the e-Transformation Turkey Project was kicked off in 2003. The Department of Information Society was founded under the State Planning Organization (SPO) to provide coordination for the project. As a part of the e-Transformation Turkey Project, country-level action plans were developed and implemented in a way to cover actions in many areas including those related to geospatial data.

To this end, the first comprehensive and coordinated action for the establishment of the national spatial data infrastructure was kicked off with the 2003-2004 Short-Term Action Plan (STAP) drawn up under the e-Transformation Turkey Project. The time when there was a palpable need for the establishment of national spatial data infrastructure was 1990s when the transition to the digital age was underway. Both technological advances and the competitive advantage provided by adaptation to the digital age have encouraged many organizations to quickly shift to the creation and use of digital spatial data. However, the shortcomings of legal, political, technical, and technological infrastructure, and lack of coordination have caused many organizations to create duplicated data in different standards and accuracy, and this has led to problems concerning the quality and interoperability of data. As a result, it is now inevitable to establish a national spatial data infrastructure that eliminates problems of quality and interoperability, prevents waste of time, labor, and resources, and consists of a combination of technologies, policies, standards, human resources, and activities with regards to spatial data.

Within this framework, the first action taken as a part of the STAP under the responsibility of the DGLC (Directorate General of Land and Cadastre) was *"conducting a preliminary work to establish TUCBS"*. Over the course of the action carried out in an inclusive process under the leadership of the DGLC, the GIS initiatives in various countries, international GIS bodies, INSPIRE ((Infrastructure for Spatial Information in the European Community), which is a spatial data infrastructure for EU countries, and the current situation in Turkey were reviewed, and the main institutional, technical, technological, and political expectations about the establishment of TUCBS were set.

The main focal point of TUCBS was infrastructure preparation efforts at the time of 2005 Action Plan that consisted of 50 actions in total under 7 themes. For this purpose, the requirements concerning data, procedures, standards, institutional structuring, legal frameworks, and communication infrastructure of TUCBS were established in a multilateral and multi-stakeholder environment under the coordination of the DGLC, and the Action 36: Policy and Strategy Document, which includes TUCBS's mission and vision, was drawn up. The next step of the process was taken under the 2006-2010 Information Society Strategy and Action Plan. In addition, the efforts to establish GIS infrastructure were kicked off under the responsibility of the DGLC for data content and change standards, geospatial data sets, main and sub-thematic data, and establishment of a GIS portal. The foundation of our General Directorate affiliated to the Ministry of Environment and Urbanization under the Decree Law No. 644in 2011 is one of the major developments to establish a leadership mechanism to eliminate the problem of GIS coordination that had been experienced at the national level. Upon its establishment, the General

Directorate was assigned as the authority mandated for all national GIS-related actions, and the roles, powers, and responsibilities about them were taken over by the General Directorate. This enabled to accelerate and carry out the activities for the establishment of a national GIS in a more holistic and systematic manner. UML and GML application schemas and a draft regulation were drawn up for 10 main data themes in 2012.

Having entered into force in 2015, the Regulation on the Establishment and Management of the National Geospatial Information System provided a legal basis for the definition of geospatial data, identification of geospatial data controllers, creation of geospatial data by controllers, sharing of data created, and provision of institutional coordination for geospatial data.

Under the Addendum to the Decree No. 9260 introduced in accordance with the Resolution of the Council of Ministers, and the Regulation on the Establishment and Management of the National Geospatial Information System for Public Agencies and Organizations, any type of geospatial data to be electronically shared through data services via the infrastructure operated by the General Directorate of Geographic Information Systems are exempted from the provision of the paragraph one of the article 1 of the Law No. 4736 of 1/8/2002.

Having entered into force in 2018, the Presidential Decree No. 1 granted the roles and powers to "take actions and perform procedures and have them taken and performed to establish, use, and develop a National Geospatial Information System, establish and use urban information systems for planning, surveying, infrastructure, and superstructure activities of local administrations, and promote their integration to the National Geospatial Information System" to the General Directorate of Geographic Information Systems.

The action 65 of the 2015-2018 Information Society Strategy and Action Plan is the development of *the Geospatial Information Strategy and Action Plan of Turkey*. As a part of the action taken under the leadership of the Directorate General of Geographic Information Systems, critical issues such as

- development of new data themes in compliance with the INSPIRE in addition to 10 fundamental data themes,
- establishment of mechanisms to provide coordination among different organizations,
- establishment of interoperability by setting policies, principles, and standards for the creation and sharing of spatial data,
- promotion of efforts to develop a domestic GIS software including open source software in particular,

- development of strategies and action plans to implement the National GIS (development of a National GIS Strategy),
- introduction of legislative amendments

were addressed, and actions were taken accordingly.

Error! Reference source not found. summarizes the national GIS actions taken under the e-Transformation Turkey Project.

Table 10.*National GIS Actions Taken Under the E-Transformation Turkey Project*

e-Transformation Turkey Action Plan	Category	Action No.	Scope of the Action
2003-2004 Short-Term Action Plan (STAP)	e-Government	47	Preliminary work to establish TUCBS
2005 Action Plan	e-Government	36	Infrastructure preparation to establish TUCBS
2006-2010 Information Society Strategy and Action Plan	Modernization in Public Administration	75	Establishment of GIS infrastructure
2015-2018 Information Society Strategy and Action Plan	User Orientation-Effectiveness in Public Services	65	Development of the Geospatial Information Strategy and Action Plan of Turkey

The Presidential Decree No. 49 on Geospatial Information Systems was published on November 7, 2019. As per the Decree, the tasks to set procedures, principles, and standards on how to provide coordination among public agencies and organizations, develop objectives and strategies, and create, update, manage, use, provide access to, secure, share, and disseminate geospatial data and information under geospatial data themes, and designate roles, powers, and responsibilities of councils established under this Presidential Decree, and of public agencies and organizations, and natural and legal persons about the National Geospatial Information System and infrastructure are delegated to the Ministry of Environment and Urbanization.

The main motivation behind the development of 2018-2023 National Geospatial Information Strategy and Action Plan is to establish national mechanisms that enable to create, access, share, and use high-quality, up-to-date, and reliable geospatial data, and set the 2028 Geospatial Information Vision. 2018-2023 National Geospatial Information Strategy and Action Plan is presented in Table 11.

Among the major developments that stood out along this dynamic journey are the introduction of the Regulation on the Establishment and Management of the National Geospatial Information System in 2015, the publication of the Presidential Decree on Geospatial Information Systems in 2019, and the introduction of main mechanisms, liabilities, fundamental principles and procedures including confidentiality and security for the establishment of national Geospatial Information Systems. In addition, a data identification document was drawn up in the process for 32 data themes, and the National Geospatial Data Custodianship Matrix and the National Geospatial Information Strategy and Action Plan were published in the Official Gazette on 6.11.2020.

Developed in cooperation with the UN and the World Bank, the Integrated Geospatial Framework (IGIF) is currently one of the major reference guidelines for countries to establish a national programme for geospatial information management, and implement it in an integrated, inclusive and sustainable manner with stakeholder engagement. The United Nations IGIF provides geospatial data creators, users, and stakeholders affected by the process, especially decision-makers and policy-makers with guidance for effective national geospatial information management in compliance with national needs, priorities, and policies, and offers main strategic elements and infrastructure requirements in line with their goals.

The United Nations IGIF encourages countries to draw up country-level action plans for integrated geospatial information management. In today's world, all countries need accurate, up-to-date, and high-quality geospatial information about natural, cultural, and social environment to carry out a great deal of activities for development. Geospatial information is of crucial importance to make right decisions about economic, environmental, and social sustainability. The creation, use, and sharing of geospatial data at various scales ranging from national to local and in many aspects such as land management, adaptation to the climate change, identification of disaster hazards and risks, establishment of integrated disaster management, food and water security, agriculture, transportation, and social welfare has become an inevitable requirement for actions to come to fruition.

Table 11. *National Geospatial Information Strategy and Action Plan of Turkey*

GOAL	OBJECTIVE	ACTION
GOAL 1. Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management	**Objective 1.1** Identification documents (data glossaries) will be drawn up for geospatial data themes.	Action 1.1.1 Identification documents (data glossaries) will be drawn up for geospatial data themes.
		Action 1.1.2 Guiding documents will be drawn up for the implementation of the standards.
	Objective 1.2 Detailed geospatial data layers and organizations that create such geospatial data will be identified.	Action 1.2.1 Geospatial data layers will be set.
		Action 1.2.2 Organizations to create geospatial data layers will be identified.
	Objective 1.3 Licensing rights and access criteria of geospatial data will be set.	Action 1.3.1 Principles on how to share geospatial data (licensing rights, accessibility) will be set.
		Action 1.3.2 Units to have access to geospatial data will be identified.
	Objective 1.4 A National Geospatial Information Platform will be established and integrated into the e-government gateway.	Action 1.4.1 A National Geospatial Information Platform will be established and implementation modules will be developed.
		Action 1.4.2 Modules that require e-government integration on the National Geospatial Information Platform will be integrated to the e-government.
	Objective 1.5 The national spatial data infrastructure will be used to retrieve, share, and use geospatial data.	Action 1.5.1 A secure geospatial data access infrastructure will be established, and organizations will be provided with access to the infrastructure.
		Action 1.5.2 Institutional geospatial data will be integrated to and shared with the national spatial data infrastructure.
		Action 1.5.3 Organizations will use geospatial data available in the spatial data infrastructure.
GOAL 2 Dissemination of geospatial information services that make effective use of geospatial data across all processes	**Objective 2.1** Maturity development models for geospatial information will be developed and a leadership mechanism will be established.	Action 2.1.1 A tailor-made geospatial information maturity model will be developed for organizations.
		Action 2.1.2 It will be made sure that organizations adopt the maturity development model.
		Action 2.1.3 The maturity level of the national geospatial information system will be improved.
	Objective 2.2 Data compliance activities will be carried out in line with spatial data infrastructure standards.	Action 2.2.1 Organizations will start actions of alignment with the national spatial data infrastructure.
	Objective 2.3 Activities will be carried out for the integration into the National Geospatial Information Platform.	Action 2.3.1 Organizations will develop applications for integration to the National Geospatial Information Platform.
	Objective 2.4 Geospatial information services that help to modernize national and institutional processes and services and make use of geospatial data will be increased.	Action 2.4.1 Geospatial information services provided by organizations will be identified and adapted to the national processes.

GOAL 3 Building a geospatial information industry to upgrade and transform institutional procedures	**Objective 3.1** The establishment of GIS-related institutes and hubs will be promoted.	Action 3.1.1 Awareness-raising activities will be carried out for the establishment of GIS-related institutes and hubs will be promoted.
	Objective 3.2 Processes that use geospatial data in organizations will be identified, and guidelines will be drawn up.	Action 3.2.1 Organizations will identify processes related to geospatial information systems.
		Action 3.2.2 Organizations will draw up guidelines on the modernization of processes related to geospatial information systems.
	Objective 3.3 Institutional transformation capabilities will be improved for the use of institutional geospatial data in national processes.	Action 3.3.1 Organizations will carry out capacity building activities.
	Objective 3.4 The capabilities of technology producers, and solution and service providers about the geospatial industry will be improved.	Action 3.4.1 Technology producers, and solution and service providers will carry out capacity-building activities about the geospatial industry.
		Action 3.4.2 Technology producers, and solution and service providers will sustain competent staff.
	Objective 3.5 The participation of organizations and sectors in international projects of the geospatial industry will be improved.	Action 3.5.1 Sectoral organizations will be encouraged to take part in international projects.
	Objective 3.6 Domestic and national geospatial information practices will be promoted and developed.	Action 3.6.1 The development of domestic and national GIS software (institutional, private sector, university) compatible with the interoperability principles and data standards will be promoted.
		Action 3.6.2 The use of geospatial information software will be increased.
	Objective 3.7 Accreditation services will be rolled out for geospatial information systems.	Action 3.7.1 A data and metadata service and format accreditation system will be established.
		Action 3.7.2 Application software of geospatial information systems will be accredited to the national geospatial information systems.
GOAL 4 Establishing sustainable institutional structuring and financial support systems.	**Objective 4.1** Adaptation and integration units will be established for activities concerning geospatial information systems.	Action 4.1.1 Units will be established within the body of public agencies and organizations, and local administrations to carry out adaptation and integration processes for geospatial information systems.
	Objective 4.2 Financial resources for activities of geospatial information systems will be mobilized in line with the strategic goals.	Action 4.2.1 Projects of geospatial information system activities carried out by organizations will be identified and prioritized, and the number of integration and modernization projects will be increased.
		Action 4.2.2 The number of projects jointly carried out about geospatial information activities by the private sector, universities, and public sector will be increased.
		Action 4.2.3 The number of projects incentivized as a part of research and development activities for the geospatial industry in organizations will be increased.
	Objective 4.3 Value propositions will be developed in line	Action 4.3.1 Value propositions will be developed, and the geospatial information and

	with the objectives of Digital Turkey.	technologies will be adopted, promoted for use, and put into effect as a part of decision support systems.
	Objective 4.4 Legislative frameworks will be developed in line with the strategic goals.	Action 4.4.1 Primary and secondary legislative frameworks will be developed under the TUCBS.
		Action 4.4.2 Guidelines will be drawn up for the harmonization of strategies and action plans of public agencies and organizations, and local administrations with TUCBS strategies and action plans, and the awareness of the top administrations will be raised.
	Objective 4.5 Coordination meetings will be organized.	Action 4.5.1 Coordination will be secured among the Boards, Working Groups, Public Agencies, Local Administrations, Universities, and the Private Sector under the TUCBS actions.
GOAL 5 Enhancing qualified education and stimulating lifelong learning opportunities.	**Objective 5.1** Geospatial information activities and training courses will be disseminated.	Action 5.1.1 Organizations will draw up a training curriculum for geospatial information activities.
		Action 5.1.2 National and international events will be organized.
		Action 5.1.3 Academic publications will be developed for geospatial information systems.
	Objective 5.2 Lifelong learning criteria will be set.	Action 5.2.1 Lifelong learning criteria will be set.
	Objective 5.3 The institutional and personal certification system will be mainstreamed.	Action 5.3.1 A certificate of professional competencies will be granted.
GOAL 6 Establishing a monitoring and reporting system that is in line with decision support systems, directly linked to processes, and takes requirements of creators and users into consideration.	**Objective 6.1** A monitoring mechanism will be established.	Action 6.1.1 An action plan monitoring mechanism will be established.
		Action 6.1.2 A maturity development model monitoring mechanism will be established.
	Objective 6.2 Monitoring activities will be carried out.	Action 6.2.1 Action plan monitoring activities will be carried out.
		Action 6.2.2 Maturity development model monitoring activities will be carried out.
	Objective 6.3 Reports will be drawn up.	Action 6.3.1 Reports will be drawn up for the actions taken under the national geospatial information systems.

All of the aforementioned actions are also directly linked to the national policies and actions needed to be taken to achieve the Sustainable Development Goals. The effective and proper implementation of country-level actions to be taken under the 2030 Sustainable Development Goals requires integrated geospatial information management. Therefore, countries should set policies and promptly put them into practice in administrative, legal, financial, technical, and technological aspects that would sustain the national geospatial information management in a robust manner.

To this end, the United Nations IGIF should focus on how to manage geospatial data created by various agencies and organizations in an integrated and secure manner that would be provide the utmost benefit for all segments. The United Nations IGIF addresses the approach of establishing integrated geospatial information management in 3 parts to easily understand and implement it as they are structured under a total of 9 strategic pathways in governance, technology, and people aspects.

The first part called *Overarching Strategic Framework* is the main guideline that explains the main strategic structure of the United Nations IGIF, and ***why*** it is important to establish integrated geospatial information management and strengthen the existing structures, and describes the national benefits that such efforts would lead to. This document is also intended to serve as a training material for decision-makers. The Overarching Strategic Framework provides insight into the United Nations IGIF's mission, vision, fundamental principles, goals, and 9 main strategic pathways to establish integrated geospatial information management.

As noted before, the strategic pathways of the United Nations IGIF, which serve as a basis for the implementation guide, are structured under the main titles of

- Governance
- Policy and Legal
- Financial
- Data
- Innovation
- Standards
- Partnerships
- Capacity and Education
- Communication and Engagement

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Described in this part, Turkey's background of development in the GIS industry is going to be addressed as a reference for this document and further efforts.

1.2. Overarching Strategic Framework for Integrated Geospatial Information Framework of Turkey

While organizations vary for each goal as a part of the overarching strategic framework, there are some generic actions that cover each goal for all organizations. The actions to be taken by the Council of Higher Education (CoHE) are to conduct academic studies to mainstream such activities and raise well-qualified human resources in higher education in line with the goals. The overarching actions for all other organizations are presented in Table 12. The details on the TUCBS Overarching Strategic Framework developed under the United Nations IGIF to achieve the sustainable development goals are provided in Table 13.

As noted at the outset of the part, security, e-government, adaptation to the climate change and land management, improvement of social resilience, reduction of disaster risks, emergency response and management, and food, water, and energy security, agriculture, transportation, and urban welfare must be associated with geospatial information. That is to say, the United Nations IGIF can be considered a guide for the utilization of geospatial information technologies to achieve sustainable development, and make effective social, economic, and environmental decisions. This is the only way to take unerring and effective decisions and offer solutions. Therefore, the importance of standardized and accurate creation, inventory, and analysis of geospatial information stands out in such efforts. Their success largely depends on preparation for circumstances concerning geospatial information technologies in different organizations, their maturity, and compatibility. To be able to achieve the strategic goals with a view to securing sustainable development and succeeding in social, environmental, and economic terms, relevant agencies and organizations should expand the use of GIS in all activities that require spatial data, and take the prioritized actions described in the Table 12 and **Error! Reference source not found.**.

In addition, the vision and mission statements of the National Geospatial Information Strategy and Action Plan revised under the United Nations IGIF have been reformulated. The vision and mission statements are presented in **Error! Reference source not found.**14.

Figure 14.*Vision and Mission Revised In Line With the Sustainable Development Goals*

Our main strategy under the Integrated Geospatial Information Framework of Turkey is to build capacity for the effective use of geospatial technologies by all the organizations in Turkey, standardize data creation processes in particular regarding all geospatial information systems, mainstream their use s a decision support system, and achieve the sustainable development goals.

Of the phases used in the third chapter of this document, which is titled the Integrated Geospatial Information Framework Strategy and Action Plan of Turkey, the Phase 3 intended to draw on geospatial information to resolve social problems is a focal point that all efforts must reach. At this point, the UN's Sustainable Development Goals are a focal point for the Phase 3. Therefore, the main basis of the Integrated Geospatial Information Framework of Turkey is to draw on geospatial information for the resolution of problems and contribute to the social life in an effort to achieve the sustainable development goals.

The UN Sustainable Development Goals, which serve as a basis for the overarching strategic framework of the Integrated Geospatial Information Framework of Turkey, are a call for global actions to achieve the goals such as sustainable development, improvement of social welfare, environmental protection, minimization of disaster risks, reduction of impacts of global climate changes, and provision of peace and welfare for all. 17 Goals are built on the accomplishments of the Millennium Development Goals, and they include new areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice. The goals are interrelated. The key to success in a goal is to address problems that have something in common with one another. The Sustainable Development Goals are based on the spirit of partnership and pragmatism to make right decisions from this day forth to sustainably improve the life for future generations. They provide clear guidance and goals for all countries to adopt in line with their own priorities and environmental challenges that the world faces. The Sustainable Development Goals are an overarching agenda, uniting us to make positive changes for both people and our planet. The promotion of the 2030 Agenda is the top priority for the United Nations Development Programme (UNDP) . UNDP is equipped with experience and expertise to secure progress and support countries toward sustainable development.

The Sustainable Development Goals took effect in January 2016, and they will guide the UNDP policy and financing for the ensuing 15 years. UNDP is in a unique position to implement the goals through its actions in over 170 countries and regions. UNDP promotes governments to integrate the Sustainable Development Goals into their own national development plan and policies. Handing down a better planet to future generations requires the partnership of governments, the private sector, non-governmental organizations, and citizens in all sectoral

areas to achieve the Sustainable Development Goals. This chapter is intended to set forth a framework for the actions needed to be taken by the GIS industry at the national level to achieve the Sustainable Development Goals. This document is also important to mainstream geospatial information systems and technologies, which is a key aspect for all the goals, as decision support mechanisms based on spatial data analyses should be established for the goal 15.

Table 12.*Shared Responsibilities of All Organizations Under the Overarching Strategic Framework*

Policy and Legal	Introduction of a TUCBS-Aligned Regulation/Circular Letter/Strategy by Organizations in line with their own efforts
	Implementation of Relevant Board Resolutions by Organizations Under TUCBS in line with their own efforts
	Implementation of the Relevant Strategy by Organizations Under TUCBS in line with their own efforts
Capacity and Education	Increasing the Quality and Number of Human Resources of Institutional GIS Departments
	Increasing the Number of TUCBS Capacity Building Actions
	Improving the Competence Rate of Institutional Data Creation/Processing/Release Equipment
	Identifying the State of Preparedness in Agencies and Affiliated Agencies/Organizations for TUCBS at the Institutional Scale and Taking Actions to Improve Their Preparedness
	Identifying the State of Maturity in Agencies and Affiliated Agencies/Organizations for TUCBS at the Institutional Scale and Taking Actions to Improve Their Maturity
Technical Infrastructure	Securing the Institutional Data Creation Software Competence
	Securing the Institutional Data Security Software Competence
	Securing the Institutional Mapping Server Software Competence
	Securing the Infrastructure of Institutional Access to Secure Networks

Table 12.*Shared Responsibilities of All Organizations Under the Overarching Strategic Framework***Table 12.***Shared Responsibilities of All Organizations Under the Overarching Strategic Framework (Cont.)*

Data	Creation and Commissioning of an Institutional Data Release Website
	Increasing the Number of Data Layers Created

Standards	Increasing the Number of Data Layer for Which Licensing Rules Are Already Set
	Increasing the Number of Data Layers Aligned With TUCBS Standards
	Increasing the Number of Data Layers Integrated With TUCBS
	Increasing the Number of Open Data Layers
	Increasing the Investment Programme Funds Granted for GIS Projects
Financial	Increasing the Institutional Funds Granted for GIS
	Increasing the Foreign Funds Granted for GIS
	Increasing the Research & Development Funds Granted for GIS Projects
Governance / Communication and Engagement	Establishing and Structuring an Institutional TUCBS Coordination Department Directly Reporting to the Directorate, and Establishing GIS Divisions Under Data-Creating Departments
	Ensuring that Data-Creating Organizations Structure Their GIS Directorates in Rural Organizations, Too
	Increasing the Quality and Number of Human Resources of TUCBS Coordination Units
Innovation	Ensuring That Actions of Geospatial Information Are a Research Priority for Turkey

Table 13. *Overarching strategic framework*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**1. Combating Poverty:** Eradicating poverty in all its forms continues to be the most significant problem humanity faces today. Even though the number of people in extreme poverty decreases day by day, a lot of people are still experiencing challenges in meeting the most basic human needs. Due to the lack of access to paid work, education, and property, it is more likely that women are in poverty. New threats posed by climate change, disasters, and food insecurity indicate that we need to work harder to save people from poverty. Sustainable Development Goals present an important target to finish what we started and eradicate all forms and types of poverty. This scope also includes the identification of the most vulnerable, increasing access to basic resources and services, as well as supporting people who are affected by disasters and climate change.	Industrial plants Land Use Energy Resources Mines Population Distribution – Demographics Natural Risk Zones Human Health and Safety Hydrography Land Cover Soil Agricultural Plants Atmospheric Data Meteorological Data Transportation Networks Infrastructure	**SDG1:** The capacities of the relevant institutions should be built in order to utilize geospatial information technologies more actively within the project aimed at increasing the level of social welfare through shaping employment, production, and agricultural policies with a view to increasing social welfare, minimizing risks related to disasters and climate change, and so on. Projects related to said topic must be nationally funded and international funding should also be sought. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**2. Achieving Food Security:** Stated as "Zero Hunger" as part of the United Nations' global development goals, this goal is handled nationally as "Achieving Food Security" in Turkey. The number of undernourished people has dropped by almost half in the past two decades because of rapid economic growth and increased agricultural productivity. Many developing countries that used to suffer from famine and hunger can now meet their nutritional needs. Unfortunately, the long-term risks related to achieving food security and water security persist due to the problems that will arise as a result of global climate change. As a direct consequence of environmental degradation, drought, and the loss of biodiversity due to disasters and global climate change, some regions face certain risks in terms of achieving food security. Therefore, we need to aim to end all forms of hunger and malnutrition, making sure all people–especially children–have sufficient and nutritious food all year. As such, measures such as supporting farmers and promoting sustainable agricultural practices that support equal access to land, technology, and markets need to be introduced.	Agricultural Plants Land Use Energy Resources Mines Population Distribution – Demographics Natural Risk Zones Human Health and Safety Industrial Plants Hydrography Land Cover Soil Atmospheric Data Meteorological Data Transportation Networks Infrastructure Distribution of Species Habitat Zones Biogeography Zones	**SDG2:** Geospatial information technologies should be actively utilized to increase agricultural productivity. Investment should be made in improving human resources, as well as infrastructure and technology. Collaborations should be made to ensure that spatial decision support systems are widely used at all levels, particularly by the producers. Synchronous and asynchronous remote training efforts should be carried out to improve human resources. Furthermore, projects related to said topic must be nationally funded and international funding should also be sought. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**3. Good Health and Well-being:** We have made great progress in reducing child mortality, improving maternal health, and combating infectious and non-infectious diseases. Preventable infant and maternal mortality rates have declined significantly. Despite the progress made in our healthcare system, there are still important works to be performed, particularly in rural areas. Furthermore, it is important that new projects are developed to gain ground in public health issues such as preventive medicine, education, and vaccination campaigns. The goal includes all measures that ensure everyone accesses general healthcare services, as well as safe and accessible medicines and vaccines. Supporting vaccine research and development, in addition to improving the transportation network and infrastructure, is essential to this process.	Human Health and Safety Population Distribution – Demographics Natural Risk Zones Industrial Plants Hydrography Land Cover Soil Atmospheric Data Meteorological Data Transportation Networks Infrastructure	**SDG3:** The responsible institutions should be encouraged to utilize geospatial information systems in health-related matters that require all spatial data to be analyzed. Technical infrastructures and human resources related to the issue should be improved. Within this context, the relevant training should be supported by synchronous and asynchronous remote training efforts. Projects related to said topic must be nationally funded and international funding should also be sought. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**Quality Education:** There has been enormous progress in achieving the target of quality education for all throughout Turkey. The enrollment rate across the country has increased significantly and the number of children out of primary and secondary education has been reduced substantially. There has also been a dramatic increase in literacy rates, and many more girls are in school than ever before. These are all remarkable successes. The presence of a large number of refugees in certain regions, extreme weather conditions, and other emergencies and crises can sometimes make it challenging to make progress. Children from the poorest households are up to four times more likely to be out of school than those of the richest households while disparities between rural and urban areas also remain high. As such, ensuring equal opportunities across the country, providing equal education to all boys and girls, providing access to vocational and higher education in addition to primary and secondary education, eliminating gender and wealth disparity, and achieving universal access to a quality higher education are important targets.	Population Distribution – Demographics Administrative Units Human Health and Safety Transportation Networks Infrastructure	**SDG4:** The relevant institutions should be enabled to utilize GIS in matters requiring the direct analysis of spatial data in order to ensure that everyone has access to quality education. The required technical capacity should be built, human resources should be improved through synchronous and asynchronous remote training, and GIS-supported education should include in curricula as part of lessons such as geography, science and technology, etc. Projects related to said topic must be nationally funded and international funding should also be sought. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level. Actions of geospatial information should be ensured to become a research priority for Turkey.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**Gender Equality:** In Turkey, gender equality has been considered as a priority topic in recent years under the leadership of the President and thanks to the contributions of all relevant public institutions and non-governmental organizations. With reference to the argument that achieving inclusive and quality education for all is the most powerful and tried instrument of education for sustainable development, more and more girls are enrolled in schools. Gender equality in primary, secondary and higher education is mostly achieved in Turkey. Furthermore, the rate of women's participation in non-agricultural paid labor force has increased and discrimination against women and girls in all areas is being eliminated in line with the sustainable development goals. More effort is required to eliminate gender discrimination in all regions at an equal level. As the studies to be conducted in this field require a significant analysis of data such as spatial demographic properties, it is crucial that the number of GIS-supported studies is increased.	Population Distribution – Demographics Administrative Units Address Human Health and Safety Transportation Networks	**SDG5:** Necessary training should be provided to increase the number of employees that can use GIS and the capacity in institutions working on gender equality. The technical infrastructures of the relevant institutions should be improved; projects related to said topic must be nationally funded and international funding should also be sought. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**6. Achieving Water Security:** Stated as "Water and Sanitation" as part of the United Nations' global development goals, this goal is handled nationally as "Achieving Water Security" in Turkey. Water scarcity affects more than 40 percent of people globally. It is a major problem that affects every continent. In 2011, 41 countries experienced water stress; in 10 of these countries, the renewable fresh water resources are about to be depleted and alternative water resources have to be used. Increasing drought and desertification are already worsening these trends. Thanks to the infrastructure investments made, Turkey is affected less by this problem. However, it is possible that certain issues arise in the long run due to global warming as a consequence of climate change. As such, it is essential that water security is achieved, society has access to better water and sanitary conditions, and safe drinking and utility water resources are rendered sustainable in Turkey. With regard to this field, which requires large-scale spatial analysis and studies on a basin level, it is crucial that geospatial information technologies are employed. Therefore, all relevant institutions should be encouraged to conduct GIS-supported project studies and have their capacities built in order to achieve water security in Turkey.	Hydrography Mines Population Distribution – Demographics Natural Risk Zones Human Health and Safety Industrial Plants Land Cover Soil Atmospheric Data Meteorological Data Transportation Networks Infrastructure Environmental Monitoring Facilities Conservation Zones Biogeography Zones	**SDG6:** A cooperation platform should be established based on exchanging geospatial data and information among all institutions and organizations working on clean water and sanitation, and a common national monitoring and auditing mechanism should be formed in this context. Technical infrastructure and human resources should be improved with a view to generalizing the use of geospatial information technologies. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**7. Achieving Energy Security:** Stated as "Affordable and Clean Energy" as part of the United Nations' global development goals, this goal is handled nationally as "Achieving Energy Security" in Turkey. Based on the developing industry, investments made, and the increasing population, the energy demand has increased significantly in Turkey. In order to take the figures of growth even higher, the demand for cheaper energy also increases day by day. The global economy reliant on fossil fuels and the increase in greenhouse gas emissions are creating drastic changes to our climate. With that in mind, the necessary legislative changes were made resolutely and the legislation was put into effect under the auspices of the President to reduce fossil-based emissions in Turkey. Furthermore, it was enabled to make significant investments in renewable energy sources such as hydroelectricity, wind, and solar. Accordingly, the number of energy investments in clean energy from wind, hydroelectric, and solar has skyrocketed in recent years in Turkey. Yet, as the demand continues to rise, a great increase in renewable energy will be necessary across the country. In order to meet the increasing demand, it must be ensured that investments in clean energy sources such as solar, wind, hydroelectric, and geothermal continue and investors must be directed toward potentially productive fields. To do that, it is essential that the correct locations are chosen with the help of geospatial information technologies. Expanding infrastructure and upgrading technology to provide clean and more efficient energy in Turkey is a goal that will encourage growth and help the environment.	Energy Resources Mines Environmental Monitoring Facilities Human Health and Safety Industrial Plants Hydrography Land Cover Atmospheric Data Meteorological Data Transportation Networks Infrastructure	**SDG7:** A joint spatial decision support infrastructure should be established among the relevant institutions in order to utilize geospatial information technologies in efforts aimed at ensuring energy efficiency and choosing locations for renewable energy investments. The technical infrastructure and human resources in the relevant institutions should be improved. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**8. Sustainable Employment and Economic Growth:** Stated as "Decent Work and Economic Growth" as part of the United Nations' global development goals, this goal is handled nationally as "Sustainable Employment and Economic Growth" in Turkey. Despite the lasting effects of the economic crisis and global recession, and the impact of the COVID-19 pandemic, Turkey is better than numerous countries in terms of economic indicators. Important steps have been taken to prevent the loss of employment and to maintain growth. However, as the COVID-19 pandemic in 2020 continues to impact the global economy, we observe that economic growth in Turkey is slower and that the job opportunities do not increase at the same rate as the growing labor force. As such, it is essential that sustained economic growth, higher levels of productivity and technological innovation are promoted. Encouraging entrepreneurship and job creation are key to increasing job and employment opportunities. The main goal is to achieve full and productive employment, and decent work, for all women and men. To this end, it is going to be important to conduct, with the aid of geospatial information technologies, the analyses that encourage productive and feasible investments for various regions by performing the required spatial analyses necessary for the various circumstances in Turkey and to monitor the developments through the use of said technology.	Industrial Plants Energy Resources Mines Land Use Land Cover Agricultural Plants Transportation Networks Infrastructure	**SDG8:** Awareness should be raised among senior bureaucrats who are going to ensure that the analysis and decision-making processes are activated with the help of geospatial information technologies in institutions working on Decent Work and Economic Growth. The technical capacities of relevant institutions should be built with regard to using geospatial information technologies, and their human resources should be improved. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**9. Industry, Innovation, and Infrastructure:** Investment in infrastructure and innovation are crucial drivers of economic growth and development. More than ninety percent of the population of Turkey lives in cities and suburbs, while less than ten percent live in rural areas. That's why mass transport and renewable energy are becoming ever more important. Similarly, the growth of new industries and information and communication technologies is crucial for increasing job opportunities in cities. Technological progress is also key to finding lasting solutions to both economic and environmental challenges, such as providing new jobs and promoting energy efficiency. Promoting sustainable industries, and investing in scientific research and innovation, are all important ways to facilitate sustainable development. Since bridging the digital divide is crucial to ensure equal access to information and knowledge, as well as foster innovation and entrepreneurship, the number of people without access to the Internet in Turkey is quite low, thanks to the investments made. However, it is essential to utilize geospatial information technologies actively so as to monitor and improve the relevant infrastructure. Furthermore, with regard to investments in industry, it is going to be important to conduct, with the aid of geospatial information technologies, the analyses that encourage productive and feasible investments for various regions by performing the required spatial analyses necessary for the various circumstances in Turkey and to monitor the developments through the use of said technology.	Industrial Plants Infrastructure Land Use Energy Resources Mines Human Health and Safety Transportation Networks	**SDG9:** Awareness should be raised among senior bureaucrats who are going to ensure that the analysis and decision-making processes are activated with the help of geospatial information technologies in institutions working on industry, innovation, and infrastructure. The technical capacities of relevant institutions should be built with regard to using geospatial information technologies. Human resources should be improved, and information and awareness-raising efforts should be conducted with various segments of society to increase the potential of using geospatial information technologies as part of innovation. Projects related to said topic must be nationally funded and international funding should also be sought. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level. Actions of geospatial information should be ensured to become a research priority for Turkey.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**10. Reduced Inequalities:** Despite efforts in recent years to invest in various regions of Turkey at as similar a level as possible, certain inequalities based on gender, family structure, lifestyles, and ethnicity persist, partly due to sociocultural and socioeconomic structures. As such, it is imperative that robust policies that support the equal economic participation of all are adopted. In order to eliminate the inequality of incomes among the regions in the country, approaches should be implemented properly with a view to structuring regional public investments and policies, regulating financial markets and organizations as well as improving the monitoring thereof, and directing development aids and direct foreign investments to the regions that need them the most. Furthermore, ensuring that people migrate and move, for various reasons, safely is an important approach in reducing inequality. For all these efforts, an effective spatial analysis capability needs to be built in the relevant organizations and institutions across Turkey.	Population Distribution – Demographics Statistical Reporting Zones Administrative Units Address Industrial Plants Agricultural Plants Energy Resources Mines Land Cover Land Use Transportation Networks Infrastructure	**SDG10:** In order to reduce inequalities, the capacity to perform geospatial information supported spatial analysis should be improved in all relevant units and the technical infrastructure of the relevant organizations and institutions should be reinforced to this end. The size of human resources competent in GIS should be increased. It should be ensured that the senior bureaucrats in the relevant organizations and institutions are informed about geospatial information technologies in order to generalizing the use of geospatial information technologies. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**11. Sustainable Smart Cities and Communities:** More than ninety percent of the population of Turkey lives in cities and suburbs, while less than ten percent live in rural areas. If we do not substantially change our way of building and managing urban areas, expedite urban transformation efforts in our cities, or utilize this transformation as an instrument for building smart and disaster-resistant cities, we cannot achieve sustainable development. Despite efforts in recent years to prevent the emergence of unlicensed buildings and squatter settlements, the rapid growth of cities and increase in rural-to-urban migration in Turkey creates a pressure on our cities in terms of urbanization and reduces the job opportunities in cities. Job and employment opportunities do not increase as fast as the rapid increase of urban population, thus negatively impacting the levels of income in households. Moreover, our cities cannot realize the urban transformation efforts as fast as it is desired due to this pressure. This, in turn, prevents the provision of rapid urban resilience against disasters. All relevant organizations and institutions need to conduct projects supported by geospatial information technologies that include spatial analyses in order to provide safe and affordable housing, transform squatter settlements, increase the availability of public transportation, create more green public spaces, and to improve urban planning and management in a participatory and inclusive manner so as to make cities safe and sustainable.	Land Use Building Energy Resources Mines Population Distribution – Demographics Statistical Reporting Zones Administrative Units Address Natural Risk Zones Human Health and Safety Industrial Plants Hydrography Land Cover Soil Atmospheric Data Meteorological Data Transportation Networks Infrastructure	**SDG11:** The number of personnel competent in geospatial information technologies should be increased in the relevant organizations and institutions in order to create sustainable cities and communities, as well as to render cities smart and resilient against disasters. The technical infrastructure should be rendered adequate; projects related to said topic must be nationally funded and international funding should also be sought. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**12. Responsible Production and Consumption:** Achieving economic growth and sustainable development requires that we urgently reduce our ecological footprint by changing the way we produce and consume goods and resources. Agriculture is the biggest user of water in Turkey, and irrigation now claims close to 70 percent of all freshwater for human use. The efficient management of our shared natural resources, and the way we dispose of toxic waste and pollutants, are important targets to achieve this goal. Encouraging industries, businesses and consumers to recycle and reduce waste is equally important. Necessary steps have already been taken in our country and social awareness has been raised. However, in order to increase food security and ensure a shift toward an economy that utilizes resources more efficiently, it is necessary to continue encouraging sustainable patterns of consumption at all levels of society. Within this framework, geospatial information technologies need to be utilized actively to come up with countrywide solutions in, for instance, creating more efficient production and supply chains, and reducing the per capita food waste at the retailer and consumer levels.	Land Use Population Distribution – Demographics Industrial Plants Hydrography Land Cover Soil Agricultural Plants Atmospheric Data Meteorological Data	**SDG12:** The size of competent human resources should be increased to generalize the use of geospatial information technologies in the relevant organizations and institutions so as to increase responsible production and consumption. Projects related to said topic must be nationally funded and international funding should also be sought, the technical infrastructure of the relevant organizations and institutions should be improved. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**13. Fight Against Climate Change:** Even though Turkey ranks low in terms of per capita greenhouse gas emissions compared to many developed countries within the context of the increase in said emissions, we are disproportionately affected by the consequences of climate change due to our position in an area that is quite susceptible to disasters related to global climate change. Recent natural phenomena observed in the country, such as floods, flash floods, tornadoes, and severe storms, lead to significant material damage. Furthermore, water sources that are depleted due to drought, etc. affect irrigation and hydroelectric power generation, and cause substantial agricultural loss. This, in turn, may negatively impact the water, food, and energy security of the country in the future. The will displayed by the President in filtering flue gases in order to reduce greenhouse gas emissions, steps taken for a national electric car, efforts for developing the infrastructure for smart cities, activities such as the National Smart Cities Strategy and Plan of Action are all aimed at mobilizing resources to help the country weather the storm. However, the number of GIS-supported projects and studies need to be increased throughout the country in order to generate faster and effective solutions for such matters.	Environmental Monitoring Facilities Habitat Zones Distribution of Species Atmospheric Data Meteorological Data Hydrography Land Use Energy Resources Mines Population Distribution – Demographics Human Health and Safety Industrial Plants Land Cover Agricultural Plants Transportation Networks Infrastructure	**SDG13:** The number of personnel competent in geospatial information technologies should be increased in organizations, institutions, and local administrations responsible for climate action. The technical infrastructure should be rendered adequate; projects related to said topic must be nationally funded and international funding should also be sought. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**14. Preserving Aquatic Life:** The seas and coasts in Turkey, which is surrounded by seas in three sides, are tried to be managed in a holistic balance of preservation and utilization both for tourism and for marine-dependent economic activities. Many citizens living in the coastal regions engage in fishing to earn their livelihoods and therefore depend on marine and coastal biodiversity. However, the sustainability of fishing activities for certain species is at risk due to overfishing and climate change. Our seas are polluted by mostly land-based sources and plastic waste and the acidification levels are increasing. This threatens the sustainability of tourism and other economic activities dependent on seas and coast. In line with our national goals, it is essential that all organizations and institutions engage in studies supported by geospatial information systems and technologies to manage the marine and coastal ecosystems in a sustainable manner, protect against pollution, minimize the impact of marine acidification, and to effectively utilize marine energy sources. By doing so, we will contribute to the increase of sustainable use of marine resources and the alleviation of some of the problems faced by our seas.	Hydrography Seas and Salt Water Areas Conservation Zones Habitat Zones Distribution of Species Environmental Monitoring Facilities Human Health and Safety Industrial Plants Land Cover Agricultural Plants Atmospheric Data Meteorological Data Infrastructure	**SDG14:** In order utilize our seas and coasts in a balanced way within the framework of preserving them as part of the goal of life below water, the capacity to perform geospatial information supported spatial analysis should be improved in all relevant units and the technical infrastructure of the relevant organizations and institutions should be reinforced to this end. The size of human resources competent in GIS should be increased in the relevant institutions. It should be ensured that the senior bureaucrats in the relevant organizations and institutions are informed about geospatial information technologies in order to generalizing the use of geospatial information technologies. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**15. Preserving Land Life:** Human life depends on the earth as much as the ocean for our sustenance and livelihoods. Plant life provides 80 percent of the human diet. Furthermore, plant production is important in terms of economic resources and means of development as raw materials for industry and for household income in Turkey. On the other hand, forests, which are the other sources for life on earth, are important for industrial and domestic use, in addition to being home to hundreds of thousands of species, which is crucial for biodiversity. Forests are sources of oxygen and carbon dioxide traps, and provide vital clean air and water resources that are important for Turkey. Due to these qualities, forests play an important role in the fight against climate change. The forest cover is also important for preventing the soil loss for the purpose of fighting against erosion. Identifying land degradation, conducting land rehabilitation and re-vegetation, and preserving forests and water sources based on geospatial information technologies are important for ensuring food and water security in Turkey in the long run. Also, efforts to preserve life on land with the support of GIS are crucial for the fight against climate change and disasters. The use of geospatial information technologies by the relevant organizations and institutions matters for preventing forest fires, mending the impaired vegetation, preserving and restoring land-based ecosystems such as forests, wetlands, drylands, and mountains. Effectively utilizing geospatial information technologies in the efforts conducted by the relevant organizations and institutions are vital for halting deforestation and mitigating the impact of climate change. Such technologies must be employed effectively so as to reduce the loss of natural habitats and biodiversity, which form a part of our common heritage.	Land Cover Land Use Soil Energy Resources Mines Population Distribution – Demographics Hydrography Agricultural Plants Atmospheric Data Meteorological Data Conservation Zones Habitat Zones Distribution of Species	**SDG15:** The capacity to perform geospatial information supported spatial analysis should be improved in all relevant units and the technical infrastructure of the relevant organizations and institutions that work on life on land should be reinforced to this end. The size of human resources competent in GIS should be increased. It should be ensured that the senior bureaucrats in the relevant organizations and institutions are informed about geospatial information technologies in order to generalizing the use of geospatial information technologies. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**16. Peace, Justice, and Strong Institutions:** A stable administrative mentality in public administration, strong institutions, and effective administration based on human rights and an effective legal system are essential for sustainable development. Violence, crime, and exploitation are prevalent and many individuals and institutions in the society are at risk in places where there is no rule of law or public security. The use of GIS is going to contribute to reducing crime rates, identifying urban areas with a high potential for criminal activity, preventing crime by analyzing the breakdown and resources of crimes, and analyzing blind spots in traffic, as well as ensuring that all forms of violence are reduces and permanent solutions are found for conflict and distrust. The use of geospatial information technologies is also going to be invaluable in generating highly effective solutions for specific issues such as tracking and controlling illicit trade. Similarly, GIS-supported efforts play an important role in ensuring a coordination and collaboration infrastructure for the authorized agencies in the prevention, tracking, and intervention stages of efforts to track and prevent terrorist activities.	Human Health and Safety Public Administration Zones Population Distribution – Demographics Administrative Units Address Transportation Networks Infrastructure	**SDG16:** A cooperation platform should be established based on exchanging geospatial data and information among all institutions and organizations working on the strategic goal of peace, justice, and strong institutions, and a common national monitoring and auditing mechanism should be formed in this context. Technical infrastructure and human resources should be improved with a view to generalizing the use of geospatial information technologies. Geospatial information technologies and GIS should be included in the curricula of all departments providing education within this framework at the higher education level.

Table 13. *Overarching strategic framework (continued)*

Goals	Scope of the Sustainable Development Goal	Relevant Data Themes	Framework for the Strategic Actions Related to the National GIS
	**17. Partnerships for the Goals:** The Sustainable Development Goals can only be realized with a strong commitment to national and international partnership and cooperation. Crises brought on by global climate change, the pandemic, or natural disasters continue to demand more financial resources and aid. The countries of the world is more interconnected than ever. Improving access to technology and knowledge is an important way to share ideas and foster innovation. Turkey has trade relations with numerous countries. It is going to be important to meet the need for geospatial data and use geospatial information technologies to analyze said data in efforts such as coordinating policies that lead the way in managing Turkey's foreign trade, improve international trade, and encourage investment in certain areas, with the goal of achieving sustainable growth and development. Furthermore, increasing the number of systems that are already centralized and associated with the e-Government in processes that require similar spatial data in various national institutions as part of the information society strategies is going to contribute to rendering the services offered to citizens more qualified and make it possible to achieve coordination among institutions.	All themes	**SDG17:** All projects and investments made to date with regard to geospatial information systems in Turkey as part of the partnerships for the goals need to be consolidated. Moreover, in order to evaluate sectoral development, a verbal and written historical review based on interviews with the representatives of institutions, private companies, municipalities, and universities that played a role in the sector should be conducted. The technical infrastructures of all institutions should be improved. Synchronous and asynchronous remote training efforts should be carried out to improve human resources in all institutions taking part in the generation of geospatial data. The technical infrastructure should be improved and the capacity to utilize geospatial information systems and technologies should be built in all institutions engaged in the generation of geospatial data. Models and web-based application tools should be developed nationally and at the institutional level so as to determine the sectoral levels of preparedness and maturity, and evaluate them through constant monitoring. Organizations should develop applications for integration to the National Geospatial Information Platform. Organizations should start actions of alignment with the national spatial data infrastructure.

SECOND CHAPTER: IMPLEMENTATION GUIDE ALIGNED WITH THE UNITED NATIONS IGIF

In this chapter, the national efforts conducted for implementing the Integrated Geospatial Information Framework of Turkey and the recommendations presented by the UN framework have been provided in comparison, based on the analyses within the UN Integrated Geospatial Information Framework presented in the first chapter, and the mission, vision, and overarching strategic framework defined for the geospatial information framework of Turkey. The national efforts conducted so far already cover the UN Framework to a large extent.

A. Positioning of National Efforts Within the Scope of United Nations IGIF Strategic Pathways

It is crucial for setting a direction for the future that countries determine, define, and evaluate the national actions they take and plan to take within the scope of integrated geospatial information management. These steps, which are part of the process for integrating the strategic pathways to the national plans of action, ensure that the current status is observed, needs and deficiencies are determined, and that strategies are reinforced through the contributions provided by the recommendations. As such, the national efforts conducted in Turkey and the timetables thereof are shown in Tables 14 to 22.

Table 14. *Timetable of national actions taken for Governance*

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
GOVERNANCE	**Forming the Leadership**	Coordination Board, Technical Committee, and Working Groups have been formed and their duties, authorities, and liabilities have been defined (Regulation on the Establishment and Management of the National Geospatial Information System).			2015	
		Geospatial Information System Council of Turkey, Geospatial Information System Steering Group of Turkey, and Working Committees have been formed and their duties, authorities, and liabilities have been defined (Presidential Decree No. 49 on Geospatial Information Systems).				2019
	Establishing Accountability	The structure and liabilities of the board, committee, and working groups, as well as the roles of organizations, institutions, and relevant stakeholders with regard to the establishment and management of TUCBS have been defined.		2012		
		The essential principles for all activities related to geospatial information service and practices have been defined.		2012		
		The principles of accessing, sharing, and using geospatial data have been determined.		2012		
		The National Geospatial Data Custodianship Matrix was prepared and enacted upon its publication in the Official Gazette dated 30.06.2020 and numbered 31171.				2020
	Setting Direction	The National Geospatial Information Vision and Mission of Turkey have been determined.	2011			
		The National Strategy and Plan of Action for Geospatial Information, which include the strategic goals and objectives as well as the actions required to achieve them, were prepared and enacted upon their publication in the Official Gazette dated 30.06.2020 and numbered 31171.				2018-2020
		During the preparation of the National Strategy and Plan of Action for Geospatial Information, workshops were held with the participation of representatives from the relevant public institutions and agencies, local administrations, and private sector; goals, objectives, and actions required to be included in the Plan of Action were determined; and the priorities of said actions were set.				2018
		The National Strategy and Plan of Action for Geospatial Information, which were prepared to take the national priorities of Turkey into consideration as well, includes the medium- and long-term actions, the institutions responsible for carrying them out, and the schedule (for 2020-2023) foreseen for the execution				2020

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
		(roadmap).				
		As part of the TUCBS Standardization Project, workshops, information and collective coordination meetings, and regular weekly meetings were held.				2018-2020
		Determination, integration, technical capacity building, and reporting efforts were conducted with the TUCBS Integration Project.				2018-2020
	Creating A Plan of Action	The National Strategy and Plan of Action for Geospatial Information were prepared and enacted upon their publication in the Official Gazette dated 30.06.2020 and numbered 31171.				2018-2020
		A tailor-made geospatial information maturity model has been developed for organizations.				2020
	Tracking Success	With regard to the actions within the National Strategy and Plan of Action for Geospatial Information of Turkey, the performance indicators (PIs), their monitoring periods and methods, and those responsible for them have been determined. The total number of PIs vary depending on the needs of each action and the plans of action also include strategies, risks, measures, and cost estimations.				2018-2020
		The plan of action monitoring mechanism (software portal) has been created.				2018
		Through the Software Portal, the process/mechanism required for monitoring the PIs included in the plan of action has been created. Thanks to this mechanism, it will be possible to make changes to the objectives not achieved, make improvements for the coming periods, carry out assessments, and conduct reporting.				2018-2020
		The Geospatial Information System Annual Report of 2019 has been prepared.				2019

Table 15. *Timetable of national actions taken for Policy and Legal*

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
POLICY AND LEGAL	**Forming the Leadership**	The National Geospatial Information System Council of Turkey is charged with "defining the national objectives and ensuring their implementation throughout the country" and "ensuring coordination among the custodian agencies and institutions within the scope of the National Geospatial Data Custodianship Matrix and the National Geospatial Data Sharing Matrix" (Presidential Decree No. 49 on Geospatial Information Systems).				2019
	Needs Analysis	Determination, integration, technical capacity building, and reporting efforts were conducted with the TUCBS Integration Project.				2018-2020
		A tailor-made geospatial information maturity model has been developed for organizations.				2018-2020
		Modules that require e-government integration on the National Geospatial Information Platform have been integrated to the e-government.				2019-2020
	Addressing Opportunities	The National Geospatial Data Custodianship Matrix was prepared and enacted upon its publication in the Official Gazette dated 30.06.2020 and numbered 31171.				2020
		Units to have access to geospatial data have been identified.			2016-2020	
		The essential principles concerning the national geospatial information platform; access, sharing, and use of geospatial data have been determined (Presidential Decree No. 49 on Geospatial Information Systems).				2019
		As part of the National Geospatial Data Sharing Matrix, works have been conducted with regard to the confidentiality levels of data and with whom they are going to be shared through which method.			2016-2020	
		Principles on how to share geospatial data (licensing rights, accessibility) have been set.				2019
		One of the main principles concerning all activities related to GIS services and practices has been stated as "Making all forms of geospatial data accessible, shareable, and available on condition that the legislative provisions on national security, protection of personal data, intellectual, industrial, and commercial rights, as well as the provisions of international treaties are reserved" (Presidential Decree No. 49 on Geospatial Information Systems).				2019
	Future-Proofing	"Ensuring the accurate and high-quality generation, up-to-dateness, reliability, continuity, and sharing of geospatial data and data information" is set forth as an				2019

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
		essential principle of all activities concerning GIS service and practices (Presidential Decree No. 49 on Geospatial Information Systems).				
	Addressing Coherence	One of the main principles concerning all activities related to GIS services and practices has been stated as "Making all forms of geospatial data accessible, shareable, and available on condition that the legislative provisions on national security, protection of personal data, intellectual, industrial, and commercial rights, as well as the provisions of international treaties are reserved" (Presidential Decree No. 49 on Geospatial Information Systems).				2019
		Principles on how to share geospatial data (licensing rights, accessibility) have been set.			2016-2020	
		Units to have access to geospatial data have been identified.			2016-2020	

Table 16. *Timetable of national actions taken for Finance*

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
FINANCE	**Setting Direction**	A provision is available for adding project appropriations within the National Geospatial Data Custodianship Matrix to the budgets of public agencies and institutions, registering of the relevant projects by the Ministries to the National Geospatial Information Platform, and covering the expenses within the scope of the National Geospatial Information Platform from the budgets of the Ministries and/or their Revolving Funds Directorates (Presidential Decree No. 49 on Geospatial Information Systems).				2019
	Situational Assessment	A tailor-made geospatial information maturity model has been developed for organizations.				2018-2020
		The data in the National Geospatial Data Custodianship Matrix are going to be shared over the National Geospatial Information Platform or the platforms of the public institutions. Other matters concerning access to and the sharing of data and data-related information through the platform, as well as the generation, sharing, and sale of data by natural or legal persons are also determined (Presidential Decree No. 49 on Geospatial Information Systems).				2019
		The ATLAS application has been prepared and data sharing infrastructure has been provided as a requirement of the open data policy.			2015	
	Financial Plan					2018-2020
		National Integrated Geospatial Framework was prepared in accordance with the United Nations Integrated Geospatial Framework				2018-2020
	Deriving Value	7 goals defined within the scope of the National Strategy and Plan of Action for Geospatial Information and their plans of action have been prepared and monitoring mechanisms for the actions have been developed.				2018-2020

Table 17. *Timetable of national actions taken for Data*

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
DATA	**Organization**	Identification documents (data glossaries) have been drawn up for geospatial data themes.				2018-2020
		A data and metadata service and format accreditation system has been established.				2020
		As part of the integration project, current status analyses and current data analyses have been conducted and data inventories have been prepared in 32 public institutions and 30 metropolitan municipalities.				2018-2019
	Planning for the Future	Guidelines for determining the definitions and scopes of the concepts concerning the geospatial data themes have been prepared within the scope of TUCBS.				2018-2020
	Capturing and Acquiring Data	The Directorate General of GIS has been assigned to acquire, transfer, and share the data (Presidential Decree No. 1, Article 108).				2018
		Organizations to create geospatial data layers have been identified.			2016-2020	
		A Board decision was made to conduct a study for updating the aerial photographs of Turkey once a year under the coordination of the Directorate General of Land Registry and Cadastre (DGLRC), Directorate General of Mapping (DGM), and DGGIS.				2020
	Managing Data Sustainably	Geospatial data layers have been set.			2016-2020	
		Organizations to create geospatial data layers have been identified.			2016-2020	
		TUCBS metadata definition documents have been prepared and metadata components have been identified.		2012-2020		
		Restrictions (access restrictions, conditions for access and use) concerning the data are defined with regard to metadata components.		2012-2020		
		Directorate General of Information Technologies, Ministry of Industry and Technology, Directorate General of National Technology, and the Digital Transformation Office have been assigned duties in areas such as data management, organization, and sharing (Presidential Decree No. 1).				2018
		Units to have access to geospatial data have been identified.			2016-2020	
	Maintaining Accurate Positioning	The Coordinate Reference Systems and Geospatial Grid Systems theme has been developed (https://tucbs-public-api.csb.gov.tr/tucbs/tucbs_tanimlama_dokumanlari/TUCBS_CG.pdf).				2020
	Integrating Data	Address-Based Identity Registration System and Spatial Address Registration		2012-2020		

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
		System projects have been carried out.				
		DGLRC carried out the TAKBIS Project and parcel inquiry application.		2012-2020		
		DGM developed the DGM ATLAS and Küre (Sphere) applications.				2019
		The E-Plan application has been developed.		2012-2015		
		The Digital Database of Turkish Lands has been created.		2013		
		The Digital Database of Turkish Geology has been created.			2015-2017	
		The generation of real orthophotos across Turkey has been completed.				2018-2019
		The generation of 3D building data on a national scale has been completed.			2015-2017	
		The generation of medium vectors for building and roads has been completed.				2018-2019
		The land status atlas for urban areas has been created.				2018-2019
		Urban topography data sets have been generated.				2019
		UAVT (National Address Database) codes have been assigned to building and road data in certain pilot city and district centers and the addresses associated with these codes have been determined and registered into the database.		2013		
		Modules that require e-government integration on the National Geospatial Information Platform have been integrated to the e-government. A secure geospatial data access infrastructure has been established, and organizations have been provided with access to the infrastructure.				2020
		Organizations have developed applications for integration to the National Geospatial Information Platform.				2018-2020

Table 18. *Timetable of national actions taken for Innovation*

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
INNOVATION	**Geospatial Information Framework**	A tailor-made geospatial information maturity model has been developed for organizations.				2018-2020
	Identifying Innovation Needs					
	Transformation Roadmap	A secure geospatial data access infrastructure has been established, and organizations have been provided with access to the infrastructure.			2015-2019	
		DGGIS has developed the ATLAS and Geoportal applications.			2015	
	Innovation Culture	National GIS Strategy and Plan of Action have been prepared and published within the framework of developing the digital transformation strategy and creating the digital transformation plan that are going to support the emergency of an innovation culture. The Information Society Strategy and Plans of Actions serve this purpose, too.				2018-2020
	Operationalizing					
	Innovation Ecosystem	Organizations have developed applications for integration to the National Geospatial Information Platform.				2018-2020
		Modules that require e-government integration on the National Geospatial Information Platform have been integrated to the e-government.				2020

Table 19. *Timetable of national actions taken for Standards*

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
STANDARDS	**Setting Direction**	The Division of Accreditation and Certification has been established.		2012		
		The conceptual model, data standards, interoperability principles, geospatial data definition and implementation chart preparation standards, and metadata standards have been identified. In order to ensure interoperability on an international level, the INSPIRE, OGC, ISO standards have been taken as reference while determining standards.		2012-2020		
		Definition documents have been prepared for 32 data themes.				2018-2020
		A tailor-made geospatial information maturity model has been developed for organizations.				2018-2020
		Circular letter No. 2009/4 of the Prime Ministry makes in mandatory to abide by the principles and standards of the Guidelines on the Principles of Interoperability in all new information systems to be established by all central and local public agencies and institutions.	2009			
	Understanding National Needs	The standards inventory has been created to understand the level at which the national or international geospatial information standards are used by users/and or data and technology providers.				2018
		Needs analyses which are aimed at identifying the needs at various levels with regard to the standards to be employed have been conducted.				2018
	Planning for Change	The National Strategy and Plan of Action for Geospatial Information were prepared and enacted upon their publication in the Official Gazette dated 30.06.2020 and numbered 31171.				2018-2020
		The National Geospatial Data Custodianship Matrix was prepared and enacted upon its publication in the Official Gazette dated 30.06.2020 and numbered 31171.				2018-2020
	Taking Action	The National Strategy and Plan of Action for Geospatial Information were prepared and enacted upon their publication in the Official Gazette dated 30.06.2020 and numbered 31171.				2018-2020
		Definition documents of 32 data themes have been published in the Official Gazette.				2020

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
	Ongoing Management	A monitoring/review mechanism has been established to regularly review and update, when necessary, the standards and technical specifications concerning geospatial information. National Geospatial Information System Steering Group of Turkey is responsible for monitoring the countrywide implementation of the goals and reviewing the monitoring reports (Presidential Decree No. 49 on Geospatial Information Systems).				2019
	Achieving Outcomes	A data and metadata service and format accreditation system has been established.				2020

Table 20. *Timetable of national actions taken for Partnerships*

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
PARTNERSHIPS	**Understanding Partnerships**	Presidential Decree No. 49 stipulates that "All activities about GIS services and practices must observe the principles of interoperability and participation".				2019
		Directorate General of GIS has prepared data sharing and cooperation protocols.		2012-2020		
		The Coordination Board for Improving the Investment Climate (CBIIC) has been established to increase the efficiency of investment processes in Turkey.	2001			
		The provision of "The data obtained as a result of the works and processes conducted within the scope of cooperation with private organizations, institutions, and universities on data sharing, data mining, and new data generation shall be shared with third parties in exchange for the fee determined by the Ministry" in Presidential Decree No. 49 paves the way for cooperation efforts.				2019
		Law No. 7221 adopts the provision that "Data can be shared free of charge with organizations, institutions, and universities within the scope of cooperation on sharing revenues with regard to data mining and new data generation, provided that the provisions on national security and legislative provisions on intellectual, industrial, and commercial rights are reserved and the opinion of the institutions responsible for generating data is obtained."				2020
	Evaluating Opportunities					
	Identifying Potential Partners	The public institutions of cooperation have been determined depending on the subject of data acquisition and have been placed in the custodianship matrix.				2020
		The Digital Transformation Office has been established to increase cooperation among institutions and ensure coordination in the relevant fields.				2018
		The Directorate General of GIS goes out to tender when there is a need for generating geospatial data.	2011-2020			
	Selecting Partners					
	Formalizing Partnership					
	Managing Partnership					

Table 21. *Timetable of national actions taken for Capacity and Education*

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
CAPACITY AND EDUCATION	**Setting Direction**	The Division of Education Planning and Coordination was established under the Directorate General.			2015	
		The Personnel Certification Unit (BelgeCBS) was established.			2015	
		The Personnel Certification Unit was established with a Quality Management System compliant with the TS EN ISO/IEC 17024 Standard, accredited by the Turkish Accreditation Agency (TÜRKAK), and authorized to perform examination and issue certificates by the Vocational Qualifications Authority (VQA).			2017	
	Assessing Needs					
	Considering Alternatives					
	Planning for Action	In order to set forth the policies, principles, and guidelines that are going to support the sharing and widespread use of data for the purpose of capacity building, the Regulation on the Establishment and Management of the National Geospatial Information System, Presidential Decree No. 49 on Geospatial Information Systems, National Geospatial Data Custodianship Matrix, and the National Strategy and Plan of Action for Geospatial Information of Turkey have been created and put into effect. Thus, the national approaches on this field started to be introduced.			2015-2020	
		The Division of Accreditation and Certification was established to perform or have others perform the certification of educational institutions providing the standard, scope, and program defined for the GIS education and expertise.		2012		
	Taking Action	There are various institutions, organizations, professional bodies, and universities that work toward organizing training and capacity building on geospatial information. GIS certificate programs, associate degrees, graduate and PhD programs, and various courses from universities, GIS courses and certificate programs from software companies, and the GIS training courses organized by trade associations are among these educational programs.		2012-2020		
	Assessing Value					

Table 22. *Timetable of national actions taken for Communication and Engagement*

	ESSENTIAL ACTIONS	NATIONAL EFFORTS	Before 2011	2012-2014	2015-2017	2018-2020
COMMUNICATION AND ENGAGEMENT	**Providing Leadership**	Presidential Decree No. 49 stipulates that "All activities about GIS services and practices must observe the principles of interoperability and participation".				2019
	Understanding Opportunities					
	Setting Direction					
	Creating A Plan of Action	6 goals determined as part of the National Strategy and Plan of Action for Geospatial Information conducted by the DGGIS and the plans of action of these goals have been prepared.				2018-2020
	Monitoring Progress					
	Communicating Value					

B. Comparative Tables for the National efforts and Actions to Be Taken as part of the United Nations IGIF

This section contains the "National Efforts and Recommendations" prepared within the scope of the strategic pathways compatible with the United Nations IGIF. The tables comparing the national efforts conducted so far and the actions to be taken are presented in this section. The descriptions in Table 23 need to be taken into consideration while evaluating these tables.

Table 23.*Color codes for "Recommendations and Actions to be Taken"*

Color Code	Description
Black text	These are the actions that are yet to be taken based on the objectives in the Strategy and Plan of Action for Geospatial Information Systems of Turkey published in the Official Gazette.
Blue text	These are the recommended actions within the scope of the strategic framework, which is the first chapter of this document.
Red text	These are the recommended actions in line with the UN Integrated Geospatial Information Framework.
All recommendations coded in black, blue, and red in this column have been transferred to the Strategy and Plan of Action matrix provided in the third chapter.	

National Actions Taken for Governance and Recommendations

The first systemic efforts aimed at creating the governance mechanism and model in Turkey started with the establishment of the Directorate General of Geospatial Information Systems under the Ministry of Environment and Urbanization in 2011 via the decree law no. 644. With the Regulation on the Establishment and Management of the National Geospatial Information System dated 20.03.2015, the legal deficiency in the generation and sharing of geospatial data was eliminated and the first leadership mechanism compliant with the United Nations IGIF was realized. The Regulation defined the structure, members, and duties of the ***Coordination Board, Technical Committee, and Working Groups***, established the liabilities of agencies and institutions, and set forth the essential principles including interoperability and data sharing. The creation of a more comprehensive, guiding, and effective leadership mechanism and governance model on a national scale was ensured via the Presidential Decree No. 49 on Geospatial Information Systems, which was published on the Official Gazette dated 07.11.2019 and numbered 30941. ***Geospatial Information System Council of Turkey, Geospatial Information System Steering Group of Turkey*** and ***Working Committees*** are the key bodies in establishing and governing the National Geospatial Information Systems of Turkey. The decree also describes the essential national principles such as the liabilities of organizations and institutions

to one another, and the widespread use of geospatial data, its interoperability, and the prevention of data duplication. Furthermore, as a result of the stakeholder meetings held under the coordination of the DGGIS, the National Strategy and Plan of Action for Geospatial Information, which include performance indicators that are compliant with the national priorities and policies and are aimed at measuring success, were prepared and enacted upon their publication in the Official Gazette dated 30.06.2020 and numbered 31171.

It is crucial for setting a direction for the future that countries determine, define, and evaluate the national actions they take and plan to take within the scope of the United Nations IGIF. These steps, which are part of the process for integrating the strategic pathways to the national plans of action, ensure that the current status is observed, needs and deficiencies are determined, and that strategies are reinforced through the contributions provided by the recommendations. To this end, actions that are taken/planned and recommendations within the scope of **Governance** are presented in Table 24.

Table 24.*National Actions Taken for Governance and Recommendations*

SP1: GOVERNANCE		
ESSENTIAL ACTIONS	**NATIONAL EFFORTS**	**RECOMMENDATIONS-ACTIONS TO BE TAKEN**
Forming the Leadership	• Coordination Board, Technical Committee, and Working Groups have been formed and their duties, authorities, and liabilities have been defined (Regulation on the Establishment and Management of the National Geospatial Information System). • Geospatial Information System Council of Turkey, Geospatial Information System Steering Group of Turkey, and Working Committees have been formed and their duties, authorities, and liabilities have been defined (Presidential Decree No. 49 on Geospatial Information Systems).	• Coordination units should be established within the body of public agencies and organizations, and local administrations to carry out adaptation and integration processes for GIS.
Establishing Accountability	• The structure and liabilities of the board, committee, and working groups, as well as the roles of organizations, institutions, and relevant stakeholders with regard to the establishment and management of TUCBS have been defined. • The essential principles for all activities related to geospatial information service and practices have been defined. • The principles of accessing, sharing, and using geospatial data have been determined. • The National Geospatial Data Custodianship Matrix was prepared and enacted upon its publication in the Official Gazette dated 30.06.2020 and numbered 31171.	• Institutions should define their processes with regard to geospatial information. • Coordination should be secured among the Boards, Working Groups, Public Agencies, Local Administrations, Universities, and the Private Sector under the TUCBS actions. • Reports related to national GIS activities need to be drawn up.

Setting Direction	• The National Geospatial Information Vision and Mission of Turkey have been determined. • The National Strategy and Plan of Action for Geospatial Information, which include the strategic goals and objectives as well as the actions required to achieve them, were prepared and enacted upon their publication in the Official Gazette dated 30.06.2020 and numbered 31171. • During the preparation of the National Strategy and Plan of Action for Geospatial Information, workshops were held with the participation of representatives from the relevant public institutions and agencies, local administrations, and private sector; goals, objectives, and actions required to be included in the Plan of Action were determined; and the priorities of said actions were set. • The National Strategy and Plan of Action for Geospatial Information, which were prepared to take the national priorities of Turkey into consideration as well, includes the medium- and long-term actions, the institutions responsible for carrying them out, and the schedule (for 2020-2023) foreseen for the execution (roadmap). • As part of the TUCBS Standardization Project, workshops, information and collective coordination meetings, and regular weekly meetings were held. • Determination, integration, technical capacity building, and reporting efforts were conducted with the TUCBS Integration Project.	• In order to evaluate the benefits (economic development, commercial opportunities, social welfare, etc) to be gained by implementing the Geospatial Information Management Strategy of Turkey, **analysis efforts** need to be conducted. • Projects of GIS activities carried out by organizations should be identified and prioritized, and the number of integration and modernization projects should be increased. • The maturity level of the national geospatial information system should be improved. • GIS units need to be generalized in order to encourage the institutions responsible for matters that require the analysis of all spatial data related to agriculture, health, education, and security to utilize GIS.

Creating A Plan of Action	• The National Strategy and Plan of Action for Geospatial Information were prepared and enacted upon their publication in the Official Gazette dated 30.06.2020 and numbered 31171. • A tailor-made geospatial information maturity model has been developed for organizations.	• A **Change Strategy**[2] that sets forth how the current geospatial information management practices should be improved/changed/developed within the scope of the National Geospatial Information Strategy of Turkey should be prepared. • While determining the Change Strategy, analyses such as **strategic needs, data inventory, institutional culture assessment, legislative analysis, capacity assessment, and gap analysis (SWOT, PESTLE, etc.)**, which are going to support the creation of this strategy from the political, legal, and technological aspects, should be conducted. • It should be ensured that institutions implement the maturity development model.
Tracking Success	• With regard to the actions within the National Strategy and Plan of Action for Geospatial Information of Turkey, the performance indicators (PIs), their monitoring periods and methods, and those responsible for them have been determined. The total number of PIs vary depending on the needs of each action and the plans of action also include strategies, risks, measures, and cost estimations. • The plan of action monitoring mechanism (software portal) has been created. • Through the Software Portal, the process/mechanism required for monitoring the PIs included in the plan of action has been created. Thanks to this mechanism, it will be possible to make changes to the objectives not achieved, make improvements for the coming periods, carry out assessments, and conduct reporting. • The Geospatial Information System Annual Report of 2019 has been prepared.	• The plan of action monitoring activities should be carried out (by the Ministry, local administrations, universities, and the private sector). • A monitoring mechanism for the maturity development model should be established. • Maturity development model monitoring activities should be carried out. • Reports related to national GIS activities need to be drawn up.

[2]The Change Strategy is a roadmap for change that defines how the current practices related to geospatial information management should be changed in line with the National Geospatial Information Strategy of Turkey (e.g. improving the existing data instruments or creating new instruments, putting new management structures and arrangements in place, creating data supply chains, using new methods and technologies, etc.). The Change Strategy should also include communication strategies for raising awareness and cover communication methods and tools to be used for explaining the targeted change to the stakeholders.

National actions taken and recommendations for Policy and Legal

National Geospatial Information System Council, the establishment and duties of which has been determined within the scope of the Presidential Decree on Geospatial Information Systems, is charged with "Defining the national objectives within the scope of decree and ensuring their implementation throughout the country". It is essential that the geospatial data sets generated in public agencies and institutions, and local administrations are shared and managed without the need for an inter-agency protocol. To this end, the National Geospatial Information Platform was planned in 6 Implementation Modules (GIS Projects Inventory Module, Data Dictionary Module, Geospatial Data Management Module- Atlas, Geoportal-, GIS Practices Inventory Module, Capacity Building Module – BelgeCBS-, Monitoring and Reporting Module) and created independently in various projects between 2011 and 2019. Afterward, the ***TUCBS Integration Project*** was initiated in April 2018 with a view to accelerating the transfer of geospatial data service and metadata of the institutions that generate geospatial data to the "National Geospatial Data Portal" and ensuring access to and sharing geospatial data depending on the granted authorizations, and the first phase of the project was completed in December 2019. First of all, essential principles concerning the national geospatial information platform, access to, sharing and use of geospatial data were determined and placed within a legal framework. The Presidential Decree No. 49 guaranteed the generation of accurate and high-quality geospatial data and information, their up-to-dateness, reliability, continuity, and sharing, as well as the accessibility, shareability, and availability of all forms of geospatial data. Furthermore, the Decree also includes principles related to the sharing of geospatial data (rights to license, accessibility). The ***Maturity Development Model*** was prepared to measure the TUCBS Maturity states of public agencies and institutions, and local administrations.

It is crucial for setting a direction for the future that countries determine, define, and evaluate the national actions they take and plan to take within the scope of integrated geospatial information management. These steps, which are part of the process for integrating the strategic pathways to the national plans of action, ensure that the current status is observed, needs and deficiencies are determined, and that strategies are reinforced through the contributions provided by the recommendations. To this end, actions that are taken/planned and recommendations within the scope of **Policy and Legal** are presented in Table 25.

Table 25.*National Actions Taken for Policy and Legal and Recommendations*

SP2: POLICY AND LEGAL		
ESSENTIAL ACTIONS	**NATIONAL EFFORTS**	**RECOMMENDATIONS-ACTIONS TO BE TAKEN**
Forming the Leadership	• The National Geospatial Information System Council of Turkey is charged with "defining the national objectives and ensuring their implementation throughout the country" and "ensuring coordination among the custodian agencies and institutions within the scope of the National Geospatial Data Custodianship Matrix and the National Geospatial Data Sharing Matrix" (Presidential Decree No. 49 on Geospatial Information Systems).	• In order to create the Integrated Geospatial Information Framework and implement the National Strategy of Geospatial Information of Turkey by reviewing the existing policies and legislation, an independent geospatial policy and legislation **Review Group**[3] should be formed to provide recommendations about the amendments/revisions to be made in said policies and legislation.

[3]The Review Group is an independent policy and legislation review group that is going to consist of the representatives of public institutions, the private sector, universities, and nongovernmental organizations (including both the users and suppliers of data). The Review Group should work together with senior management mechanisms such as the National Geospatial Information System Council of Turkey and the Geospatial Information System Steering Group of Turkey.

Needs Analysis	• Determination, integration, technical capacity building, and reporting efforts were conducted with the TUCBS Integration Project. • A tailor-made geospatial information maturity model has been developed for organizations. • Modules that require e-government integration on the National Geospatial Information Platform have been integrated to the e-government.	• The maturity development model of institutions should be revised and implemented within the framework of the published strategy document. • The maturity level of the national geospatial information system should be improved. • Current policies and legislations concerning the implementation of TUCBS and the realization of the National Geospatial Information Strategy of Turkey should be reviewed, an inventory (policy and legal inventory) should be created, needs for change should be determined, and analyses should be conducted to ensure that these needs are met[4]. • Primary and secondary legislative frameworks should be developed under the TUCBS. • Guidelines should be drawn up for the harmonization of strategies and action plans of public agencies and organizations, and local administrations with TUCBS strategies and action plans, and the awareness of the top administrations should be raised. • The National Geospatial Information Platform should be modernized. (Action 1.4.1. of the Plan of Action published in the Official Gazette, which stated that "A National Geospatial Information Platform should be established and implementation modules should be developed", was changed and transferred here).

[4]Analyzing the current policies and legislation (legal framework) is a priority for realizing the National Geospatial Information Strategy of Turkey. Through these analyses, the role and effects of the current policies and legislation concerning the implementation of the geospatial information management across the country are determined. The results of the analyses serve as input for the revisions that need to be made as within the scope of the policies and legislation. Policy and legislation analyses can be coordinated by the Review Group.

Addressing Opportunities	• The National Geospatial Data Custodianship Matrix was prepared and enacted upon its publication in the Official Gazette dated 30.06.2020 and numbered 31171. • Units to have access to geospatial data have been identified. • The essential principles concerning the national geospatial information platform; access, sharing, and use of geospatial data have been determined (Presidential Decree No. 49 on Geospatial Information Systems). • As part of the National Geospatial Data Sharing Matrix, works have been conducted with regard to the confidentiality levels of data and with whom they are going to be shared through which method. • Principles on how to share geospatial data (licensing rights, accessibility) have been set. • One of the main principles concerning all activities related to GIS services and practices has been stated as "Making all forms of geospatial data accessible, shareable, and available on condition that the legislative provisions on national security, protection of personal data, intellectual, industrial, and commercial rights, as well as the provisions of international treaties are reserved" (Presidential Decree No. 49 on Geospatial Information Systems).	• A cooperation platform should be established based on exchanging geospatial data and information among all institutions and organizations working on increasing social welfare, boosting productivity in agriculture, energy, and industry, and fighting against disasters, climate change, and environmental problems; and a common national monitoring and auditing mechanism should be formed in this context.
Future-Proofing	• "Ensuring the accurate and high-quality generation, up-to-dateness, reliability, continuity, and sharing of geospatial data and data information" is set forth as an essential principle of all activities concerning GIS service and practices (Presidential Decree No. 49 on Geospatial Information Systems).	• A **Review Group**[5] (or committee/council) should be formed. This group is important for ensuring that the policy and legal framework adapts to the needs and conditions of the future. • Organizations working on partnerships for the goals should start actions of alignment with the national spatial data infrastructure.

[5]The Review Group, which is going to carry out the duty of reviewing policies and legislations, should regularly conduct reviews, assessments, and analyses, within the operating principles to be defined, so as to easily adapt the policy and legislations to the emerging technology and needs; and should provide recommendations for changes/revisions. Thus, it can be ensured that the policies and legislation can be swiftly and effectively updated in line with the current developments.

Addressing Coherence	• One of the main principles concerning all activities related to GIS services and practices has been stated as "Making all forms of geospatial data accessible, shareable, and available on condition that the legislative provisions on national security, protection of personal data, intellectual, industrial, and commercial rights, as well as the provisions of international treaties are reserved" (Presidential Decree No. 49 on Geospatial Information Systems). • Principles on how to share geospatial data (licensing rights, accessibility) have been set. • Units to have access to geospatial data have been identified.	• The legislation (law) that protects **intellectual property rights for geospatial data/information** should be prepared. • Legislation should be prepared on privacy, data confidentiality (particularly on matters such as national security), data protection, and data obligations (liabilities).
Delivering Compliance		• A **Compliance Strategy**[6]should be prepared for the purpose of defining how the institutions are going to comply with TUCBS and the National Strategy and Plan of Action for Geospatial Information of Turkey and to monitor the developments concerning such compliance. • Geospatial information services provided by organizations should be identified and adapted to the national processes. • Organizations should start actions of alignment with the national spatial data infrastructure. • Units should be established within the body of public agencies and organizations, and local administrations to carry out adaptation and integration processes for GIS. • Projects of GIS activities carried out by organizations should be identified and prioritized, and the number of integration and modernization projects should be increased. • Guidelines should be drawn up for the harmonization of strategies and action plans of public agencies and organizations, and local administrations with TUCBS strategies and action plans, and the awareness of the top administrations should be raised. • Coordination should be secured among the Boards, Working Groups, Public Agencies, Local Administrations, Universities,

[6]Strategies should be developed for compliance with the identified policies.

		and the Private Sector under the TUCBS actions.

National actions taken and recommendations for Finance

Finance, which is one of the strategic pathways of integrated geospatial information management, is a milestone for national development. Actions such as current status analyses, benefits analyses, financial partnerships, the identification of financial instruments provide added value to the national economy in the financial management of geospatial information. To this end, the National Strategy and Plan of Action for Geospatial Information have been prepared in Turkey. Financial plans are among the actions prepared for the goals included within the plan of action. A budgetary assessment has been performed for each action in the plan. Moreover, there are actions planned for the future with the goal of preparing reports for the monitoring activities and developing value propositions. Recommendations that are going to add value to the strategic actions in the light of the United Nations IGIF play an important role toward national financial development.

It is crucial for setting a direction for the future that countries determine, define, and evaluate the national actions they take and plan to take within the scope of integrated geospatial information management. These steps, which are part of the process for integrating the strategic pathways to the national plans of action, ensure that the current status is observed, needs and deficiencies are determined, and that strategies are reinforced through the contributions provided by the recommendations. To this end, actions that are taken/planned and recommendations within the scope of **Finance** are presented in Table 26.

Table 26.*National Actions Taken for Finance and Recommendations*

SP3: FINANCE		
ESSENTIAL ACTIONS	**NATIONAL EFFORTS**	**RECOMMENDATIONS – ACTIONS TO BE TAKEN**
Setting Direction	• A provision is available for adding project appropriations within the National Geospatial Data Custodianship Matrix to the budgets of public agencies and institutions, registering of the relevant projects by the Ministries to the National Geospatial Information Platform, and covering the expenses within the scope of the National Geospatial Information Platform from the budgets of the Ministries and/or their Revolving Funds Directorates (Presidential Decree No. 49 on Geospatial Information Systems).	• A leadership mechanism that is going to assume all authority and liability for the financial matters concerning the National Geospatial Information Strategy and TUCBS should be established. As such, the GIS sector should be defined under the Presidency of Strategy and Budget. • Guidelines and regulations that are going to clarify the financial processes, rules, and policies within the framework of ensuring the management of geospatial information and the implementation of the national strategy should be prepared.
Situational Assessment	• A tailor-made geospatial information maturity model has been developed for organizations. • The data in the National Geospatial Data Custodianship Matrix are going to be shared over the National Geospatial Information Platform or the platforms of the public institutions. Other matters concerning access to and the sharing of data and data-related information through the platform, as well as the generation, sharing, and sale of data by natural or legal persons are also determined (Presidential Decree No. 49 on Geospatial Information Systems). • The ATLAS application has been prepared and data sharing infrastructure has been provided as a requirement of the open	• It should be ensured that institutions implement the maturity development model. • The maturity level of the national geospatial information system should be improved. • The current business model[7] should be defined. • All principles and rules concerning the use, sharing, and publishing of data for the public good should be clarified.

[7]Understanding the current business model is key to comprehend the financial and political status concerning the activities related to the management of geospatial information. For example, the current business model should be established for matters such as the authorities concerning the use of public funds, possibility of public institutions to compete with the private sector, institutional arrangements with regard to budget, maturity level of the geospatial information market, the concern and liability of the state toward geospatial products and services for the public good.

	data policy.	
Financial Plan	• 6 goals determined as part of the National Strategy and Plan of Action for Geospatial Information conducted by the DGGIS and the plans of action of these goals have been prepared. Estimated costs for implementing each action have been stated in the plan. • National Integrated Geospatial Framework was prepared in accordance with the United Nations Integrated Geospatial Framework.	• A business model[8] based on national priorities and needs should be developed. • The return (contribution) on the investments, which are to be made for ensuring and maintaining the management of geospatial information, to the national economy should be calculated. • Detailed financial plans that comply with the National Strategy for Geospatial Information should be prepared and it should be ensured that the budget is regularly reviewed.
Case for Investment		• It is necessary to conduct socioeconomic impact assessment and analyses[9] (profit-loss, cost-impact analyses). • The Business Case[10] for the investment to be made to the Geospatial Information Framework should be established.
Sources of Funding		• The budget revenues (central budgets, partnerships, funds, international investments, GGIM, etc.) to be transferred to the Geospatial Information Management program (or to be utilized during the process) should be calculated/determined (the Finance Model should be prepared). • Strategic opportunities for generating funds should be utilized by associating the projects and programs for geospatial information management with international agendas and national/international investment priorities that provide strategic opportunities, such as the Sustainable Development Goals.

[8]After establishing the current business model, a business model that is going to ensure the sustainable financial management required for implementing the geospatial information management should be defined. Within this scope, the business model should clarify how to provide funding, how to determine the annual, 5-year, and 10-year budgets, expense items and how to cover them, socioeconomic benefits, how to make investments, etc.

[9]The socioeconomic impacts caused by the investment or changes made within the scope of TUCBS and the National Strategy and Plan of Action for Geospatial Information should be determined.

[10]The Business Case is a study that lays the foundation of why it is required to develop a national program for the management of geospatial information and it covers financial and administrative issues. The Business Case makes it possible to verify the investment to be made and it defines which expense items are required for each activity. The Business Case is an instrument that verifies the economic benefit of geospatial information.

		• National funding should be provided and international funding should be sought for the projects aimed at increasing the level of social welfare through shaping health, education, employment, industry, production, and agricultural policies with a view to increasing social welfare, minimizing risks related to disasters and climate change, and so on.
Deriving Value	• 7 goals defined within the scope of the National Strategy and Plan of Action for Geospatial Information and their plans of action have been prepared and monitoring mechanisms for the actions have been developed.	• Value propositions should be developed, and the geospatial information and technologies should be adopted, promoted for use, and put into effect as a part of decision support systems. • The benefit to be gained from geospatial data (for the public and private sector, the time saving on time, innovation, etc.) should be reported and shared[11].

[11] It is necessary to develop a strategy and mechanism for constant and effective messaging, correspondence, and communication with all stakeholders, particularly with the public, so as to create awareness and share information about the added value created by the investment made in geospatial information management.

National actions taken and recommendations for Data

Data definition documents have been created as part of the National Strategy and Plan of Action for Geospatial Information of Turkey and duties have been assigned with regard to obtaining, transferring, sharing, managing, and organizing data. Applications have been developed to enable the integration of institutions to the National Geospatial Information Platform and the required obligations have been assigned to institutions.

As part of the Plan of Action, the necessity to determine projects for GIS activities carried out in institutions and to increase the number of modernization projects has been stated in consideration of the works defined within the scope of the United Nations IGIF. Necessary training and certification systems need to be created in order to increase the capabilities of the personnel and to catch up with the developing technologies, and the inter-agency order and chain of authority should be defined as clearly as possible.

It is crucial for setting a direction for the future that countries determine, define, and evaluate the national actions they take and plan to take within the scope of integrated geospatial information management. These steps, which are part of the process for integrating the strategic pathways to the national plans of action, ensure that the current status is observed, needs and deficiencies are determined, and that strategies are reinforced through the contributions provided by the recommendations. To this end, actions that are taken/planned and recommendations within the scope of **Data** are presented in Table 27.

Table 27.*National Actions Taken for Data and Recommendations*

SP4: DATA		
ESSENTIAL ACTIONS	**NATIONAL EFFORTS**	**RECOMMENDATIONS – ACTIONS TO BE TAKEN**
Organization	• Identification documents (data glossaries) have been drawn up for geospatial data themes. • A data and metadata service and format accreditation system has been established. • As part of the integration project, current status analyses and current data analyses have been conducted and data inventories have been prepared in 32 public institutions and 30 metropolitan municipalities.	• Models and web-based application tools should be developed nationally and at the institutional level so as to determine the sectoral levels of preparedness and maturity at the organizations working on partnerships for the goals, and evaluate them through constant monitoring.
Planning for the Future	• Guidelines for determining the definitions and scopes of the concepts concerning the geospatial data themes have been prepared within the scope of TUCBS.	• Projects of GIS activities carried out by organizations should be identified and prioritized, the number of integration and modernization projects should be increased, and institutional capacity-building activities should be carried out by institutions. • Data requirements should be determined by taking the existing data inventories into consideration and starting from the missing and high-priority data, and planning should be performed for the generation of such data. • Plans of action should be developed within the scope of alignment with geospatial data themes.
Capturing and Acquiring Data	• The Directorate General of GIS has been assigned to acquire, transfer, and share the data (Presidential Decree No. 1, Article 108).	• Institutional geospatial data should be integrated to and shared with the national spatial data

	• Organizations to create geospatial data layers have been identified. • A Board decision was made to conduct a study for updating the aerial photographs of Turkey once a year under the coordination of the Directorate General of Land Registry and Cadastre (DGLRC), Directorate General of Mapping (DGM), and DGGIS.	infrastructure. • A National Data Acquisition Program[12] should be created to determine the methods to be used in capturing and acquiring data. • A cooperation platform should be established based on exchanging geospatial data and information among all institutions and organizations working on increasing social welfare through shaping health, education, employment, industry, production, and agriculture policies, minimizing risks associated with disasters and climate change, fighting against poverty and environmental problems, striving toward clean water and sanitation, peace, justice, and strong institutions; and a common national monitoring and auditing mechanism should be formed in this context.
Managing Data Sustainably	• Geospatial data layers have been set. • Organizations to create geospatial data layers have been identified. • TUCBS metadata definition documents have been prepared and metadata components have been identified. • Restrictions (access restrictions, conditions for access and use) concerning the data are defined with regard to metadata components. • Directorate General of Information Technologies, Ministry of Industry and Technology, Directorate General of National Technology, and the Digital	• It should be ensured that organizations use geospatial data available in the spatial data infrastructure and start actions of alignment with the said infrastructure. • Geospatial information services provided by organizations should be identified and adapted to the national processes. • Organizations working on partnerships for the goals should start actions of alignment with the national spatial data infrastructure. • A Data Management Model[13] that describes the

[12] A program should be prepared to determine which data to be acquired based on the annual data needs of the institutions and strategies. Thus, it can be ensured that planning and prioritization is performed for data acquisition, duplicate purchase and acquisition is prevented, thereby reducing costs.

	Transformation Office have been assigned duties in areas such as data management, organization, and sharing (Presidential Decree No. 1). • Units to have access to geospatial data have been identified.	processes and steps within the life cycle of data should be defined. • A secure, easily accessible system with defined maintenance and disposal procedures should be developed for storing and editing the data transferred to the digital environment.
Maintaining Accurate Positioning	• The Coordinate Reference Systems and Geospatial Grid Systems theme has been developed (https://tucbs-public-api.csb.gov.tr/tucbs/tucbs_tanimlama_dokumanlari/TUCBS_CG.pdf).	
Integrating Data	• Address-Based Identity Registration System and Spatial Address Registration System projects have been carried out. • DGLRC carried out the TAKBIS Project and parcel inquiry application. • DGM developed the DGM ATLAS and Küre (Sphere) applications. • The E-Plan application has been developed. • The Digital Database of Turkish Lands has been created. • The Digital Database of Turkish Geology has been created. • The generation of real orthophotos across Turkey has been completed. • The generation of 3D building data on a national scale has been completed. • The generation of medium vectors for building and roads has been completed. • The land status atlas for urban areas has been created.	• Institutional geospatial data should be integrated to and shared with the national spatial data infrastructure. • Technology producers, and solution and service providers should sustain competent staff. • The developed national geocoding systematics should be implemented throughout Turkey. • A National Data Supply Chain Strategy[14] should be developed. • A cooperation platform should be established based on exchanging geospatial data and information among all institutions and organizations working to achieve the Sustainable Development Goals, and a common national monitoring and auditing mechanism should be formed in this context.

[13] A Data Management Model should be created to describe the entire life cycle process including data acquisition, the method employed for checking and verifying compliance with standards, the procedure followed in case of noncompliance, principles for archiving confirmed data, disposal of the data that is not needed, long-term data protection, converting the data format, storage, use, and publishing.

[14] A supply chain should be created and implemented to engage in data updating and sharing practices that are going to ensure the generation of a constant data traffic among institutions. Discrepancy can occur in the main data when an institution obtains data from another and changes/updates this data. Similarly, when the main data is updated, the data of the institution that acquires the data before the update may become incoherent. The Data Supply Chain Strategy should enable synchronization and the generation of solutions to such problems.

	• Urban topography data sets have been generated. • UAVT (National Address Database) codes have been assigned to building and road data in certain pilot city and district centers and the addresses associated with these codes have been determined and registered into the database. • Modules that require e-government integration on the National Geospatial Information Platform have been integrated to the e-government. A secure geospatial data access infrastructure has been established, and organizations have been provided with access to the infrastructure. • Organizations have developed applications for integration to the National Geospatial Information Platform.	• Institutions working on partnerships for the goals should develop applications for integration with the National Geospatial Information Platform.

National actions taken and recommendations for Innovation

In today's world of digitalization, innovation and transformation in geospatial information becomes a necessity. Conventional geospatial information and processes further the divide in the geospatial information ecosystem. Swift change and transformation are required to bridge this divide. Encouraging change and innovation is the first step in this regard. Keeping up with the ever-advancing technological innovations and seizing opportunities is only possible by embracing the culture of innovation. To this end, the National Strategy and Plan of Action for Geospatial Information, which cover these objectives, have been prepared in Turkey. In order to identify the geospatial information environment and needs, steps have been taken as part of the plan. There are also plans aimed at operationalizing innovation and creating integrated geospatial information environments.

It is crucial for setting a direction for the future that countries determine, define, and evaluate the national actions they take and plan to take within the scope of integrated geospatial information management. These steps, which are part of the process for integrating the strategic pathways to the national plans of action, ensure that the current status is observed, needs and deficiencies are determined, and that strategies are reinforced through the contributions provided by the recommendations. To this end, actions that are taken/planned and recommendations within the scope of **Innovation** are presented in Table 28.

Table 28.*National Actions Taken for Innovation and Recommendations*

SP5: INNOVATION		
ESSENTIAL ACTIONS	**NATIONAL EFFORTS**	**RECOMMENDATIONS – ACTIONS TO BE TAKEN**
Geospatial Information Framework	• A tailor-made geospatial information maturity model has been developed for organizations.	• An expert working group[15] that is going to conduct reviews, assessment, and monitoring on innovation and opportunities should be formed and this group should work in collaboration with the units in the senior management mechanism. • It should be ensured that institutions implement the maturity development model. • The national geospatial information system preparedness model should be created; within this context, the technological maturity status of TUCBS should be identified. • Under the coordination of the expert working group, a digital transformation agenda (roadmap) that suits the technological maturity level of the institutions and complies with the National Strategy for Geospatial Information of Turkey should be prepared.
Identifying Innovation Needs		• The innovation expert working group should monitor the elements and events that steer the technological advances in geospatial information and should conduct studies (Technology Need Assessment - SWOT, PEST, etc.) to identify the needs and deficiencies of institutions.
Transformation	• A secure geospatial data access infrastructure has	• Essential applications/methods that are going to ensure the modernization

[15]It is essential that a competent team is formed to work in collaboration with the Geospatial Information System Council of Turkey and/or Geospatial Information System Steering Group of Turkey, constantly keep track of the new technologies and methods in the field of GIS, and provide recommendations for improving the implementation of the national geospatial information system. Thus, requirements for innovation can be effectively and timely reflected on the policies and regulations related to the implementation of the National GIS Strategy.

Roadmap	been established, and organizations have been provided with access to the infrastructure. • DGGIS has developed the ATLAS and Geoportal applications. •	of the existing data instruments (methods for data capture, digitization, update, completion, integration, etc.) and the generation of modern data should be identified[16]. • Projects of geospatial information activities carried out by organizations should be identified and prioritized, and the need for increasing the number of integration and modernization projects should be determined. • It should be ensured that organizations use geospatial data available in the spatial data infrastructure. • The maturity level of the national geospatial information system should be improved. • A maturity development model monitoring mechanism should be established. • Maturity development model monitoring activities should be carried out.

[16]Existing data/information assets should be digitized with newer and more advanced technologies, and the accuracy and scope of existing data should be improved via more effective methods. In other words, national and institutional plans should be prepared for capturing and modernizing geospatial data.

Innovation Culture	• National GIS Strategy and Plan of Action have been prepared and published within the framework of developing the digital transformation strategy and creating the digital transformation plan that are going to support the emergency of an innovation culture. The Information Society Strategy and Plans of Actions serve this purpose, too.	• Guidelines on the modernization of processes related to GIS should be prepared by the institutions. • Value propositions should be developed, and the geospatial information and technologies should be adopted, promoted for use, and put into effect as a part of decision support systems. • Guidelines should be drawn up for the harmonization of strategies and action plans of public agencies and organizations, and local administrations with TUCBS strategies and action plans, and the awareness of the top administrations should be raised. • The relevant institutions should be encouraged to utilize GIS in matters requiring the direct analysis of spatial data for the purpose of increasing social welfare through shaping health, education, employment, industry, production, and agriculture policies, minimizing risks associated with disasters and climate change, and fighting against poverty and environmental problems. • Models and web-based application tools should be developed nationally and at the institutional level so as to determine the sectoral levels of preparedness and maturity at the organizations working on partnerships for the goals, and evaluate them through constant monitoring.
Operationalizing Innovation		• The number of projects incentivized as part of R&D activities for the GIS industry in organizations should be increased. • The development of domestic and national GIS software (institutional, private sector, university) compatible with the interoperability principles and data standards should be promoted.

		• Geospatial information services that help to modernize national and institutional processes and services and make use of geospatial data should be increased. • Institutional transformation capabilities should be improved for the use of institutional geospatial data in national processes. • The use of geospatial information software should be increased. • The establishment of the National Innovation System and Innovation Programs should be supported so that institutions embrace the innovation culture, engage in innovative practices, and funds and resources are generated for innovative efforts. • Innovation centers that operate in geospatial information should be established and environments where innovative ideas can be generated should be created.
Innovation Ecosystem	• Organizations have developed applications for integration to the National Geospatial Information Platform. • Modules that require e-government integration on the National Geospatial Information Platform have been integrated to the e-government.	• Coordination should be secured among the Boards, Working Groups, Public Agencies, Local Administrations, Universities, and the Private Sector under the TUCBS actions. • Institutional geospatial data should be integrated to and shared with the national spatial data infrastructure. • Institutions working on partnerships for the goals should develop applications for integration with the National Geospatial Information Platform.

National actions taken and recommendations for Standards

Data definition documents and a plan of action monitoring mechanism have been created as part of the National Strategy and Plan of Action for Geospatial Information of Turkey, and a data and metadata service and format accreditation system has been established.

Guiding documents should be drawn up for the implementation of the standards, the governance framework should be determined, and awareness should be raised about standards in consideration of the works defined within the scope of the United Nations IGIF. It has been stated in the Plan of Action that activities such as performing gap analysis by determining the current status and needs of standards, defining strategic objectives, preparing the required plans of action, forming the community of practice, and determining the capacity-building programs should be conducted as soon as possible.

It is crucial for setting a direction for the future that countries determine, define, and evaluate the national actions they take and plan to take within the scope of integrated geospatial information management. These steps, which are part of the process for integrating the strategic pathways to the national plans of action, ensure that the current status is observed, needs and deficiencies are determined, and that strategies are reinforced through the contributions provided by the recommendations. To this end, actions that are taken/planned and recommendations within the scope of **Standards** are presented in Table 29.

Table 29.*National Actions Taken for Standards and Recommendations*

SP6: STANDARDS		
ESSENTIAL ACTIONS	**NATIONAL EFFORTS**	**RECOMMENDATIONS – ACTIONS TO BE TAKEN**
Setting Direction	• The Division of Accreditation and Certification has been established. • The conceptual model, data standards, interoperability principles, geospatial data definition and implementation chart preparation standards, and metadata standards have been identified. In order to ensure interoperability on an international level, the INSPIRE, OGC, ISO standards have been taken as reference while determining standards. • Definition documents have been prepared for 32 data themes. • A tailor-made geospatial information maturity model has been developed for organizations. • Circular letter No. 2009/4 of the Prime Ministry makes in mandatory to abide by the principles and standards of the Guidelines on the Principles of Interoperability in all new information systems to be established by all central and local public agencies and institutions.	• Guiding documents should be drawn up for the implementation of standards. • The maturity level of the national geospatial information system should be improved. • A maturity development model monitoring mechanism should be established. • Maturity development model monitoring activities should be carried out.
Understanding National Needs	• The standards inventory has been created to	• Institutions should define their processes with regard to GIS.

	understand the level at which the national or international geospatial information standards are used by users/and or data and technology providers. • Needs analyses which are aimed at identifying the needs at various levels with regard to the standards to be employed have been conducted.	
Planning for Change	• The National Strategy and Plan of Action for Geospatial Information were prepared and enacted upon their publication in the Official Gazette dated 30.06.2020 and numbered 31171. • The National Geospatial Data Custodianship Matrix was prepared and enacted upon its publication in the Official Gazette dated 30.06.2020 and numbered 31171.	• Guiding documents should be drawn up for the implementation of standards. • Programs/processes/mechanisms should be developed to monitor the activities of institutions within the scope of implementing the national standards.
Taking Action	• The National Strategy and Plan of Action for Geospatial Information were prepared and enacted upon their publication in the Official Gazette dated 30.06.2020 and numbered 31171. • Definition documents of 32 data themes have been published in the Official Gazette.	• Guiding documents should be drawn up for the implementation of standards. • Organizations should start actions of alignment with the national spatial data infrastructure. • A communication plan should be developed and information activities should be carried out to effectively inform all stakeholders, including the public, on TUCBS and the National Strategy and Plan of Action for Geospatial Information.
Ongoing Management	• A monitoring/review mechanism has been established to regularly review and update, when necessary, the standards and technical specifications	• Studies that include exemplary practices (that include examples of good practices) on the implementation of geospatial information standards should be prepared and shared with stakeholders.

	concerning geospatial information. National Geospatial Information System Steering Group of Turkey is responsible for monitoring the countrywide implementation of the goals and reviewing the monitoring reports (Presidential Decree No. 49 on Geospatial Information Systems).	• Institutions should carry out institutional capacity-building activities and technology producers, solution and service providers should carry out capacity-building activities about the geospatial information industry. • Coordination should be secured among the Boards, Working Groups, Public Agencies, Local Administrations, Universities, and the Private Sector under the TUCBS actions.
Achieving Outcomes	• A data and metadata service and format accreditation system has been established.	• Organizations should start actions of alignment with the national spatial data infrastructure. • The software of GIS should be accredited with the national GIS. • Units should be established within the body of public agencies and organizations, and local administrations to carry out adaptation and integration processes for GIS. • Organizations working on partnerships for the goals should start actions of alignment with the national spatial data infrastructure. • A framework should be determined for tracking the achievement of the goals related to the standards and success indicators should be defined.

National actions taken and recommendations for Partnerships

Presidential Decree No. 49 stipulates that "All activities about GIS services and practices must observe the principles of interoperability and participation".

The benefit obtained by using geospatial information increases with the multiplier effect of the convergence of various data and processes, thus serving the desired goal in the best manner possible. The Division of Institutional Communication has been established to conduct communication activities and to create collaborations that are going to provide mutual benefits among public agencies and institutions, local administrations, universities, and nongovernmental organizations that engage in activities and projects conducted under the Directorate General of GIS as part of the partnerships.

Data sharing protocols conducted by the Directorate General of GIS: Are conducted jointly with the Data Sharing Protocols employed within the scope of Ministries, Directorates General, Central and District Metropolitan Municipalities, Special Provincial Administrations, Development Agencies, Organized Industrial Zones, Universities, Companies, and the Service Improvement and Process Simplification (HISS). The Directorate General of GIS goes out to tender when there is a need for generating geospatial data. The technical and administrative specifications prepared specifically for each job associated with the tender include an extensive list of the criteria for the custodian institutions, the experts they need to employ, and the duties and obligations of both parties. The properties stated in these specifications are utilized when choosing partnerships.

Furthermore, the third component of the program for improving the business and investment environment in the 2014-2018 Tenth Development Plan, namely the duty of "facilitating the procurement of investment location" is assigned to the Ministry of Environment and Urbanization. The goal here is to improve the investment ecosystem by using GIS. Based on this, The Coordination Board for Improving the Investment Climate (CBIIC) has been established to increase the efficiency of investment processes in Turkey. It is projected that long-term investment maps of Turkey will be prepared, the existing regional strategy plans, Environmental Plans (EPs), and other overarching plans will be revised according to the investment map, and infertile lands will be put to use for investment in all provinces or regions affiliated with this goal.

It is crucial for setting a direction for the future that countries determine, define, and evaluate the national actions they take and plan to take within the scope of integrated geospatial information management. These steps, which are part of the process for integrating the strategic pathways to the national plans of action, ensure that the current status is observed, needs and

deficiencies are determined, and that strategies are reinforced through the contributions provided by the recommendations. To this end, actions that are taken/planned and recommendations within the scope of **Partnerships** are presented in Table 30.

Table 30.*National Actions Taken for Partnerships and Recommendations*

SP7: PARTNERSHIPS		
ESSENTIAL ACTIONS	**NATIONAL EFFORTS**	**RECOMMENDATIONS – ACTIONS TO BE TAKEN**
Understanding Partnerships	• Presidential Decree No. 49 stipulates that "All activities about GIS services and practices must observe the principles of interoperability and participation". • Directorate General of GIS has prepared data sharing and cooperation protocols. • The Coordination Board for Improving the Investment Climate (CBIIC) has been established to increase the efficiency of investment processes in Turkey. • The provision of "The data obtained as a result of the works and processes conducted within the scope of cooperation with private organizations, institutions, and universities on data sharing, data mining, and new data generation shall be shared with third parties in exchange for the fee determined by the Ministry" in Presidential Decree No. 49 paves the way for cooperation efforts. • Law No. 7221 adopts the provision that "Data can be shared free of charge with organizations, institutions, and universities within the scope of cooperation on sharing revenues with regard to data mining and new data generation, provided that the provisions on national security	• **Needs assessment and analysis** should be conducted to understand where improvements are required and to decide on the types of partnerships to benefit from effective public, public-private and nongovernmental partnerships. • Secondary legislative reforms should be introduced as part of cooperation. • In order to consolidate all projects and investments made to date in Turkey with regard to GIS as part of the partnerships for the goals, as well as to evaluate sectoral development, a verbal and written historical review based on interviews with the representatives of institutions, private companies, municipalities, and universities that played a role in the sector should be conducted and the technical infrastructures of all institutions should be improved.

	and legislative provisions on intellectual, industrial, and commercial rights are reserved and the opinion of the institutions responsible for generating data is obtained."	
Evaluating Opportunities		• Coordination should be secured among the Boards, Working Groups, Public Agencies, Local Administrations, Universities, and the Private Sector under the TUCBS actions. • The process for evaluating partnership opportunities and the selection criteria for determining the partners should defined[17].
Identifying Potential Partners	• The public institutions of cooperation have been determined depending on the subject of data acquisition and have been placed in the custodianship matrix. The Digital Transformation Office has been established to increase cooperation among institutions and ensure coordination in the relevant fields. • The Directorate General of GIS goes out to tender when there is a need for generating geospatial data.	• Stakeholder analyses should be performed to identify potential partners. • The preliminary screening process should be defined for the potential partners to be identified as part of the stakeholder analysis. • The number of projects jointly carried out about geospatial information activities by the private sector, universities, and public sector should be increased.
Selecting Partners		• A **financial analysis** should be conducted to **prioritize** the potential partners who meet the selection criteria and to ensure that they have sufficient resources (financial resources, human resources, hardware, logistics, etc.) in the field of partnership.
Formalizing		• A framework of agreement (Letter of Intent, Memorandum of

[17]Within this framework, it is expected to determine and realize a preliminary partnership approach that comprises the steps of specifying the prioritized partnership matters and potential partners, performing a preliminary screening, obtaining information from potential partners, evaluating the possibilities, conducting a resource impact assessment and financial analysis, engaging in a reconciliation process and formalizing the partnership, and creating the management and communication plans for conducting the partnership.

Partnership		Understanding, Civil Partnership Agreement, etc.) should be provided to formalize the partnership and to define the mutual liabilities of the parties. • After the partnership is formalized, a communication plan should be drawn up to ensure effective communication and sharing between the parties. • Partnership norms need to be created so that the parties can better understand the missions, visions, and objectives of each other and act within the framework of common goals.
Managing Partnership		• A working plan should be developed to set forth the agreed-upon duties, deadlines, measurable deliverables, mutual liabilities, etc. within the scope of partnerships, and reporting should be performed. • Regular review and evaluations processes, which are going to track the works conducted within the scope of partnerships and the level completion for the objectives, should be defined. • A formal closure process should be defined to issue the final controls and approvals for the finalization of the partnership, agree upon and submit the deliverables, complete the financial control and payments, archive the project record, conduct the surveys on the partnership process, prepare the closure report, celebrate the achievements, etc.

National actions taken and recommendations for Capacity and Education

The increased use of GIS technologies in Turkey, as is the case in the whole world, and their dissemination in public institutions as well as the private sector made it inevitable to train and employ personnel competent in GIS. As such, important efforts were initiated as of 2013 within the Directorate General of GIS to define the occupations related to GIS and to contribute to the development of national occupational standards and competencies for such occupations.

Within this scope, the ***Personnel Certification Unit (Belge CBS)*** was established under the Directorate General of GIS within the scope of service units and job definitions that were revised upon the Ministerial Approval dated 29.09.2015 and numbered 12772. The main purpose of the Personnel Certification Unit is to contribute to the employment of competent personnel by providing examination and certification services in national competencies concerning GIS. The Personnel Certification Unit was established with a Quality Management System compliant with the TS EN ISO/IEC 17024 Standard, accredited by the Turkish Accreditation Agency (TÜRKAK), and authorized to perform examination and issue certificates by the Vocational Qualifications Authority (VQA). Moreover, the Personnel Certification Unit was accredited by the Turkish Accreditation Agency on 04/10/2017 with the number AB-0164-P to issue a ***Vocational Qualification Certificate*** and officially started its examination and certification efforts upon being authorized on 11/06/2018 following the review, audit, and evaluation performed by the VQA.

Considering the education on GIS in Turkey, it is notable that there are programs that directly issue degrees on GIS in higher education institutions. Furthermore, there are numerous classes on GIS in the curricula of higher education programs such as urban planning, engineering, agriculture, geography, landscape architecture, etc. Also, some universities, institutions, and private companies organize online and face-to-face GIS certificate programs. Software companies share open course materials that can be used free of charge on their websites. In addition to these, the Ministry organizes National GIS days and provides internal GIS training to technical personnel in all of the 81 provinces.

It is crucial for setting a direction for the future that countries determine, define, and evaluate the national actions they take and plan to take within the scope of integrated geospatial information management. These steps, which are part of the process for integrating the strategic pathways to the national plans of action, ensure that the current status is observed, needs and deficiencies are determined, and that strategies are reinforced through the contributions provided by the recommendations. To this end, actions that are taken/planned and recommendations within the scope of **Capacity and Education** are presented in Table 31.

Table 31.*National Actions Taken for Capacity and Education and Recommendations*

SP8: CAPACITY AND EDUCATION		
ESSENTIAL ACTIONS	**NATIONAL EFFORTS**	**RECOMMENDATIONS – ACTIONS TO BE TAKEN**
Setting Direction	• The Division of Education Planning and Coordination was established under the Directorate General. • The Personnel Certification Unit (BelgeCBS) was established. • The Personnel Certification Unit was established with a Quality Management System compliant with the TS EN ISO/IEC 17024 Standard, accredited by the Turkish Accreditation Agency (TÜRKAK), and authorized to perform examination and issue certificates by the Vocational Qualifications Authority (VQA).	• An Expert Working Group (or a similar entity) that is going to develop strategies and programs on building the required capacity in geospatial information and conducting the educational activities and that is going to work with higher boards/committees should be formed. • Target groups and their current statuses and capacity building/education needs should be determined to build capacity and develop education programs within the framework of geospatial information management and the National GIS Strategy.
Assessing Needs		• An assessment on the current information, capability, and resources of the relevant institutions, organizations, and sectors with regard to geospatial information management should be made and analyses should be performed for determining the capacity building and education needs on a national scale[18].
Considering Alternatives		• A Capacity Building and Education Strategy[19] (and plan of action), which is going to supplement the management of geospatial information (the implementation of the National GIS

[18]An inventory on the current capacity building and education policies, programs, and resources (technological, financial, human resources) in the country should be created. Thus, it can be possible to specify the objectives based on the current status and needs concerning education and capacity building and to track the progress in achieving these objectives.
[19]Stakeholders must be included in this process.

		Strategy and Plan of Action) and which is compliant with the national sustainable development goals and priorities, should be created.
Planning for Action	• In order to set forth the policies, principles, and guidelines that are going to support the sharing and widespread use of data for the purpose of capacity building, the Regulation on the Establishment and Management of the National Geospatial Information System, Presidential Decree No. 49 on Geospatial Information Systems, National Geospatial Data Custodianship Matrix, and the National Strategy and Plan of Action for Geospatial Information of Turkey have been created and put into effect. Thus, the national approaches on this field started to be introduced. • The Division of Accreditation and Certification was established to perform or have others perform the certification of educational institutions providing the standard, scope, and program defined for the GIS education and expertise.	• A plan of action should be drawn up for the capacity building and education activities so as to realize the Capacity Building and Education Strategy. • The duties and responsibilities of the Division of Accreditation and Certification should be developed in order to ensure the regular review of education/certification programs about GIS. • The structure necessary for providing program accreditation (or for ensuring that the programs are regularly reviewed/evaluated through a similar organization) for the academic programs providing education on GIS-related matters should be established. • Outreach Initiatives[20] should be established to ensure that individuals who are unable to access educational activities on GIS-related matters are educated. • Awareness-raising activities should be carried out for the establishment of GIS-related institutes and centers. • Organizations should carry out capacity building activities. • Technology producers, and solution and service providers should carry out capacity-building activities about the

[20]Outreach Initiatives should be handled not only within the scope of access to academic programs or certification programs/training but also within the framework of education and outreach activities aimed at various target groups in need of capacity building. An example can be the training of employees in a certain industry on data capture and map creation via mobile phones.

		geospatial industry. • Sectoral organizations should be encouraged to take part in international projects. • A certificate of professional competencies should be granted. • Technology producers, and solution and service providers should sustain competent staff. • The use of geospatial information software should be increased. • National and international events should be organized. • Awareness should be raised among senior bureaucrats who are going to ensure that the analysis and decision-making processes are activated with the help of geospatial information technologies in institutions working on decent work and growth, industry, innovation and infrastructure, reduced inequalities, utilizing our seas and coasts in a balanced way within the framework of preserving life below water, and on preserving life on earth. • Human resources working on geospatial information technologies to increase agricultural productivity should be improved and investments should be made in infrastructure and technology. • The relevant institutions should be incentivized to utilize GIS in matters requiring the direct analysis of spatial data in order to ensure that everyone has access to quality education. • Necessary training should be provided to increase the number

		of employees that can use GIS and the capacity in institutions working on gender equality. • Technical infrastructure and human resources should be improved among all institutions and organizations working on clean water and sanitation, ensuring energy efficiency, decent work and growth, reduced inequalities, peace, justice and strong institutions, and partnerships for the goals; with a view to generalizing the use of geospatial information technologies. • The relevant institutions should be encouraged to utilize GIS in matters requiring the analysis of all spatial data for the purpose of increasing social welfare through shaping health, education, employment, industry, production, and agriculture policies, minimizing risks associated with disasters and climate change, and fighting against poverty and environmental problems. • It should be ensured that actions of geospatial information are a research priority for Turkey in order to ensure quality education for all. • Human resources should be improved, and information and awareness-raising efforts should be conducted with various segments of society to increase the potential of using geospatial information technologies as part of innovation in institutions working on industry, innovation, and infrastructure. • The size of human resources competent in GIS should be increased in all units working on reduced inequalities,

		sustainable cities and communities, creating smart and disaster-resilient cities, responsible production and Consumption, climate action, life below water, and life on earth. • In order utilize our seas and coasts in a balanced way within the framework of preserving life below water and on earth as part of the goal of life below water, the capacity to perform geospatial information supported spatial analysis should be improved in all relevant units and the technical infrastructure of the relevant organizations and institutions should be reinforced to this end.
Taking Action	• There are various institutions, organizations, professional bodies, and universities that work toward organizing training and capacity building on geospatial information. GIS certificate programs, associate degrees, graduate and PhD programs, and various courses from universities, GIS courses and certificate programs from software companies, and the GIS training courses organized by trade associations are among these educational programs.	• Organizations should draw up a training curriculum for geospatial information activities. • Academic publications should be developed for GIS. • Lifelong learning criteria should be set. • The establishment of innovation centers and incubators that are going to operate in the field of geospatial information management should be encouraged. • Geospatial information technologies should be taught in primary and secondary schools. • An infrastructure should be created to provide scholarship and internship opportunities for education on GIS and related subjects. • Geospatial information technologies and GIS should be included in the curricula of all departments providing education

		within this framework at the higher education level as part of the projects aimed at increasing the level of social welfare through shaping employment, production, and agricultural policies with a view to increasing social welfare, minimizing risks related to disasters and climate change, and so on. • At the higher education level, geospatial information technologies and GIS should be included in the curricula of all departments providing education on increasing agricultural productivity, health, geography, science and technology, clean water and sanitation, ensuring energy efficiency, choosing locations for renewable energy investments, industry, innovation and infrastructure, sustainable cities and communities, creating smart and disaster-resilient cities, climate action, life below water, and life on earth. • Furthermore, geospatial information technologies and GIS should be included in the curricula of all departments providing education related to the strategic goals of quality education for all, gender equality, decent work and growth, reduced inequalities, responsible production and consumption, peace, justice, and strong institutions. • Synchronous and asynchronous remote training efforts should be carried out to improve human resources so as to ensure quality education for all and to increase agricultural productivity.

		• The technical infrastructure and human resources concerning health should be improved and the required training should be supported by synchronous and asynchronous remote training efforts. • Synchronous and asynchronous remote training efforts should be carried out to improve human resources in all institutions that generate and use geospatial data as part of partnerships for the goals.
Assessing Value		• Reports related to national GIS activities need to be drawn up. • Capacity building and education activities on GIS should be monitored and success indicators should be determined to this end.

National actions taken and recommendations for Communication and Engagement

Another United Nations IGIF strategic pathway that aims at social, economic, and environmental development is ensuring effective communication and engagement. Communication is required to ensure engagement, mutual understanding, and cooperation at all levels internally at the institutions and among the stakeholders. For communication, it is required to have strategic actions such as determining the methods of effective communication, identification and evaluation of stakeholders, and encouraging and incentivizing geospatial information through the promotion of good examples. To this end, the National Strategy and Plan of Action for Geospatial Information, which cover these objectives, have been prepared in Turkey. The Plan includes actions and objectives such as identifying and raising maturity level. Stakeholder surveys conducted for the purpose of determining the maturity level provide deliverables that are important for both the analysis of the current status and communication. On the other hand, there are also plans of actions to improve communication with stakeholders and participants in future efforts.

It is crucial for setting a direction for the future that countries determine, define, and evaluate the national actions they take and plan to take within the scope of integrated geospatial information management. These steps, which are part of the process for integrating the strategic pathways to the national plans of action, ensure that the current status is observed, needs and deficiencies are determined, and that strategies are reinforced through the contributions provided by the recommendations. To this end, actions that are taken/planned and recommendations within the scope of **Communication and Engagement** are presented in Table 32.

Table 32.*National Actions Taken for Communication and Engagement and Recommendations*

SP9: COMMUNICATION AND ENGAGEMENT		
ESSENTIAL ACTIONS	**NATIONAL EFFORTS**	**RECOMMENDATIONS – ACTIONS TO BE TAKEN**
Providing Leadership	• Presidential Decree No. 49 stipulates that "All activities about GIS services and practices must observe the principles of interoperability and participation".	• An Engagement Strategy should be developed to clarify the strategic priorities of the engagement of stakeholders and participants in geospatial information management, the expected outcomes, the groups expected to participate, liabilities, etc. • A working committee should be formed to steer stakeholder communication and engagement. • An effective internal communication/correspondence mechanism should be created for the parties that are going to partake in realizing the National Geospatial Information Strategy. • Coordination should be secured among the Boards, Working Groups, Public Agencies, Local Administrations, Universities, and the Private Sector under the TUCBS actions.
Understanding Opportunities		• A stakeholder analysis should be conducted to identify the stakeholders and their levels of interest and impact. • Awareness raising efforts should be conducted for the stakeholders who have lower levels of interest in engagement.
Setting Direction		• Effective written and visual promotion materials should be created and social media platforms should be established for the promotional activities related to the National Geospatial Information Strategy and TUCBS.

		• Promotion should be made and awareness should be raised by ensuring that a **brand is created** (developing slogans/generating strategic messages) for TUCBS and/or geospatial information. • Awareness should be raised among senior bureaucrats who are going to ensure that the analysis and decision-making processes are activated with the help of geospatial information technologies in institutions working on decent work and growth, industry, innovation and infrastructure, reduced inequalities, preserving life below water and on earth.
Creating A Plan of Action	• 6 goals determined as part of the National Strategy and Plan of Action for Geospatial Information conducted by the DGGIS and the plans of action of these goals have been prepared.	• A Communication Strategy and communication plan of action should be created based on the objectives included in the National GIS Strategy and plan of action. The communication methods to be employed in the communication and awareness raising efforts aimed at the relevant stakeholders within the scope of said strategy and plan of action should be determined.
Monitoring Progress		• Processes should be defined to monitor and evaluate the level of achieving the objectives in line with the Communication Strategy and the plan of action. • Surveys can be conducted to evaluate the effectiveness of the communication and engagement activities, and communication activities can be constantly improved based on the results of said surveys.
Communicating Value		• Value propositions should be developed, and the geospatial information and technologies should be adopted, promoted for use, and put into effect as a part of decision support systems. • Efforts should be conducted to analyze the social, economic,

		environmental, and political benefits to be obtained through the implementation of the National Geospatial Information Strategy and plan of action. • All developments, survey and analysis results within the process of implementing the National Geospatial Information Strategy and plan of action should be monitored, reported, and the lessons learned should be utilized to obtain national benefits. Benefits obtained throughout this process should be shared with the stakeholders and the public via the appropriate communication methods.

CHAPTER THREE: INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK, PLAN OF ACTION AND PERFORMANCE INDICATORS OF TURKEY

In the third chapter of this study, the Strategy and Plan of Action regarding the national integrated geospatial information framework to be developed according to the UN Framework are presented. The general framework that concerns the presented plan is shown in the following figure.

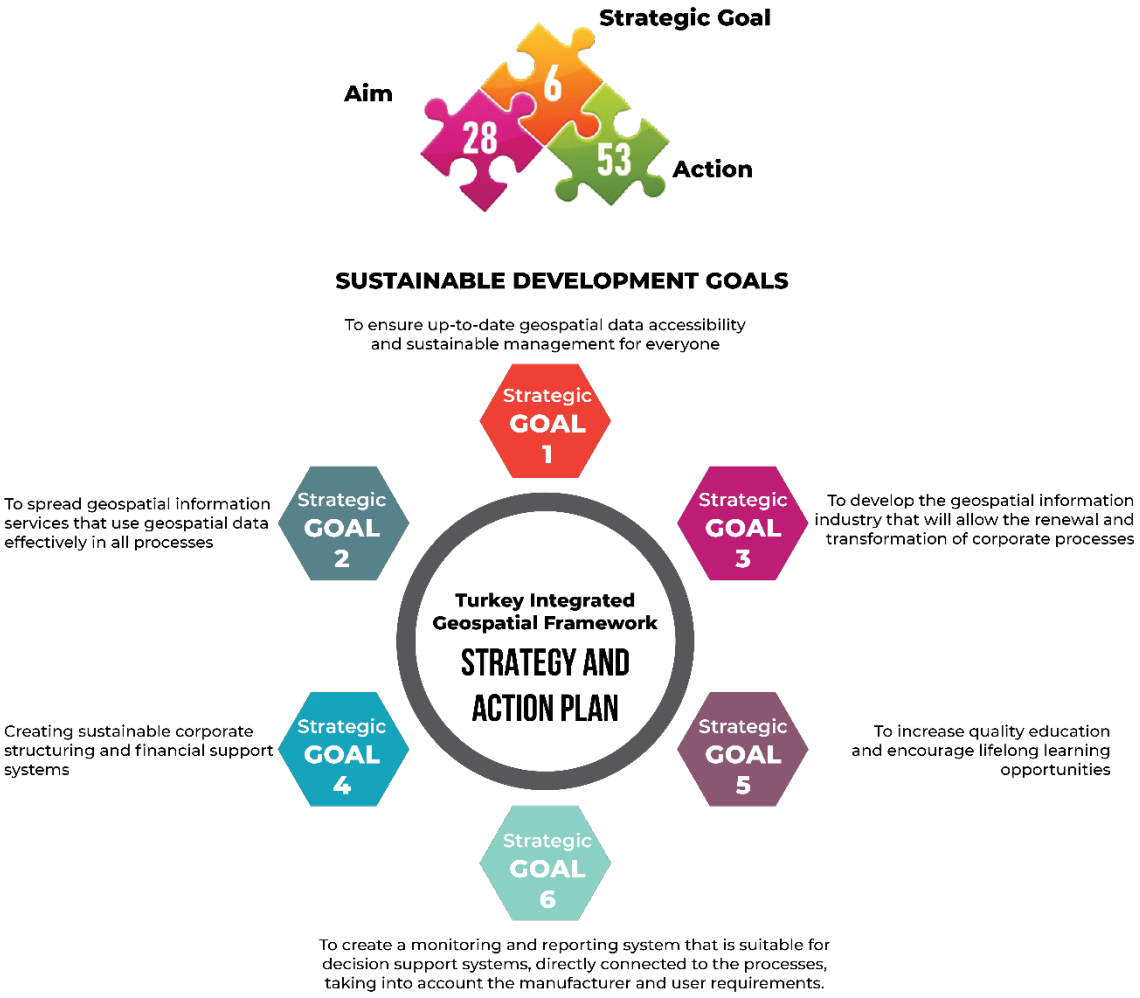

Figure 15. *Strategy and Plan of Action for the Geospatial Information Framework of Turkey*

Actions and the performance indicators related to them, which are going to be carried out within the next three years in line with a matrix based on the National Strategy and Plan of Action for Geospatial Information (Figure 14), which entered into force upon its publication in the Official Gazette, are presented as "action cards" that include the objectives and actions.

The actions associated with the sustainable development objectives defined in chapter one of the Integrated Geospatial Information Framework of Turkey and the Recommendations and Actions

to Be Taken, which are identified within the scope of the strategic pathways presented in chapter two, have been used as input for the creation of this matrix and have been included as objectives, goals, actions, or descriptions in the matrix.

The most important condition for realizing this strategy and these actions is to determine, track, monitor, and assess the current maturity levels of all stakeholders in the GIS sector and to direct the institutions to improve their quality. The maturity model developed for Turkey is configured in four phases. These are the determination of the level of preparedness of Turkey by the end of 2020 for the geospatial information framework; maturity activation and preparedness model; maturity utilization-competency maturity model; and the monitoring model for the performance indicators of the Strategy and Plan of Action. In this context, the preparedness should be identified as widely as possible at the first phase, the current status should be determined based on the level of preparedness, and the maturity level model should be implemented by the agencies and institutions who have a higher-than-average preparedness level, according to a general assessment, among similar institutions based on the identified current status. Levels of preparedness and maturity should be improved via a web-based application and dynamically monitored by the Directorate General of Geospatial Information Systems; the recommendations for improving preparedness and maturity should be presented to the relevant institutions; and the new strategies and actions should be planned within this framework on a national scale.

There are 6 strategic goals, 28 objectives, and 53 actions within the Strategy and Plan of Action for the Geospatial Information Systems of Turkey (Figure 15). Actions defined within the Strategy and Plan of Action for the Geospatial Information Systems of Turkey, the liable and relevant agencies and institutions, and the breakdown of actions based on the strategic goals and objectives are shown in Table 33, Table 34, and Figure 16. Furthermore, the figures showing the breakdown of the actions included in the Strategy and Plan of Action for the Geospatial Information Systems of Turkey according to three phases (Figure 17) and the strategic pathways (Figure 18) are presented below.

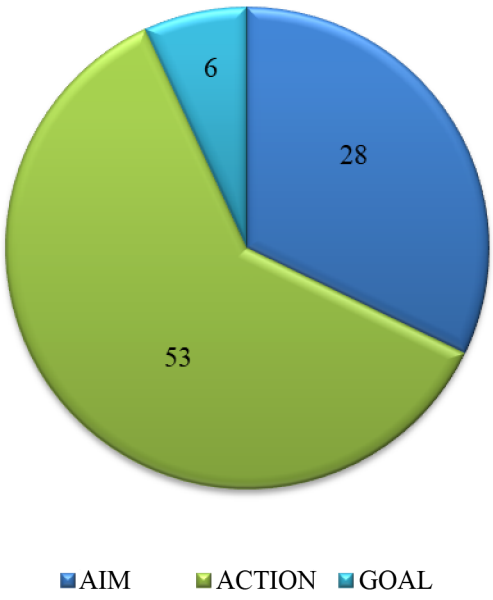

Figure 16.*Goals, Objectives, and Actions included in the Strategy and Plan of Action for the Geospatial Information Systems of Turkey*

Table 33.*List of Actions and Custodian Agencies and Organizations for the Geospatial Information Framework Strategy and Action Plan of Turkey*

Action No.	Action Name	Custodian Agency/Organization
1.1.1.	Identification documents (data glossaries) will be drawn up for geospatial data themes.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
1.1.2.	Guiding documents will be drawn up for the implementation of the standards.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
1.2.1.	Geospatial data layers will be set.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
1.2.2.	Organizations to create geospatial data layers will be identified.	Ministries
1.3.1.	Principles on how to share geospatial data (licensing rights, accessibility) will be set.	Ministries
1.3.2.	Units to have access to geospatial data will be identified.	Ministries
1.3.3.	A law that protects intellectual property rights for geospatial data/information should be prepared.	Ministries
1.4.1.	A National Geospatial Information Platform will be established and implementation modules will be developed.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
1.4.2.	Modules that require e-government integration on the National Geospatial Information Platform will be integrated to	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems

	the e-government.	
1.5.1.	A secure geospatial data access infrastructure will be established, and organizations will be provided with access to the infrastructure.	Ministry of Environment and Urbanization- Directorate General of Geospatial Information Systems, R.o.T. Ministry of Transportation and Infrastructure
1.5.2.	Institutional geospatial data will be integrated to and shared with the national spatial data infrastructure.	Ministries, Local Administrations
1.5.3.	Organizations will use geospatial data available in the spatial data infrastructure.	Ministry of Environment and Urbanization- Directorate General of Geospatial Information Systems
1.5.4.	The number of open data layers will be increased.	Ministry of Environment and Urbanization- Directorate General of Geospatial Information Systems
2.1.1.	A tailor-made geospatial information maturity model will be developed for organizations.	Ministry of Environment and Urbanization- Directorate General of Geospatial Information Systems
2.1.2.	It will be made sure that organizations adopt the maturity development model.	Ministries, Local Administrations
2.1.3.	The maturity level of the national geospatial information system will be improved.	Ministry of Environment and Urbanization- Directorate General of Geospatial Information Systems
2.2.1.	Organizations will start actions of alignment with the national spatial data infrastructure.	Ministries, Local Administrations
2.3.1.	Organizations will develop applications for integration to the National Geospatial Information Platform.	Ministries
2.4.1.	Geospatial information services provided by organizations will be identified and adapted to the national processes.	Ministries, Local Administrations, R.o.T. Ministry of Environment and Urbanization- Directorate General of Geospatial Information Systems
3.1.1.	Awareness-raising activities will be carried out for the establishment of GIS-related institutes and hubs will be promoted.	Ministry of Environment and Urbanization- Directorate General of Geospatial Information Systems, TÜBİTAK (Scientific and Technological Research Council of Turkey), KOSGEB (Small And Medium Enterprises Development Organization), Universities, Techno-cities
3.2.1.	Institutions will define their processes related to GIS.	Ministries, Local Administrations
3.2.2.	Organizations will draw up guidelines on the modernization of processes related to GIS.	Ministries, Local Administrations
3.3.1.	Organizations will carry out capacity building activities.	Ministries, Local Administrations
3.4.1.	Technology producers, and solution and service providers will carry out capacity-building activities about the geospatial industry.	Ministry of Industry and Technology, Ministry of Trade
3.4.2.	Technology producers, and solution and service providers will sustain competent staff.	Ministries, Local Administrations, Private Sector
3.5.1.	Sectoral organizations will be encouraged to take part in international projects.	Ministry of Environment and Urbanization- Directorate General of Geospatial Information Systems, Ministry of Industry and Technology, Ministry of Trade

3.6.1.	The development of domestic and national GIS software (institutional, private sector, university) compatible with the interoperability principles and data standards will be promoted.	Ministry of Industry and Technology
3.6.2.	The use of geospatial information software will be increased.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
3.6.3.	National mass GIS applications will be developed to provide input for geospatial information technologies and to allow the public to actively benefit from geospatial information technologies.	Ministries, Local Administrations
3.7.1.	A data and metadata service and format accreditation system will be established.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
3.7.2.	Software about GIS will be accredited with the national GIS.	R.o.T. Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
4.1.1.	Units will be established within the body of public agencies and organizations, and local administrations to carry out adaptation and integration processes for GIS.	Ministries, Local Administrations
4.2.1.	Projects of GIS activities carried out by organizations will be identified and prioritized, and the number of integration and modernization projects will be increased.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
4.2.2.	The number of projects jointly carried out about geospatial information activities by the private sector, universities, and public sector will be increased.	Ministry of Industry and Technology
4.2.3.	The number of projects incentivized as a part of research and development activities for the GIS industry in organizations will be increased.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
4.2.4.	The number of nationally-funded projects on geospatial information technologies will be increased.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
4.3.1.	Value propositions will be developed, and the geospatial information and technologies will be adopted, promoted for use, and put into effect as a part of decision support systems.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
4.4.1.	Primary and secondary legislative frameworks will be developed under the TUCBS.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
4.4.2.	Guidelines will be drawn up for the harmonization of strategies and action plans of public agencies and organizations, and local administrations with TUCBS strategies and action plans, and the awareness of the top administrations will be raised.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
4.5.1.	Coordination will be secured among the Boards, Working Groups, Public Agencies, Local Administrations, Universities, and the Private Sector under	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems

	the TUCBS actions.	
4.6.1.	Partnership opportunities will be created, the number of platforms and networks will be increased, and communication channels will be established.	Ministries, Local Administrations
4.6.2.	Partnerships will be formalized.	Ministries, Local Administrations
5.1.1.	Organizations will draw up a training curriculum for geospatial information activities.	Council of Higher Education, NGOs, R.o.T. Ministry of National Education
5.1.2.	National and international events will be organized.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems, Ministries, Local Administrations, Universities, Private Sector, Nongovernmental Organizations
5.1.3.	Academic publications will be developed for GIS.	Universities, Private Sector, Ministries, Local Administrations
5.1.4.	The number of courses on geospatial information technologies will be increased at all institutions from primary education to higher education for the purpose of achieving success in resolving social problems.	Council of Higher Education, NGOs, R.o.T. Ministry of National Education
5.2.1.	Lifelong learning criteria will be set.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
5.3.1.	A certificate of professional competencies will be granted.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems, Nongovernmental Organizations, Private Sector
6.1.1.	An action plan monitoring mechanism will be established.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
6.1.2.	A maturity development model monitoring mechanism will be established.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
6.2.1.	Action plan monitoring activities will be carried out.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
6.2.2.	Maturity development model monitoring activities will be carried out.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems
6.3.1.	Reports will be drawn up for the actions taken under the national geospatial information systems.	Ministry of Environment and Urbanization-Directorate General of Geospatial Information Systems

Table 34. *Goals of the Geospatial Information Framework Strategy and Action Plan of Turkey by Objectives and Actions*

Strategic Goal		Number of Objectives	Number of Actions
Strategic Goal 1	Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management	5	13
Strategic Goal 2	Dissemination of geospatial information services that make effective use of geospatial data across all processes	4	6
Strategic Goal 3	Building a geospatial information industry to upgrade and transform institutional procedures	7	12
Strategic Goal 4	Establishing sustainable institutional structuring and financial support systems.	6	11
Strategic Goal 5	Enhancing qualified education and stimulating lifelong learning opportunities.	3	6
Strategic Goal 6	Establishing a monitoring and reporting system that is in line with decision support systems, directly linked to processes, and takes requirements of creators and users into consideration.	3	5

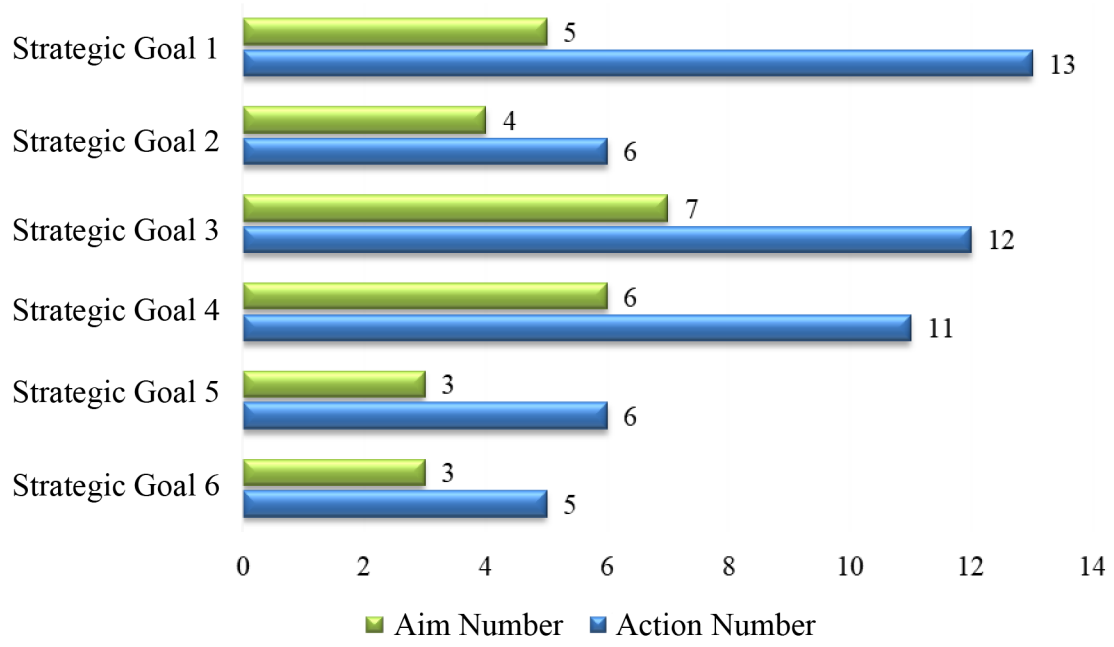

Figure 17. *Goals of the Geospatial Information Systems Strategy and Action Plan of Turkey by Objectives and Actions*

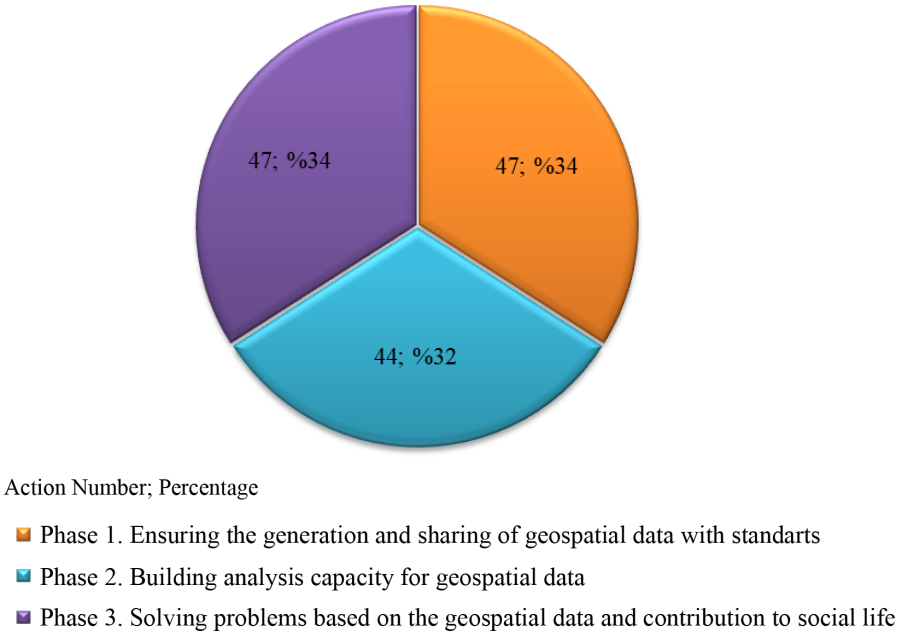

Figure 18.*Number of actions in each "Phase"*

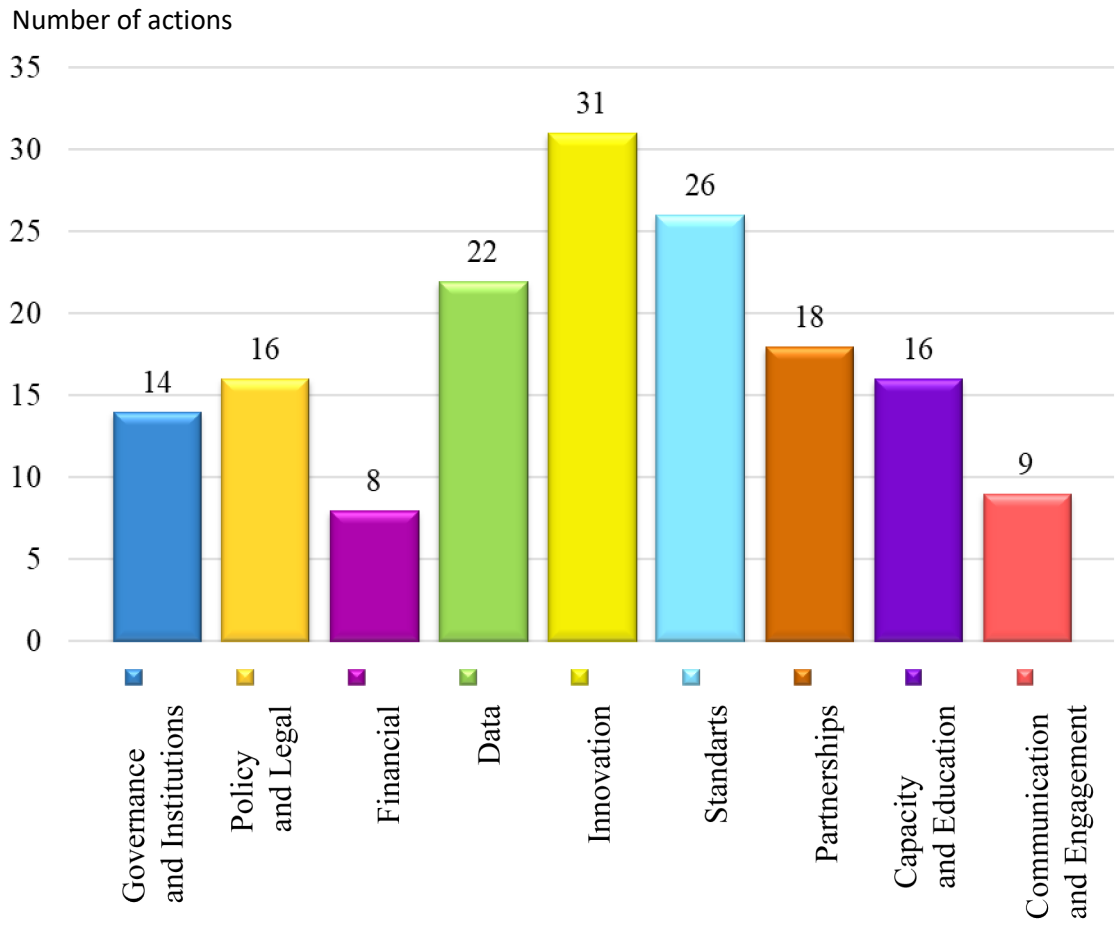

Figure 19.*Number of actions in each "Strategic Pathway"*

In this section of the document, the Strategy and Action Plan for Integrated Geospatial Information Framework of Turkey, which is the final phase of the UN Framework, will be presented as Action Cards based on Actions. Furthermore, in order to make this chapter more explanatory, the Integrated Geospatial Information Framework Strategy and Action Plan of Turkey will be provided as a matrix in ANNEX-1; and the Strategy and Plan of Action, and the UN Integrated Geospatial Information Framework Matrix of Relations will be presented in ANNEX-2.

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.1	Identification documents (data glossaries) will be drawn up for geospatial data themes.								
Action No 1.1.1	Identification documents (data glossaries) will be drawn up for geospatial data themes.								
Indicators	The number of data themes, the identification document (data glossary) of which is drawn up.								
Description	Identification documents (data glossaries) of 20 geospatial data themes out of 32 were drawn up. The data identification documents (data glossaries) of 12 geospatial data themes will be drawn up.								
Assessment (Situational Analysis Findings)	A data identification document should be drawn up for 12 data themes numbered 21 to 32 in the appendix of the Presidential Decree No. 49 on Geospatial Information Systems.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations								
Performance Indicators	2020			2021			2022		2023
Planned	12			-			-		-
Achieved	12			-			-		-
Remaining	0			-			-		-
Completion Rate	100			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**					
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x		**x**			

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.1	Identification documents (data glossaries) will be drawn up for geospatial data themes.								
Action No 1.1.2	Guiding documents will be drawn up for the implementation of the standards.								
Indicators	The number of data themes, the guiding document of which is drawn up.								
Description	Detailed guiding documents will be drawn up for the implementation of the 32 geospatial data themes.								
Assessment (Situational Analysis Findings)	In order to disseminate identification documents, guiding documents should be drawn up that will include information about them such as their general structure, data model components, data classification, data delivery and sharing, etc.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Non-Governmental Organizations, Universities, Private Sector								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			32			-		-
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
					x	**x**			

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.2	Detailed geospatial data layers and organizations that create such geospatial data will be identified.								
Action No 1.2.1	Geospatial data layers will be set.								
Indicators	The number of geospatial data layers set based on data themes.								
Description	Geospatial data layers will be set in detailed based on geospatial data themes.								
Assessment (Situational Analysis Findings)	32 geospatial data themes were identified in the Presidential Decree No. 49 on Geospatial Information Systems. The contents of these themes are determined by description documents. In 2019, description documents of 20 geospatial data themes were drawn up and out of these themes, the features of 370 geospatial data layers were identified. Geospatial data layers that fall within the remaining 12 geospatial data themes should also be identified.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	410		-		-		-		
Achieved	410		-		-		-		
Remaining	0		-		-		-		
Completion Rate	100		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x					

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.2	Detailed geospatial data layers and organizations that create such geospatial data will be identified.								
Action No 1.2.2	Organizations to create geospatial data layers will be identified.								
Indicators	The number of data layers, the creator organization of which is identified.								
Description	52 sub-themes were identified that fall within 32 geospatial data themes and their custodians were identified. Custodians will identify the organizations that create the geospatial layers that fall within the geospatial data theme they are the custodians of, and report them to the General Directorate of Geospatial Information Systems.								
Assessment (Situational Analysis Findings)	32 geospatial data themes were identified in the Presidential Decree No. 49 on Geospatial Information Systems. Organizations that are the custodians of data themes are determined by the National Geospatial Data Custodianship Matrix. In coordination with the General Directorate of Geographic Information Systems, relevant organizations, which create geospatial data layers that fall within geospatial data themes, should be identified.								
Custodian	Ministries								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	410		-		-		-		
Achieved	410		-		-		-		
Remaining	0		-		-		-		
Completion Rate	100		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x					

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.3	Licensing rights and access criteria of geospatial data will be set.								
Action No 1.3.1	Principles on how to share geospatial data (licensing rights, accessibility) will be set.								
Indicators	The number of geospatial data layers, the sharing principles of which are set.								
Description	Principles for sharing geospatial data layers, which are identified for the preparation of the Geospatial Data Sharing Matrix, by organizations that created them will be set. Geospatial data layer sharing principles, which are set by custodians in coordination with relevant organizations, will be reported to the General Directorate of Geospatial Information Systems.								
Assessment (Situational Analysis Findings)	32 geospatial data themes were identified in the Presidential Decree No. 49 on Geospatial Information Systems. Organizations that are the custodians of data themes are determined by the National Geospatial Data Custodianship Matrix. In coordination with the General Directorate of Geographic Information Systems, relevant organizations, which create geospatial data layers that fall within geospatial data themes, should be identified. Using the first stage of the National Geospatial Data Sharing Matrix, access categories (restricted, confidential, open, etc.), and licensing rights, etc. of geospatial data layers should be identified.								
Custodian	Ministries								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	410			-			-		-
Achieved	410			-			-		-
Remaining	0			-			-		-
Completion Rate	100			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
				x			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
		x		**x**					

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.3	Licensing rights and access criteria of geospatial data will be set.								
Action No 1.3.2	Units that will have access to geospatial data will be identified.								
Indicators	The number of data layers, the sharing units (public, local administrations, citizens, etc.) of which are identified.								
Description	The parties, with which geospatial data layers, the sharing criteria of which are set by creating organizations, will be shared, will be identified. The parties, with which geospatial data layers are created as a result of efforts carried out by custodians in coordination with relevant organizations, will be reported to the General Directorate of Geospatial Information Systems.								
Assessment (Situational Analysis Findings)	32 geospatial data themes were identified in the Presidential Decree No. 49 on Geospatial Information Systems. Organizations that are the custodians of data themes are determined by the National Geospatial Data Custodianship Matrix. In coordination with the General Directorate of Geographic Information Systems, relevant organizations, which create geospatial data layers that fall within geospatial data themes, will be identified. The second phase of the National Geospatial Data Sharing Matrix and sharing conditions of geospatial data layers with agencies and organizations should be defined.								
Custodian	Ministries								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			414			-		-
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
				x			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
		x		**x**					

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.3	Licensing rights and access criteria of geospatial data will be set.								
Action No 1.3.3	There is a need to introduce a law that safeguards intellectual property rights of geospatial data/information.								
Indicators	The number of laws safeguarding intellectual property rights								
Description	There is a need for legislation with regard to the licensing of geospatial data and the registration of resulting intellectual properties to the organizations creating it.								
Assessment (Situational Analysis Findings)	32 geospatial data themes were identified in the Presidential Decree No. 49 on Geospatial Information Systems. Organizations that are the custodians of data themes are determined by the National Geospatial Data Custodianship Matrix. A regulation is needed that safeguards the intellectual property rights of the data created by relevant organizations, which create geospatial data layers that fall within geospatial data themes, under the coordination of the General Directorate of Geographic Information Systems in line with the United Nations IGIF Guidelines.								
Custodian	Ministries								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			1			-		-
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x								
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
		x		**x**		**x**			

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.4	A National Geospatial Information Platform will be established and integrated into the e-Government gateway								
Action No 1.4.1	A National Geospatial Information Platform will be established and implementation modules will be developed.								
Indicators	The number of implementation modules modernized and operationalized in the National Geospatial Information Platform								
Description	The National Geospatial Information Platform is made up of 6 implementation modules (GIS Projects Inventory Module, Data Glossary Module, Geospatial Data Management Module (Atlas, Geoportal), GIS Practices Inventory Module, Capacity-Building Module (BelgeCBS), Monitoring and Reporting Module), which have been separately developed under various projects between 2011 and 2019. This platform will be modernized in line with advancing technologies and will operate in an integrated manner.								
Assessment (Situational Analysis Findings)	Geospatial data sets, which are created by public agencies and organizations and local administrations, should be shared and managed without the need for interagency protocols. Each organization should share on the said platform the status of the creation of data, which it is the custodian of, the rate of compliance with data description documents, and the date of completion. All location-based projects will be integrated into the platform in terms of data-sharing. This platform will offer automated service management for data sharing between projects. In this context, efforts are needed to develop the application modules of the platform.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Presidency of Strategy and Budget								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	3			3			-		-
Achieved	3			-			-		-
Remaining	3			-			-		-
Completion Rate	100			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
		x		**x**	**x**		**x**		

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.4	A National Geospatial Information Platform will be established and integrated into the e-Government gateway								
Action No 1.4.2	Modules that require e-government integration on the National Geospatial Information Platform will be integrated into the e-Government.								
Indicators	The number of application modules in the National Geospatial Information Platform that are integrated into the e-Government								
Description	The National Geospatial Information Platform is made up of 6 application modules (GIS Projects Inventory Module, Data Glossary Module, Geospatial Data Management Module (ATLAS, Geoportal), GIS Applications Inventory Module, Capacity-Building Module (BelgeCBS), Monitoring and Reporting Module), which have been separately developed under various projects between 2011 and 2019. Some sections (documentation) of the Geospatial Data Management Module and the Capacity-Building Module have been integrated into e-Government. The National Geospatial Information Platform also needs to be modernized.								
Assessment (Situational Analysis Findings)	The National Geospatial Information Platform should be integrated into the e-Government gateway to serve as its geospatial infrastructure. Atlas and the National Geospatial Data Portal, which are currently operated by the General Directorate of Geographic Information Systems, have been updated and become the building blocks of the National Geospatial Information Platform. In this context, efforts should be carried out to modernize the Platform so that it can serve as the spatial data infrastructure of the e-Government gateway and to integrate its relevant modules into the gateway.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Presidency of Strategy and Budget, Turkish Ministry of Transport and Infrastructure								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	2			4			-		-
Achieved	2			-			-		-
Remaining	0			-			-		-
Completion Rate	100			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x								
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x	**x**		**x**		

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.5	The national spatial data infrastructure will be used to retrieve, share, and use geospatial data.								
Action No 1.5.1	A secure geospatial data retrieval infrastructure will be established, and organizations will be provided with access to the infrastructure.								
Indicators	The number of organizations that have a secure connection to the spatial data infrastructure								
Description	The connections of ministries and their relevant organizations are provided through a secure network connection called Kamu Net operated by the Turkish Ministry of Transport and Infrastructure. Efforts will be carried out to ensure the secure retrieval and sharing of geospatial data created and used by not only ministries but also local administrations. In this context, the order of priority will be as such: 30 metropolitan municipalities, 51 provincial municipalities, and 51 special provincial administrations, districts in metropolitan municipalities, and districts in other provinces.								
Assessment (Situational Analysis Findings)	The lack of necessary infrastructure of public agencies and organizations to share and use TUCBS data via KAMU NET should be addressed. Local administrations need to be allocated financial resources so that the geospatial data communication among local administrations, and between local administrations and public agencies and organizations is secure.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization Turkish Ministry of Transport and Infrastructure								
Collaborative Organizations	Ministries, Local Administrations, Non-Governmental Organizations, Universities, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		132		519		400		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x	**x**		**x**		

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.5	The national spatial data infrastructure will be used to retrieve, share, and use geospatial data.								
Action No 1.5.2	Institutional geospatial data will be integrated into and shared with the national spatial data infrastructure.								
Indicators	The number of geospatial data layers integrated into the spatial data infrastructure along with its metadata and made available for sharing								
Description	The geospatial data layers created by organizations working under partnerships for the goals will be integrated. In this context, organizations will be integrated into Atlas and Geoportal.								
Assessment (Situational Analysis Findings)	In coordination with the General Directorate of Geographic Information Systems, relevant organizations, which create geospatial data layers that fall within geospatial data themes, will be identified. Custodians should ensure that geospatial data layers, which are created in coordination with relevant organizations, are delivered to the National Geospatial Information Platform along with their metadata in line with the set standards. Just as the use of GIS in resolving social problems is of vital importance in the context of Sustainable Development Goals, partnerships also play a significant role. Interoperability and partnerships are pivotal to achieving this goal, and GIS technologies, TUCBS' data standardization and harmonization approaches facilitate partnerships and interoperability to a great extent.								
Custodian	Ministries, Local Administrations								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	200		210		-		-		
Achieved	200		-		-		-		
Remaining	0		-		-		-		
Completion Rate	100		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x	**x**		**x**		

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.5	The national spatial data infrastructure will be used to retrieve, share, and use geospatial data.								
Action No 1.5.3	Organizations will use geospatial data available in the spatial data infrastructure.								
Indicators	The rate of growth in the number of users of geospatial data retrieved through the spatial data infrastructure.								
Description	Geospatial data layers will be retrieved using a single platform, the use of which will be disseminated.								
Assessment (Situational Analysis Findings)	The data available in the National Geospatial Information Platform in alignment with the set standards will also be used in official processes; downloading services will be launched, which will lead to the growing use of the data available on the platform.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Non-Governmental Organizations, Universities, Private Sector								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			50%			50%		50%
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x	**x**		**x**		

Table 35. *Ensuring the Accessibility of Up-to-date Geospatial Data by Everyone and Its Sustainable Management (Continued)*

Goal 1	**Ensuring the accessibility of up-to-date geospatial data by everyone and its sustainable management**								
Objective 1.5	The national spatial data infrastructure will be used to retrieve, share, and use geospatial data.								
Action No 1.5.4	The number of open data layers will be increased.								
Indicators	The rate of growth in the number of open data layers.								
Description	All principles and rules with regard to the use, sharing, and release of data in the public interest will be clarified. A cooperation platform based on geospatial data and information-sharing will be established among all agencies and organizations working to improve public welfare, increase efficiency in agriculture, energy, and industry, and combat poverty, disasters, climate change, and environmental issues, and a joint national monitoring and inspection mechanism will also be established.								
Assessment (Situational Analysis Findings)	Supporting the public and private sectors and universities to create open data is an important step in the formation of a GIS industry. An increase in the number of open data created in alignment with national standards means that more stakeholders effectively make use of the opportunities offered by GIS to resolve social problems.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Non-Governmental Organizations, Universities, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		50		50		50		
Achieved	-		-		-		-		
Remaining	-		50		50		50		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x		**x**	**x**		**x**

Table 36. *Dissemination of Geospatial Information Services That Make Effective Use of Geospatial Data Across All Processes*

Goal 2	**Dissemination of geospatial information services that make effective use of geospatial data across all processes**								
Objective 2.1	Maturity development models for geospatial information will be developed and a leadership mechanism will be established.								
Action No 2.1.1	A tailor-made geospatial information maturity model will be developed for organizations.								
Indicators	The number of maturity development models developed and put into practice								
Description	Maturity development models will be developed for public agencies and organizations, municipalities, universities and local administrations.								
Assessment (Situational Analysis Findings)	A model should be developed to measure the level of TUCBS maturity of public agencies and organizations and local administrations.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	2			-			-		-
Achieved	4			-			-		-
Remaining	0			-			-		-
Completion Rate	100			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	**x**	**x**		**x**	**x**			

Table 36. *Dissemination of Geospatial Information Services That Make Effective Use of Geospatial Data Across All Processes (Continued)*

Goal 2	**Dissemination of geospatial information services that make effective use of geospatial data across all processes**								
Objective 2.1	Maturity development models for geospatial information will be developed and a leadership mechanism will be established.								
Action No 2.1.2	It will be made sure that organizations adopt the maturity development model.								
Indicators	The number of institutions that adopted a maturity development model.								
Description	The maturity development models that are developed will be shared with ministries and local administrations, and the maturity levels of organizations will be identified.								
Assessment (Situational Analysis Findings)	A central portal software will be developed to monitor the maturity of public agencies and organizations and local administrations with regard to their readiness for TUCBS. Representatives of public agencies and organizations and local administrations will be able to access this portal where their TUCBS maturity levels will be automatically calculated and they will be given scores. The shortcomings of relevant agencies and organizations with regard to their TUCBS maturity will be automatically displayed in the form of radar charts. This will allow organizations to understand which areas to focus on, and invest and develop projects in so that they can improve their TUCBS maturity levels and manage their processes accordingly.								
Custodian	Ministries, Local Administrations								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		148		519		-148		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	**x**	**x**	**x**	**x**	**x**			

Table 36. *Dissemination of Geospatial Information Services That Make Effective Use of Geospatial Data Across All Processes (Continued)*

Goal 2	**Dissemination of geospatial information services that make effective use of geospatial data across all processes**								
Objective 2.1	Maturity development models for geospatial information will be developed and a leadership mechanism will be established.								
Action No 2.1.3	The maturity level of the national geospatial information system will be improved.								
Indicators	The rate of growth in the maturity level of the national GIS								
Description	The national maturity level will be identified based on the maturity levels of organizations, and geospatial information activities will be carried out to improve this level.								
Assessment (Situational Analysis Findings)	Upon determining the maturity levels of organizations, the national maturity level should also be identified on a national scale.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		-		50%		50%		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	**x**	**x**	**x**	**x**	**x**			

Table 36. *Dissemination of Geospatial Information Services That Make Effective Use of Geospatial Data Across All Processes (Continued)*

Goal 2	**Dissemination of geospatial information services that make effective use of geospatial data across all processes**								
Objective 2.2	Data compliance activities will be carried out in line with spatial data infrastructure standards.								
Action No 2.2.1	Organizations will start actions of alignment with the national spatial data infrastructure.								
Indicators	The number of institutions engaged in geospatial data alignment activities.								
Description	Public agencies and organizations and local administrations will develop projects to align the data they create with the set standards. This alignment should be achieved within 3 years pursuant to the Presidential Decree No. 49 on Geospatial Information Systems. An Alignment Strategy will be drawn up to identify how organizations will align with TUCBS and the National Geospatial Information Strategy and to monitor their progress. A framework will be drawn up to monitor the achievement of objectives and success indicators will be identified in line with standards.								
Assessment (Situational Analysis Findings)	Public agencies and organizations and local administrations should perform alignment activities to release the data they created to the national geospatial information platform. In this context, public agencies and organizations and local administrations will be offered counseling and technical assistance.								
Custodian	Ministries, Local Administrations								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	27			30			102		519
Achieved	27			-			-		-
Remaining	0			-			-		-
Completion Rate	100			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
		x		**x**	**x**	**x**			

Table 36. *Dissemination of Geospatial Information Services That Make Effective Use of Geospatial Data Across All Processes (Continued)*

Goal 2	**Dissemination of geospatial information services that make effective use of geospatial data across all processes**								
Objective 2.2	Data compliance activities will be carried out in line with spatial data infrastructure standards.								
Action No 2.2.1	Organizations will start actions of alignment with the national spatial data infrastructure.								
Indicators	The number of aligned geospatial data layers in compliance with the standards (rate of completion for each data layer)								
Description	Public agencies and organizations and local administrations will establish a unit or commission an existing one responsible for ensuring the alignment of the created data with the set standards and inform the General Directorate of Geographic Information Systems. This unit will be at the ministerial level for public agencies and organizations, and at the metropolitan municipality, provincial municipality, or special administration level for local administrations.								
Assessment (Situational Analysis Findings)	Public agencies and organizations and local administrations should perform alignment activities to deliver the data they created to the national geospatial information platform. In this context, public agencies and organizations and local administrations will be offered counseling and technical assistance.								
Custodian	Ministries, Local Administrations								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			410			-		-
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
		x		**x**	**x**	**x**			

Table 36. *Dissemination of Geospatial Information Services That Make Effective Use of Geospatial Data Across All Processes (Continued)*

Goal 2	**Dissemination of geospatial information services that make effective use of geospatial data across all processes**								
Objective 2.3	Activities will be carried out for the integration into the National Geospatial Information Platform.								
Action No 2.3.1	Organizations will develop applications for integration to the National Geospatial Information Platform.								
Indicators	The number of geospatial information applications integrated into the National Geospatial Information Platform								
Description	Institutional GIS applications will be developed as in the case of the Ministry of Energy and Natural Resources, and these applications will be integrated into the National Geospatial Information Platform.								
Assessment (Situational Analysis Findings)	The institutional geospatial information software developed by public agencies and organizations and local administrations will be integrated into the National Geospatial Information Platform. The geospatial data of organizations should be retrieved through a single platform using integrated software.								
Custodian	Ministries								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	1			3			6		7
Achieved	1			-			-		-
Remaining	0			-			-		-
Completion Rate	100			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x	**x**		**x**		

Table 36. *Dissemination of Geospatial Information Services That Make Effective Use of Geospatial Data Across All Processes (Continued)*

Goal 2	**Dissemination of geospatial information services that make effective use of geospatial data across all processes**								
Objective 2.4	Geospatial information services that help to modernize national and institutional processes and services and make use of geospatial data will be increased.								
Action No 2.4.1	Geospatial information services provided by organizations will be identified and adapted to the national processes.								
Indicators	The number of institutional geospatial information services where data creation, sharing, and use are carried out along with other processes.								
Description	Institutional geospatial information services will be identified. E.g. the procedure of obtaining a building permit.								
Assessment (Situational Analysis Findings)	The institutional geospatial information software developed by public agencies and organizations and local administrations will be integrated into the National Geospatial Information Platform. The geospatial data of relevant institutions will be retrieved through a single platform using integrated software.								
Custodian	Ministries, Local Administrations								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			3			3		3
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	**x**		**x**	**x**	**x**			

Table 36. *Dissemination of Geospatial Information Services That Make Effective Use of Geospatial Data Across All Processes (Continued)*

Goal 2	**Dissemination of geospatial information services that make effective use of geospatial data across all processes**								
Objective 2.4	Geospatial information services that help to modernize national and institutional processes and services and make use of geospatial data will be increased.								
Action No 2.4.1	Geospatial information services provided by organizations will be identified and adapted to the national processes.								
Indicators	The number of geospatial information systems, which are used in institutional processes and adapted to national processes.								
Description	Institutional geospatial information systems that are adapted to national processes will be identified. E.g. the process of drawing up an EIA report.								
Assessment (Situational Analysis Findings)	The institutional geospatial information software developed by public agencies and organizations and local administrations will be integrated into the National Geospatial Information Platform. The geospatial data of relevant institutions will be retrieved through a single platform using integrated software.								
Custodian	Ministries, Local Administrations								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			3			3		3
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	**x**		**x**	**x**	**x**			

Table 36. *Dissemination of Geospatial Information Services That Make Effective Use of Geospatial Data Across All Processes (Continued)*

Goal 2	**Dissemination of geospatial information services that make effective use of geospatial data across all processes**								
Objective 2.4	Geospatial information services that help to modernize national and institutional processes and services and make use of geospatial data will be increased.								
Action No 2.4.1	Geospatial information services provided by organizations will be identified and adapted to the national processes.								
Indicators	The rate of growth of instant sharing of up-to-date and high-quality geospatial data layers, which are created and integrated into the National Geospatial Information Platform (daily, monthly, and yearly viewing and downloading of data layers)								
Description	Monitoring of the rate of instant sharing of up-to-date and high-quality geospatial data layers, which are created and integrated into the National Geospatial Information Platform.								
Assessment (Situational Analysis Findings)	The institutional geospatial information software developed by public agencies and organizations and local administrations will be integrated into the National Geospatial Information Platform. The geospatial data of relevant institutions will be retrieved through a single platform using integrated software.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		10%		20%		30%		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	**x**		**x**	**x**	**x**			

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures*

Goal 3	**Building a geospatial industry to upgrade and transform institutional procedures**								
Objective 3.1	Foundation of institutes and hubs (the establishment of GIS-related institutes and hubs will be promoted)								
Action No. 3.1.1	Awareness-raising activities will be carried out for the establishment of GIS-related institutes and hubs.								
Indicators	The number of ministries, universities, and technopoles contacted with about activities relating to GIS institutes or hubs								
Description	Institutes and hubs will be established to improve geospatial information activities and the industry. GIS units will be disseminated to encourage organizations that are custodians of fields, which require the analysis of spatial data on agriculture, health, disaster management, environment, education, security, etc., to make use of GIS. Necessary efforts will be made to prioritize research on geospatial information so that GIS can serve as an effective tool in resolving social matters.								
Assessment (Situational Analysis Findings)	The development of public and private sectors and universities is a key step in building a GIS industry. To take this step, GIS hubs that support innovative entrepreneurship in the field of geospatial information systems should be established. These hubs should be supported by development agencies. These hubs will be established in technology development zones on university campuses across Turkey's 7 regions (under clustering strategies). The focus areas of these centers will also be identified. The themes such as smart cities and local administrations (urbanization), agriculture, environment, defense, transport, and health, which make up the GIS industry, will be prioritized. Also, in order to meet hardware and software needs of the GIS industry, areas such as big data management, spatial artificial intelligence applications and software, GNSS and GPS equipment, precision agriculture machinery, sensors, tools and equipment, ground-based and airborne data acquisition (UAVs, drones, measurement devices, photogrammetric systems, camera and lens technologies, etc.), inertial navigation systems (IMU), screening technologies and sensors as well as national and domestic built-in systems and GIS software will be prioritized. Necessary efforts will be made to make sure that the projects to be developed in these hubs are supported by TUBITAK and KOSGEB via project calls.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization, TUBITAK, KOSGEB, Universities, Technopoles								
Collaborative Organizations	TUBITAK, KOSGEB, universities, technopoles								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		1		1		1		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
							x		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
					x	x		x	

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures (Continued)*

Goal 3	**Building a geospatial industry to upgrade and transform institutional procedures**								
Objective 3.2	Processes that use geospatial data in organizations will be identified, and guidelines will be drawn up.								
Action No. 3.2.1	Organizations will identify processes related to geospatial information systems.								
Indicators	The number of national and institutional processes that are related to the GIS industry and require transformation								
Description	Agencies, organizations, and local administrations will identify the national and institutional processes related to the GIS industry. These processes will be communicated to the General Directorate of Geographic Information Systems.								
Assessment (Situational Analysis Findings)	In order to automate business processes and establish a data creation and sharing infrastructure aligned with the set standards, public agencies and organizations should first identify the business processes that create geospatial data. A link should be established between these identified processes and national business processes.								
Custodian	Ministries, Local Administrations								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			4			6		7
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x				**x**	**x**	**x**		

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures (Continued)*

Goal 3	**Building a geospatial industry to upgrade and transform institutional procedures**								
Objective 3.2	Processes that use geospatial data in organizations will be identified, and guidelines will be drawn up.								
Action No. 3.2.2	Organizations will draw up guidelines on the modernization of processes related to geospatial information systems.								
Indicators	The number of transformation guidelines drawn up								
Description	Agencies, organizations, and local administrations will develop transformation guidelines about the integration of GIS-related institutional processes into the national ones. The identified processes, and the guidelines about transformation and integration into national processes will be reported to the General Directorate of Geographic Information Systems. Also, a digital transformation agenda (road map) that is aligned with the National Geospatial Information Strategy of Turkey and is in line with the technological maturity of institutions will be drawn up under the coordination of a specialist working group.								
Assessment (Situational Analysis Findings)	Road maps should be drawn up to integrate the business processes identified under Action 3.2.1 into national processes and the national geospatial information platform; transformation guidelines should be drawn up on how to transfer these processes to the digital environment.								
Custodian	Ministries, Local Administrations								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		-		4		6		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
					x				

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures (Continued)*

Goal 3	**Building a geospatial industry to upgrade and transform institutional procedures**			
Objective 3.3	Institutional transformation capabilities will be improved for the use of institutional geospatial data in national processes.			
Action No. 3.3.1	Organizations will carry out institutional capacity-building activities.			
Indicators	The number of organizations engaged in transformation planning and capacity-building efforts required for process transformation			
Description	Public agencies and organizations and local administrations will carry out transformation planning and capacity-building activities to comply with and integrate into the national geographic information system and processes. These efforts will be reported to the General Directorate of Geographic Information Systems. Strategies and programs on building the capacity and carrying out the training activities required by the field of geospatial information will be drawn up and a specialist working group (or an equivalent) will be formed, which will work together with the higher board/committee. A capacity-building and training strategy (or an action plan), which will strengthen geospatial information management (implementation of the country-level GIS strategy and action plan) and is aligned with the national sustainable development goals and priorities, will be drawn up. Success criteria will be identified to monitor the capacity-building and training activities in the field of GIS. The available knowledge, skills, and resources of agencies, organizations, and industries operating in the field of geospatial information management at the country-level will be evaluated and analyses will be conducted to identify capacity-building and training needs. Awareness will be raised to shape the fields of health, education, employment, industry, production, and agricultural policies, where GIS can be used to resolve social problems, using GIS to enhance social welfare and institutions, which are responsible for areas that require spatial data to be analyzed directly, will be encouraged to make use of GIS with a view to reducing the risks relating to disasters and climate change, and combat poverty and environmental issues.			
Assessment (Situational Analysis Findings)	Training and briefing activities should be organized to increase institutional capacity so that public agencies and organizations can modernize business processes by making use of the geospatial information systems infrastructure. Training and briefing activities should be organized in cooperation with universities and academic institutions to increase institutional capacity so that public agencies and organizations, municipalities and the private sector can restructure business processes by making use of the geospatial information systems. Actions should be identified and implemented to increase the institutional level determined as a result of readiness and maturity efforts.			
Custodian	Ministries, Local Administrations			
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization			
Performance Indicators	**2020**	**2021**	**2022**	**2023**
Planned	-	16	132	519
Achieved	-			
Remaining	-			
Completion Rate	-			
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**	**PHASE2. Building analytical capacity for geospatial data**	**PHASE3. Resolution of geospatial data-based problems and contribution to social life**	
	x	**x**	**x**	

Relevant United Nations Strategic Pathway	Governance	Policy and Legal	Financial	Data	Innovation	Standards	Partnerships	Capacity and Education	Communication and Engagement
				x	x	x		x	

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures (Continued)*

Goal 3	Building a geospatial industry to upgrade and transform institutional procedures			
Objective 3.4	The capabilities of technology producers and solution and service providers about the geospatial industry will be improved.			
Action No. 3.4.1	Technology producers and solution and service providers will implement capacity-building activities about the geospatial industry.			
Indicators	The number of private sectors engaged in transformation planning and capacity-building efforts required for process transformation			
Description	The private sector will engage in transformation-planning and capacity-building activities with regard to compliance with and integration into the national geographic information system and processes. Information with regard to such activities will be reported to the General Directorate of Geographic Information Systems.			
Assessment (Situational Analysis Findings)	Training will be delivered to make progress in TUCBS-related R&D efforts and activities will be organized on the sidelines of such training programs. The scope of the training will be decided by the Steering Committee, and hubs will be assigned responsibilities within the framework of training sessions and programs to be organized annually to guide the GIS industry. Based on the idea of customizing themes to different regions without being limited to a single area in Turkey, themes will be identified according to regional opportunities and available technical and human capacity. The capacity of the private sector should be built.			
Custodian	Ministry of Industry and Technology, Ministry of Commerce			
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization, Private Sector			
Performance Indicators	2020	2021	2022	2023
Planned	-	10	10	20
Achieved	-	-	-	-
Remaining	-	-	-	-
Completion Rate	-	-	-	-

PHASES	PHASE1. Creating and sharing geospatial data in line with the standards	PHASE2. Building analytical capacity for geospatial data	PHASE3. Resolution of geospatial data-based problems and contribution to social life
	x	x	x

Relevant United Nations Strategic Pathway	Governance	Policy and Legal	Financial	Data	Innovation	Standards	Partnerships	Capacity and Education	Communication and Engagement
					x	x		x	

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures (Continued)*

Goal 3	**Building a geospatial industry to upgrade and transform institutional procedures**								
Objective 3.4	The capabilities of technology producers and solution and service providers about the geospatial industry will be improved.								
Action No. 3.4.2	Technology producers, and solution and service providers will sustain competent staff.								
Indicators	The rate of growth in the number of certified and competent personnel in public and private sectors.								
Description	The number of competent human resources qualified in GIS at all units working towards peace, justice and strong institutions, decent work and economic growth, reduced inequalities, sustainable cities, and communities, creating smart and disaster-resistant cities, responsible consumption and production, climate action, achieving energy efficiency, and partnerships for the goals will be increased. Public agencies and organizations, local administrations, and the private sector will certify the competent personnel engaged in GIS-related activities.								
Assessment (Situational Analysis Findings)	Training should be delivered to raise awareness and brief about and disseminate the use of TUCBS. The scope of these training sessions and the competencies of the personnel in the public and private sector should be increased and they should receive certificates from accredited organizations based on their level of GIS knowledge. Organizations should include in their priorities to employ GIS specialists, GIS operators and individuals who are trained and competent in GIS and increase the number of personnel qualified in GIS.								
Custodian	Ministries, Local Administrations, Private Sector								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			15			15		15
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x				**x**	

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures (Continued)*

Goal 3	**Building a geospatial industry to upgrade and transform institutional procedures**								
Objective 3.5	The participation of organizations and sectors in international projects of the geospatial industry will be improved.								
Action No. 3.5.1	The organizations in the sector will be encouraged to take part in international projects.								
Indicators	The number of private sectors engaged in international project activities								
Description	Projects that aim at shaping health, education, employment, trade, production and agricultural policies, and reducing the risks relating to disasters and climate change to improve social welfare and quality of life will be funded at the country-level, and also international funds will be sought. Counseling, support, and briefing activities will be held for private sector companies to assist them to take part in international projects.								
Assessment (Situational Analysis Findings)	Joint projects that leverage the collective dynamics and strengths of the public and private sectors and universities should be developed to make effective use of geospatial information systems in Turkey and to build a GIS industry. Software or hardware to be developed or widespread use of geospatial data achieved as a result of such projects will directly or indirectly accelerate the improvement of many other industries such as defense, planning, or disaster management. Meetings should be held and joint projects developed with leading organizations in Europe and in the Americas such as the National Spatial Data Infrastructure Management, the INSPIRE Committee, the Joint Research Centre (JRC) of the European Union, the United Nations Geographic Information Working Group (UNGIWG), and the American Federal Geographic Data Committee. As a result of these meetings, efforts will be carried out to integrate into relevant country- and continent-level geospatial networks. The purpose of such efforts is to arrange partnerships to share Turkey's geospatial data with the available geospatial information infrastructure, transfer technology know-how, disseminate the use of the products of Turkish brands, gain information about advancing geospatial information technologies and new standards beforehand, and encourage the Turkish GIS industry.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization, Ministry of Industry and Technology, Ministry of Trade								
Collaborative Organizations	General Directorate of Turkish Ministry of Foreign Affairs, TOBB (The Union of Chambers and Commodity Exchanges of Turkey), Technopoles, Private Sector, Ministries, Local Administrations								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			2			2		2
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
							x		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
							x	x	x

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures (Continued)*

Goal 3	**Building a geospatial industry to upgrade and transform institutional procedures**								
Objective 3.6	Domestic and national geospatial information practices will be promoted and developed.								
Action No. 3.6.1	The development of domestic and national GIS software (institutional, private sector, university) in alignment with the interoperability principles and data standards will be promoted.								
Indicators	The number of domestic and national GIS software developed in alignment with interoperability principles and data standards								
Description	Support will be provided for the development of domestic and national GIS software								
Assessment (Situational Analysis Findings)	Counseling support will be provided for the efforts to obtain patent for products with the GIS industry label in Turkey. Products carrying this label should be based on innovative, domestic and national resources and infrastructure. Fees arising from domestic and international patent applications for successful projects will be covered. For this, projects will be required to get accreditation. Accredited projects will be evaluated and a decision will be made whether to offer them support. Counseling services will be provided for branding GIS-related domestic and national products internationally and financial support will be offered for possible activities abroad and promotional expenses during branding.								
Custodian	Ministry of Industry and Technology								
Collaborative Organizations	Universities, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		1		3		3		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x								
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
					x	**x**		**x**	

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures (Continued)*

Goal 3	**Building a geospatial industry to upgrade and transform institutional procedures**								
Objective 3.6	Domestic and national geospatial information practices will be promoted and developed.								
Action No. 3.6.2	The use of geospatial information software will be increased.								
Indicators	Rate of growth of the total number of GIS software users in public agencies and organizations, universities, local administrations, and the private sector								
Description	A communication strategy and communication action plan will be drawn up in alignment with the national GIS strategy and the objectives of the action plan. Within the scope of this strategy and action plan, the communication methods to be used for communicating with relevant partners and awareness-raising activities will be identified. Processes for reviewing and assessing the status of achieving objectives will be defined in line with the communication strategy and action plans.								
Assessment (Situational Analysis Findings)	Training and promotional activities should be carried out to disseminate the use of domestic and national GIS software by public agencies and organizations, universities, local administrations and the private sector.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Universities, Private Sector, Citizens								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		10%		50%		70%		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x								
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
					x			**x**	

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures (Continued)*

Goal 3	**Building a geospatial industry to upgrade and transform institutional procedures**								
Objective 3.6	Domestic and national geospatial information practices will be promoted and developed.								
Action 3.6.3	National and public GIS software will be developed to provide input for geospatial information technologies and to ensure the effective use of geospatial information technologies by the public.								
Indicators	The rate of growth of the number of agencies and organizations developing a public GIS software								
Description	Cooperation will be established for the widespread use of spatial decision support systems across all stages starting from the public to improve efficiency in agriculture, energy, and industry and to combat poverty, disasters, climate change, and environmental issues with the goal of improving social welfare.								
Assessment (Situational Analysis Findings)	Also, in order to meet hardware and software needs for the GIS industry, areas such as big data management, spatial artificial intelligence applications and software, GNSS and GPS equipment, precision agriculture machinery, sensors, tools and equipment, ground-based and airborne data acquisition (UAVs, drones, measurement devices, photogrammetric systems, camera and lens technologies, etc.), inertial navigation systems (IMU), screening technologies and sensors as well as domestically-produced and local built-in systems and GIS software will be prioritized and R&D funds will be allocated for these priorities.								
Custodian	Ministries, Local Administrations								
Collaborative Organizations	Ministries, Local Administrations, Non-Governmental Organizations, Universities, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		100		100		100		
Achieved	-		-		-		-		
Remaining	-		100		100		100		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
						x	**x**		**x**

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures (Continued)*

Goal 3	**Building a geospatial industry to upgrade and transform institutional procedures**								
Objective 3.7	Accreditation services will be rolled out for geospatial information systems.								
Action No 3.7.1	A data and metadata service and format accreditation system will be established.								
Indicators	The number of data standardization validation systems and data system accreditation systems developed								
Description	Software that checks the alignment of geospatial data with the standards (service, format) will be developed								
Assessment (Situational Analysis Findings)	Systems should be developed that check the alignment of created geospatial data with the set standards and then accredit these data.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Turkish Ministry of Industry and Technology, TUBITAK, Ministries, Local Administrations, Universities, Technopoles, Private Sector								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	1			1			-		-
Achieved	1			-			-		-
Remaining	0			-			-		-
Completion Rate	100			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x								
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x		**x**			

Table 37. *Building a Geospatial Industry to Upgrade and Transform Institutional Procedures (Continued)*

Goal 3	**Building a geospatial industry to upgrade and transform institutional procedures**								
Objective 3.7	Accreditation services will be rolled out for geospatial information systems.								
Action No. 3.7.2	Application software of geospatial information systems will be accredited to the national geospatial information systems.								
Indicators	The number of domestic and national GIS application software developed in compliance with interoperability principles and data standards, and accredited								
Description	Software will be identified by meetings to be held with the private sector, which develops application software about GIS services, in 2020. Existing GIS application software and those to be developed will be accredited								
Assessment (Situational Analysis Findings)	The compliance of domestic and national GIS application software with interoperability principles, the national geospatial information platform, and data standards should be accredited.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		-		1		1		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
					x	**x**			

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.1	Adaptation and integration units will be established for activities concerning geospatial information systems.								
Action No 4.1.1	Units will be established under public agencies and organizations and local administrations that will carry out GIS adaptation and integration activities.								
Indicators	The number of central public agencies that established a TUBCS coordination, adaptation and integration unit								
Description	Under ministries, units will be established that will coordinate other relevant units and carry out adaptation and integration processes. These units will actively take part in data adaptation and integration processes in coordination with the General Directorate of Geographic Information Systems. An independent geospatial policy and legislation review group will be established which will review existing policies and regulations and advise about amendments/revisions need to be introduced to them so that the Integrated Geospatial Information Framework can be drawn up and the National Geospatial Information Strategy of Turkey can be implemented. A leadership mechanism, which will assume all financial power and responsibility about the National Geospatial Information Strategy and TUCSB, will be established. In this context, the geospatial industry should be defined under the Presidency of Strategy and Budget. A specialist working group, which will review, assess and monitor innovation and opportunities, and this group will review and monitor the elements and events that guide technological advances in the field of geospatial information and identify the needs and gaps of organizations in cooperation with the units under the upper-level administration (Technology Needs Assessment, SWOT, and PEST analyses, etc.). Innovation and incubation hubs operating in the field of geospatial information will be established and environments will be created where innovative ideas are born.								
Assessment (Situational Analysis Findings)	Units that will carry out geospatial information systems adaptation and integration processes should be established under ministries and local administrations. Such units should be at the department level directly reporting to the minister at ministries and at the division level at custodians that create data.								
Custodian	Ministries								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			16			50		-
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	**x**		**x**	**x**	**x**	**x**		

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.1	Adaptation and integration units will be established for activities concerning geospatial information systems.								
Action No 4.1.1	Units will be established under public agencies and organizations and local administrations that will carry out GIS adaptation and integration activities.								
Indicators	The number of local administrations that established a TUCBS coordination, adaptation and integration unit								
Description	Under local administrations, units will be established that will coordinate other relevant units and carry out adaptation and integration processes. This unit to be established will actively take part in data adaptation and integration processes in coordination with the General Directorate of Geographic Information Systems. Organizations working under partnerships towards achieving goals will begin activities to comply with the national spatial data infrastructure.								
Assessment (Situational Analysis Findings)	Units that will carry out geospatial information systems adaptation and integration processes should be established under ministries and local administrations. Such a unit should be established under metropolitan municipalities, provincial municipalities, and special provincial administrations. For district municipalities, the coordination should be carried out at metropolitan or provincial municipality level.								
Custodian	Local Administrations								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			30			102		-
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	**x**		**x**	**x**	**x**	**x**		

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.2	Financial resources for activities of geospatial information systems will be mobilized in line with the strategic goals.								
Action No 4.2.1	Projects of geospatial information system activities carried out by organizations will be identified and prioritized, and the number of integration and modernization projects will be increased.								
Indicators	The number of investment projects about GIS activities (hardware, application software, data creation, data adaptation, data sharing, human resources capacity-building) implemented by organizations and the budget of these projects								
Description	Information with regard to the investment projects about GIS activities (hardware, application software, data creation, data adaptation, data sharing, human resources capacity-building) carried out by organizations will be collected and reported. Projects related to national processes will be developed. A business case will be developed for investments to be made in the Geospatial Information Framework. The return (contribution) of investments to be made to achieve and sustain geospatial information management to the country's economy will be calculated.								
Assessment (Situational Analysis Findings)	TUCBS standardization and integration efforts carried out by the General Directorate of Geographic Information Systems helped raise the awareness of public agencies and institutions and local administrations on GIS. In addition, Presidential Decree No. 49 on Geospatial Information Systems sets forth geospatial data-related responsibilities and duties of public agencies and organizations and local administrations. In this context, it is necessary for relevant organizations to prioritize projects on geospatial information systems. Joint projects that leverage the collective dynamics and strengths of the public and private sectors and universities should be developed to make effective use of geospatial information systems in Turkey and to build a geospatial industry. Software or hardware to be developed or widespread use of geospatial data achieved as a result of such projects will directly or indirectly accelerate the improvement of many other industries such as defense, planning, or disaster management.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Presidency of Strategy and Budget, Ministries, Local Administrations								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			32			32		32
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	**x**		**x**	**x**				

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.2	Financial resources for activities of geospatial information systems will be mobilized in line with the strategic goals.								
Action No 4.2.2	The number of projects jointly carried out about geospatial information activities by the private sector, universities, and public sector will be increased.								
Indicators	The number of projects jointly implemented about GIS activities (hardware, application software, data creation, data adaptation, data sharing, capacity-building of human resources) by the private sector, universities, and public sector and the budget of these projects								
Description	Information about the projects jointly implemented about GIS activities (hardware, application software, data creation, data adaptation, data sharing, capacity-building of human resources) by the private sector, universities, and public sector will be collected, reported, and reported to the General Directorate of Geographic Information Systems. A Geospatial Information System Industry will be established to develop projects about national processes, and necessary efforts will be carried out to ensure the sustainability of the number and budget of projects in line with technological advances.								
Assessment (Situational Analysis Findings)	Joint projects that leverage the collective dynamics and strengths of the public and private sectors and universities should be developed to make effective use of geospatial information systems in Turkey and to build a geospatial industry. Software or hardware to be developed or achieving the widespread use of geospatial data as a result of such projects will directly or indirectly accelerate the improvement of many other industries such as defense, planning, or disaster management.								
Custodian	Ministry of Industry and Technology								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		1		3		3		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
					x	**x**	**x**		**x**

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.2	Financial resources for activities of geospatial information systems will be mobilized in line with the strategic goals.								
Action No 4.2.3	The number of projects incentivized as a part of research and development activities for the geospatial industry in organizations will be increased.								
Indicators	The rate of growth of the budget of projects incentivized as a part of research and development activities for the geospatial industry.								
Description	Projects that aim at shaping health, education, employment, trade, production and agricultural policies, and reducing the risks relating to disasters and climate change to improve social welfare and quality of life will be funded at the country-level, and also international funds will be sought. Information with regard to the R&D projects about GIS activities (hardware, application software, data creation, data adaptation, data sharing, human resources capacity-building) carried out by organizations will be collected and reported. Project duplication will be avoided and projects related to national processes will be developed.								
Assessment (Situational Analysis Findings)	The capacity increase required to make more effective use of GIS-related processes in institutional budget planning should be planned in accordance with the annual level of realization of responsibilities of relevant institutions set out in the action plan. Incentive mechanisms will be developed for research and development projects to be implemented about geospatial information systems and public agencies should be supported to work in collaboration with university researchers towards developing institutional geospatial information solutions.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Presidency of Strategy and Budget, Ministries, Local Administrations								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		50%		50%		50%		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
					x		**x**		

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.2	Financial resources for activities of geospatial information systems will be mobilized in line with the strategic goals.								
Action 4.2.4	The number projects related to geospatial information technologies funded at the country-level will be increased.								
Indicators	The rate of growth of the number of country-level projects carried out related to geospatial information technologies								
Description	Projects that aim at shaping health, education, employment, trade, production and agricultural policies, and reducing the risks relating to disasters and climate change to improve social welfare and quality of life will be funded at the country-level, and also international funds will be sought.								
Assessment (Situational Analysis Findings)	Joint projects that leverage the collective dynamics and strengths of the public and private sectors and universities should be developed to make effective use of geospatial information systems in Turkey and to build a geospatial industry. Software or hardware to be developed or the widespread use of geospatial data achieved as a result of such projects will directly or indirectly accelerate the improvement of many other industries such as defense, planning, or disaster management. The development of public and private sectors and universities is a key step in building a GIS industry. To take this step, TUCBS hubs that support innovative entrepreneurship in the field of geospatial information systems should be established. These hubs should be supported by development agencies. These hubs will be established in technology development zones on university campuses across Turkey's 7 regions (under clustering strategies). The themes of focus of these centers will also be identified. The themes such as smart cities and local administrations (urbanization), agriculture, environment, defense, transport, and health, which make up the geospatial industry, will be prioritized. In addition, priority areas will be identified to meet software and hardware needs of the GIS industry. Necessary efforts will be made to make sure that the projects to be developed in these hubs are supported by TUBITAK and KOSGEB via project calls.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		100		50		50		
Achieved	-		-		-		-		
Remaining	-		100		50		50		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
			x		**x**			**x**	

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.3	Value propositions will be developed in line with the objectives of Digital Turkey.								
Action No 4.3.1	Value propositions will be developed, and the geospatial information and technologies will be adopted, promoted for use, and put into effect as a part of decision support systems.								
Indicators	The number of value proposition reports								
Description	Value proposition suggestion reports will be drawn up that will modernize and innovate geospatial information system-related processes of public agencies and organizations and local administrations by following international and national efforts, communicating with non-governmental organizations and the private sector and establishing platforms where the public can also participate. For this purpose, a value proposition expression will be defined that explains the importance and necessity of developing TUCBS and reveals the value that TUCBS will offer. A socio-economic value analysis will be performed for TUCBS to support the value proposition expression. In addition, socio-economic impact assessment and analyses (profit-loss, cost-impact analysis) will be performed on financial issues.								
Assessment (Situational Analysis Findings)	GIS value guidelines should be drawn up, the benefits of GIS and examples of decision support systems should be noted and their efficiency, speed and financial advantages should be underlined. Workshops should be held for senior administrators of public agencies and organizations to give information about GIS values and explain the benefits of using GIS.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Non-Governmental Organizations, Universities, Private Sector								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			1			1		2
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x		**x**		**x**				**x**

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.4	Legislative frameworks will be developed in line with the strategic goals.								
Action 4.4.1	Primary and secondary legislative frameworks will be developed under the TUCBS.								
Indicators	The number of published legislative frameworks								
Description	Existing policies and regulations with regard to the implementation of TUCBS and the realization of the National Geospatial Information Strategy of Turkey will be reviewed and an inventory (policy and legislation inventory) will be drawn up, amendment needs will be identified and analyses will be performed on how to meet these needs. Legislation will be developed on privacy, data privacy (especially on national security), data protection and data liability (responsibility) and secondary legislation will be developed on cooperation. The existing business model will be defined and a new one will be developed based on national priorities and needs. Guidelines and regulations will be developed which will clarify the financial processes, rules, and policies necessary for geospatial information management and the implementation of the national strategy. This will allow the budget to be reviewed regularly by drawing up detailed financial plans aligned with the National Geospatial Information Strategy. Budget revenues (government, partnerships, funds, donor countries, GGIM, etc.) to be transferred to (or to be made use of) the Geospatial Information Management program will be calculated/set (a financing model will be drawn up).								
Assessment (Situational Analysis Findings)	Within the framework of the Presidential Decree No. 49 on Geospatial Information Systems, regulations are needed to regulate the functioning of the geospatial information systems infrastructure at the country-level. Regulations are also needed to give digital GIS data official validity in processes that involve geospatial data such as the zoning law, expropriation law and the land registry law.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Non-Governmental Organizations, Universities, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	1		4		-		-		
Achieved	0		-		-		-		
Remaining	1		-		-		-		
Completion Rate	0		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
		x					**x**		

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.4	Legislative frameworks will be developed in line with the strategic goals.								
Action 4.4.2	Guidelines will be drawn up for the alignment of strategies and action plans of public agencies and organizations, and local administrations with TUCBS strategies and action plans, and the awareness of the top administrations will be raised.								
Indicators	The number of organizations that completed awareness-raising efforts								
Description	Top administrations will attend "the Turkish Geospatial Information System Board" and "the Turkish Geospatial Information System Steering Committee" meetings and awareness will be raised. Awareness-raising efforts will be carried out for top administrators, who will help analysis and decision-making processes to be activated by making use of geospatial information technologies in all organizations that need to make effective use of GIS technologies for resolving social issues.								
Assessment (Situational Analysis Findings)	Awareness-raising meetings should be held with ministries, organizations listed in the data custodianship matrix, universities, and the private sector, respectively.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Universities, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	26		132		400		319		
Achieved	26		-		-		-		
Remaining	0		-		-		-		
Completion Rate	100		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
							x		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
		x			**x**	**x**		**x**	**x**

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.4	Legislative frameworks will be developed in line with the strategic goals.								
Action 4.4.2	Guidelines will be drawn up for the alignment of strategies and action plans of public agencies and organizations, and local administrations with TUCBS strategies and action plans, and the awareness of top administrations will be raised.								
Indicators	The number of local administrations that completed awareness-raising efforts								
Description	Top administrations will be informed about what needs to be done under the resolutions of the "Turkish Geospatial Information System Board" and the "Turkish Geospatial Information System Steering Committee" as well as the Presidential Decree No. 49.								
Assessment (Situational Analysis Findings)	Awareness-raising meetings should be held with ministries, the General Directorate of Local Administrations, the Union of Municipalities of Turkey and local administrations.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Local Administrations								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			132			519		400
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
							x		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
		x			**x**	**x**		**x**	

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.5	Coordination meetings will be organized.								
Action No 4.51	Coordination will be secured among the boards, working groups, public agencies, local administrations, universities, and the private sector under the TUCBS actions.								
Indicators	The number of coordination meetings held.								
Description	Coordination meetings will be held on the TUCBS legislation, strategy and action plans, data glossaries, and adaptation and integration activities. In 2018 and 2019, coordination and awareness-raising meetings were held with 32 general directorates and 30 metropolitan municipalities.								
Assessment (Situational Analysis Findings)	The purpose of boards and working groups established under the Presidential Decree No. 49 on Geospatial Information Systems is to establish coordination. Meetings should be held to this end. Coordination meetings should also be held with local administrations, universities, and the private sector.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	120			100			100		100
Achieved	120			-			-		-
Remaining	0			-			-		-
Completion Rate	120			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	**x**			**x**	**x**	**x**		**x**

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.6	Cross-sector and interdisciplinary cooperation will be carried out to implement a more effective process and to make mutual achievements under partnerships for the goals.								
Action 4.6.1	Partnership opportunities will be created, the number of platforms and networks will be increased, and communication channels will be developed.								
Indicators	The rate of growth of the number of GIS projects jointly implemented by different organizations								
Description	Selection criteria for evaluating partnership opportunities and identifying partners will be set. Stakeholder analyses will be performed to identify potential partners and stakeholders and their levels of interest and impact. A preliminary screening process will be defined for potential partners to be identified under the stakeholder analysis. Efforts will be carried out to form clusters among sectoral organizations. Efforts will be carried out to increase cooperation opportunities among the public and private sector and academic institutions.Awareness-raising activities will be held for stakeholders with a low interest in participation. A financial analysis will be performed to prioritize potential partners in line with the selection criteria and to make sure that they have sufficient resources (financial resources, human resources, infrastructure, hardware, logistics, etc.) in the field of partnership. A needs assessment and analysis will be carried out to understand which areas to strengthen in order to make effective use of public, public-private and civil society partnerships and to make a decision on the types of partnerships to establish.								
Assessment (Situational Analysis Findings)	Just as the use of GIS in resolving social problems is of vital importance in the context of Sustainable Development Goals, partnerships also play a significant role. Interoperability and partnerships are pivotal to achieving this goal, and GIS technologies, TUCBS' data standardization and adaptation approaches facilitate partnerships and interoperability to a great extent. It is of vital importance for the public and private sectors and universities to increase their GIS-using capacities and competencies, and that more stakeholders make effective use of GIS capabilities to resolve social problems in order to create a success story in forming a geospatial industry. Partnerships are highly important also for attracting more stakeholders to the industry.								
Custodian	Ministries, Local Administrations								
Collaborative Organizations	Presidency of Strategy and Budget, Ministries, Local Administrations								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			20			20		20
Achieved	-			-			-		-
Remaining	-			20			20		20
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
							x	**x**	

Table 38. *Establishing Sustainable Institutional Structuring and Financial Support Systems (Continued)*

Goal 4	**Establishing sustainable institutional structuring and financial support systems**								
Objective 4.6	Cross-sector and interdisciplinary cooperation will be carried out to implement a more effective process and to make mutual achievements under partnerships for the goals.								
Action 4.6.2	Partnerships will be formalized.								
Indicators	The number of formal cooperation protocols signed between organizations								
Description	An agreement framework will be established that will formalize partnerships and set out the responsibilities of parties (Statement of Intent, Memorandum of Understanding or Legal Partnership Agreement, etc.). After partnerships become official, a communication plan will be drawn up that will ensure effective communication and sharing between the parties. For established partnerships, partnership norms will be identified so that the parties can better understand each other's mission, vision, and goals and act within the framework of shared goals. Within the scope of partnerships, work plans will be drawn up that set out agreed tasks, duration, measurable deliverables, mutual responsibilities, etc. and reporting will be carried out. Regular review and assessment processes will be defined in which the efforts and the level of achievement of the goals under partnerships will be kept in check. A formal closing process will be defined where the final control and approvals for the termination of the partnership will be given, deliverables will be agreed upon and handed over, financial checks and payments will be completed, project records will be archived, surveys on the partnership will be held, a closing report will be drawn up, and achievements will be celebrated, etc.								
Assessment (Situational Analysis Findings)	Just as the use of GIS in resolving social problems is of vital importance in the context of Sustainable Development Goals, partnerships also play a significant role. Interoperability and partnerships are pivotal to achieving this goal, and GIS technologies, TUCBS' data standardization and adaptation approaches facilitate partnerships and interoperability to a great extent. It is of vital importance for the public and private sectors and universities to increase their GIS-using capacities and competencies, and that more stakeholders make effective use of GIS capabilities to resolve social problems in order to create a success story in forming a geospatial industry. Partnerships are highly important also for attracting more stakeholders to the industry.								
Custodian	Ministries, Local Administrations								
Collaborative Organizations	Ministries, Local Administrations, Non-Governmental Organizations, Universities, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		1		2		3		
Achieved	-		-		-		-		
Remaining	-		1		2		3		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
							x		**x**

Table 39. *Enhancing Qualified Education and Stimulating Lifelong Learning Opportunities.*

Goal 5	**Enhancing qualified education and stimulating lifelong learning opportunities**								
Objective 5.1	Geospatial information activities and training courses will be disseminated.								
Action No 5.1.1	Organizations will draw up a training curriculum for geospatial information activities.								
Indicators	The number of training curricula for GIS activities								
Description	Undergraduate and graduate GIS programs of universities will work together with the private sector and public agencies to draw up curricula about GIS activities. Necessary training will be provided to increase the number and capacity of staff who can make use of GIS in organizations working on gender equality. The scope of duty and responsibility of the Division of Accreditation and Certification will be expanded and training/certification programs on GIS will be regularly reviewed.								
Assessment (Situational Analysis Findings)	Undergraduate and graduate GIS programs of universities should work together with the private sector and public agencies to draw up curricula about GIS activities. Training and briefing activities should be organized in cooperation with universities and academic institutions to increase institutional capacity so that public agencies and organizations, municipalities and the private sector can restructure business processes by making use of geospatial information systems.								
Custodian	Council of Higher Education (YOK), NGOs, Ministry of National Education								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		2		2		2		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
								x	

Table 39. *Enhancing Qualified Education and Stimulating Lifelong Learning Opportunities (Continued)*

Goal 5	**Enhancing qualified education and stimulating lifelong learning opportunities**								
Objective 5.1	Geospatial information activities and training courses will be disseminated.								
Action No 5.1.2	National and international events will be organized.								
Indicators	The number of workshops, congresses, and symposia held on GIS								
Description	Ministries, local administrations and universities will organize scientific meetings to raise awareness about GIS								
Assessment (Situational Analysis Findings)	The GIS Day event, which is held annually by the General Directorate of Geographic Information Systems to raise awareness about GIS, should be organized more than once a year in provinces other than Ankara or Istanbul. GIS events will be held in schools to raise awareness about and form a culture of geospatial information systems during pre-university educations, visual documentation and animations will be prepared for these events, and simple tools and equipment will be made for the use of students. The forming of GIS-themed study groups in universities will be encouraged and these groups should gather on GIS Day.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization, Ministries, Local Administrations, Universities, Private Sector, Non-Governmental Organizations								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			10			13		24
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
								x	

Table 39. *Enhancing Qualified Education and Stimulating Lifelong Learning Opportunities (Continued)*

Goal 5	**Enhancing qualified education and stimulating lifelong learning opportunities**								
Objective 5.1	Geospatial information activities and training courses will be disseminated.								
Action 5.1.3	Academic publications will be developed for geospatial information systems.								
Indicators	The rate of growth of the number of academic publications for geospatial information systems								
Description	The number of academic publications on GIS will be increased								
Assessment (Situational Analysis Findings)	Activities should be carried out to increase the number of academic publications on geospatial information systems, awareness should be raised on this matter, various publication platforms should be established, and scientific events should be organized.								
Custodian	Universities, Private Sector, Ministries, Local Administrations								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		50%		50%		50%		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
							x		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
								x	

Table 39. *Enhancing Qualified Education and Stimulating Lifelong Learning Opportunities (Continued)*

Goal 5	**Enhancing qualified education and stimulating lifelong learning opportunities**								
Objective 5.1	Geospatial information activities and training courses will be disseminated.								
Action 5.1.4	To achieve success in fields aimed at resolving social problems, the number of courses on geospatial information technologies will be increased in all institutions providing education at various levels, from primary to higher education.								
Indicators	The rate of growth in the number of courses on geospatial information technologies								
Description	Geospatial information technologies should be included in the curricula of primary and secondaryschools. In higher education institutions, geospatial information technologies and GIS will be included in the curricula of departments that offer training under projects that aim at improving social welfare such as on employment, shaping of production and agricultural policies, and reducing disaster and climate change-related risks. Outreach initiatives will be kicked off to ensure that individuals who do not have access to educational activities on GIS and GIS management receive education. Infrastructure will be developed to offer scholarships and internship opportunities for training in GIS and relevant fields. To ensure social welfare, synchronous and asynchronous distance education efforts will be carried out by making sure that everyone has access to qualified education with an aim to develop human resources. The necessary infrastructure will be developed to accredit (or ensuring their regular review/assessment with a similar structure) programs that offer training in GIS and relevant fields.								
Assessment (Situational Analysis Findings)	New courses should be planned in the curriculum to raise awareness and provide information about and disseminate the use of GIS and TUCBS, and certification and e-certification training programs should be offered in addition to associate degree, undergraduate, and graduate programs. These training programs should improve the competencies of the staff in the public and private sector and local administrations.								
Custodian	Council of Higher Education (YOK), NGOs, Ministry of National Education								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		50		50		50		
Achieved	-		-		-		-		
Remaining	-		50		50		50		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
								x	

Table 39. *Enhancing Qualified Education and Stimulating Lifelong Learning Opportunities (Continued)*

Goal 5	**Enhancing qualified education and stimulating lifelong learning opportunities**								
Objective 5.2	Lifelong learning criteria will be set.								
Action No 5.2.1	Lifelong learning criteria will be set.								
Indicators	The number of professional competencies, the criteria of which are set or updated								
Description	Criteria for identifying professional qualifications will be set.								
Assessment (Situational Analysis Findings)	Criteria for identifying professional qualifications for geospatial information systems should be set together with the Vocational Qualifications Authority.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Vocational Qualifications Authority								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			1			-		-
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
								x	

Table 39. *Enhancing Qualified Education and Stimulating Lifelong Learning Opportunities (Continued)*

Goal 5	**Enhancing qualified education and stimulating lifelong learning opportunities**								
Objective 5.3	The institutional and personal certification system will be mainstreamed.								
Action No 5.3.1	A certificate of professional competencies will be granted.								
Indicators	The number of accredited units that issue professional competency certificates on GIS								
Description	Units will be established on personnel certification								
Assessment (Situational Analysis Findings)	The number of accredited units that issue professional competency certificates on geospatial information systems of various levels and the number of people who obtain such certificates should be increased.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization, Non-Governmental Organizations, Private Sector								
Collaborative Organizations	Vocational Qualifications Authority								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		1		1		1		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
								x	

Table 39. *Enhancing Qualified Education and Stimulating Lifelong Learning Opportunities (Continued)*

Goal 5	**Enhancing qualified education and stimulating lifelong learning opportunities**								
Objective 5.3	The institutional and personal certification system will be mainstreamed.								
Action No 5.3.1	A certificate of professional competencies will be granted.								
Indicators	The rate of growth in the number of people certified in accordance with professional competencies								
Description	Ministries and the private sector will make sure that their staff receive certification								
Assessment (Situational Analysis Findings)	The number of accredited units that issue professional competency certificates on geospatial information systems at various levels and the number of people who obtain such certificates should be increased.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization, Non-Governmental Organizations, Private Sector								
Collaborative Organizations	Ministries, Local Administrations, Private Sector, Citizens								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	20%			20%			20%		20%
Achieved	20			-			-		-
Remaining	0			-			-		-
Completion Rate	100			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
				x				**x**	

Table 40. *Establishing a Monitoring and Reporting System That Is In Line with Decision Support Systems, Directly Linked to Processes, and Takes Requirements of Creators and Users Into Consideration*

Goal 6	**Establishing a monitoring and reporting system that is in line with decision support systems, directly linked to processes, and takes requirements of creators and users into consideration**								
Objective 6.1	A monitoring mechanism will be established.								
Action 6.1.1	An action plan monitoring mechanism will be established.								
Indicators	The rate of completion of the strategy and action plan monitoring system								
Description	An action plan monitoring software portal will be developed. Analysis efforts will be carried out to evaluate the benefits (economic development, commercial opportunities, social welfare, etc.) of implementing the National Geospatial Information Strategy of Turkey. In addition, efforts will be carried out to analyze the social, economic, environmental, and political benefits to be realized by implementing the National Geospatial Information Strategy and the action plan. All of these processes will be monitored.								
Assessment (Situational Analysis Findings)	An application software will be developed to monitor the action plan. A central portal software will be developed to track the performance of activities in the action plan.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	1			-			-		-
Achieved	1			-			-		-
Remaining	0			-			-		-
Completion Rate	100			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x		**x**		**x**	**x**			

Table 40.*Establishing a Monitoring and Reporting System That Is In Line with Decision Support Systems, Directly Linked to Processes, and Takes Requirements of Creators and Users Into Consideration (Continued)*

Goal 6	**Establishing a monitoring and reporting system that is in line with decision support systems, directly linked to processes, and takes requirements of creators and users into consideration**								
Objective 6.1	A monitoring mechanism will be established.								
Action No 6.1.2	A maturity development model monitoring mechanism will be established.								
Indicators	The rate of completion of maturity development model monitoring systems								
Description	A portal will be developed to monitor the maturity development models developed by ministries and local administrations.								
Assessment (Situational Analysis Findings)	A model should be developed to measure the level of maturity of public agencies and organizations and local administrations. A central portal software will be developed to monitor the level of maturity of public agencies and organizations and local administrations with regard to their readiness for TUCBS. Representatives of public agencies and organizations and local administrations will be able to access this portal where their TUCBS maturity levels will be automatically calculated and they will be given scores. The shortcomings with regard to their TUCBS maturity will be automatically displayed in the form of radar charts. In this context, they will be able to identify the issues to focus on to improve their TUCBS maturity levels and the projects that need to be developed.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Performance Indicators	**2020**			**2021**			**2022**		**2023**
Planned	-			1			-		-
Achieved	-			-			-		-
Remaining	-			-			-		-
Completion Rate	-			-			-		-
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	**x**	**x**		**x**	**x**			

Table 40.*Establishing a Monitoring and Reporting System That Is In Line with Decision Support Systems, Directly Linked to Processes, and Takes Requirements of Creators and Users Into Consideration (Continued)*

Goal 6	**Establishing a monitoring and reporting system that is in line with decision support systems, directly linked to processes, and takes requirements of creators and users into consideration**								
Objective 6.2	Monitoring activities will be carried out.								
Action No 6.2.1	Action plan monitoring activities will be carried out.								
Indicators	The number of units (central organization, university, local administration, private sector) being monitored								
Description	Ministries, local administrations, universities, and the private sector will be monitored for certain periods within the scope of the activities in the action plan. All developments, and survey and analysis results throughout the implementation of the National Geospatial Information Strategy and the action plans will be monitored and documented, and the lessons learned will be used to achieve national benefits. The benefits realized in this process will be shared with stakeholders and the public using appropriate communication methods.								
Assessment (Situational Analysis Findings)	Monitoring activities should be carried out to assess the alignment of TUCBS-related projects to be developed by agencies and organizations and local administrations with the country-level action plan.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Non-Governmental Organizations, Universities, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		46		102		1000		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
						x			

Table 40.*Establishing a Monitoring and Reporting System That Is In Line with Decision Support Systems, Directly Linked to Processes, and Takes Requirements of Creators and Users Into Consideration (Continued)*

Goal 6	**Establishing a monitoring and reporting system that is in line with decision support systems, directly linked to processes, and takes requirements of creators and users into consideration**								
Objective 6.2	Monitoring activities will be carried out.								
Action 6.2.2	Maturity development model monitoring activities will be carried out.								
Indicators	The number of units (central organization, university, local administration, private sector), the maturity development model of which is being monitored								
Description	Components within the framework of the maturity development model will be monitored in certain periods and the level of maturity of organizations will be tracked								
Assessment (Situational Analysis Findings)	Monitoring activities should be carried out to evaluate the level of maturity and scores of agencies and organizations and local administrations for budgeting purposes. An infrastructure will be developed where the Presidency of Strategy and Budget can monitor relevant maturity levels								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Non-Governmental Organizations, Universities, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		46		102		1000		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x				**x**	**x**			

Table 40. *Establishing a Monitoring and Reporting System That Is In Line with Decision Support Systems, Directly Linked to Processes, and Takes Requirements of Creators and Users Into Consideration (Continued)*

Goal 6	**Establishing a monitoring and reporting system that is in line with decision support systems, directly linked to processes, and takes requirements of creators and users into consideration**								
Objective 6.3	Reports will be drawn up.								
Action 6.3.1	Reports will be drawn up for the actions taken under the national geospatial information systems.								
Indicators	The number of reports drawn up on institutional geospatial information actions								
Description	Geospatial information services offered by ministries and local administrations will be monitored and reported in certain periods. Benefits to be realized from geospatial data (benefits for the public and private sectors, time savings, innovation, etc.) will be reported and shared.								
Assessment (Situational Analysis Findings)	A Geospatial Information Strategy and Action Plan Monitoring and Evaluation Portal were developed to implement and monitor the National Geospatial Information Strategy of Turkey and the Country-Level Action Plan. Public agencies and organizations, local administrations, universities, the public sector, and non-governmental organizations will enter this portal their TUCBS legislation (primary and secondary legislation), duties, business processes, human resources, hardware and software infrastructures, projects, the situation with regard to the creation of data they are custodians of, institutional strategies, and annual budget allocated for TUCBS-related efforts. For the entry of new projects, required geospatial data that are under the custodianship of various organizations will be entered, and custodian agencies and organizations will be able to get information on the availability of these data based on data entries. The data to be entered on this portal will also be opened for the access of the Presidency of Strategy and Budget, and the views of the Steering Committee will be included in the evaluation of the projects submitted.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	1		1		1		1		
Achieved	1		-		-		-		
Remaining	0		-		-		-		
Completion Rate	100		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			x			x		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x	x	x			x	x	x	

Table 40.*Establishing a Monitoring and Reporting System That Is In Line with Decision Support Systems, Directly Linked to Processes, and Takes Requirements of Creators and Users Into Consideration (Continued)*

Goal 6	**Establishing a monitoring and reporting system that is in line with decision support systems, directly linked to processes, and takes requirements of creators and users into consideration**								
Objective 6.3	Reports will be drawn up.								
Action 6.3.1	Reports will be drawn up for the actions taken under the national geospatial information systems.								
Indicators	The number of projects, the reporting of which is completed								
Description	Country-level GIS projects will be monitored and reported.								
Assessment (Situational Analysis Findings)	On the portal software developed, reports and statistics screens will be developed that will automatically show the progress of the plan of action, budget use, created products and the level of achievement of a particular geospatial industry objective. All sub activities carried out within the framework of the plan of action will be monitored through visual documents. The breakdown of actions under the projects and their rate of completion will also be monitored through this portal, when needed.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		5		5		5		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x		**x**		**x**	**x**	**x**		

Table 40.*Establishing a Monitoring and Reporting System That Is In Line with Decision Support Systems, Directly Linked to Processes, and Takes Requirements of Creators and Users Into Consideration (Continued)*

Goal 6	**Establishing a monitoring and reporting system that is in line with decision support systems, directly linked to processes, and takes requirements of creators and users into consideration**								
Objective 6.3	Reports will be drawn up.								
Action 6.3.1	Reports will be drawn up for the actions taken under the national geospatial information systems.								
Indicators	The number of published geospatial industry statistics reports								
Description	Geospatial industry statistics on personnel, financial situation, hardware, software, etc. will be reported in certain periods								
Assessment (Situational Analysis Findings)	On the portal software developed, reports and statistics screens will be developed that will automatically show the progress of the plan of action, budget use, created products and the level of achievement of a particular geospatial industry objective. All sub activities carried out within the framework of the plan of action will be monitored through visual documents. The breakdown of actions under the projects and their rate of completion will also be monitored through this portal, when needed.								
Custodian	General Directorate of Geographic Information Systems of the Turkish Ministry of Environment and Urbanization								
Collaborative Organizations	Ministries, Local Administrations, Private Sector								
Performance Indicators	**2020**		**2021**		**2022**		**2023**		
Planned	-		1		1		1		
Achieved	-		-		-		-		
Remaining	-		-		-		-		
Completion Rate	-		-		-		-		
PHASES	**PHASE1. Creating and sharing geospatial data in line with the standards**			**PHASE2. Building analytical capacity for geospatial data**			**PHASE3. Resolution of geospatial data-based problems and contribution to social life**		
	x			**x**			**x**		
Relevant United Nations Strategic Pathway	**Governance**	**Policy and Legal**	**Financial**	**Data**	**Innovation**	**Standards**	**Partnerships**	**Capacity and Education**	**Communication and Engagement**
	x		**x**		**x**	**x**	**x**		

GLOSSARY

This document is based on the guidelines of the Integrated Geospatial Information Framework of the United Nations. Some important concepts and terms found in the original guidelines were used in the Turkish version of the document with the below-listed translations, while others were adapted into Turkish in line with national practices and approaches. While reading or using the original documents, it is recommended to take into consideration the glossary below.

"bir kere topla, defalarca kullan": "collect once, use many times"

Açık bir değer önermesi: A clear value proposition

Açık iletişim protokolü: Clear communication protocol

Açık veri grupları: Open data groups

Akademik program değerlendirme komitesi: Academic program review committee

Artımlı yaklaşım: Incremental approach

Bağış ortaklıkları: Donor partnerships

Başlangıç sözleşmesi: Initial engagement

Beceri kazandırma programları: Training programs

Bilgi talebi: Request for information

Birlikte çalışabilirlik: Interoperability

BM: Birleşmiş Milletler

Boşluk analizi: Gap analysis

Coğrafi bilgi: Geospatial-Geospatial information

Coğrafi bilgi çerçevesi: Geospatial information framework

Coğrafi bilgi çevresi: Geospatial landscape

Coğrafi bilgi değeri: Value of geospatial information

Coğrafi bilgi girişimleri: Geospatial information initiatives

Coğrafi bilgi yönetim stratejisi: Geospatial information management strategy

Coğrafi bilgi sistemleri (CBS): Geographical information systems (GIS)

Coğrafi kodlama ve bütünleştirme: Geocoding and aggregation

Coğrafi sayısal dönüşüm: Geospatial digital transformation

Coğrafi bilgi lisanslandırma: Licensing geospatial information

Coğrafi sayısal uçurum: Geospatialdigital divide

Coğrafi sayısal uçurum kapatma: Bridging the geospatial digital divide

Coğrafi ve istatistiksel entegrasyon: Geospatial and statistical integration

Coğrafi veri altyapısı: Spatial data infrastucture (SDI)

Çıktı: Deliverable

Danışma Kurulu: Advisory Body

Değer bildirimi: Communicating value

Değer önermesi: Value proposition

Destek programları: Outreach programs

Destekçiler: Advocates

Doğru konumlandırmanın sağlanması: Maintaining accurate positioning

Dönüşüm yol haritası: Transformation road map

Dönüşümcü liderlik: Transformational leadership

Durum değerlendirmesi: Situational Assessment

Ekonomik gerekçe: Economic case

ECBÇ: IGIF

Entegre coğrafi bilgi çerçevesi: Integrated geospatial framework

Entegre coğrafi bilgi yönetimi: Integrated geospatial information management

Entegre sistemler sistemi: Integrated system-of-systems

Entelektüel mülkiyet hakları: Intellectual property rights

Etki değerlendirmesi: Impact assessment

Eylem planı: Action plan

Fayda analizi: Benefits analysis

Finansal düzenleme ve yönetim planı: Financial arrangement and management plan

Fon birlikleri: Funding alliances

Geleceğe uyum: Future-Proofing

Gözden geçirme ve değerlendirme: Review and evaluation / Review and assessment

Hassas bilgi: Sensitive information

Hedeflenen iş modeli: Desired business model

Hibe eşleştirme: Grant matching

Hizmetlerin entegrasyonu: Integration of services

İhtiyaç değerlendirmesi: Needs assessment

İletişim ve katılım: Communication and engagement

İnceleme grubu: Review group

İş gerekçesi: Business case

İş modeli: Business model

İzleme ve değerlendirme çerçevesi: Monitoring and evaluation framework

İzleme komitesi: Streering committee

İşyeri eğitimleri: On-the-job training

Kapasite değerlendirme: Capacity assessment

Kapasite Geliştirme: Capacity building

Kapasite tarama matrisi: Capacity scanning matrix

Kapasite ve eğitim çalışma grubu: Capacity and education working group

Kapsayıcı stratejik çerçeve: Overarching strategic framework

Karşılıklı ziyaretler: Exchange visits

Kaynak etki değerlendirmesi: Resource impact assessment

Korunan jeodezik altyapı: Maintained Geodetic Infrastructure

Kuluçka merkezleri: Incubators

Mahremiyet ve veri koruma: Privacy and data protection

Masa başı çalışma: Table top excersise

Mesleki ağlar: Professional networks

Mesleki eğitim: Professional education

Mevcut çalışma ortamı: Current operating environment

Olgunluk geliştirme modeli: Maturity development model

Ortak girişimler: Joint ventures

Ortaklıklar: Partnerships

Ortaklığın resmileşmesi: Formalizing partnerships

Ölçülmüş faydalar: Quantified benefits

Ön araştırma ve keşif: Preliminary research and fact finding

Paydaş ve kullanıcı katılımı: Stakeholder and user engagement

Politika ve yasal inceleme grubu: Policy and legal review group

Rehberlik: Leadership

Risk değerlendirmesi: Risk assessment

Sanayi konseyleri: Industry councils

Sayısal economy: Digital economy

Sonuç: Outcome

Sorumluluk, temin ve yönetim: Custodianship, acquisition and management

Sosyal yardım girişimleri: Outreach initiatives

Sosyo-ekonomik faydaların değerlendirilmesi: Socio-economic value assessment

Standart envanteri: Standards inventory

Standart yönetimi ve politikası: Standards governance and policy

Standart yönetişim çerçevesi: Standards governance framework

Standartlar kapasite geliştirme programı: Standards capacity building programs

Standartlar uygulama topluluğu: Standards community of practice

Standartlara yönelik temel anket: Standards baseline survey

Standartları gözden geçirme programı: Standards review program

Standartların uygulanması ve yayımlanması: Implementation and communication of standards

Stratejik birlikler: Strategic alliances

Stratejik gerekçe: Strategic case

Stratejik uyum: Strategic alignment

Stratejik yollar: Strategic pathways

Stratejik yönlendiriciler: Strategic drivers

Teklif talebi: Request for proposal

Teknolojik ihtiyaçların değerlendirilmesi: Technology needs assessment

Teknolojik olgunluk endeksi: Technology maturity index

Temel anket: Baseline survey

Ticari gerekçe: Commercial case

Toplumsal katılım: Community participation

Tutarlılığın Belirlenmesi: Addressing Coherence

Ulusal eylem planı: Country-level action plan

Ulusal coğrafi bilgi markalaşması: National geospatial branding

Uygulama topluluğu: Community of practice

Uygulamalı deneyim: Hands-on experience

Uyum stratejisi: Compliance strategy

Uyumluluk testi: Compliance testing

Uzman çalışma grubu: Specialist working group

Veri çerçevesi: Data framework

Veri depolama ve erişim sistemleri: Data storage and retrieval systems

Veri envanteri: Data inventory

Veri iyileştirme: Data curation

Veri iyileştirme ve yayımlama: Data curation and delivery

Veri koruma, lisanslama ve paylaşım: Data protection, licensing and sharing

Veri kullanıcı: Data consumer

Veri mükerrerliği/tekrarı: Data duplication

Veri paylaşım ve yayılımı: Data sharing and dissemination

Veri sağlayıcı: Data provider

Veri tedarik zinciri: Data supply chain

Veri temaları: Data themes

Veri teması yol haritası: Data theme road map

Veri temin: Data acquisition

Veri toplama: Data capture

Veri seti profilleri: Data set profiles

Veri sorumluluk matrisi: Data custodianship matrix

Veri sorumluluk politika ve rehberleri: Data custodianship policy and guidelines

Veri varlıklarının modernizasyonu: Modernizing data assets

Veri yayımlama: Data release

Veri yönetişimi: Data governance

Yatırım gerekçesi: Case for investment

Yatırımın kıymetlendirilmesi: Investment appraisal

Yenilikçilik: Innovation

Yenilikçilik ekosistemi: Innovation ecosystem

Yenilikçilik kültürü: Culture of innovation

Yenilikçilik merkezleri: Innovation hubs

Yenilikçilik programları: Innovation programs

Yenilikçilik sistemi: Innovation system

Yenilikçilik çalışma grubu: Innovation group

Yönetim kurulu: Governing board

Yönetimin sürekliliği: Ongoingmanagement

Yönetişim: Governance

Yönetişim modeli: Governence model

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ANNEX 1 MATRIX OF THE STRATEGY AND ACTION PLAN FOR INTEGRATED GEOSPATIAL INFORMATION SYSTEMS OF TURKEY

The access link for the matrix can be found below as a QR code.

ANNEX 2 MATRIX OF IGIF-TUCBS RELATIONS

The access link for the matrix can be found below as a QR code.