Strategic Pathway 1

Governance and Institutions

*This **strategic pathway** establishes the leadership, governance model, institutional arrangements and a clear value proposition to strengthen multi-disciplinary and multi-sectoral participation in, and a commitment to, achieving an Integrated Geospatial Information Framework.*

*The **objective** 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.*

Summary

Geospatial information is increasingly being harnessed to interconnect and integrate government functions and commercial services - making cities more livable, citizens more engaged and informed, and agricultural areas more productive. Traffic congestion, weather reports, air pollution, bus locations, pest monitoring, flood sensors, and electricity outage applications are all underpinned by geospatial information that can be synthesized into a seamless knowledge environment so that information can be accessed quickly by users to make informed decisions. For government this means streamlining operations, reducing costs and improving overall economic and social sustainability.

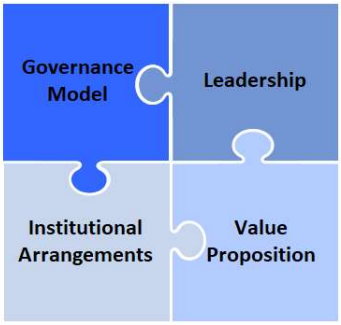
This level of geospatial capability can only be achieved through cooperative governance frameworks and with strong leadership that penetrates across sectors and through all levels of government. Institutions need to work together to share information and work towards common strategic priorities and goals.

By interconnecting government functions through well-functioning governance frameworks, it is possible to bring together geospatial information from multiple sources so that it can be used seamlessly on any digital platform or device.

Good governance and cooperative institutional arrangements are the first priority in the geospatial information reform agenda. They enable geospatial information challenges to be met head on, provide flexibility to accommodate the rapidly changing environment, and the ability to embrace community and business participation within a culture of digital reform and transformation.

Common to all governance and institutional arrangements are four key elements that are required to build a cooperative data sharing environment and an appreciation of the value of geospatial information for decision-making.

The four elements are:



- **Governance Model** - based on a geospatial strategy for the nation 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** - to formulate and sustain a national geospatial information management strategy, develop a Country-level Action Plan for implementing the Integrated Geospatial Information Framework (IGIF), and create a governance process for assuring effective management responsibilities for the enterprise.
- **Value Proposition** - that measures, monitors, and communicates the economic benefit of integrated geospatial information to national priorities including citizen and societal benefits.
- **Institutional Arrangements** - that define roles and responsibilities across government for tasks associated with all aspects of geospatial information management, including appropriate coordination, management and oversight for meeting national priorities.

These elements are underpinned by principles that promote successful governance and institutional arrangements and which can be adopted by each country. The principles are put into practice through several strategic actions that deliver and strengthen participation and commitment to achieving the IGIF. Tools, such as matrices, examples and checklists, are provided in the appendices to assist countries to work through concepts and processes to successfully complete each action. The overall structure for governance and institutional arrangements is illustrated in and anchored by Figure 1.1.

When implemented the actions (and their interrelated actions[1]) will enable the achievement of the four elements, which in turn will deliver significant and sustainable national outcomes and benefits for a country. These outcomes include attaining:

- Efficient planning and coordination of the government's geospatial information resources;
- Strengthened leadership, institutional mandates and political buy-in;
- A cooperative data sharing environment; and
- A shared understanding of the value of integrated geospatial information management.

[1] Examples of the interrelated actions across Strategic Pathways are described in the introductory chapter; Solving the Puzzle: Understanding the Implementation Guide.

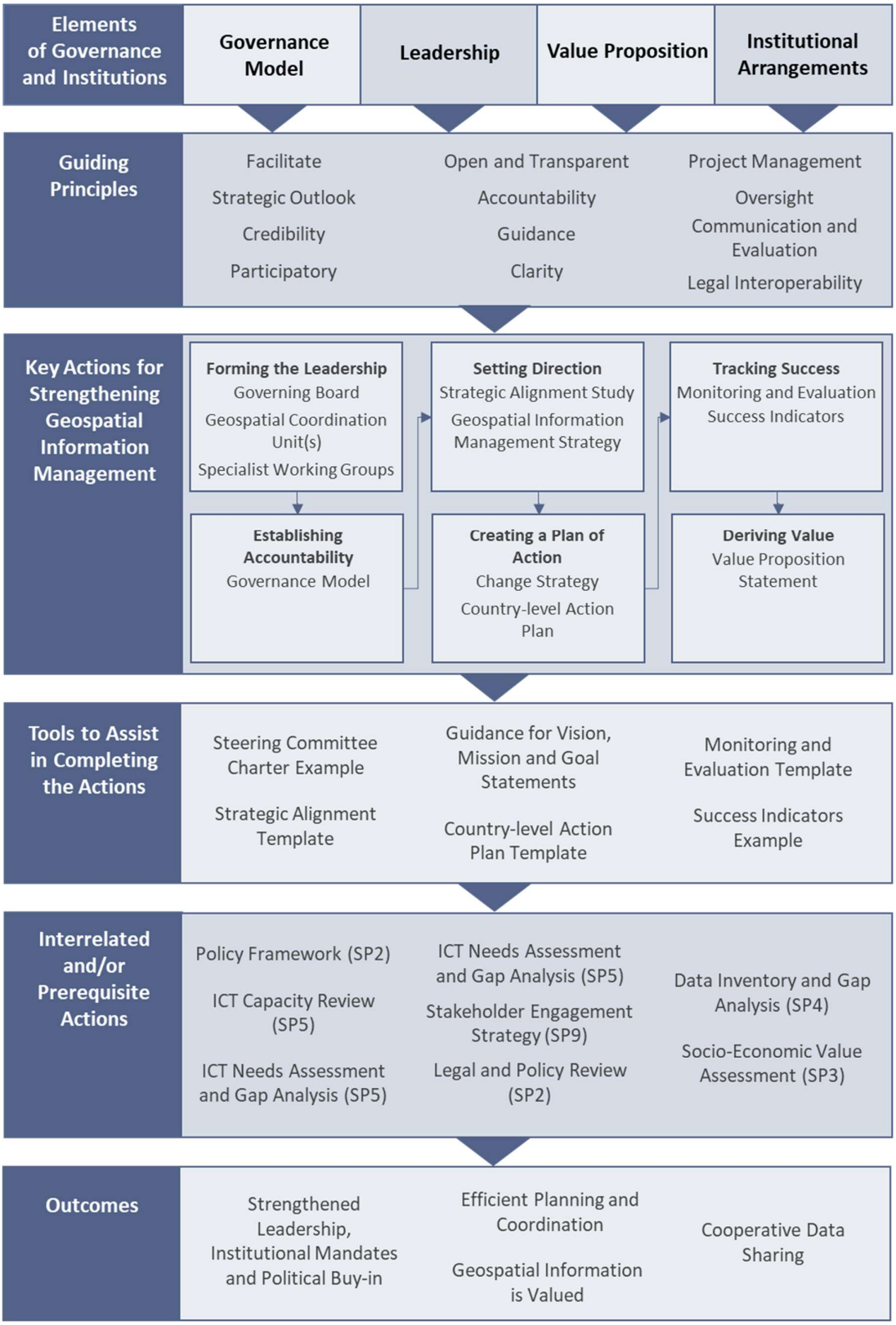


Figure 1.1: *Overall structure for the Governance and Institutions Strategic Pathway - showing the four key elements, guiding principles, actions and interrelated actions, and the tools provided in the Appendices to support and achieve the outcomes.*

1.1 Introduction

Governance and institutional arrangements present a clear division of roles and responsibilities among organizations involved in geospatial information management.

Governance and institutional arrangements for geospatial information management refers to the formal and informal structures of cooperation between and among organizations. These structures support and link institutions with other organizations (either public or private) to help fulfill their mandate. Organizational structures are formulated on policies, laws, systems, processes and productive frameworks that enable sustainable management of geospatial information (UN-GGIM, 2017).

The recent growth in the acquisition and generation of data has meant that governments now increasingly realize the value of geospatial information and digital technologies as key strategic assets that lead to valuable and quantifiable results, thus changing the lives of economies and societies around the globe. However, it should be emphasized that 'implementing and sustaining' these strategic assets is still relatively novel, and requires leadership to drive change, communicate the value proposition, and to understand the challenges to be overcome. National geospatial champions are crucial to create and maintain the momentum.

Therefore, with increased activity in the collection and management of data and information across the wider government sector, it is important to have a governance framework and associated institutional arrangements that support the data life cycle, including its consistency, integration and usability.

Governance and institutional arrangements tend to evolve over time and are typically unique to each country, although there are specific regional examples, such as INSPIRE[2], that may influence the regulatory construct of these arrangements. Nonetheless, arrangements will depend on a broad range of conditions including the general institutional and legal framework within each country, governance traditions, available human and financial resources, and the prevailing political system.

The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) recognized the global importance of national governance and institutional arrangements in geospatial information management at its second session in August 2012.[3] It identified the need for countries to examine institutional arrangements in geospatial information management and provided governments with several options on how to create a national governance strategy.

[2] Infrastructure for Spatial Information in the European Community Directive.

[3] Derived from the inventory of issues to be addressed by UN-GGIM (E/C.20/2012/5/Add.1).

These options recognize that although institutional arrangements are a key component of governance - wider governance responsibilities of authority, decision-making and accountability need to be clearly defined at all levels of government (national, provincial and local), and complemented by a policy and legal framework that is supportive of information access, dissemination, and reuse.

To maintain relevance, the policy and legal framework needs to be periodically reviewed and enhanced as the geospatial information ecosystem advances – both in terms of technologies and applications.

A geospatial information program's success is improved with sound principles of project management at every level. Responsibilities on change management, risk management and mitigation, project schedules, budget and resource allocations, and monitoring and performance indicators, collectively offer tools for successful outcomes.

Governance and institutional arrangements present a clear division of roles and responsibilities among organizations involved in geospatial information management. This includes the rules, operations, oversight and regulatory conditions between institutions. Arrangements typically include mechanisms for collaboration across government sectors, and with non-public sector stakeholders, such as donors, private sector and non-government organizations. These can be extended to collaborative arrangements with community groups and individuals that are engaged in participatory data collection and mapping programs.

It may be necessary for some countries to develop new governance and institutional arrangements to transform and integrate geospatial information management practices across the broader government sector. However, there is no single universal governance framework and institutional arrangements that fit all countries. Nevertheless, successful approaches do have a number of common elements that have evolved from past experiences and lessons learned.

This strategic pathway chapter discusses the importance of governance and institutional arrangements and identifies several actions that countries can adopt and implement to strengthen and bring about effective and sustainable geospatial information management, coordination and leadership.

While not always the first action to be implemented, an important step is to form the leadership, establish a governing board, council, advisory body, steering committee (or similar mechanism), to bring all stakeholders together to focus on preparing the governance framework, guidelines and managerial instruments to be used across government. This provides an environment for the strategic thinking, planning and decision-making necessary to modernize and sustain geospatial information management practices.

1.2 Context and Rationale

National geospatial information management challenges are often dictated or shaped by existing governance and institutional arrangements.

National geospatial information management challenges are often dictated or shaped by existing governance and institutional arrangements. The most common challenges are related to a lack of structure; organization and leadership. This often stems from weak links with, or communication gaps arising between, the political/policy decision-making levels of government and the more technically orientated geospatial community. Information silos often create or exacerbate further impediments and barriers to information sharing.

Within countries, there are often a number of national institutions responsible for the management of geospatial information, depending on their needs and/or mission. The division of roles and responsibilities is usually domain-specific where urban, transport, rural, forestry, environment, cadastral, topographic, statistical mapping and remote sensing is conducted by different organizations and institutions. There are typically very limited policies or agreements in place to mandate and encourage the required coordination and data exchange, and often no underlying organizational culture of sharing information.

These organizational 'information silos' may lead to the same datasets being created independently and multiple times, causing data inconsistencies and ambiguity for end users, and a duplicative financial overhead for government. The effects of duplication hamper cooperation, as ownership and dependency on data and services challenge what is best for the national interests while promulgating different data standards and models that may arise to meet different business and user needs.

This is often a problem for development projects. It is not always easy to determine if geospatial information exists and/or which organization has the responsibility to provide it. Consequently, information is often duplicated to meet short-term project goals.

A more collaborative approach to governance and institutional arrangements is required, but is not always easy to enact. Mapping systems, technology options, data models and business processes are well entrenched within organizations and difficult to change – culturally and financially – more so without strong leadership.

Nonetheless, the widespread adoption of digital transformation and technologies has made digital collaborations more conceivable. Therefore, geospatial data responsibilities today are increasingly involving multiple organizations working together to deliver geospatial data, products and services to government, the market and the community.

1.3 Approach

The way forward relies on understanding the value of geospatial information and having the leadership to drive change.

In this strategic pathway, the approach for establishing the leadership, attaining political endorsement, strengthening institutional mandates and building a cooperative data sharing environment is through a shared understanding of the value of the IGIF, and the roles and responsibilities to drive change and achieve the vision.

The approach includes four key elements that are a guide for nations to strengthen participation and commitment to achieving the IGIF. These elements include the implementation of a **governance model** to strengthen multi-disciplinary and multi-sectoral participation, effective and transformational **leadership,** supportive **institutional arrangements** and a clear **value proposition** that is appreciated broadly. These elements are explained in more detail in section 1.4 below.

The approach includes strategic pathway actions that are recommended as a means to achieve the four key elements. The actions, which are underpinned by guiding principles, provide the step-by-step guidance to implement and achieve the desired outcomes. While most of these actions may be unique to this strategic pathway, there are several interrelated and/or prerequisite actions detailed in other strategic pathways that may also need to be completed. Tools to assist in completing the actions are available in the appendices to the strategic pathway. The approach for Strategic Pathway 1: Governance and Institutions is illustrated in Figure 1.2 and explained in the following sections.

1.4 Elements

1.4.1 Governance Model

A governance model is the operating structure that defines the way geospatial information responsibilities are assigned, coordinated, managed and monitored within and across institutions.

A governance model is the operating structure that defines the way geospatial information responsibilities are assigned, coordinated, managed and monitored within and across institutions. It provides the policies, guidelines and measures to effectively collect, manage, share, curate and leverage geospatial information.

The governance model directs the level of geospatial information coordination across government – ideally with all levels of government – through partnerships (local, national, regional and global). It reflects the interrelated relationships and operational dynamics that influence the management of geospatial information.

It is essential to achieving government objectives, driving improvement and maintaining a legal and ethical standing in the eyes of stakeholders, partners, regulators and the broader community. The governance model ensures that the geospatial data needed for a nation's current operations and future planning are

considered and recognized, along with the technology and standards that are required to achieve the outcomes.

The model adopted should meet key accountability and outcome provisions of individual government departments, as well as balancing the need for effective collaboration across institutions to achieve the best outcome from a whole-of-government perspective.

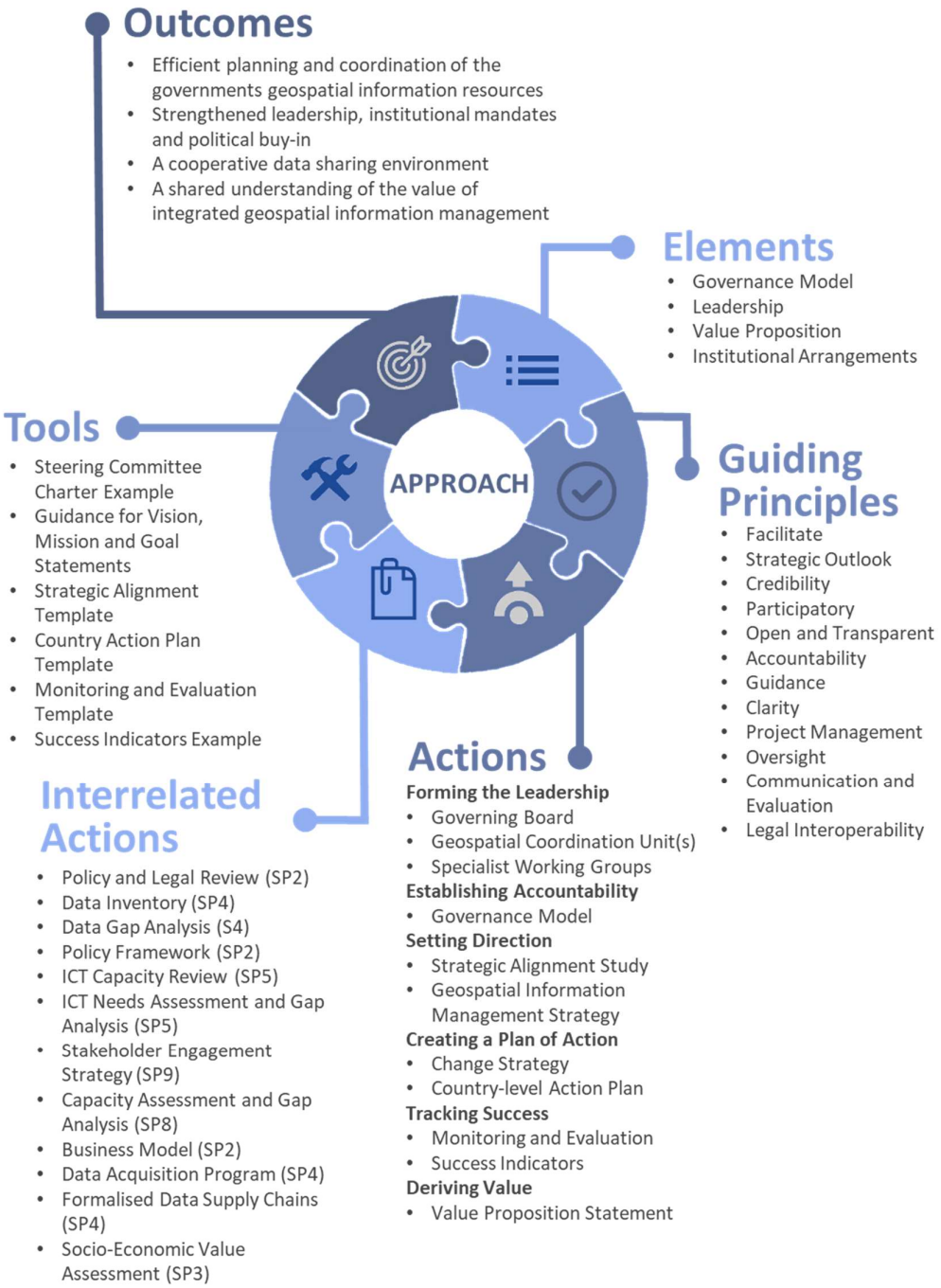


Figure 1.2: *The approach to governance and institutional arrangements.*

1.4.2 Leadership

Leadership requires vision, drives change, and is realized through the implementation of a national strategy.

Leadership drives change and is realized through the implementation of a national geospatial strategy that clearly describes the country's strategic priorities and how geospatial information can be applied to address these priorities. Leadership is about having a vision, the capacity to take positive steps, and knowing the tactics to achieve the vision. With strong leadership, anything is possible; without leadership, very little is achievable.

The geospatial strategy answers the question – Where are we going? It paints a vision of a future where the implementation of the IGIF is realizing significant national social, economic and environmental benefits. Having this vision builds momentum among stakeholders and partners to take action and achieve results.

A "champion" (in government) is typically identified to actively lead, engage and promote the strengthening of geospatial information management across government organizations (at a local, national and global level), and with industry, the private sector, academia, and the local community.

1.4.3 Value Proposition

The geospatial information value proposition is key to achieving political support.

There are many benefits that geospatial information delivers to support the mandates, priorities and responsibilities of government - the benefits of which are ultimately realized by the community. However, the value proposition – understanding the costs (economic, social and environmental) and benefits to the community – is not always clear.

The value proposition is part of the geospatial strategy. It is a statement of what makes geospatial information important and necessary to the responsibilities and activities of government. Understanding and communicating the value proposition, in a country's specific context, is key to achieving political and management buy-in, financial support, human resources, and sustainability.

Understanding the value proposition is necessary in making the case for demonstrating why geospatial information is a valuable government asset. In the first instance, the value proposition is a critical input into the geospatial strategy. Later, it is necessary for the financial investment process and business model.

1.4.4 Institutional Arrangements

Institutional arrangements may be defined as those formal and informal cooperation structures that support and link public and private institutions and/or organizations to fulfill their mandate. They are used to establish the organizational, legal and productive frameworks to allow for the sustainable management of an entity.

Institutional arrangements establish the organizational, legal and productive frameworks for effective geospatial information management.

Appropriate institutional arrangements should be included in the roles and responsibilities of organizations involved in geospatial information, providing the foundation for effective geospatial information management, from the identification of data sources to the dissemination of outputs, and an authoritative, reliable and sustainable geospatial information base for all users. They also provide the operating relationship between organizations - producers, administrators and/or users of geospatial information.

Institutions need to be adequately enabled and mandated to acquire, administer, manage and deliver operations associated with geospatial information and decision-making over the longer term. Sound policies and legal mechanisms strengthen institutional arrangements.

1.5 Guiding Principles

By applying the guiding principles, countries can make progress in strengthening their geospatial information management.

There are specific guiding principles and elements common to successful governance and institutional arrangements that can be adopted by each country. Replicating a successful institutional model from one nation to another will likely not work in its entirety, as there are different priorities and levels of development maturity and cultural aspects that need to be taken into account. That said, using and leveraging good ideas and successful implementations across nations is encouraged where the approach is suitable. The guiding principles for governance and institutional arrangements are:

- **Facilitate**: Provide a forum for the effective management and sharing of geospatial information across government, industry, the private sector, academia and the broader community.
- **Strategic Outlook:** A governance approach that focuses on strategic national imperatives and goals, as well as institutional requirements.
- **Credibility**: A governance model that is easily accessible and credible to participating institutions and broader stakeholders.
- **Participatory:** A governance model that is inclusive of all stakeholders and embraces an inter-disciplinary and cross-sector participatory approach.
- **Open and Transparent:** Open and transparent communication that fosters a culture of cooperation, participation, accountability and innovation.
- **Accountability:** The responsibility for the decisions and laws that affect the strengthening of geospatial information management rests with government and is responsive to stakeholders' needs and is in the interests of the community.

- **Guidance**: A model that is driven from the top, so that participating institutions are well supported, encouraged and guided in their daily tasks and decisions.
- **Clarity:** Clear delegated levels of authority, and roles and responsibilities for implementing and maintaining the IGIF.
- **Project Management**: Sound principles of project management applied at every level clearly indicating responsibilities and expectations for assuring project success for the IGIF program.
- **Oversight:** Review of existing and proposed geospatial information programs to assure that goals and objectives are progressing or have been accomplished and to inform and learn about conditions and circumstances that impact realization of the outcomes.
- **Communication and Evaluation:** Regular cross-sector and cross-committee announcements, program updates, reporting and monitoring, complemented by re-evaluation of performance expectations and adjustments where necessary.
- **Legal Interoperability:** Institutional arrangements and mandates that are interlinked with the policies and laws that enable and promote geospatial information sharing and use.

1.6 Actions

The strategic pathway actions are recommended as a means to achieve the four key elements.

The strategic pathway actions are recommended as a means to achieve the four key elements of governance and institutions. Country-specific actions may be influenced by factors such as country priorities, existing capabilities, national circumstances, resources, culture and other practicalities. These will influence approaches for implementing each strategic pathway and their related actions.

For ease of use, particularly to assist countries in the initial and early stages of developing and strengthening their national geospatial information management arrangements, the actions are presented in a sequential step-by-step structure. A road map illustrating this order and where the actions typically occur and are completed, is presented in Figure 1.3. However, it is acknowledged that countries, depending on existing national arrangements, may also wish to start their actions at different steps along the pathway, and in a different sequence. Therefore, a less structured road map is additionally presented in Figure 1.4.

Some actions may have interrelated and/or prerequisite actions that need to be achieved prior to, or in conjunction with, the strategic pathway actions. These interrelated actions are also illustrated in Figures 1.3 and 1.4, are referenced in the text, and detailed under other strategic pathways.

Figure 1.3: *Governance and institutional arrangements includes several actions and tools designed to assist countries to achieve political endorsement and strengthened institutional mandates for building a cooperative data sharing environment. The actions are divided into six categories and reflect the order with which these actions are typically completed.*

Figure 1.4: *Governance and institutional arrangements includes several actions and tools designed to assist countries to achieve political endorsement and strengthened institutional mandates for building a cooperative data sharing environment. The interrelated actions provide key linkages to other strategic pathway actions.*

Whatever the implementation approach, each action should take into account the guiding principles in section 1.5, as these describe drivers for attaining effective and efficient geospatial information management.

The actions for governance and institutions are divided into six categories, which are:

1. Forming the Leadership
2. Establishing Accountability
3. Setting Direction
4. Creating a Plan of Action
5. Tracking Success
6. Deriving Value

The following actions are typically used to address gaps in capability. They serve as a guide to building the necessary capacity to strengthen integrated geospatial information management processes and systems.

1.6.1 Governing Board

A Governing Board will provide the necessary leadership and direction for implementing and sustaining the Integrated Geospatial Information Framework.

An important first step in forming the leadership is to establish a governing board, council, advisory body, steering committee, or similar leadership mechanism. This provides the necessary leadership and direction for implementing and sustaining the IGIF.

The governing board is generally made up of members from across government which collect, manage and are significant users of geospatial information, and have a significant role to play in strengthening geospatial information management. It provides an environment for strategic thinking, planning and decision-making necessary to modernize and sustain geospatial information management practices.

These key stakeholders may also be identified according to key policy areas and domains. They may include data producers and users from the infrastructure and environment, health and social, defence and economic sectors; as well as stakeholders with mandate and interest in policy priorities that span areas such as ICT, e-government, and science and technology. Private sector and academic institutions may be involved where appropriate. In cases where more complex political and administrative structures exist across different levels of government, various governance configurations may be used to form the governing board, such as networks of stakeholder agencies led by the national geospatial agency, or nested systems of committees.

Using a 'Steering Committee' as an example leadership mechanism, Appendix 1.1 provides a Steering Committee Charter Example as a tool to guide countries in the establishment of such a Committee for National Geospatial Information Management. The Steering Committee requires a Chair to act as the spokesperson, Terms of Reference, roles and responsibilities and code of conduct. The Charter is used to define the Committee's mission, authority and responsibilities, composition, how and when meetings will be held, communicating meeting details and Committee actions, and how meeting minutes will be written and approved.

Ideally, the Chair will be a senior official within the Cabinet or Ministry of Government, with the ability to 'champion' and oversee the geospatial information management strategy and policy, and whom can drive change, mandate and decision-making. In some cases, a Co-Chair may be appointed as a senior official in the national geospatial, mapping or survey agency, and able to contribute geospatial-related expertise and experience to aid decision-making.

The Charter will also incorporate the Committee's purpose, goals and objectives, and may:

- Include agency responsibilities for each fundamental geospatial data asset (theme) for collecting, maintaining, and assuring data coverage, quality and completeness;
- Provide strategic direction and endorse overall policy and strategic plans for sharing geospatial information;
- Deliver whole of government strategic outcomes through the Geospatial Coordination Unit (See section 1.6.2) work plan and the implementation of operational strategies within organizations;
- Coordinate access to geospatial information held by government departments and facilitate cross-sector consultation and liaison;
- Ensure capabilities are planned and implemented for integrating geospatial information across government; and
- Foster innovation, provide leadership and coordination, and promote standards necessary to strengthen geospatial information management.

An example of a Steering Committee Charter is provided in Appendix 1.1

1.6.2 Geospatial Coordination Unit

A Geospatial Coordination Unit (or Office) could be established to coordinate and be accountable for all IGIF related activities.

Importantly, the Coordination Unit is an independent body representing whole-of-government needs and not just the needs of a single Ministry or organization. Such a Unit would preferably be accountable to, and situated within, a Ministry

A Geospatial Coordination Unit is an independent body representing whole-of-government geospatial needs.

to be able to take full advantage of Ministry powers, financial services and human resource management.

The Coordination Unit should have a Senior Responsible Officer (Director) appointed to 'champion' and provide oversight across all government projects involving the collection and management of geospatial information. The position should be as senior as possible, and have political support.

The Geospatial Coordination Unit is typically responsible for:

- Formulating strategies and producing general standards, policies and guidelines for cross-government data management and access;
- Preparing institutional arrangement guidelines and recommendations;
- Building networks of people to continually improve the sharing of geospatial information across the government sector and promote its use for sustainable development;
- Encouraging geospatial-related project sponsors to share experiences within and across sub-national levels, and with a mix of data producers and users. This arrangement should be inclusive of community mapping groups and the private sector, where appropriate; and
- Using communication and engagement resources to reach out to a wider set of stakeholders, at the national and sub-national levels, to publicize use cases and successes, and to scale up emergent capabilities.

To strengthen governance, other sub-coordinating units may be established over time to support the Coordination Unit in specific functions. For example, data and mapping committees may coordinate technical working groups related to data policies, standards and clearinghouses, under the overall direction of the Coordination Unit. Ad-hoc advisory committees may also be set up to oversee particular focus areas.

1.6.3 Specialist Working Groups

Specialist Working Groups, advise the Coordination Unit and Governing Board on specialist matters.

Specialist Working Groups (or subcommittees), comprising subject matter experts, are required to advise the Coordination Unit and Governing Board (or Steering Committee). Working Groups will facilitate frameworks for wider sharing of geospatial data and their interoperability across institutions. The following themes for Specialist Working Groups are suggested:

- **Technical:** Provides advice on effective processes for the development of the technical aspects associated with data sharing and integration, and provides advice on the ongoing operational components of data exchange systems. In addition, if there is an intent for a national geospatial portal and/or website for users to access any and all geospatial data for the country, a technical working group could assume the coordination of that effort.

- **Data:** Provides advice on the management, integration, organization, scope and development of the Fundamental Data Framework, monitors issues associated with geospatial data collection and management, and develops and monitors the adoption of data standards for access to and use of geospatial data.
- **Capacity and Education:** Provides oversight and directs initiatives aimed at raising awareness and building the skills and knowledge necessary for strengthening geospatial information management.
- **Policy and Legal:** Provides advice on matters relating to the geospatial information policy and legal framework and its implementation, drafts policy and legal documents and provides advice on the review, approval, and promulgation of policies.
- **Financial:** Proposes effective and efficient methods of financing and investment for the operational sustainability of national and regional geospatial information management. Builds partnerships with donor organizations, commercial sector enterprises and academia to sustain the ongoing operations of geospatial information coordination.
- **UN-GGIM:** Coordinates the review of UN documents related to global, regional, national, and local geospatial topics. Coordinates preparation for the annual intergovernmental session of UN-GGIM. Assures participation on the UN-GGIM Subcommittee, Expert and Working Groups associated with geospatial responsibilities.
- **Users:** Coordinates between the geospatial user community and the government agencies responsible for collecting, managing, integrating, and disseminating geospatial information. Develops strategies for effective engagement with the user community. Encourages comments, feedback and reviews on topics of geospatial data availability, quality, usability, currency, and coverage.
- **Boundaries:** Assures development of nationally consistent boundaries for each fundamental data theme, as appropriate, that are integrated to a common geographic base. Promotes the use of geospatial standards in the delineation, collection, and management of boundaries. Provides guidance on the creation and management of boundary metadata.

It is also important to establish a Communication and Engagement Steering Group to direct, evaluate and make recommendations on the stakeholder communication and engagement processes over the longer term (See SP9: Communication and Engagement).

The interrelationship between the Governing Board/Steering Committee, Geospatial Coordination Unit, Specialist Working Groups, and the Communication and Engagement Steering Group are illustrated in Figure 1.5.

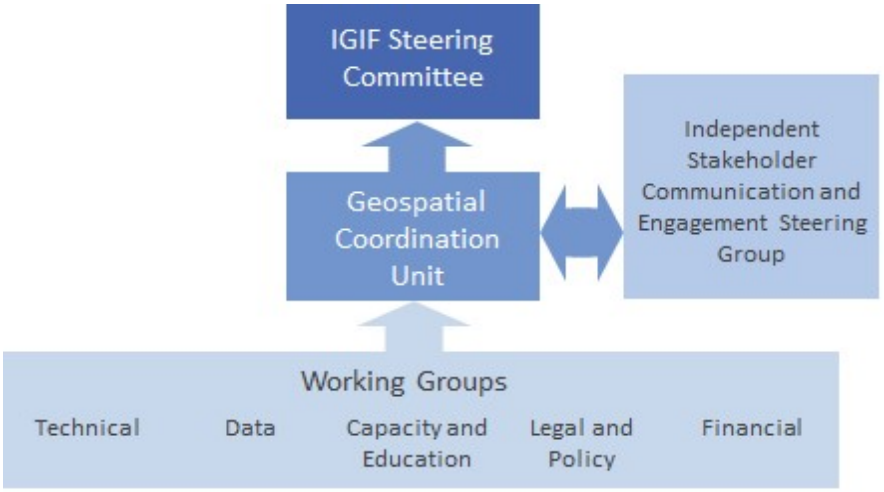


Figure 1.5: *Interrelationships between the Governing Board/Steering Committee, Geospatial Coordination Unit, the Specialist Working Group, and the Communication and Engagement Steering Group*

1.6.4 Governance Model

The Governance Model is designed to bring national and municipal agencies together to share geospatial information.

The Governance Model demonstrates the interrelationships between the proposed institutions, Governing Board, Committees and the Geospatial Coordinating Unit. The Governance Model is designed to bring national and municipal agencies together to share geospatial information, reform cross-agency business processes and adopt data standards and interoperable systems.

Ideally, the Model should build on and encourage stakeholder participation and innovation, reduce data duplication across the government and project sectors, and maximize the use of geospatial data at the national and local levels. Specifically, the Governance Model should provide guidelines for:

- Addressing national geospatial needs and priorities while ensuring that sufficient investments are planned;
- Promoting an overall environment of collaboration across national and local government organizations;
- Providing a description of each institution and their delegated powers, and roles and responsibilities in reference to the IGIF;

- Identifying the key institutions, along with their roles and responsibilities, to effectively manage and implement coordinated management of geospatial information across all levels of government;
- Developing processes and procedures that serve as communication channels for geospatial information and knowledge sharing;
- Providing a mechanism for civic and user engagements to assure that user expectations are heard and considered; and
- Developing institutional organizational models and regulations for effective management and sharing of geospatial information across sectors.

The adoption of a Governance Model for geospatial information management in developing countries can be enhanced through twinning arrangements with developed countries; this could be facilitated through mechanisms such as UN-GGIM.

1.6.5 Strategic Alignment Study

A Strategic Alignment Study assists countries to align geospatial information management activities to what matters most.

Integrated geospatial information management is a strategic enabler. It enables improved planning for economic growth and delivery of better services, supports the implementation of the SDGs, engenders socially inclusive development, facilitates protection of the environment, reduces disaster response times, supports regional cooperation and promotes transparency in governance.

A Strategic Alignment Study assists countries to set the direction towards aligning geospatial information management activities to what matters most. It results in the linking of integrated geospatial information needs and resources with the priorities of government (social and economic development, SDGs, regulatory, public safety and emergency response, etc.). A Strategic Alignment Study essentially determines and defines a portfolio of geospatial information management activities, projects and programs that will deliver a nation's strategic priorities. The results from this Study are typically included in the Geospatial Information Management Strategy (See section 1.6.6). Institutional mandates can be harmonized in line with higher-level government priorities and initiatives.

Strategic alignment enables improved performance of integrated geospatial information management activities by optimizing the contributions of organizations (people, processes, and inputs) in a way that minimizes waste, duplication, and misdirection of effort and resources. Specific examples of how integrated and strengthened geospatial information management is a strategic

enabler, as benefits, are provided in the introductory chapter: Solving the Puzzle.

The first step in a Strategic Alignment Study is to identify the country's strategic priorities. This involves listing the strategic drivers that will benefit from having strengthened geospatial information management, determining what actions are required to facilitate transformational change, and prioritizing effort.

A template for conducting a Strategic Alignment Study is provided in Appendix 1.2.

1.6.6 Geospatial Information Management Strategy

The Geospatial Information Management Strategy identifies the vision, mission, goals and objectives of the geospatial information management initiative.

The Geospatial Information Management Strategy is an important first step towards identifying the vision, mission, goals and objectives of the geospatial information management initiative. It is a plan to achieve the long-term and overall aim of the IGIF and provides the direction for defining the institutional arrangements.

The Strategy can vary in scale and scope, ranging from a comprehensive master plan to a set of nested strategies and action plans that span different thematic use cases, technical issues, and sectors. The Strategy can also be reviewed and developed in phases to provide flexibility for adaptation to evolving priorities and focus areas for geospatial information management. Depending on a country's political and administrative structures, the formulation of the Strategy may be mandated by legislation or take place as part of policy processes.

The Strategy development process should include the views of all stakeholder groups. Typically, this is achieved through a Strategic Workshop and a consultation process of the draft Strategy where key stakeholder groups can have input into the Strategy's development (See SP9: Communication and Engagement). This can take place through various approaches. For example, visioning exercises can be conducted to identify broad outcomes, strategies and opportunities; while roundtable discussions and leadership forums may complement these exercises by articulating more detailed objectives and plans. Individual interviews may also be held with key experts and stakeholders for in-depth discussions and consultation.

The Strategy should include the case for change, compliance to agency missions, significance and examples of benefits such as economic development, commercial opportunities and societal wellbeing, and consider specific policy and legal requirements. This may be supported by feasibility studies that aim to assess and demonstrate benefits of the Strategy.

The Strategy should connect to other broader strategic and policy objectives of government (Environmental Policies, Financial Policies, Health Policies, etc.) in

order to provide direction on where to focus and apply most effort (See section 1.6.5).

Guidance on how to create a vision and mission statement, and strategic goals is provided in Appendix 1.3.

1.6.7 Change Strategy

The Change Strategy identifies how a country will change current geospatial information management practices.

Once the Geospatial Information Management Strategy is complete, a Change Strategy is conducted to identify actions that need to be included in the Country-level Action Plan (See section 1.6.8). The Change Strategy identifies how a country will change current geospatial information management practices, addressing such things as creating or enhancing existing data assets, implementing new governance structures and institutional arrangements, streamlining the data supply chains, adopting new technologies and methods, developing a supporting policy and legal framework, and building human capacity.

As part of the development of the Change Strategy the following tasks can be undertaken. The output of these tasks informs the Change Strategy and subsequently the Country-level Action Plan. The tasks include:

- **Data Inventory and Gap Analysis** based on strategic needs and priorities (See SP4: Actions 4.6.2 and 4.6.4).
- **Institution Culture Assessment and Gap Analysis** to gauge whether stakeholders understand the reasons for the IGIF, and whether they view the Framework as potentially beneficial and are in support of the changes required. It will then be possible to determine what cultural changes may be required to implement the Framework. This action forms part of the Stakeholder Communication and Engagement Strategy (See SP9: Actions 9.6.3 and 9.6.4).
- **Data Acquisition and Supply Chain Assessment** to understand the vertical and horizontal data sharing and integration activities across institutions, and the role of the private and volunteering sectors in acquiring data, and the conditions under which this data can be used (See SP4: Action 4.6.16).
- **Technology Assessment and Gap Analysis** to understand the current technological capabilities for collecting, maintaining and sharing integrated geospatial information. This may include hardware,

software, system interoperability, network and Internet connectivity and bandwidth as well as public interfacing open Internet (See SP5: Action 5.6.2 and 5.6.3).

- **Policy and Legal Review and Gap Analysis** to better understand the policy and legal changes necessary to implementing integrated geospatial information management and access (See SP2: Action 2.6.x).
- **Capacity Assessment and Gap Analysis** to identify where resources and skills fall short of requirements. Gaps in training and knowledge exchange among stakeholders are identified early to inform the Change Strategy (and will also inform the capacity-building plan (See SP8: Action 8.6.1 to 8.6.4).

The results from the above assessment tasks are necessary to better tailor the Change Strategy to a country's particular needs. The Change Strategy also includes communication strategies designed to raise awareness and understanding of the benefits and opportunities of the IGIF, and to ensure these benefits are communicated to decision-makers and stakeholders more broadly.

In summary, the Change Strategy clearly outlines the current and proposed future state of integrated geospatial information management, capacity and education, data acquisition and supply chain strategies, policy and legal reform, and communication and engagement strategies.

1.6.8 Country-level Action Plan

The Country-level Action Plan describes how a country will meet its goals and objectives, when, and by whom.

The Country-level Action Plan, which forms Part 3 of the IGIF, describes how a country will meet its goals and objectives through detailed actions, when these actions will be undertaken and by whom. The Country-level Action Plan references the specific guidance, options and actions provided in the Implementation Guide, and is the process of building an IGIF for a nation, beginning with specific plans that align with a nation's priorities and circumstances.

While more detail on the Country-level Action Plans is provided in 'Solving the Puzzle', this strategic pathway, as governance and institutions, provides the transition from the guidance – what types of actions can be taken; to the doing – how the actions will be carried out, when and by whom. In this regard, it is important to recognize that the Country-level Action Plan is a plan, not a programme, that is implemented.

The Country-level Action Plan contains the processes, templates and tools that are available and necessary to first develop a national action plan, and then operationalize the IGIF through its subsequent implementation, and aligned with national priorities. The Country-level Action Plan can be viewed as the 'requirements document' for national geospatial implementation.

The Country-level Action Plan is typically spread across appropriate horizon periods (e.g. 1-3 years, 3-5 years, or 5+ years as relevant). Delivering integrated geospatial information is likely to be a complex and time-consuming exercise and therefore the road map should be designed to grow capability over time. While there is no specific order required, a sequence of actions helps to plan for subsequent dependent actions.

A template for a Country-level Action Plan is provided in Appendix 1.4.

1.6.9 Monitoring and Evaluation

The Monitoring and Evaluation Framework monitors achievements towards attaining strategic goals.

The Monitoring and Evaluation Framework ensures regular monitoring of achievements towards attaining a country's strategic geospatial information management goals. The Monitoring and Evaluation Framework should:

- Identify the people and institutions involved in delivering and maintaining integrated geospatial information;
- Provide the methodology and procedures for reporting; and
- Allow for incentives (and disincentives) for enabling successful integrated geospatial information management practices.

A template for Monitoring and Evaluation is provided in Appendix 1.5.

1.6.10 Success Indicators

Success Indicators monitor and evaluate progress towards strengthening integrated geospatial information management.

Success indicators are used to monitor and evaluate progress towards strengthening integrated geospatial information management. Success can be gauged by measuring progress towards achieving the objectives for each strategic pathway, the objectives identified in the Geospatial Information Management Strategy, or by measuring progress of the Strategy in relation to global trends in geospatial information management. As such, indicators on different scales may be used, such as the status of completion of specific initiatives in progress report cards; and international best practices that act as benchmarks of the level of use of geospatial information and technology in different local sectors.

Achieving objectives indicates being on the right path towards achieving the strategic goals. If an objective is not met, corrective action may be required. It

is worthwhile documenting contributing factors and extenuating circumstances that may justify either leaving the objective as-is or changing it.

An example of Success Indicators is provided in Appendix 1.6.

1.6.11 Value Proposition Statement

The Value Proposition Statement answers 'why' governments need integrated geospatial information. It reflects the importance of geospatial investment.

A value proposition is the statement(s) that answers 'why' governments need integrated geospatial information. It is the means to convince decision-makers the importance of investing in geospatial data and the technologies that enable information sharing, improved government services and products. Importantly, the value statement, explains 'why' having integrated geospatial information will be of more value than just continuing to manage data in the same ways.

The value proposition is a clear and concise statement that addresses problems that would benefit from having integrated geospatial data and analytical capabilities. It explains how geospatial information can address these problems, the benefits that can be realized, and what makes these benefits valuable.

Value proposition statements are often created using a value proposition canvas (Figure 1.6). The canvas has two main functions:

- **Understand the Need:** This step considers existing government organizational activities, the outcomes that government is trying to achieve by conducting these activities, and the problems (inefficiencies and ineffectiveness) encountered when trying to complete these activities; and
- **Explain the Value:** This step lists the products and services that can be delivered using geospatial information, describes how these products and services can be applied to eliminate the problems faced by organizations, and outline how geospatial information produces increase and/or maximize outcomes and benefits organizations.

An example for creating a value proposition statement is as follows:

Step 1: Understand the Needs

a. Government Activity Performed: Forestry Management: Issuing of Logging Permits.

b. Problem/Pressure Point: Do not understand the impact of logging on the environment and whether permits are appropriately issued.

c. Outcome: Be able to issue logging permits in a way that preserves the environment by knowing the likely risks of logging in particular areas e.g. salinity and health costs of diseases associated with deforestation.

Step 2: Explain the Value

a. New Product and Service: Satellite Monitoring Systems e.g. pasture biomass, vegetation quality.

b. New Solutions/Capabilities: Detect changes in the environment, potentially through logging practices, so that farmers can modify practices to counteract emerging environmental issues.

c. Direct Benefits: Improved forestry, farmland and environmental management resulting in the preservation of the environment.

Step 3: Create the Value Proposition Statement:

"Satellite remote sensing is used to monitor change in the environment, and this capability is used to inform government policy on the management of the environment, so that best practices land management techniques are adopted to preserve the environment for future generations."

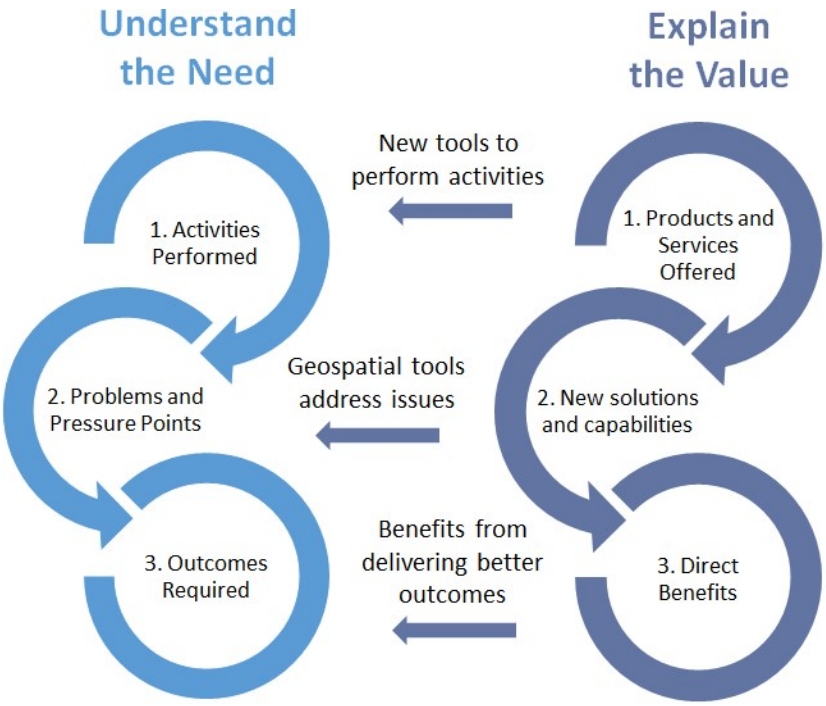


Figure 1.6: *Steps for creating a Value Proposition Statement.*

A geospatial socio-economic value assessment further develops the value proposition statement. It enumerates the potential costs of implementing the IGIF, the value of the anticipated benefits derived from strengthening geospatial information management, and the trade-offs inherent in alternative options.

The socio-economic value assessment provides a valuation of geospatial information in economic terms, as this is necessary to achieving valid consideration in government policy.

For more information on the socio-economic value assessment see SP2: Financial. An integrated socio-economic analysis can capture both hidden costs and benefits of geospatial information, as well as the synergies and institutional economies of scale that may be achieved through complementary policies that support sustainable development.

1.7 Deliverables

The list of deliverables below are the outcomes typically created as a result of completing the actions in this strategic pathway. They are key success indicators in realizing an Integrated Geospatial Information Framework. Examples include:

- A Governing Board, such as a Steering Committee and agreed Steering Committee Charter;
- A Geospatial Coordination Unit appropriately staffed and with delegated powers, roles and responsibilities, and funding and computing resources;
- Fully functioning Specialist Working Groups (or subcommittees) with specific Terms of Reference;
- Geospatial Information Management Strategy;
- Change Strategy:
    - Data Inventory and Gap Analysis
    - Institution Culture Assessment and Gap Analysis
    - Data Acquisition and Supply Chain Assessment
    - Technology Assessment and Gap Analysis
    - Policy and Legal and Review and Gap Analysis
    - Capacity Assessment and Gap Analysis
- Detailed Country-level Action Plan including a schedule of actions;
- Monitoring and Evaluation Framework and Success Indicators for effective multi-stakeholder monitoring of actions under the Action Plan Road Map; and
- Geospatial Value Proposition and Socio-economic Value Assessment.

1.8 Outcomes

The following outcomes result from establishing the leadership, governance model, and institutional arrangements and a clear value proposition for integrated geospatial information management:

- Efficient planning and coordination of the governments geospatial information resources;
- Strengthened leadership, institutional mandates and political buy-in;
- A cooperative data sharing environment; and
- A shared understanding of the value of integrated geospatial information management.

1.9 Resources

As part of the work programme of UN-GGIM, there are a number of related initiatives and activities including by the Subcommittee, Expert and Working Groups of the Committee of Experts. These initiatives and activities are multi-stakeholder when arriving at outcomes and outputs. This inclusive and participatory nature of work has allowed the preparation of a number of resource documents/publications that are helpful and useful when addressing the complexities in governance and institutions that impacts geospatial information management. This includes specifically the work and contributions of the UN-GGIM Working Group on Trends in National Institutional Arrangements. The Working Group has provided a series of deliverables that will support countries in developing their governance structures and institutional arrangements for geospatial information management, and have been used in this strategic pathway. These include:

- National Institutional Arrangements: Instruments, Principles and Guidelines[4];
- Compendium of Good Practices for National Institutional Arrangements[5];
- Foundational Guide to National Institutional Arrangements Instruments for Geospatial Information Management (Asia-Pacific)[6]; and
- Future Trends in Geospatial Information Management: The five to ten year vision. Second Edition.[7]

[4] http://ggim.un.org/meetings/GGIM-committee/7th-Session/documents/Agenda%207%20NIA%20Instruments,%20Principles%20and%20Guidelines.pdf

[5] http://ggim.un.org/meetings/GGIM-committee/7th-Session/documents/Agenda%207%20Compendium%20of%20NIA%20Good%20Practices.pdf

[6] http://ggim.un.org/meetings/GGIM-committee/9th-Session/documents/Foundational_Guide_NIA_Instruments_for%20Geospatial_Information_Management.pdf

[7] http://ggim.un.org/documents/UN-GGIM-Future-trends_Second%20edition.pdf

1.10 References

UN-GGIM, 2017. *Trends in national institutional arrangements in global geospatial information management*. E/C.20/2017/6/Add.1. http://ggim.un.org/meetings/GGIM-committee/7th-Session/documents/E-C20-2017-6%20National%20Institutional%20Arrangements%20Report.pdf