Strategic Pathway 3

Financial

*This **strategic pathway** establishes the business model, develops financial partnerships, and identifies the investment needs and means of financing for delivering integrated geospatial information management, as well as recognizing the benefits realization milestones that will achieve and maintain momentum.*

*The **objective** is to achieve an understanding of the financial plans required to establish and maintain an integrated geospatial information management, as well as the longer-term investment program that enables government to respond to evolving societal, environmental and economic demands for geospatial data.*

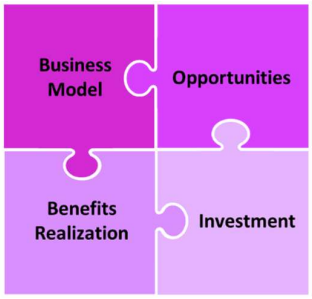
Summary

Financial governance, planning, management, and investment 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 nationally, and there is a corresponding and credible financial plan to realize these targeted benefits.

For most countries, investment in geospatial information management is framed in terms of a business case that provides justification for undertaking a program or project, includes an evaluation of the benefits, costs, and risks associated with different implementation options, and the rationale for the preferred solution. This business case answers the questions “why is this investment activity important?” and “what benefits does the country derive from its implementation?” The business case addresses the viability of the proposed investment and answers the question “what problem or challenge is solved with this investment?”

The preparation of a business case is only one aspect of financing integrated geospatial information management. Additionally, there is a need for a robust and sustainable business model built around strong realizable value propositions followed by a financial plan that describes how the business model is achieved. This business model typically is based on market development opportunities for geospatial information management, which in today’s terms, is likely to focus increasingly on a range of location-based services rather than traditional data and map products.

Common to all financial arrangements are four key elements that are required to deliver integrated geospatial information management that can be strengthened, supported and sustained over the longer term.



The four elements are:

- **Business Model** facilitates the wider use of integrated geospatial information, is compatible with the government's fiscal policy and funding approaches, and is implemented through a financial plan.
- **Opportunities** are the techniques and methods for aligning integrated geospatial use cases with national strategic and policy objectives to identify opportunities, partnerships, investment priorities, and benefits.
- **Investment,** the business case that justifies funding and investment including the strategic case (why now), economic case (quantified benefits), commercial case (customers and partners), financial case (funding sources), and the financial management strategy for implementing the investment and resources required.
- **Benefits Realization,** a plan to reliably evaluate, measure, and monitor the complete life cycle of the implementation of the Integrated Geospatial Information Framework (IGIF), including the key performance indicators that form the basis for impact assessment and quantification.

These elements are underpinned by principles that promote financial responsibilities associated with geospatial activities that can be adopted by each country. The principles are put into practice through strategic planning and actions that deliver and strengthen financial resourcing, fiscal responsibility, and accountability for achieving nationally integrated geospatial information management. 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 the financial Strategic Pathway is illustrated in, and anchored by, Figure 3.1.

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

- An investment plan that includes current funding sources, obligations, and estimates for future years;
- New funding initiatives identified to meet the priorities for integrated geospatial information management;
- A financial accounting of costs associated with all aspects of a national integrated geospatial information program; and
- The socio-economic value of geospatial information that is well defined and aligns with the financial plan to realize benefits.

[1] The interrelated actions across all Strategic Pathways are described in detail in the introductory Chapter; Solving the Puzzle: Understanding the Implementation Guide.

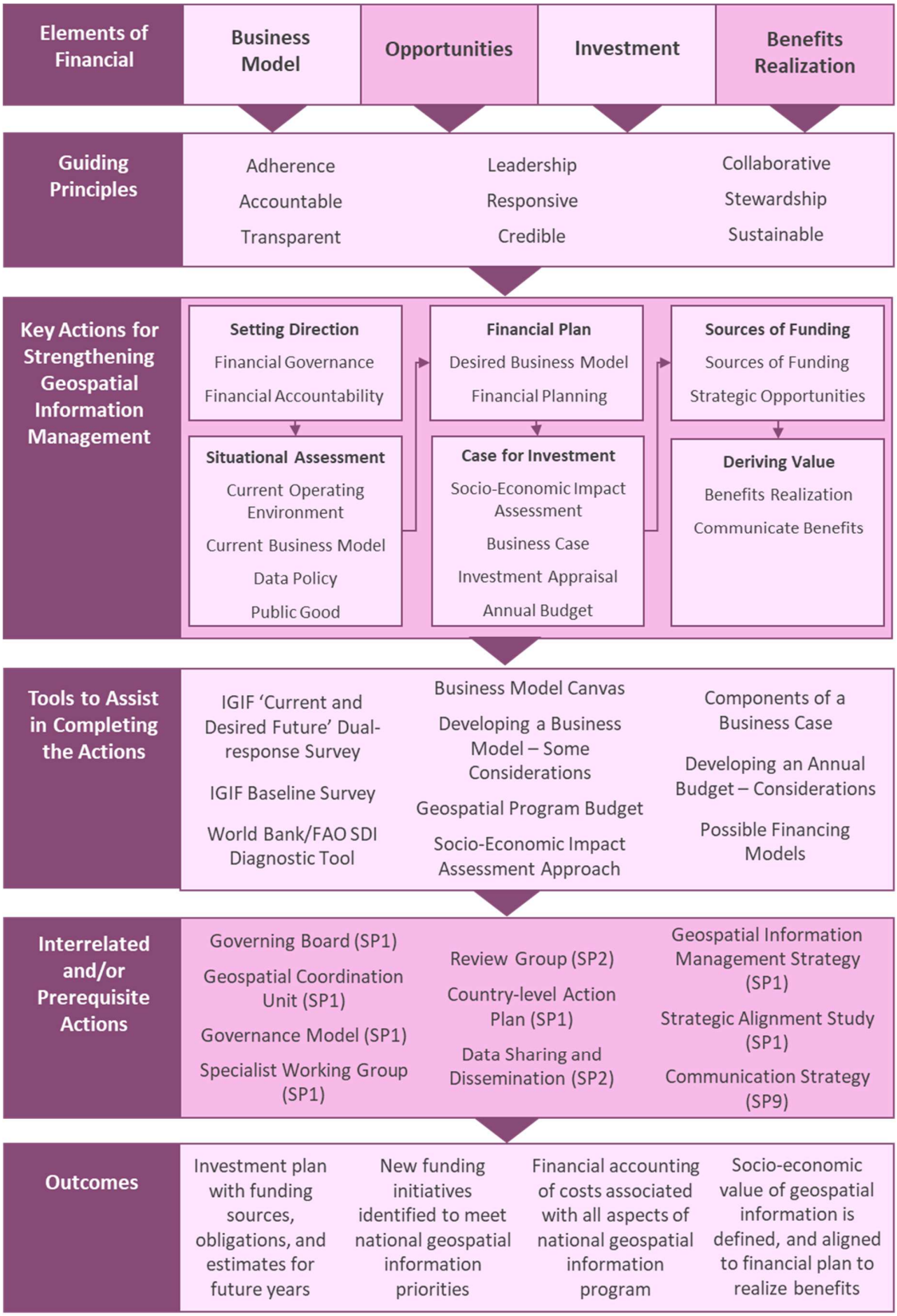


Figure 3.1: *The overall structure for the Financial Strategic Pathway – showing the four key elements, guiding principles, actions and interrelated actions, and the tools provided in the Appendices to support and achieve the outcomes.*

3.1 Introduction

Planning, organizing, directing, and controlling the financial activities for strengthening integrated geospatial information management is crucial.

Planning, organizing, directing, and controlling the financial activities for strengthening integrated geospatial information management is a crucial pathway of the IGIF. Financial management is accomplished through financial policies and plans, sound financial controls and accountability, and making financial decisions such as those needed for procurement and utilization of funds – all of which is achieved according to general management principles.

The range of approaches to financing the implementation of the IGIF are diverse, there are several approaches that countries can choose to meet their needs. The choice is primarily influenced by fiscal policy, other policy frameworks and regulations imposed by governments, institutional arrangements and relationships, as well as the maturity of the geospatial information markets and associated suppliers of products and services.

One important aspect of fiscal governance is how a country sets rules, regulations, and procedures to plan, approve, implement, and monitor national budgeting, allocation of funding, and the monitoring of expenditures. Fiscal governance will be impacted by policy and legal frameworks, as these provide both guidance and restrictions on how funds can be used (See SP2: Policy and Legal).

In some countries, certain taxes and fees are dedicated to a particular purpose, such as emergency response, public safety, or environmental improvement. In these situations, the value proposition of funding integrated geospatial information management will depend fundamentally on understanding costs and benefits.

In terms of costs, information technology (IT) and data needs often comprise a high percentage of costs, and require appropriate financial planning and management. Example of these costs include collecting, acquiring, and maintaining data (See SP4: Data), IT purchases, leases and maintenance, and expenses associated with innovation (See SP5: Innovation). In terms of benefits, an understanding is required of the socio-economic value of geospatial information and the necessary levels of investment and funding sources required to deliver and maintain this value.

There are several comprehensive studies demonstrating the value of integrated geospatial information for consumers (commuting and fuel efficiency, personal safety, and purchasing efficiency); private sector and industry (new products and services, productivity benefits, and sales growth, particularly for small businesses and tourism spend); government (urban planning, civic engagement, public health, safety, and emergency response); and wider societal benefits (job creation, health management, disaster preparedness, environmental and

wildlife preservation, traffic congestion, knowledge creation, and human capital development) (Alphabeta, 2017).

With government financing, the value of investment in geospatial information is typically viewed as benefits to social, environmental and economic program outcomes. However, other values of geospatial information are often underreported. Current studies are limited to global studies and national reports in developed countries. There is less published work related to developing countries. Furthermore, limitations relate to the lack of national statistics that directly report the geospatial market, making estimations reliant upon assumptions that are not strong in evidence and can be contested.

Therefore, a significant challenge is to calculate an economic indicator for the public good as well as economic growth of geospatial information. For example, enhanced business opportunities for small and large businesses are made possible because of the availability of basic geospatial information offered by government; while users and the community benefit in their day-to-day needs and activities. The first example is one of economic growth and development, while the second reflects public good.

Human resources are a significant investment and cost for organizations but offer sustainable benefits when well-planned. Ensuring a ready workforce requires adequate higher-level educational offerings, as well as continual learning opportunities for current staff to keep pace with innovation, and user needs and demands (See SP8: Capacity and Education). Financial considerations include staff costs (including any overhead costs such as leave, training, travel, healthcare, and pension fund obligations), and adjustments for annual inflation rates. Staff resources (internal and contracted services) are usually one of the highest costs associated with an integrated geospatial information management program.

Partnerships are also crucial to building relationships that support the funding of IGIF initiatives. There are a variety of funding partnerships including: (a) cost sharing with other government agencies; (b) loans from lending institutions, such as regional development banks, with conditions; (c) grants from donor organizations and donor countries where scope and conditions are agreed to; (d) in-kind financial benefits resulting from IGIF activities, such as data sharing between different levels of government; (e) cooperative research and development agreements between government and private sector; and (f) other financing arrangements, such as public-private partnerships (see SP7: Partnerships).

National institutional arrangements also play a significant role in shaping the approach to financing IGIF initiatives (UN-GGIM, 2017). Institutional arrangements are built on cooperation, trust, and shared responsibilities. These partnerships can be difficult to manage, but typically yield financial benefits

when implementing the IGIF. For example, in some countries, geospatial data is regularly and better maintained, and more accurate within local governments. Therefore, using this same data for regional and national purposes ensures better use of the data, reduced duplication of efforts and costs, and the establishment of effective working relationships between the different levels of government. Hence, data sharing is financially efficient and benefits the country and its population.

In summary, the use of the Financial Strategic Pathway, in conjunction with other IGIF strategic pathways, is essential in providing an opportunity for a country to address and respond to the value of integrated geospatial information management in meeting national priorities and circumstances. Having financial, funding, and resource plans based on reasonable estimates, along with a proposed action plan to implement the Framework, makes possible, and strengthens, efforts to maintain or advance a country's integrated geospatial information management.

This strategic pathway is a guide for sound, responsible and accountable financial governance, planning, management, and investment required to achieve sustainable integrated geospatial information management. Investment will typically be realized when governments can see evidence that geospatial information will deliver the desired social, environmental, and economic benefits.

3.2 Context and Rationale

Countries have a wide variety of good practice business models and financing arrangements to choose from across the world.

For all countries, sound financial policies, the mobilization and effective use of domestic resources, underscored by the principle of national ownership,[2] and accountability, are central to the common pursuit for nationally integrated geospatial information management. Additionally, for some countries, the ability to access international public finance, including overseas development assistance, catalyzes additional resource mobilization from other sources[3]. These additional sources may include philanthropic foundations and public-private partnerships. Creating an enabling environment for private geospatial businesses to apply their creativity and innovation, as well as increasing geospatially related business investment and activities, are major drivers for productivity, inclusive economic growth and job creation[4]. These drivers increase domestic resources, and contribute to solving the financial challenges of a nationally integrated geospatial information management.

[2] Paragraph 20, Addis Ababa Action Agenda - Financing for Development
[3] Paragraph 54, Addis Ababa Action Agenda - Financing for Development
[4] Paragraph 35, Addis Ababa Action Agenda - Financing for Development

Countries have a wide variety of 'good practice' business models and financing arrangements to choose from across the world. However, the adopted model(s) should be compatible with the suggested national guidelines suggested mode for financial operations, strategic requirements, and fiscal and funding procedures and capabilities. Efforts should reflect national benefits from the wider use of geospatial data in government, the private sector and the community, and account for sustainability of nationally integrated geospatial information management.

Alternative models for financing vary and include government funded cost recovery, shared funding, and full commercial models. Hybrid versions of these will typically exist. Government funded programs, referred to here, are those where the management and responsibility of geospatial data, products, and services are fully funded from public revenues. A cost recovery model involves a financial approach where the cost of creating and maintaining geospatial data, products, and services is recovered and where the income is used to supplement government funding to run and maintain operations. The shared funding approach is to portion costs across public sector organizations and user stakeholders. Government organizations may generate a positive return on investment through the 'commercialization' of geospatial data, products, and services, and use the surplus to maintain operations without government funding.

The development of an integrated geospatial information management nationally is likely to require new funding. The reason is that the IGIF exceeds previous efforts devoted to creating and maintaining a national spatial data infrastructure (NSDI). Where NSDI efforts successfully collected, managed, and disseminated geospatial information, the reality of greater user demands for more data and data types that are integrated to answer societal, environmental, and economic questions require new and additional investment. This will require quantifying the value of geospatial information in terms of national needs and its relevance to key government programs, as well as economic growth opportunities.

In cases where geospatial information is deemed a public good, government allocation and funding sustain a country's geospatial information program through the government's budgetary process. The government assumes the financial obligation for providing integrated geospatial information management and related infrastructures, products, and services that meet the requirements of government policies and programs. Additionally, these government-funded investments may encourage businesses to apply their creativity and innovation, opportunities for government contracts and value-added data, products, and services that stimulate and grow national economies.

Where cost recovery models are used, organizations responsible for integrated geospatial information management may be required to recover a proportion of the costs involved in its development from sources of revenue, or income other than allocations from public funding. The main sources of revenue usually come from fees or incomes for geospatial products and services and/or shared cost agreements with other organizations from across the government. Revenues are thus market-driven and susceptible to adverse market conditions and economic downturns.

Sometimes there is an expectation that an organization will transform to full cost recovery over time, achieved by raising sufficient revenues to balance operating costs plus enough surplus to fund investment and continual improvement. This is not an easily attainable model for many countries as potential "customers" of geospatial information may not afford the fees or costs. Additionally, the organization may concentrate on sustaining products and services, or collecting geospatial data, to meet specific requirements that have potential to generate higher revenues for the organization.

Income from the licensing of data and services is another option for a government organization. However, licensing fees will typically not realize a significant benefit, because there are often resourcing costs associated with the licensing process, and the cost to license data may deter the wider use of data in government, the private sector, and the community. Further, the cost of collecting fees and income may be substantial, particularly if collected from other government entities, and can be greater than the revenue itself. Engaging with countries which have attempted this approach is a valuable exercise to learn the pros and cons of their experiences.

There are often constraints on the ability of organizations to raise revenue. This ability may be limited by market demand but also the level of added value that government organizations are allowed to provide through their products and services. Some governments have clear policies that differentiate between the remits of the public and private sectors.

Initial efforts to realize sound financial governance, planning and management will likely face challenges from various directions. Each attempt builds on lessons learned, where knowledge is gained, and improvements are realized from experience. Assessment, analysis, monitoring, and evaluation will indicate the benefits that are realized from the implementation of the IGIF, and will guide adjustments and modifications of the financial strategy and plan to ensure the best use of funds and resources as they relate to national priorities and circumstances.

3.3 Approach

The way forward, framed by sound justification, includes an evaluation of the benefits, costs, risks, and investment needs associated with different implementation options, and preferred solutions.

In this strategic pathway, the approach for financial governance, management, and investment required to achieve sustainable integrated geospatial information management is cognizant that investment in integrated geospatial information management, and framed by sound justification, includes an evaluation of the benefits, costs, and risks associated with different implementation options, and the rationale for the preferred solution. The approach identifies near-, medium-, and long-term investment needs while ensuring that a sound and disciplined approach is in place to manage funds, revenues, and expenditures.

The approach includes four key elements that are a guide for countries to strengthen participation and commitment to achieving nationally integrated geospatial information management. These elements include the implementation of a **business model** with a financial plan to strengthen financial management processes, a socio-economic value analysis to highlight financing and partnership **opportunities**, the business case that supports and justifies **investment** and a management plan, and a **benefits realization** plan to measure success in achieving the desired outcomes. These elements are explained in more detail in Section 3.4 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 3: Financial is illustrated in Figure 3.2 and explained in the following sections.

The actual implementation approach of each strategic pathway action will depend on country-specific needs, which may be influenced by country priorities, existing capabilities, resourcing potential, culture and other practicalities. Whatever the implementation approach, each action should reference the guiding principles below (See Section 3.5) as these describe what is important for effective and efficient geospatial information management.

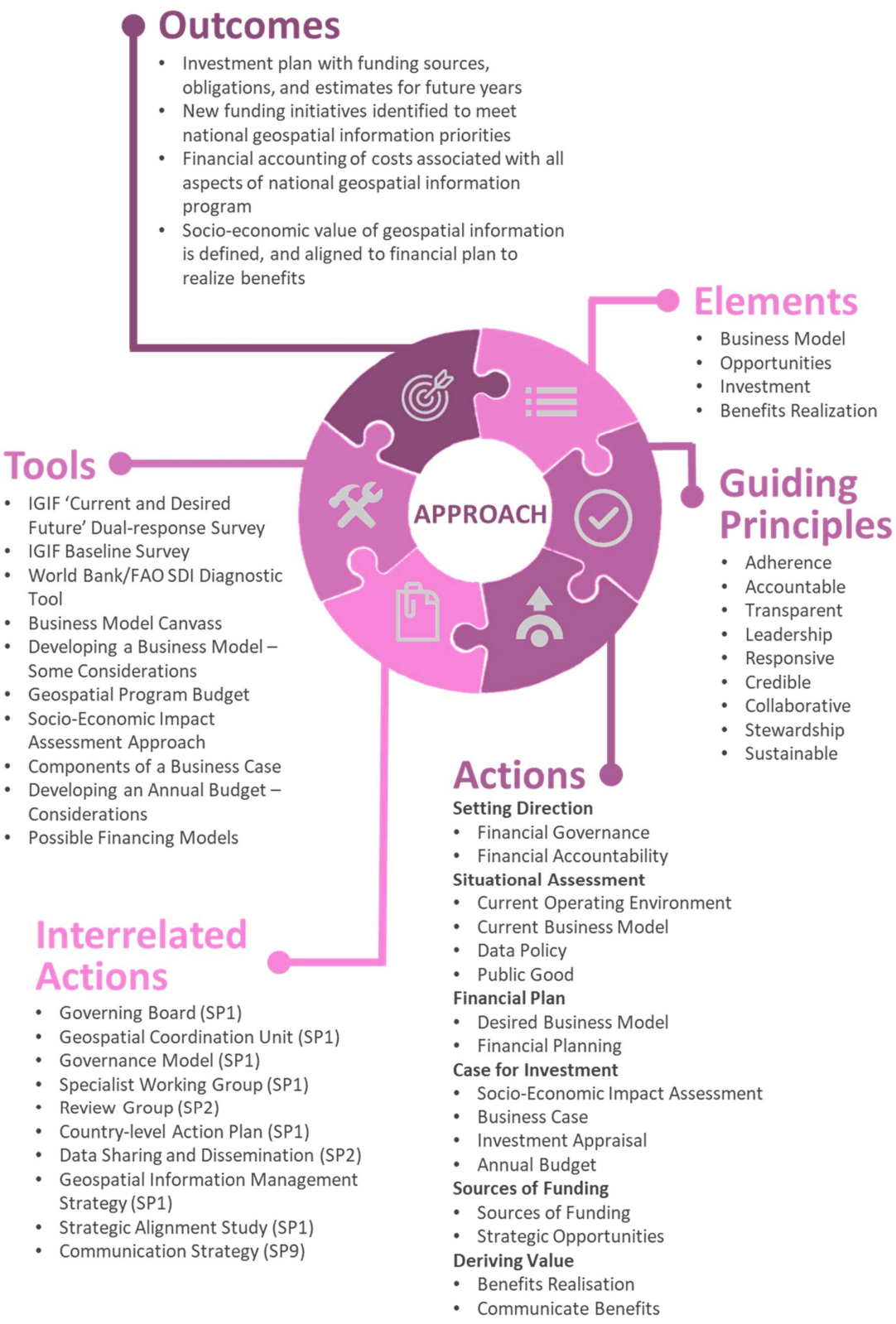


Figure 3.2: *The approach to financial.*

3.4 Elements

3.4.1 Business Model

A business model is a framework for how government creates value, is influenced by policy, legal, and fiscal governance, and underpinned by a series of strategic value propositions.

Within the context of this strategic pathway, a business model is a plan for the successful operation of an activity, and outlines how it will be economically successful and sustainable. While the traditional definition of a business model applies to an actual business, the concept also applies to the creation, management, and operation of a nationally integrated geospatial information management. The business model identifies the sources of funding and revenue, the intended user base, products and services, and details of financing. The objective of the business model for integrated geospatial information management is to create value for society and the economy. It is influenced by policy, legal, and fiscal governance, and is underpinned by a series of strategic value propositions. The business model operates at two levels – at a whole of government level, and at an organizational level. The whole-of-government business model sets the government's fiscal agenda and funding capabilities, which typically influence the business model at an organizational level. Organizations are closer to the products and services offered, and therefore understand the requirements needed and the estimated associated costs. Organizations also engage directly with partners and stakeholders, which may include external financial arrangements, such as the procurement for goods and services.

The business model captures the fundamental assumptions about how integrated geospatial information management will operate. It identifies the sources of funding and revenue, products and services to be offered, the intended user base, financial commitments and costs, stakeholder contributions, expected benefits, and details of other financing opportunities. Results from these efforts contribute to the value proposition for investing in integrated geospatial information management and its infrastructures.

While a government is not typically a commercial operation, employing the practices of commercial management, particularly in regard to the creation of a business case, financial plan (budget), procurement, and project management, significantly assist government in effectively planning for and managing geospatial information programs.

3.4.2 Opportunities

The value of integrated geospatial information management, its infrastructures, products, and services, to benefit national priorities and circumstances, is achieved through sound financial governance, management, and investment. Creating, acquiring, managing, and disseminating geospatial information costs money. Qualified staff, facilities to conduct work, and contracted goods and services are examples of some of the higher costs normally associated with

The value of the IGIF and services to national priorities and circumstances, is achieved through sound investment and financial management.

managing geospatial information. Leaders need to take a longer view of the investment, specifically the opportunities, that geospatial information offers toward basic social, environmental and economic needs, priorities, and opportunities.

Although not always easy to know that they may be available, investment and/or financing opportunities do exist. The challenge is connecting to them. There are techniques for aligning geospatial use cases with national policy objectives and strategic programs in order to trigger investment opportunities in geospatial information. A strategic alignment study considers the priorities of government, and thus the funding opportunities, to support the programs and activities that may exist. For example, a land administration modernization program is an opportunity to improve the accuracy of the cadastre; establishing and maintaining a national digital cadastral database and addressing system that supports communication, taxation, voting and census. A disaster preparedness program is an opportunity to capture building footprints and integrate them with household data. In these examples, integrated geospatial information management provides the essential geospatial-related components.

3.4.3 Investment

A national geospatial information program requires ongoing funding and investment if it is to be sustainable.

A national geospatial information program requires ongoing funding and investment if it is to be sustainable. There are various financing arrangements that fit different circumstances available for consideration. Having committed funding prior to commencing work to strengthen a national geospatial information program is paramount. Having funding for the continued maintenance of integrated geospatial data, products, and services is equally as important.

Sources of funding include government provided budget allocations, loans, or grants from international financing institutions or donor countries, public-private partnerships, and portions of revenue, generated from geospatial products and services, which may be returned to the organization for operating expenses.

Government funding may be supplemented by loans or grants from international financing institutions or donor countries. These options continue to be favored requirements for many developing countries. Funding from government owned enterprises, such as postal agencies or utilities (energy, water, and communication enterprises), or from quasi-government entities that collect fees for services, provide further possibilities. These options alone, or in combination, provide investment opportunities for many countries.

Recent interest in collaboration between different sectors of society and economy, such as public-private partnerships, are another consideration. The private sector often responds to market trends more quickly, thereby taking advantage of the value-added benefits provided by geospatial information.

Having a strategic business case that includes partners and stakeholders is helpful in meeting the financial demands of integrated geospatial information management.

3.4.4 Benefits Realization

Benefits realization is the process of identifying and evaluating the benefits over the complete life cycle of the national geospatial information program.

The realization of integrated geospatial information management is framed by a sound value proposition, rationale and justification, planning, and management that includes an evaluation of the benefits and impacts, including socio-economic, productivity, and efficiency gains associated with different implementation options.

Generally, benefits realization is a three-step process that: (a) identifies the benefits that can be reliably measured over the complete life cycle of the program; (b) establishes the key performance indicators to be used as the basis for evaluating and quantifying the benefits; and (c) measuring the benefits in terms of the outputs delivered through the program. Key performance indicators are established prior to implementation. However, they need to retain flexibility and be reviewed and revised as more is known, and as the objectives, opportunities and expected accomplishments evolve.

While benefits realization may appear daunting, efforts to determine benefits assist in justifying the sustainability of a national geospatial information program, and should be communicated as a benefit from the investment (See SP9: Actions 9.6.14 and 9.6.15). The benefits identified and supporting evidence, along with other use cases identified in the country or internationally, will build the needed knowledge for benefits realization.

3.5 Guiding Principles

By applying these guiding principles, nations will be able to make progress in financially strengthening their national geospatial information management arrangements.

There are specific guiding principles and elements common to successful financial governance, arrangements, and management, which can be adopted by each country. Replicating a successful financial model for integrated geospatial information management from one country to another will likely not work in its entirety, as there are different priorities, levels of development, and cultural aspects that need to be considered. That said, using and leveraging good ideas and proven practices across nations are encouraged where the approach is suitable. The guiding principles for financial governance, arrangements, and management are:

- **Adherence:** Fiscal, policy, and legal mandates are the basis for sound financial governance and management. Adherence to these mandates provides the means for responsible, accountable, and transparent financial arrangements to secure and sustain funding and investment.
- **Accountable**: Funding and investments are required to be accountable to society, businesses, organizations, and government; good and

responsible governance and practices ensure the desired outcomes and benefits are realized.

- **Transparent**: All aspects of funding, financial, and contractual arrangements, including the basis for financial decisions, must be clear, accessible, and transparent. Examples may include procurements, licensing, costs, liabilities, and constraints.
- **Leadership:** Strong and sound fiduciary leadership provides the trust, accountability, and transparency at all levels, and effectively communicates across government, partners and stakeholders the value proposition, business model, financial arrangement and benefits.
- **Responsive:** Agility, adaptability and flexibility to respond and address changing priorities, national circumstances, political agendas, mandated requirements, policy, legislative and regulatory frameworks, new technologies, business environments, and market demands.
- **Credible:** Accurate and credible information, realistic estimates, and reliable cost accounting ensure trust and commitment to successfully deliver the desired outcomes and benefits.
- **Collaborative**: Collaboration through partnerships, including financial, is needed to deliver desired outcomes and associated products and services. Ensures effective management of geospatial and related data from various sources across different organizations and sectors.
- **Stewardship:** Financial roles and responsibilities are known and designated, with checks and balances. Monitoring and review, solid financial management, and good stewardship, account for the appropriate disbursements of funds and investments.
- **Sustainable**: Sustainability and continuity are needed for successful financial governance, arrangements, and management for integrated geospatial information management, with clear understanding of the current, recurring, and future needs.

3.6 Actions

The following strategic 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 financial. They are a guide to ensuring sustainable financial governance, planning, management, and investment to achieve integrated geospatial information management. Country-specific needs 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 3.3. 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 3.4.

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 3.3 and 3.4, are referenced in the text, and detailed under other strategic pathways.

Whatever the implementation approach, each action should take into account the guiding principles in section 3.5, as these describe drivers for attaining effective and efficient geospatial information management.

The actions for the financial strategic pathway are divided into six categories, which are:

1. Setting Direction
2. Situational Assessment
3. Financial Plan
4. Case for Investment
5. Sources of Funding
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.

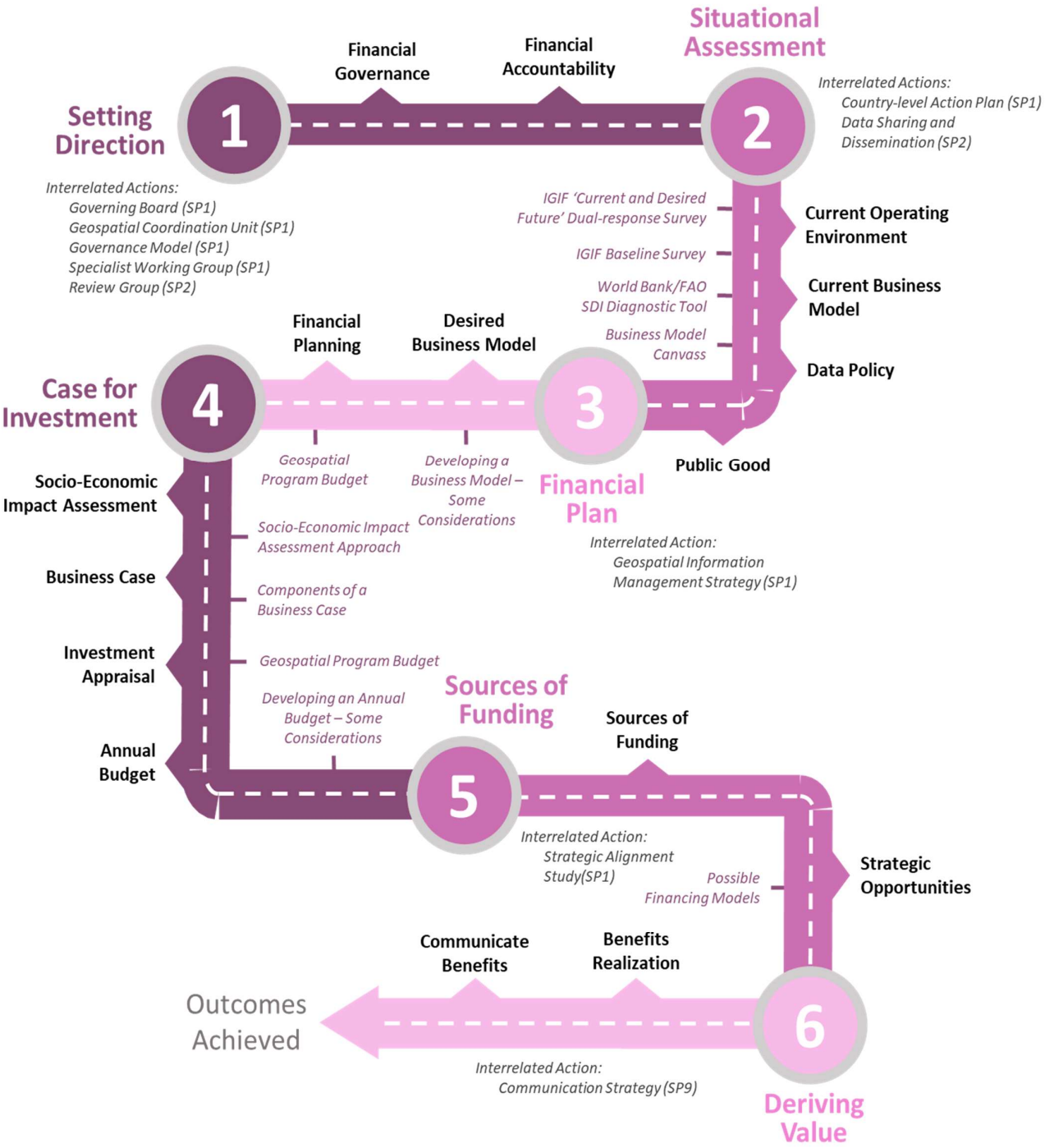


Figure 3.3: *Financial includes several actions and tools designed to assist countries to understand the financial plans and investment program required to establish and maintain an integrated geospatial information management program. The actions are divided into six categories and reflect the order with which these actions are typically completed.*

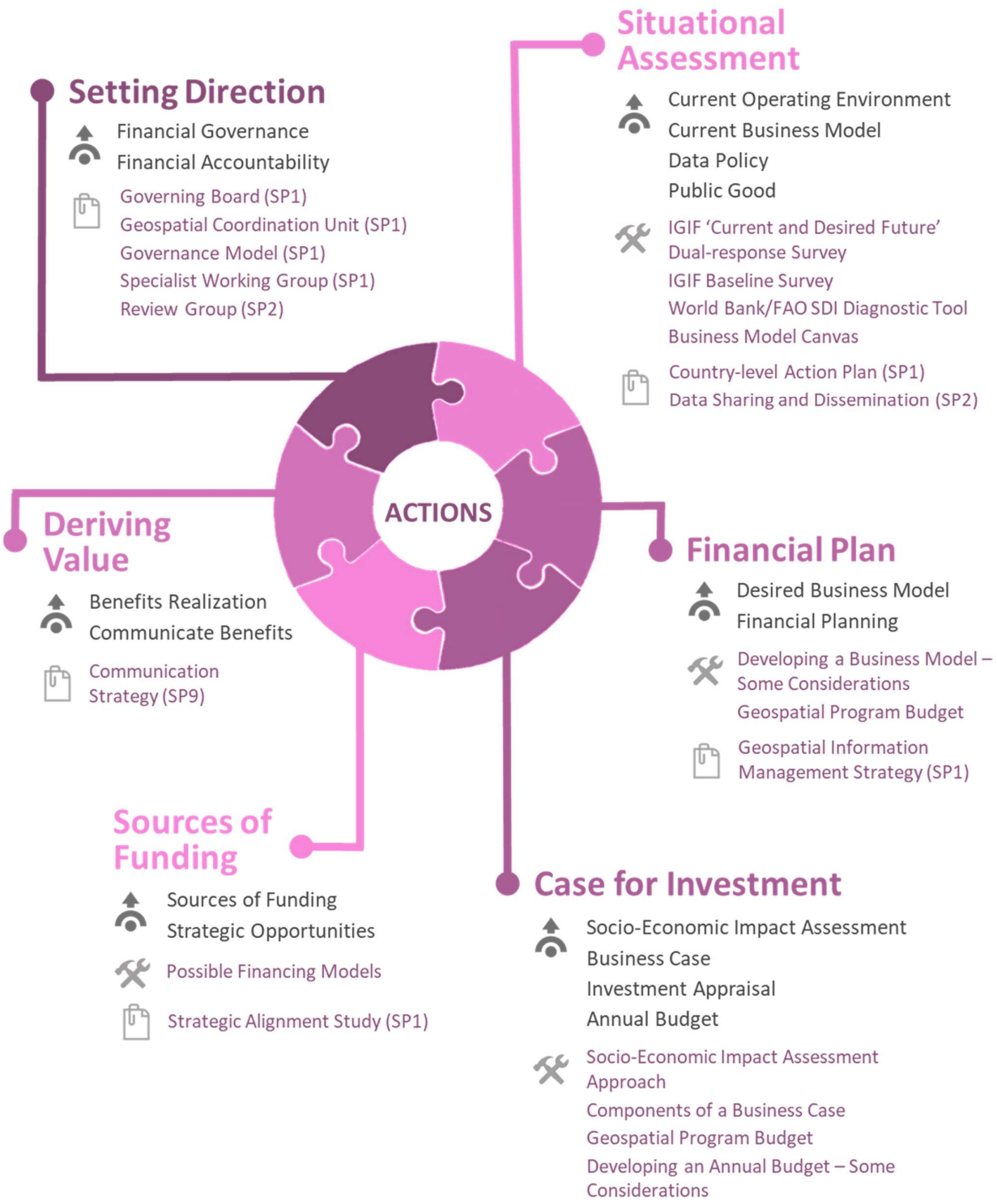


Figure 3.4: *Financial includes several actions and tools designed to assist countries to understand the financial plans and investment program required to establish and maintain an integrated geospatial information management program. The interrelated actions provide key linkages to other strategic pathway actions.*

3.6.1 Financial Governance

The governing board, or similar leadership mechanism, provides the leadership and direction for financial governance.

A governing board (See SP1: Action 1.6.1) will provide the necessary leadership and direction for implementing and sustaining integrated geospatial information management. This governing board, council, advisory body, steering committee, or similar leadership mechanism, provides the necessary leadership and direction for the financial governance, management, and arrangements that are adopted by each nation. This leadership mechanism would have the overall 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.

In situations where geospatial responsibilities are decentralized across government, general coordination may be provided by the geospatial coordination unit (See SP1: Action 1.6.2), as well as from within each agency with specific responsibilities. In the latter case, financial management is likely managed from within each agency. Regardless, the guidance provided in this pathway is still applicable.

A financial management function should be established within the governance model (See SP1: Action 1.6.4) to manage all actions under the financial strategic pathway. This function should be led by a senior financial manager (usually at director level) with responsibility for finance, and with significant experience in financially managing evolving business models, delivering business cases, financial plans, management, and operations. The financial manager will 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.

Close collaboration and communication between financial and geospatial managers is important. Mutual appreciation of respective roles and responsibilities, understanding the societal and economic value of geospatial programs, and the associated financial and program management implications, strengthens financial governance, arrangements, and management, including support from within government, partners, and stakeholders.

See Interrelated Actions on a Governing Board (SP1); Geospatial Coordination Unit (SP1); and Governance Model (SP1).

3.6.2 Financial Accountability

Guidelines, policies, regulations and laws provide the 'boundary' for financial arrangements, planning, and management.

Guidelines, policies, regulations, and laws related to financial obligations provide the context and 'boundary' for financial arrangements, planning, and management. These national policy and legal framework instruments ensure accountability and promote good financial stewardship. They also protect those with financial responsibilities with the required 'checks and balances' for proper accounting, auditing, reporting, and review.

Financial policies and guidelines for integrated geospatial information management will need to be prepared. This can be best achieved by establishing a specialist working group (See SP1: Action 1.6.3) to prepare the needed financial policies and guidelines, and to review and revise as appropriate, ensuring adherence to national policy and legal frameworks. The specialist working group should liaise with, and work as a sub-group of, the policy and legal review group (See SP2: Action 2.6.1).

It is important that accountability mechanisms adhere to prevailing national policy and legal frameworks, and to all levels of management and responsibility within a national geospatial information program. It is the responsibility of the governing board (See SP1: Action 1.6.1) to ensure compliance. Financial accountability involves planning (See Action 3.6.8) and budgeting (See Action 3.6.12), mechanisms for internal controls and record keeping, provisions for proper accounting and audit, and regular monitoring and reporting.

See Interrelated Actions on a Specialist Working Group (SP1); and a Review Group (SP2).

3.6.3 Current Operating Environment

A first priority is to review, assess and understand the current situation and operational environment.

One of the first priorities in working towards an effective financial arrangements, planning, and management environment for geospatial information is to review, assess, and understand the current situation and operational environment. In implementing the IGIF, prevailing guidelines, policies, regulations, and laws that apply (See Action 3.6.2) to existing geospatial information management, the evolving technological and user requirements, and what changes are required to achieve the desired goals and outcomes, must be considered.

A situational assessment and analysis, involving all partners and stakeholders, is valuable to establish a baseline on existing capacities and capabilities and, where appropriate, the level of maturity. This will provide clarity for how clear

actions will support the transition from the current to the future state, and assist in prioritizing mobilization of resources and investments (See SP1: Country-level Action Plan). In cases where geospatial capacity is limited or does not currently exist, the same assessment and analysis should be used to establish the desired capacity and capability.

There are several geospatial maturity and assessment tools available for the implementation of the IGIF. For example, the United Nations has developed a Current and Desired Dual-response Survey and a Baseline Survey as tools that countries can use to assess, analyze, and to provide an understanding of their level of geospatial information management maturity. The World Bank (WB), working with the Food and Agriculture Organization of the United Nations (FAO), has developed a Spatial Data Infrastructure (SDI) Diagnostic Tool package to facilitate an assessment of a country's SDI readiness and geospatial-maturity (Kelm *et al*, 2017). These resources provide a means to assess and gauge progress towards managing and maintaining integrated geospatial information management sustainably.

An example of an IGIF 'Current and Desired Future' Dual-response Survey is provided in Appendix 3.1, an example of an IGIF Baseline Survey is provided in Appendix 3.2, and an example of a World Bank/ FAO SDI Diagnostic Tool is provided in Appendix 3.3.

See Interrelated Action on Country-level Action Plan (SP1).

3.6.4 Current Business Model

It is important to understand the financial and policy environment within which geospatial information management currently operates.

In terms of understanding the financial and policy environment within which geospatial information management operates, there is a need to fully understand the current business model. An assessment and/or enhancement of the business model will require considering a number of factors, including:

- Fiscal policy and legal mandates, and related policies and guidelines that require compliance. For example, authority to spend government funds, the ability for government agencies to directly compete with the private sector, and how to legally conduct contract agreements;
- Institutional arrangements and relationships, including agency budgetary procedures and fiduciary responsibilities, in meeting implementation requirements;
- Maturity of the geospatial information markets and associated providers of products and services that impact, as an example, procuring products and services, or to develop capabilities within the national geospatial organization;
- Government's appetite and responsibility for geospatial products and services as a public good;

- Level of financial independence of the organization, dependence on other agencies, or foreign development assistance and funding, to implement IGIF initiatives;
- Governance structure supporting the implementation of the IGIF. For example, within a single organization, or as a collaborative effort involving multiple organizations within government; and
- Implementation environment influencing outcomes, such as national priorities, economic conditions, budget austerity, open data policies, etc.

To assist countries in assessing their current business needs, the elements identified in Figure 3.5 are common to most business models, and are similarly applicable to a business model for the implementation of the IGIF.

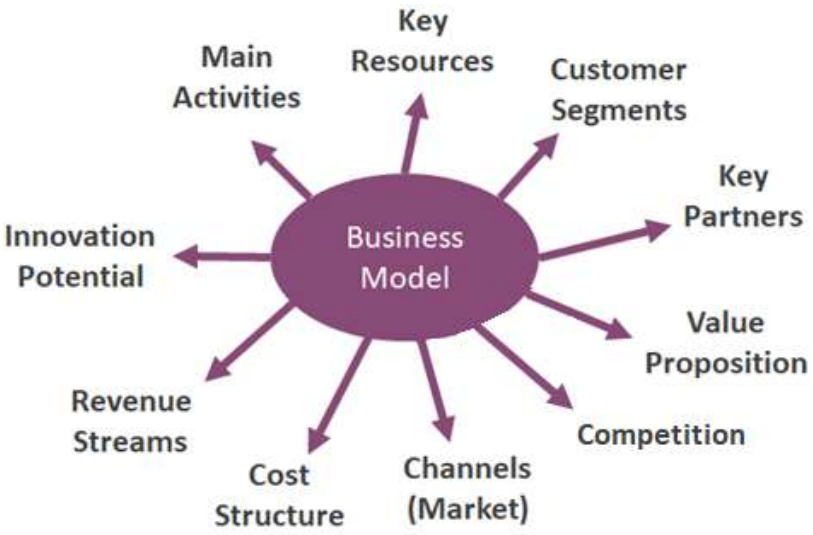


***Figure 3.5**: Elements of a Business Model*

The situational assessment and analysis allows a realistic understanding of the current operating environment. It sets the basis for developing the desired business model with a clear understanding of the challenges and opportunities, resource mobilization and investments, and how these will evolve during the process of developing or strengthening geospatial information management.

An example of a Business Model Canvas is provided in Appendix 3.4.

3.6.5 Data Policy

There is a need to assess the prevailing data policy environment, including open government initiatives and any related open data policies. A robust data framework (See SP4: Action 4.6.1) and policy is desired. Increasingly, there is a global movement towards 'open government', often leading to having geospatial data openly available and accessible.

The provision of open data does have cost and financial implications within the IGIF.

The provision of open data does have cost and financing implications within the IGIF. Most view the costs associated with open data as an investment for public good and for the greater benefit to a country, including its economy, its services and its citizens. When embraced appropriately, open government initiatives usually lead to national data policies that include open data. These are often driven by three objectives:

- Providing governments, citizens, and businesses with greater transparency in public decision-making;
- Encouraging smarter use and reuse of available data; and
- Stimulating economic growth by making public data freely available to everyone, including businesses.

A business model is particularly effective when fundamental geospatial data and related services are readily available and accessible at no or minimal cost to users. There are several comprehensive studies, e.g. Alphabeta (2017), showing the benefits of geospatial information to government, the private sector and consumers, as well as the many wider societal benefits.

Making government data readily available and accessible, and in easy-to-use interoperable formats, consumes resources, including financial. This may require investment, to enable government, organizations, businesses, and communities to leverage the data and services in innovative and value-added ways. Readily available and accessible data is particularly relevant to the user community. Fundamental geospatial data is an integral part of the IGIF. In addition, datasets created by government, organizations, businesses, scientific, academia, and civil societies add further value. New derived data can either be shared as part of an open data approach, or used to create products and services by organizations, businesses, and communities including economic development and improvements. Geospatially referenced data, such as meteorological services, socio-economic data, transportation data, and health data are just a few examples.

3.6.6 Public Good

The collection, maintenance, and dissemination of geospatial information offers great value to a country, and is typically considered a public good.

A public interest task, or public good, is a product or service that an individual can consume without reducing its availability to another individual, and from which no-one is excluded. National defense, public utilities, transportation, public water and sewer systems, public education, health care, public parks and other basic societal needs can all be considered public goods. In some countries, components of the IGIF are considered a public good or a public interest task.

The term 'public good' is an important concept in the re-use of public sector data. It is one of the main factors determining whether data produced, collected or held by a public sector organization is readily available and accessible. The current trend is to reuse data whenever possible. With increasing amounts of data used for many government programs, it is important to be proactive in

avoiding duplication in the collection, management and dissemination of the same data in the public interest.

The collection, maintenance, and dissemination of geospatial data offers great value to a country and is typically considered a public good. How 'value' is determined and applied differs for each country. Considerations for some include a service for offering geospatial information as a public good, similar to providing national health care, public safety, or a public library. Other countries consider the economics of geospatial information and seek some return on the investment from offering geospatial products and services. Still, other countries have a variable approach that may include different approaches based on their goals, circumstances, and customs.

Ultimately, data has value and, in some cases, policies and legislations are used to guide actions such as how to collect data and how the data can be used, which is often commensurate with its value. For example, legal authorization to collect boundary changes can result in an accurate depiction of the geographic extent of land parcels with legal traceability. Data use may also be guided by directives or legislations that assure some level of privacy and confidentiality of those affected.

With so much location-based data, the need for custodians to be responsible for collecting or aggregating as well, managing data not only requires well-defined responsibilities, but also demands financial considerations where applicable. Effective use of geospatial data likely involves extensive sharing and reuse of the data in the public interest. Countries that assign custodian responsibilities to different agencies and organizations want to be sure that these responsibilities explicitly provide for appropriate sharing of data between and among those organizations. Different sharing instruments, such as contracts, memoranda of understanding, and memoranda of agreement indicate goals, responsibilities, and any financial arrangements between these organizations.

'Collect once and use many times for a multiplicity of purposes' is a common mantra in the geospatial information community these days. However, geospatial information, as a public good, does have financial implications.

See Interrelated Action on Data Sharing and Dissemination (SP2).

3.6.7 Desired Business Model

There needs to be an overall business model for the planning, development, implementation, maintenance, and use of the national IGIF.

Having assessed and understood the current situation, operational environment, existing business model, and prevailing data policy for geospatial information management, an appropriate desired business model will need to be considered and developed. This business model contributes to improving understanding and raising awareness of the value and the financing required for geospatial information management and associated program, infrastructures, and activities across government and within organizations.

There are various business model options for planning, specifying, justifying, managing, and financing integrated geospatial information management for countries to choose from. Each approach has a series of common underlying activities that are good practices.

Countries will need to consider which business model is most appropriate to their circumstances. Replicating an existing business model from another country, with similar national circumstances, might be a practical starting point to begin the financial planning process, using what is relevant and ignoring what does not apply. In other cases, such an approach may not be optimal, especially when trying to replicate models from countries where geospatial information management processes and services are well-developed and mature. Considerations should include feasibility, funding and revenue sources, spending plans, financial management, and sustainability.

The business model should be driven by a clear understanding of national priorities, national needs, and the related societal, environmental, and economic benefits. Being able to articulate a sound business strategy based on specific priority use cases (or political drivers), and supported by compelling socio-economic benefits, are key factors for investment planning and financing and to acquire the necessary approvals from government. Offering examples when making the case for implementing the IGIF as an investment with positive outcomes would be helpful, such as economic development, improving efficiencies of government programs, effective government delivery systems, and benefiting the lives of residents through improved public safety and effective emergency response.

Developing countries may consider financial sustainability carefully and be specifically aware of the commitments associated with investments made by third parties. For example, ongoing operational, maintenance, and updating/upgrading considerations need to be integral to the planning and implementation decision-making process. This can be achieved by estimating

into future budgets identified operational and maintenance requirements. Having proposed annual budget (See Action 3.6.12) estimates five or ten years into the future makes clear the financial commitment needed to sustain a national geospatial information program. These functions have associated costs which often times take up a sizable percentage of an annual budget. These costs must be included in a financial plan.

The international development community and donors also have a role to play in ensuring that any resourcing or investments made for geospatial information management are coordinated with both government and non-government stakeholders. Adopting and encouraging good governance and responsible practices, and ensuring access and use of geospatial information investments across a wide range of stakeholders, with a culture of sharing and an emphasis on sustainability, will improve the business model and its financing.

An example of Developing a Business Model for Integrated Geospatial Information Management is provided in Appendix 3.5.

3.6.8 Financial Planning

Once a desired business model is developed, a more detailed financial plan, which includes budget-related documents, is needed.

Once a desired business model is developed, a more detailed financial plan is needed. The financial plan includes budget-related documents that are used for two purposes. The first is a yearly summary of revenue and expenditures by general categories and a projected estimate for future years. It is recommended that estimates are provided for a five- or ten-year cycle. Having revenue or income and expenditure projections serves several purposes. It alerts leadership of the continuity of products and services expected, and the financial obligations required to attain or sustain those activities into the future.

The second document is the financial plan that has specific details on the amount of funding and resources available for spending within a fiscal year, how the funds are allocated for general spending categories, and the periodic status of expenditures as they relate to the total allocation of an activity for that year. Following a disciplined approach, as outlined, ensures successful financial governance, planning, and arrangements.

Financial planning is directly linked to the Geospatial Information Management Strategy (See SP1: Action 1.6.6), its goals and objectives, its acceptance, and its implementation. Funding should be dependent on acceptance of the strategy and its strategic goals[5]. Without acceptance, funding the implementation of the Geospatial Information Management Strategy may not occur. The Strategy can vary in scale and scope, ranging from a comprehensive master plan to a set of

[5] Strategic Pathway 1: Governance and Institutions Appendix 1.3: Guidance for Vision, Mission and Goal Statements

nested strategies and action plans that span different thematic use cases, technical issues, and sectors. The financial implications need to be understood and thus planned for and managed.

Within governments and organizations, accepted programs or proposals are funded, rejected programs and proposals are not. Approved funding and investment initiates geospatial activities and tasks. Without approved funding or investment, geospatial activities or tasks should not occur. The financial plan includes a justification for why funding and investment is needed, including socio-economic-technical considerations, how much is needed, and how it will be spent within the lifecycle of the program or proposal. It is important to consider the public's interest.

Sources of funding are a basic component of a financial plan. A single source of funding, such as government allocation coming from government levied charges, fees, and taxation is one funding stream. A more likely scenario involves multiple funding streams that may include a government-funded allocation, funding transfers from other organizations, including from within government, fees assessed for services, special allocations to address a need or event (for example to respond to an emergency event), and possible sales of geospatial products and services. While 'in-kind' products and services are not technically revenue, they do add to the value of geospatial capabilities.

Examples of a Geospatial Program Budget are provided in Appendix 3.6.

See Interrelated Action on Geospatial Information Management Strategy (SP1).

3.6.9 Socio-Economic Impact Assessment[6]

The IGIF is an important component of a national framework in both developed and developing countries.

The IGIF is an important component of a national framework for improving productivity, increasing economic development, supporting sustainable development, and planning for and responding to the impact of national events, such as natural disasters. A key challenge for policy makers and program managers has been in evaluating the net benefits of policy change or investment

[6] This section has been informed by the 'PC-IDEA SDI Manual for the Americas' https://unstats.un.org/unsd/geoinfo/RCC/docs/rcca10/E_Conf_103_14_PCIDEA_SDI%20Manual_ING_Final.pdf

in these solutions. In some cases, like natural disasters, action is needed regardless of other factors.

There are many methodologies[7] for evaluating the economic impact of policy change and/or investment in the field of geospatial information, but no single best practice solution has yet been identified. Cost-benefit analysis (and its variants) will continue to be essential for project-scale investments, because it is widely understood as an influence, and offers a mechanism for comparison of investment choices. Therefore, a socio-economic cost-benefit analysis is recommended.

A decision on whether to pursue a cost-benefit analysis early in the planning and development stages of a geospatial information management strategy and program is important. Conducting a cost-benefit analysis is resource intensive as many assumptions and estimates will be required with explanation and justification. Given the immature state of this type of analysis for geospatial information, this is an activity that could be delayed for some countries until more case studies are developed by others.

An example of a socio-economic impact assessment approach is included in Appendix 3.7. For countries that pursue a socio-economic impact assessment approach[8], the steps typically taken to justify investments in the IGIF are: (1) Agree on scope and priorities; (2) Develop the engagement plan; (3) Gather the socio-economic evidence; (4) Analyze the information gathered; and (5) Justify the benefits. These steps are illustrated in Figure 3.6, and explained in Appendix 3.7.

Furthermore, Appendix 3.7 provides a range of examples of economic modelling for national geospatial information management and Earth Observations, respectively. There are numerous variations of expenditure justification analysis. Terms such as performance measurement, cost-benefit analysis, and cost-effectiveness analysis are common. All are concerned with comparing the benefits and costs of an initiative, although they may differ in terms of breadth and depth of scope.

[7] Economic and Financial Modelling of the Impact of Geospatial Information - Techniques and Results for land administration in developing Nations' https://www.conftool.com/landandpoverty2017/index.php/04-11-Smart-426_paper.pdf?page=downloadPaper&filename=04-11-Smart-426_paper.pdf&form_id=426&form_version=final

[8] This process is based on the socio-economic analysis conducted around the application of geospatial information to support the Albanian Integrated Land Management Program.

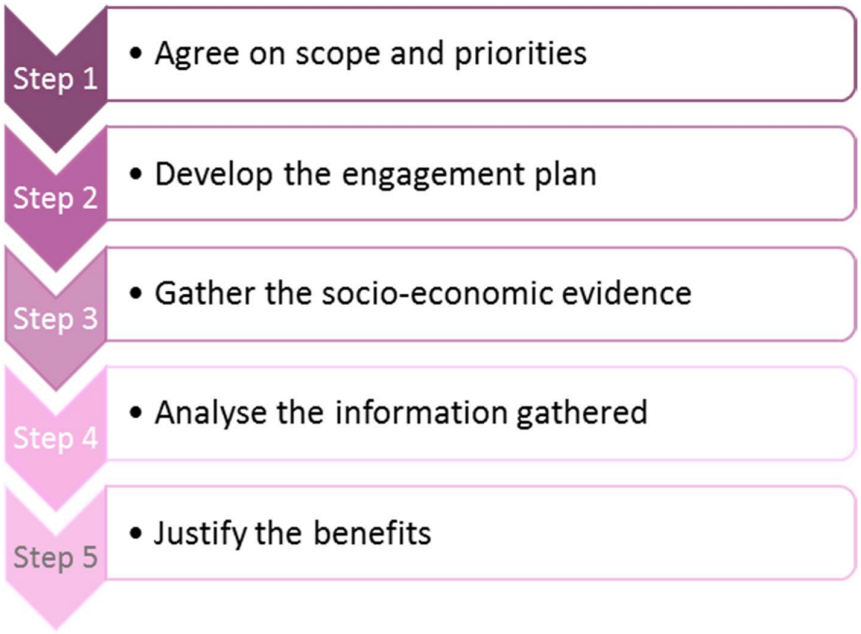


***Figure 3.6**: The major steps for undertaking a socio-economic impact assessment.*

Examples of a Socio-Economic Impact Assessment Approach are provided in Appendix 3.7.

3.6.10 Business Case

The business case is a financial and project management tool used to acquire the necessary approvals justifying the need for geospatial activities and functions.

A Business Case is a financial and project management tool used to acquire the necessary approvals justifying the need for geospatial activities and functions within a country through investment in the IGIF, the Geospatial Information Management Strategy (See SP1: Action 1.6.6) or a specific project or activity within the IGIF Implementation Plan. The Business Case states the rationale for investing and committing funding based on the need and benefit of integrated geospatial information activities.

The Business Case approach includes the planning efforts for making the proposal, including statements why such an investment is in the best interest of the country. It summarizes the results of all the necessary research and analysis needed to support decision-making in a transparent way. In its final form, the Business Case becomes the key document of record for the proposed program/project with associated costs, summarized objectives, key features of implementation management, and arrangements for post implementation evaluation.

The Business Case will be used as one of the program evaluation resources by internal and external assessors on the success of the program. It addresses basic assumptions of 'this is why an integrated geospatial capability is needed and this is what is included to meet that need.'

Governments usually require justification prior to approving a budget for ministries, departments, and agencies. Any new spending or new initiative such as the IGIF will normally require a detailed plan of what is required along with costs for each major activity. Costs typically include categories such as staffing, IT, procurement of goods and services, and operations and maintenance.

Estimated costs for the duration of the program/project are also expected. Since the implementation of the IGIF is likely to be an on-going program, it will require estimates for future years so that budget allocations are planned for future expenditures. Often, less than what is requested is approved for spending, so budget impacts must be developed in order to determine the final scope of the program. Likely impacts include the number of staff, the type of IT approved, and the amount allocated for procurements.

The Business Case lays out the justification for why investing in the geospatial information is economically beneficial. It provides an opportunity to address questions on why the geospatial information projects are an important expenditure and investment, and what anticipated financial obligations are needed to create and maintain the framework.

Common justifications may include saving costs by responding to a national need or circumstance in a more efficient way, modernizing traditional processes thereby increasing capacity and capabilities in responding to national needs; advancing national competencies in geospatial information management to align with current technologies; and/or establishing or enhancing business opportunities and economic development.

A Business Case is the key activity for seeking investment. Having committed funding prior to the start of work to strengthen integrated geospatial information management is paramount. This is made possible by documenting the Business Case, sharing the plan with those approving spending, and effectively communicating (SP9) the rationale and benefits.

Business cases can cover a wide range of types and levels of spending. Each case will need to be developed to reflect the type of proposal being considered. The Business Case should enable budget decision-makers and other stakeholders to ascertain the importance, value, and cost of the proposal. Often, these professionals have no knowledge or understanding of geospatial concepts, so effective communication and basic, easily understood, examples help make the case. The use of maps and graphics are highly effective at making the Business Case better understood.

The Business Case covers five key perspectives (Figure 3.7) – the strategic case (why now?); economic case (quantify the financial benefits, including cost efficiencies and public good benefits); commercial case (how the customers and potential partners will be engaged); financial case (funding sources); and

management plan (what capabilities and resources are required for implementation to be successfully achieved?).

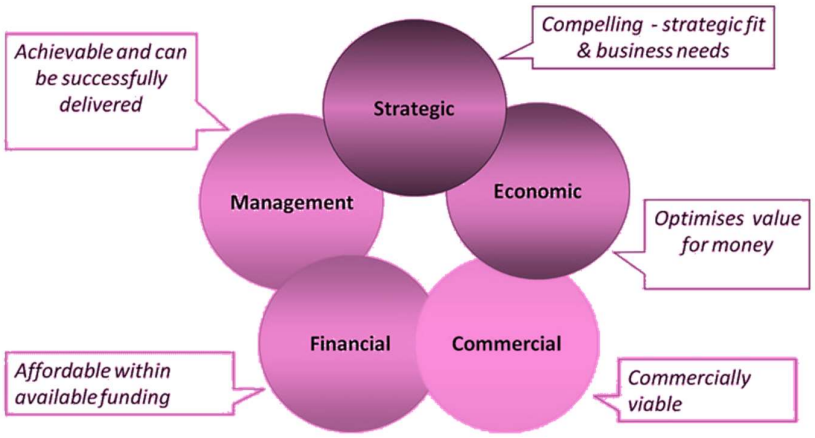


***Figure 3.7**: The five different aspects of a Business Case.*

Examples of Components of a Business Case - Five Key Perspectives are provided in Appendix 3.8.

3.6.11 Investment Appraisal

Investments include major capital spending and strategic investments, and generally include all expenditure for future benefit.

The rapid advances of technology present a wide range of opportunities for the application of geospatial information; along with challenges to appraise the appropriate investment needs. These opportunities may be attractive to National Geospatial and Mapping Agencies. Investments may include major capital spending through to strategic technology investments.

Investments generally include all expenditure for future benefit, and include capacity development and education, research and development, communication, partnership, and revenue enhancement activities. It should also include other intangible expenditures. Decision-making regarding investment in significant projects in all these areas is enhanced by systematic financial and sustainability analysis.

A generic process to help evaluate investment opportunities is illustrated in Figure 3.9. The appraisal process begins with an 'opportunity trigger'. The trigger may be a situational circumstance, an event, technological innovation, meeting a demand, perceived need or change in economic outlook, or a reaction to competitive pressures.

In response to the trigger, the concept development is initiated to build understanding of the proposed new product or service to assess its feasibility. This requires information inputs from a series of perspectives:

- First, does the concept fit strategically with the national priorities, current business model, and operating environment? Perhaps assessment and analysis are needed to understand what it aims to address?
- What are the demands or who are the competitors, and how is the value proposition different? Will differentiation be on the basis of niche, quality, or price?
- The other important perspective is capability – does the organization have the ability to build the product or service? If so, what effort is required to design, develop, build, and test a prototype?

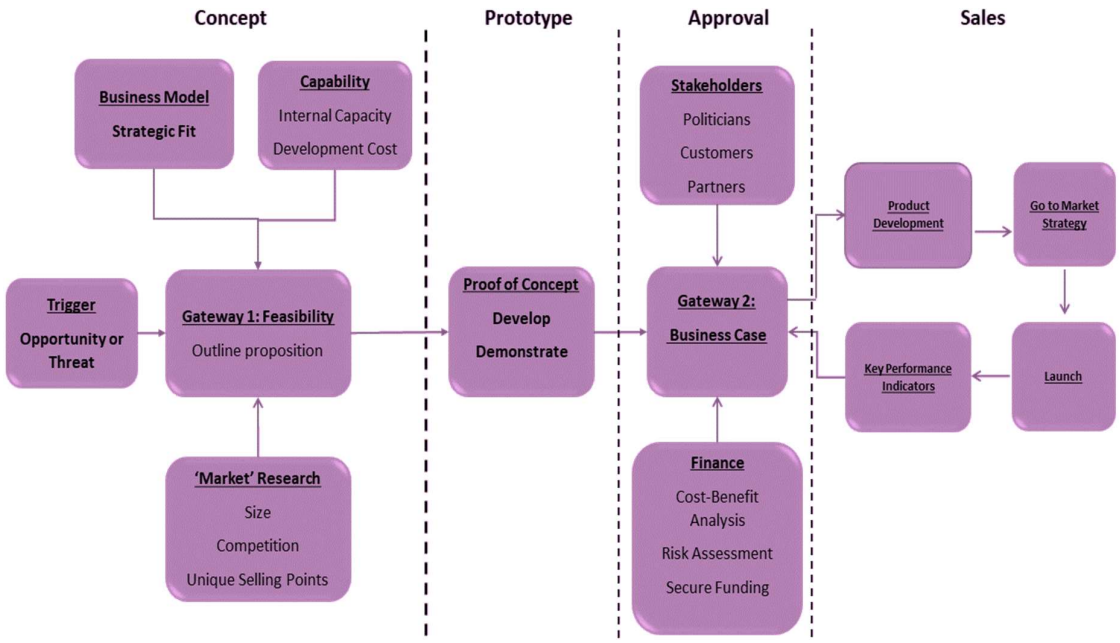


Figure 3.9: *A generic process to help evaluate investment opportunities*

Once this information has been gathered as an outline proposition, it can be presented for consideration – typically to the Governing Board (See SP1: Action 1.6.1) or the Geospatial Coordination Unit (See SP1: Action 1.6.2). In the generic process illustrated in Figure 3.9, it is 'Gateway 1'. This is usually carried out together with financial experts that may be appointed by the Ministry of Finance to support the implementation of the Geospatial Information Management Strategy (See SP1: Action 1.6.6). If the decision is made to proceed with evaluating the proposition, then resources and funds will be allocated to develop a proof of concept.

Once the proof of concept has been developed and demonstrated, a cost-benefit analysis will be undertaken, a review conducted of the views of stakeholders, including policy- and decision-makers, partners, and may include parliamentarians or politicians, and a risk assessment completed.

Preparation of a narrative, e.g. business case, will be required to secure funding. If the Business Case is accepted by the Governing Board or the Geospatial Coordination Unit, it can be considered to have passed 'Gateway 2' as illustrated by Figure 3.9. The product or service development then commences, and a 'go to production or market strategy' developed to support a successful launch of the product or service. Key Performance Indicators (KPIs) covering both financial and strategic objectives are typically used to report on-going performance and benefits realization to the Governing Board or the Geospatial Coordination Unit.

Depending on the size of the investment, it may be necessary to seek Governing Board approval for further tranches of expenditure before being able to launch the product or service. For larger or longer-term investments, a more comprehensive investment process, with more sophisticated 'Gateway' reviews, may be required.

3.6.12 Annual Budget

Annual budgeting involves estimating and preparing a budget for geospatial information operations, maintenance, and related costs.

Annual budgeting involves estimating and preparing a budget for an integrated geospatial information management program, including its infrastructure, operations, maintenance, and related costs. It is important to establish whether there is a separate budget amount for the geospatial information program, or if the financial allocations for the geospatial program are covered as part of a larger organizational budget. If this is the case, then the annual budgeting may involve preparing the budget for integrated geospatial information management as part of the larger organizational budget.

The budget includes categories needed to monitor funding sources and expenditures divided into categories and sub-categories by fiscal year. These budget 'line items' help in managing an efficient and sustainable integrated geospatial information program.

Consider initially using, as examples, budgets from other areas within government or from other successful geospatial organizations. Once an annual budget is estimated, prepare a similar budget for several years into the future, and include proposed increases and decreases in the amount estimated. It is important that this multi-year budgeting caters for not just recurring expenditure but also for replacement or upgrades, especially in the case of technology, that may consume higher budget amounts during the year of replacement or upgrades.

One approach to developing an annual budget is to prepare a budget narrative that describes some of the following content: goal of the program, initiative or project; description on the importance of location data to the nation in the context of the program, initiative, or project; brief description of current geospatial assets and capabilities; identify problems and shortcomings of the current approach; describe what is needed to solve the deficiencies; provide a cost breakdown by major proposed activity; describe detailed benefits with the

implementation of the program, initiative and project; and include an overall budget with the new initiative costs included by fiscal year.

An example of a Geospatial Program Budget is provided in Appendix 3.6. An example of Developing an Annual Budget – Some Considerations is provided in Appendix 3.9.

3.6.13 Sources of Funding

Sources of funding include, government allocations, development and donor assistance, revenues from geospatial products and services, and private sector investment.

Governments will need to determine the source(s) of funding for integrated geospatial information management. Considerations include, government allocation through its budgetary process, cooperative government organization funding agreements, development and donor assistance, revenues from geospatial products and services, and private sector investment.

A range of possible financing models (Gif and Coleman, 2015) that fit different circumstances, and may be used in combination, include: i) government funding; ii) donor funding; iii) government owned or state owned enterprise; iv) outsourcing; and v) partnerships that may include government partnerships, public partnerships, or private-public partnerships.

The funding approaches (UNGGIM, 2013) within developing countries can be difficult and complex due to the higher priorities and economic circumstances, and may require the creation of a 'pool of funds' that are combinations of the funding models described above. In many countries, the lack of local financial resources means that implementing integrated geospatial information management may not be financially sustainable when it depends primarily on development assistance and donor funding. Usually donor support for these projects is time-limited, and the future of many of these systems may be unsustainable beyond the development assistance and donor support. This is one reason why a financial plan, with an accompanying longer-term budget, is so important in communicating funding needs for sustainable integrated geospatial information management.

Continuity and collaboration of funding may be more likely if donors are invited as partners to take part in the participative process defining the components of an IGIF. In addition, the organization of the nine strategic pathways of the IGIF offer options for funding decisions based on national priorities and circumstances. Some activities can be funded early in the development phase, while others of lesser priority can be delayed.

An example of Possible Financing Models is provided in Appendix 3.10.

3.6.14 Strategic Opportunities

Aligning investment with national priorities and circumstances increases the likelihood of ongoing government support.

Aligning financial and investment plans and requests with national priorities, current needs, and national circumstances, increases the likelihood of ongoing government support. Additionally, aligning with global development agendas, e.g. the 2030 Agenda for Sustainable Development, may improve opportunities for international or regional development assistance and donor support. Known and understood problems and challenges, where geospatial information is part of the solution, are opportunities for making sound financial arguments for funding and investment. If possible, countries should consider aligning with an economic sector or a national project, such as a census, or a national program, such as land administration, where successful accomplishment is a consequence of reliable, quality and timely geospatial information.

The scope and priorities of the IGIF should also be aligned with the current national political and policy drivers, and strategic objectives of the country. It is common for security, e-government, climate change adaptation, and land administration to feature prominently, but increasingly it could be resilience and disaster risk reduction, emergency response and management, food security and agriculture, transportation and urban wellbeing. These usually feature strongly based on national circumstances and the state of development.

As an example, a government in Eastern Europe identified six priority sectors for strategic investment: Energy and Mining; Transport, Telecommunication, Infrastructure and Urban Waste; Tourism; Agriculture and Fisheries; Economic Zones; and Priority Development Areas. In contrast, a post-conflict country has identified housing for Internally Displaced People as one of their priorities, and small island developing states have focused on mitigating climate change as their priority.

When considering national priorities, an assessment of various national indicators helps guide the potential alignment with integrated geospatial information management, including:

- National political platforms that are shared with the public on plans for national growth and improvement;
- The political agenda with government leaders to determine key policy objectives and the associated intervention framework;
- The national government's budget to determine where increases in investment in the country through allocations to various departments and agencies are focused based on changing conditions;

- The national economy to determine what sectors contribute most to the overall GDP;
- External influences, such as political, economic, social, technological, legislative and environmental influences, e.g. accession to a regional economic community or a trade pact; and
- Existing business case approaches for national projects that have been prepared and appraised by decision makers.

The results of these assessments can indicate the priority and political objectives to be potentially supported by the IGIF. These, in turn, will guide the socio-economic analysis to propose investing in geospatial information to support these political priorities. Communicating the value of geospatial information to national political leaders, and to department and agency leadership, can result in collaborations for advancing the national agenda for a country.

See Interrelated Action on Strategic Alignment Study (SP1).

3.6.15 Benefits Realization

Benefits realization management continues during implementation to monitor the delivery of the benefits during the implementation of the IGIF.

During and after implementation, all plans, investments, and commitments should be able to clearly show how benefits realization will be achieved and measured. This requires a Benefits Realization Plan.

The socio-economic analysis identifies and defines the expected benefits. The IGIF Country-level Action Plan typically includes milestones for implementing the IGIF.

Benefits realization management continues during implementation to monitor the delivery of the benefits during the implementation of the IGIF. Monitoring often serves to make necessary adjustments to implementation. The cause or reason for the adjustments vary but could include changes in national circumstances, recognition of required modifications to original workload and/or cost estimates, or inclusion of new technology. This requires a Monitoring and Evaluation Framework (See SP1: Action 1.6.9) to be established prior to implementation to ensure that the corresponding strategy and action plan is delivering the KPIs and the predicted benefits.

Feedback from the benefits realization monitoring process at key milestone points will allow changes to the IGIF program to be applied to optimize the benefits. These changes may, for example, abandon elements of the program

since it is not delivering benefits, or accelerate elements since they are delivering greater than expected benefits.

Throughout the implementation of the IGIF, at key milestones, the delivered benefits are evaluated to determine if the benefits of integrated geospatial information management have actually been realized. Benefits realization management should be considered a business change process that contributes to the sustainability of the program.

3.6.16 Communicate Benefits

It is important to communicate the benefits of geospatial information management as they come to fruition.

It is important to communicate the benefits of integrated geospatial information management as they come to fruition. This is an action rarely successful with geospatial information. Learning from other country successes in this action is beneficial, and may be contemplated until sufficient information is available.

Strategies, plans, and methods for communicating benefits are discussed in Strategic Pathway 9. Effective communication is served by strategic messaging, and hence a need to develop messages to communicate the benefits realized as a consequence of the funding and investment.

Plans, methods, and messages suitable to communicating financial benefits include: public announcement of a summary of the Financial Plan that includes the stated rationale and need for the investment, and expectations from the investments and expenditures; annual financial statements that include investment, and spending in comparison to financial goals, monitoring, and evaluation reports on the progress of the implementation; examples of benefits realized to society, environment, and economy; business opportunities and job creation, including testimonials from business and government leaders; and examples of successful partnerships across government agencies, between national and local governments, and with the private sector or academic community.

See Interrelated Action on Communication Strategy (SP9).

3.7 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:

- Financial Arrangement and Management Plan;
- Situational Assessment and Analysis;
- Strategic Opportunities Assessment;

- Desired Business Model for Integrated Geospatial Information Management;
- Financial Plan;
- Socio-economic Impact Assessment;
- Investment Appraisal;
- Annual Budget; and
- Benefits Realization and Communication Plan.

3.8 Outcomes

The following outcomes result from establishing the financial business model, opportunities, investments, and benefits realization, and a clear value proposition for integrated geospatial information management:

- An investment plan that includes current funding sources, obligations, and estimates for future years;
- New funding initiatives identified to meet the priorities for integrated geospatial information management;
- A financial accounting of costs associated with all aspects of a national integrated geospatial information program; and
- The socio-economic value of geospatial information that is well defined and aligns with the financial plan to realize benefits.

It should be noted that the primary outcome from using the guidance, options, and recommended actions in this strategic pathway is that integrated geospatial information management is sufficiently funded and will remain sustainable. Innovation and creative application of geospatial information, together with technological advancement, presents many opportunities to improve efficiency and effectiveness. However, within the many opportunities, there is a need to align with national priorities, be strategic, and to include rigor in financial assessments of the return on investment and other non-quantifiable socio-environmental-economic benefits. An investment appraisal is not a single event, and the identification of key performance indicators, which can be reviewed, evaluated, and monitored over the life cycle of an investment, will ensure the predicted benefits are realized.

3.9 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 several resource documents/publications that are helpful and useful when addressing the complexities in realizing nationally integrated geospatial information management.

This includes the Future Trends in Geospatial Information Management: Five- to Ten-year Vision; the work and contributions of the UN-GGIM Expert Group on Land Administration and Management; the Working Group on Legal and Policy Frameworks for Geospatial Information; and the Working Group on Global Fundamental Geospatial Data Themes. These expert and working groups have provided a series of deliverables that will support countries in developing their financial governance, arrangements, plans, and management for integrated geospatial information management.

3.10 References

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