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# ROLE OF THE PRIVATE SECTOR IN STRENGTHENING THE UNITED NATIONS INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK (UN-IGIF)

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Submitted by  
UN-GGIM Private Sector Network

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### Disclaimer:

This report is based on data collected from stakeholders of the regional geospatial ecosystem from May 21 to May 27, 2024. Participation in the survey was voluntary, and respondents could skip questions they didn't want to answer. Therefore, the data's completeness may have been influenced. While efforts were made to obtain a representative sample, the respondents may not perfectly reflect the views and characteristics of the entire target population. Caution should be exercised when generalizing the results to a broader audience.

The accuracy of the data depends on the honesty and precision of the respondents. The findings presented in this report are based on the data available at the time of analysis and should be interpreted as indicative rather than definitive. Results may be influenced by contextual factors not captured in the survey, and they reflect the views and conditions during the specific survey period.

Opinions and circumstances may change over time, and the findings may not be applicable in different temporal contexts. The survey was conducted in accordance with strict confidentiality and privacy standards. Personal identifiers have been removed to protect the identity of respondents, ensuring that individual responses cannot be traced back to any specific participant. This report is intended for informational purposes only, and the conclusions and recommendations are based on the survey data.

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# 1. Context

The [United Nations Committee of Experts on Global Geospatial Information Management \(UN-GGIM\)](#) was established in 2011 to enhance Geospatial information management, support decision-making, and contribute to sustainable development. UN-GGIM supports Member States and aspires to address global challenges related to Geospatial information, notably to implement the 2030 Agenda for Sustainable Development and other development objectives.

Recognizing the critical need for effective geospatial information management to deliver the 2030 Agenda, UN-GGIM adopted the [Integrated Geospatial Information Framework \(IGIF\)](#) in August 2018. **This integrated framework provides a basis and guides countries to develop and strengthen their geospatial information management arrangements and related infrastructures.** The framework guides collecting, managing, analyzing, and disseminating geospatial information to support evidence-based decision-making and sustainable development. The IGIF was established and developed in close consultation with Member States, thematic networks, including the academic and private sectors, and with contributions from ISO and OGC.

The IGIF provides a **common language and framework for geospatial information management**, helping countries to develop and implement national strategies and policies. The UN IGIF catalyzes countries, guiding them in developing their national action plans for geospatial information. The IGIF serves as the foundational design framework to guide the development of strategies for dynamic geospatial systems. It is not a static framework that requires strict adherence but is a flexible set of guidelines.

Figure 1 depicts the IGIF, which is anchored and implemented through three (3) critical areas of influence: governance, technology, and people. These strategic pathways aim to help governments implement integrated geospatial information systems to achieve a vision for sustainable social, economic, and environmental growth.

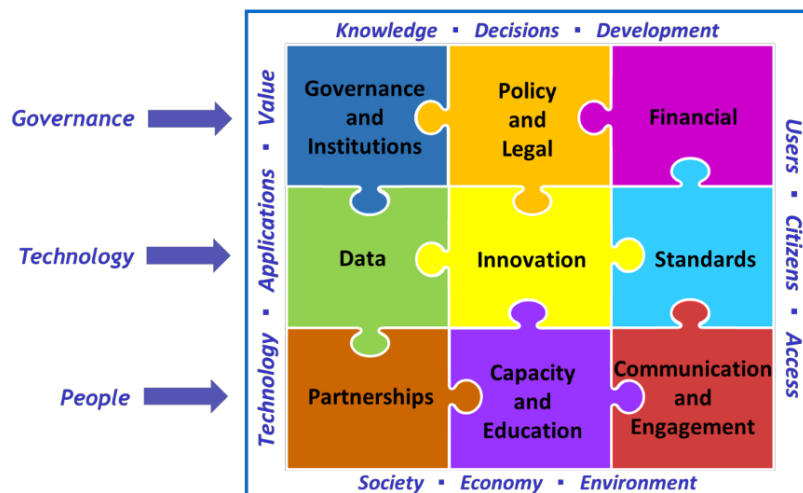


Figure 1: UN-IGIF is anchored in nine strategic pathways

## 1.1 The UN-GGIM: Private Sector Network

The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) officially endorsed the creation of the [UN-GGIM: Private Sector Network \(UN-GGIM: PSN\)](#) during the 6<sup>th</sup> Session to foster stronger partnerships between the public and private sectors for fully leveraging new data sources and technologies to achieve the United Nations' 2030 Agenda.

The Private Sector Network (PSN) took on an observer role within UN-GGIM to increase private sector involvement in the process. The PSN is a self-organized group that facilitates direct communication between the private sector and Member States. Its goal is to enhance geospatial information capacity. As observers, the PSN leverages its expertise to support the UN process at national, regional, and global levels, including policies, processes, practices, and recommendations.

The vision of PSN is to increase representation and foster a mutually beneficial collaboration. Members of the PSN volunteer their expertise to strengthen the global agenda, focusing not on business development or product promotion but on addressing specific UN-GGIM agenda items with their specialized knowledge.

The 12th and 13th Plenary Sessions of the United Nations, the Committee of Experts on Global Geospatial Information Management (UN-GGIM) emphasized the need for collaboration beyond governments to achieve the UN-IGIF agenda. They highlighted the important role of thematic networks, especially the private sector, in supporting and strengthening these efforts due to the global nature of the issues at hand. It was acknowledged that governance cannot solely operate on governmental terms; instead, the aim is to build a collective ecosystem where every participant is valued and can contribute to addressing the solutions and challenges we face.

## 1.2 PSN Regional Consultations

To address the above-mentioned need for stronger collaboration beyond governments to achieve the UN-IGIF agenda, the PSN planned a report on the Role of the Private Sector Network in Strengthening the implementation of the UN-IGIF.

The current report is a result of consultation sessions conducted across all UN-GGIM regions with relevant public, private, and academic stakeholders to understand the role of the geospatial private sector in supporting the implementation of the UN-IGIF in their unique contexts and countries. The global virtual consultations were held in all the regions as follows:

- Americas (21 May 2024)
- Europe (23 May 2024)
- Africa (23 May 2024)
- Asia Pacific (24 May 2024)
- Arab States (27 May 2024)

## 1.3 Objectives of the Consultations

The regional consultations aimed to assess the role of the private sector in strengthening the implementation of UN-IGIF at the country level. The survey and discussion-based exercise sought to understand the expectations and ideas of stakeholders, especially private sector participants from



all regions, on how they can collaborate with national mapping agencies and governments to ensure optimal private sector involvement in the nine strategic pathways for improved outcomes of geospatial information management. It also aimed to identify any obstacles they face and propose solutions to address these issues.

### 1.4 Format of Discussions

Each regional consultation, lasting approximately one hour, was led by the Regional Chair of the UN-GGIM: Private Sector Network. During the sessions, a Mentimeter-based survey was conducted, allowing for anonymous input on questions. These surveys were interspersed with discussions to facilitate comprehensive engagement. Mentimeter, an online survey tool, enabled participants to provide their input anonymously.

A total of 181 participants attended the five regional consultation meetings, as detailed in Figure 2.

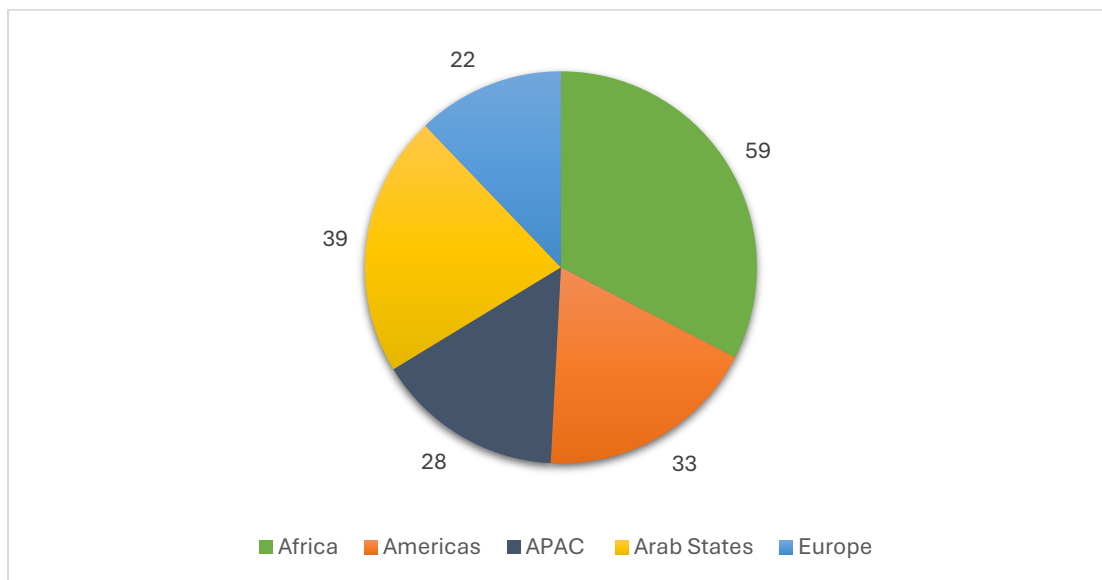


Figure 2: Breakup of Regional Consultation Participation

The following chapters present the inputs from the regional consultations on the nine UN-IGIF strategic pathways, followed by a common consensus with proposed next steps.

## 2. Africa

The African regional consultation was attended by 59 participants representing various public, private, and academic institutions from across the continent. The summary of the discussions from the African consultation is depicted in Figure 3. The findings from each strategic pathway are elaborated in the following sections.

<b>GOVERNANCE &amp; INSTITUTIONS</b> <i>PSN's contribution to strengthen IGIF implementation</i>	Communicating the value proposition of Geospatial Information      Actively participating in Working Groups for Geospatial Information management      Providing feedback to the government on governance issues		
<b>POLICY &amp; LEGAL</b> <i>Policies required to enhance the role of the Private sector</i>	<ol style="list-style-type: none"> <li>1. Policies that involve more private sector in Geospatial Information management</li> <li>2. Open access policies</li> <li>3. Guiding policies on roles and responsibilities of the private sector and their contribution</li> <li>4. Data Interoperability and Data Privacy policies</li> <li>5. Policies that promote FOSS</li> <li>6. Geospatial Information Management (GIM) Policy</li> </ol>		
<b>FINANCIAL</b> <i>PPP engagement models</i>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; background-color: #f0f0f0;">Build trust between government entities and the private sector for a successful PPP.</div> <div style="font-size: 20px;">→</div> <div style="border: 1px solid black; padding: 5px; background-color: #f0f0f0;">Develop Geospatial data collection partnerships and management of Spatial assets</div> <div style="font-size: 20px;">→</div> <div style="border: 1px solid black; padding: 5px; background-color: #f0f0f0;">Help the national mapping agency build a methodology and scope for socioeconomic impact assessment.</div> </div>		
<b>DATA</b> <i>Top 5 data themes on the level of availability &amp; productivity improvement measures</i>	<ol style="list-style-type: none"> <li>1. Land cover/ Land use</li> <li>2. Geodetic Framework</li> <li>3. Geology &amp; Soils</li> <li>4. Geographical Names</li> <li>5. Transport Network</li> </ol>		
<b>INNOVATION</b> <i>Support the promotion of innovation in geospatial sector</i>	<b>Supporting innovation in the country</b> <ol style="list-style-type: none"> <li>1. Become an active member of an Innovation Group</li> <li>2. Be a part of the review board/process</li> <li>3. Help with conducting technology needs assessments</li> <li>4. Provide Training and Workshops on Geospatial Information</li> <li>5. Building Innovation Programs &amp; Hubs</li> </ol>	<b>Productivity Improvement Measures for the NMA</b> <ol style="list-style-type: none"> <li>1. Modernized Technology and Automation</li> <li>2. Data Management and Sharing</li> <li>3. Workflow Optimization and Collaboration</li> <li>4. Skills Development and Training</li> <li>5. Performance Measurement and Monitoring</li> </ol>	
<b>STANDARDS</b> <i>Initiatives are undertaken for Standards development</i>	Participating in the process of standards development	Adopting national standards for products and services	Developing capacity and training on various standards
<b>PARTNERSHIPS</b> <i>Initiatives are undertaken for Standards development</i>	<ol style="list-style-type: none"> <li>1. Standards development</li> <li>2. Awareness building initiatives</li> <li>3. Industry-Academic collaborations for joint research &amp; development</li> <li>4. Cross-sector/Interdisciplinary initiatives</li> </ol>		
<b>CAPACITY &amp; EDUCATION</b> <i>Private Sectors support in Capacity-building Initiatives</i>	<ol style="list-style-type: none"> <li>1. Providing training to government officials on the latest technologies and products</li> <li>2. Providing skill development courses to students and young professionals to promote Geospatial education</li> <li>3. Developing a community of practitioners</li> </ol>		
<b>COMMUNICATION &amp; ENGAGEMENT</b> <i>Efforts for Geospatial advocacy to the users promoting geospatial information</i>	<ol style="list-style-type: none"> <li>1. Establishing an industry association that acts as a collective voice for the geospatial industry in the country</li> <li>2. Building and participation in various stakeholder engagement programs</li> <li>3. Organizing periodic conferences/meetings</li> <li>4. Publishing geospatial knowledge content that promotes knowledge exchange</li> <li>5. Collaboration for research and development</li> </ol>		

Figure 3: Overview of African Regional Consultation

## 2.1 Governance and Institutional Arrangements

The consultation participants in the Africa region outlined several ways for the private sector to contribute to the governance and institutional arrangements to strengthen the implementation of the Integrated Geospatial Information Framework (UN-IGIF):

- Actively participating in national working groups dedicated to improving geospatial information management.
- Communicating the value proposition of geospatial information to various stakeholders.
- Providing constructive feedback to governments on governance issues.

Additionally, the private sector can:

- Offer sustainable solutions to government challenges.
- Serve as members of a National Geospatial Strategy design group.
- Educate policymakers on the benefits and applications of geospatial information.
- Participate in think tanks or similar initiatives to enhance governance and institutional arrangements for geospatial information management.

The private sector seeks a more prominent role in the policy-making process for geospatial information, advocating for regular meetings and interactions to ensure their active involvement.

## 2.2 Policy and Legal

The private sector in Africa requires supportive policies to promote ease of doing business in the geospatial sector. While some effective policies exist, there are notable loopholes and practical hindrances that impede achieving this goal.

To support the private sector in achieving the goals of the Integrated Geospatial Information Framework (UN-IGIF), several policy measures can be implemented:

### **Geospatial Policies, Laws, and Strategies:**

- Establishing a comprehensive legal and policy framework.
- Facilitating public-private partnerships.
- Implementing skills development programs.
- Offering tax breaks and financial incentives.
- Clearly defining the roles and responsibilities of public and private entities.
- Developing guiding policies that enable the private sector's role in geospatial information management.
- Mandating the use of geospatial information in key government projects.
- Enforcing data and technology procurement policies that promote transparency and accountability.

### **Data Policies:**

- Promoting policies that support free and open-source data/software.
- Ensuring robust data privacy policies.
- Implementing e-commerce policies.
- Developing data interoperability policies.

The African private sector expects these policies to be clearly articulated in unambiguous terms, enhancing transparency and inclusivity, outlining the appropriate use of geospatial information, and reducing duplication of efforts.

## 2.3 Financial

The private sector in the Africa region has identified a lack of sufficient laws to promote shared funding or public-private partnerships (PPPs) for geospatial projects. While PPPs are considered a viable funding mechanism for developing nations in the region, several issues impact their implementation:

- Lack of trust between government entities and the private sector.
- Insufficient availability of lucrative PPP opportunities.
- Limited capital within the private sector to invest in projects or assume the financial risks associated with PPPs.
- Variability in the maturity of the geospatial private sector across the region.
- Limited understanding of the value of geospatial information and technology for development, coupled with government entities' reluctance to utilize geospatial technology.

PPPs can be established for fundamental data collection, the establishment of Continuously Operating Reference Stations (CORS) networks, management of geospatial assets, and collaboration on utility services delivery. Additional PPP initiatives could focus on capacity development, education, land parcel capture, managed cloud services, and sharing utility data that has been previously published. There is a need to explore innovative business models in the region.

The African private sector also recognizes the value of conducting socio-economic impact assessments of geospatial information. They are prepared to assist their national mapping agencies in developing the methodology and scope for such assessments, distributing surveys to relevant stakeholders, or independently conducting socio-economic impact assessments of geospatial information.

## 2.4 Data

The African region participants conveyed that data on land use/land cover, geology and soils, imagery, geographical names were some of the best quality data available in their respective countries.

While the perceived quality of other datasets is also in the average range, there is significant scope for the private sector to contribute to capturing, processing, maintaining, and managing these data themes. The primary issue, however, lies in financing the creation and maintenance of datasets, rather than the technical expertise required for such tasks. Several companies in the region capture such data and offer it for a price, as the open and free data model is not viable for them.

While data captured and made available through public portals is appreciated, such open data portals are limited and inconsistent across the region. Improved access to open data would enable the private industry to develop solutions for broader use. The private sector advocates for listing

data sources by government departments and making them available online, including contact details for further engagement.

The African private sector can further support data adoption by promoting use cases, best practices, and sectoral applications within the region and engaging in complementary opportunities that address government areas of weakness.

Figure 4 illustrates the responses collected from the African regional consultation regarding the availability of fundamental data. Participants evaluated each fundamental data theme using a scale from 0 to 5, where 0 represented very poor quality and 5 represented very good quality.

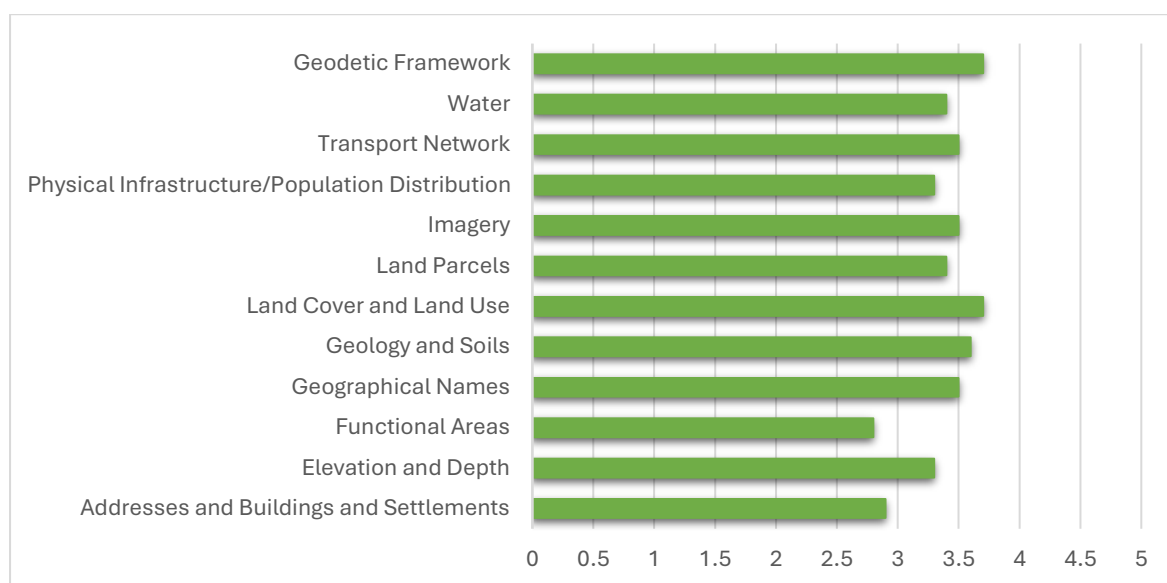


Figure 4: Level of Fundamental Data Availability in the African Region

## 2.5 Innovation

To enhance productivity and improve geospatial information management within national mapping agencies in the region, the private sector has proposed the following measures:

- **Adopting a multi-stakeholder approach** to creating National Spatial Data Infrastructures (NSDI).
- **Implementing independent quality control mechanisms** to ensure data integrity.
- **Providing quality assessments and statements** for data to maintain high standards.
- **Assigning data custodians** to oversee and manage data effectively.
- **Eliminating time-boxed programs** and avoiding unstable technology models to ensure continuity and reliability.
- **Outsourcing repetitive tasks** to experts capable of delivering within shorter timeframes for increased efficiency.
- **Allocating adequate budgets** to support sustainable geospatial initiatives.
- **Ensuring transparency** in all processes to build trust and accountability.
- **Promoting automation** to streamline operations and reduce manual workload.
- **Establishing performance measurement and monitoring systems** to track progress and improve outcomes.

The African private sector is committed to supporting innovation in their countries by:

- **Becoming active members of Innovation Groups** to foster collaborative development.
- **Participating in the Innovation Hubs review board/process** to guide and evaluate new ideas.
- **Assisting with conducting technology needs assessments** to identify and address gaps in the current infrastructure.

## 2.6 Standards

The African private sector acknowledges the crucial role of standards in geospatial information management. They have been actively adopting national standards for products and services, participating in the development of these standards, and building capacity through training on various standards. However, there remains a need for the development and implementation of additional geospatial standards in the region to further enhance the effectiveness and consistency of geospatial information management.

## 2.7 Partnerships

The geospatial private sector in the African region has established partnerships for standards development, awareness-building initiatives, and industry-academic collaborations for joint research and development. However, there is a need for more strategic cooperation opportunities with academia and international organizations that are long-term and independent of specific programs or projects. Additionally, the sector seeks to establish partnerships for international multidisciplinary projects to further enhance the region's geospatial capabilities.

## 2.8 Capacity and Education

The African private sector can contribute to skills development initiatives and public sector training by offering programs on technology modernization, workforce upskilling, leadership development, and integration with other key agencies such as space and AI adoption.

These training programs could be designed for government officials, students and young professionals, graduates, and interns. Additionally, the private sector can conduct UN-IGIF training sessions for other user agencies and stakeholders, thereby fostering a comprehensive understanding and effective implementation of the framework.

## 2.9 Communication and Engagement

The African geospatial private sector recognizes the value of establishing industry associations that serve as a collective voice for the geospatial industry within their respective countries. These associations are instrumental in building and participating in various stakeholder engagement programs, organizing periodic conferences and meetings, and publishing geospatial knowledge content to promote knowledge exchange.

The private sector in the region advocates for open communication platforms where their concerns can be addressed, and they can actively contribute to the implementation of the Integrated Geospatial Information Framework (UN-IGIF). There is broad consensus on the necessity for



government, private sector, and academia to collaborate at a cross-sectoral level to achieve shared geospatial objectives.

### 3. Americas

The Americas regional consultation was attended by 33 participants representing various public, private, and academic institutions from across the region. The summary of the discussions from the regional consultation is depicted in Figure 5. The findings from each strategic pathway are elaborated in the following sections.

<b>GOVERNANCE &amp; INSTITUTIONS</b> <i>PSN's contribution to strengthen IGIF implementation</i>	Communicating the value proposition of Geospatial Information      Actively participating in Working Groups for Geospatial Information management      Providing feedback to the government on governance issues		
<b>POLICY &amp; LEGAL</b> <i>Policies required to enhance the role of the Private sector</i>	<ol style="list-style-type: none"> <li>1. Easier procurement policies</li> <li>2. Open data policies</li> <li>3. Policies for geospatial data collection and processing, recognizing authorship</li> <li>4. Data access policies</li> </ol>		
<b>FINANCIAL</b> <i>PPP engagement models</i>	 <pre> graph LR     A[Develop Geospatial data collection partnerships and management of Spatial assets] --&gt; B[Build trust between government entities and the private sector for a successful PPP.]     B --&gt; C[Help the national mapping agency build a methodology and scope for socioeconomic impact assessment.]           </pre>		
<b>DATA</b> <i>Top 5 data themes on the level of availability &amp; productivity improvement measures</i>	<ol style="list-style-type: none"> <li>1. Geology &amp; Soils</li> <li>2. Imagery</li> <li>3. Geodetic Framework</li> <li>4. Geographical Names</li> <li>5. Addresses/Buildings and Settlements</li> </ol>		
<b>INNOVATION</b> <i>Support the promotion of innovation in geospatial sector</i>	<b>Supporting innovation in the country</b> <ol style="list-style-type: none"> <li>1. Become an active member of an Innovation Group</li> <li>2. Be a part of the review board/process</li> <li>3. Provide Training and Workshops on Geospatial Information</li> <li>4. Building Innovation Programs &amp; Hubs</li> <li>5. Help with conducting technology needs assessments</li> </ol>		<b>Productivity Improvement Measures for the NMA</b> <ol style="list-style-type: none"> <li>1. Timebound delivery and outcome-based projects</li> <li>2. Streamlining procurement and data access</li> <li>3. Improving transparency</li> <li>4. More efficient communication and information sharing with the private sector</li> </ol>
<b>STANDARDS</b> <i>Initiatives are undertaken for Standards development</i>	Participating in the process of standards development	Developing and participating in a community of practice	Developing specifications for their data and products
<b>PARTNERSHIPS</b> <i>Initiatives are undertaken for Standards development</i>	<ol style="list-style-type: none"> <li>1. Industry-Academic collaborations for joint research &amp; development</li> <li>2. Standards development</li> <li>3. Capacity building</li> <li>4. Awareness building initiatives</li> </ol>		
<b>CAPACITY &amp; EDUCATION</b> <i>Private Sectors support in Capacity-building Initiatives</i>	<ol style="list-style-type: none"> <li>1. Providing skill development courses to students and young professionals to promote Geospatial education</li> <li>2. Providing training to government officials on the latest technologies and products</li> <li>3. Developing a community of practitioners</li> </ol>		
<b>COMMUNICATION &amp; ENGAGEMENT</b> <i>Efforts for Geospatial advocacy to the users promoting geospatial information</i>	<ol style="list-style-type: none"> <li>1. Establishing an industry association that acts as a collective voice for the geospatial industry in the country</li> <li>2. Collaboration for research and development</li> <li>3. Organizing periodic conferences/meetings</li> <li>4. Publishing geospatial knowledge content that promotes knowledge exchange</li> <li>5. Building and participation in various stakeholder engagement programs</li> </ol>		

Figure 5: Overview of Americas Regional Consultation



### 3.1 Governance and Institutional Arrangements

The majority of the Americas' regional private sector believes that they can best contribute to governance and institutional arrangements supporting the UN-IGIF by effectively communicating the value proposition of geospatial information. They emphasize the importance of providing feedback to governments on governance issues and actively participating in working groups and committees dedicated to enhancing geospatial information management. The extent of their contribution depends on their philosophy and business models regarding data sharing and the specific features of their solutions that are monetized.

### 3.2 Policy and Legal

Regarding policy and legal requirements, the Americas private sector identifies existing loopholes and practical hindrances that impede the ease of doing business in the geospatial industry, along with a lack of sufficient policies to support this ease. They also report a deficiency of laws promoting shared funding or public-private partnerships for geospatial projects.

To enhance the role of the private sector in achieving UN-IGIF goals, the following policies are required:

1. Simplified procurement policies
2. Open data policies
3. Policies fostering public-private collaborations for building geospatial infrastructure
4. Intellectual property rights laws for geospatial data
5. Data access policies

Regular engagement with the private sector is essential for the development and implementation of these policies.

### 3.3 Financial

The region recognizes the potential for developing opportunities for the private sector to collaborate effectively with their respective governments in public-private partnerships (PPPs) to support the foundational geospatial data value chain. To this end, a comprehensive program framework and execution model, incorporating techno-commercial analysis, is essential to build confidence and achieve mutually beneficial outcomes for both the public and private sectors. Additionally, it is crucial to address the lack of trust between government entities and the private sector to enhance geospatial information management.

The potential and scope for private sector participation in PPPs for geospatial data collection, followed by the management of spatial assets, are evident. Furthermore, developing nations seek support from developed nations to modernize their geospatial data and infrastructure. This modernization can be facilitated through PPPs, provided that funding is available. The private sector has shown a willingness to engage in PPP arrangements for maintaining geospatial infrastructure and service delivery, contingent upon the public sector's investment in the creation of fundamental data and infrastructure. Additionally, the private sector can play a vital role in training and capacity building in a PPP mode to enhance the technological capabilities of public sector officials.

The UN-GGIM has underscored the importance of the socioeconomic value of geospatial information and the requisite investment and funding levels needed to deliver and sustain this value. The private sector in the region is prepared to support their governments in conducting a study by developing the methodology and scope, distributing the survey to relevant stakeholders, or serving as an on-ground implementation partner to showcase a pertinent case study for geospatial applications.

To promote a common understanding of the funding opportunities under the United Nations Integrated Geospatial Information Framework (UN-IGIF), the private sector can organize multidisciplinary meetings involving donors, funders, international financial institutions, philanthropic organizations, and Member States.

### 3.4 Data

Data constitutes the foundation of geospatial information, necessitating significant efforts and resources dedicated to the collection, processing, management, maintenance, and dissemination of geospatial data. While there are good fundamental datasets available in some parts of the region, enhancing the quality of available fundamental data themes is a significant need in the region. There is also a need for consistent national data layer content standards.

Certain companies provide discounted software and hardware to developing nations to enhance their geospatial information management capabilities or collaborate with governments during emergencies and disasters to share data. The private sector can further contribute through public-private partnerships (PPPs) aimed at developing geodetic infrastructure, especially by developed nations to assist developing nations.

Enhancing the quality of fundamental data themes in the region presents a valuable opportunity for public-private collaborations. This issue is particularly critical given that, although free and open data are commendable objectives, such provisions are not always sustainable or feasible for the private sector. Even if free and open data are initially made available through a funding mechanism, their long-term maintenance remains a challenge. The geospatial value chain does not necessarily commence with open data; when it does, it relies on very limited datasets that have been demonetized or replaced by more relevant, higher resolution, or more recent data.

Another potential area for collaboration involves the establishment and operation of geospatial infrastructure, where the private sector can play a significant role.

Figure 6 illustrates the responses collected from the Americas regional consultation regarding the availability of fundamental data. Participants evaluated each fundamental data theme using a scale from 0 to 5, where 0 represented very poor quality and 5 represented very good quality.

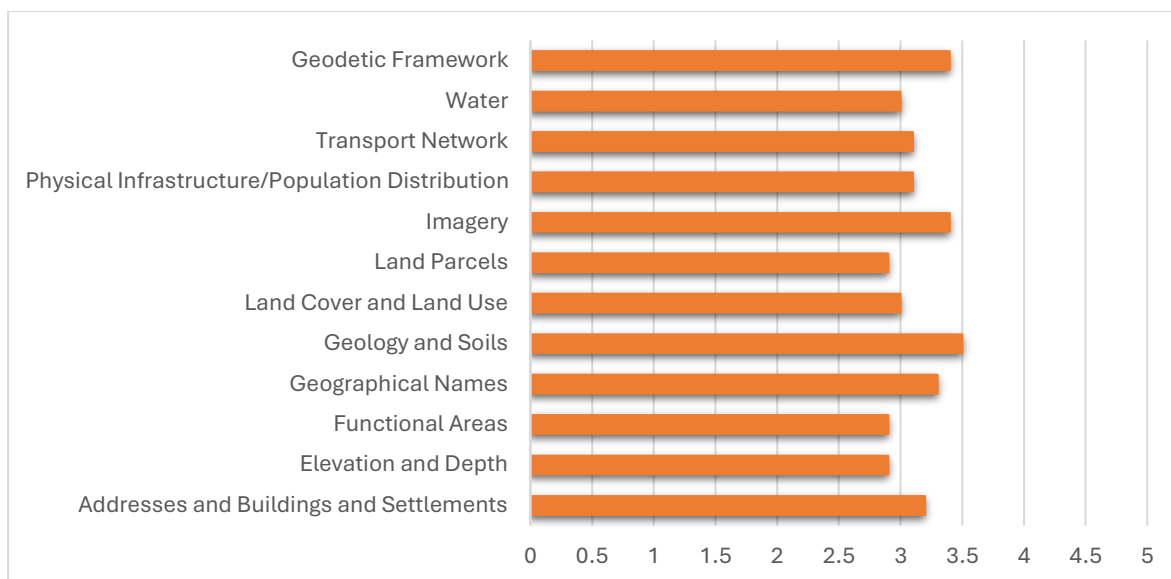


Figure 6: Level of Fundamental Data Availability in the Americas Region

### 3.5 Innovation

Innovation is essential for enhancing geospatial information management and adoption, thereby contributing to the achievement of various national and global goals. The geospatial private sector plays a pivotal role in driving innovation. The regional consultation in the Americas highlighted several expectations from the private sector regarding productivity enhancement measures to foster innovation within national mapping agencies. These expectations include:

- Facilitating partnerships to improve geodetic network coverage in remote and sparsely populated areas.
- Providing assessments of geohazard risk levels.
- Implementing time-bound delivery and outcome-based programs.
- Streamlining procurement and quality assurance processes.
- Enhancing dataset accessibility via a unified portal, with a particular emphasis on boundary shapefiles.
- Ensuring greater transparency and more efficient communication and information sharing with private-sector implementation partners.

The private sector can support governments by actively participating in innovation groups or review boards, offering training and workshops, and assisting in the development of innovation programs. Additionally, the private sector can contribute to technology needs assessments and provide data, platform, and cloud services. Creating matchmaking platforms to align capabilities with product and service needs can also facilitate more collaborative experimentation and development.

### 3.6 Standards

Geospatial standards are essential for ensuring that geospatial data can be used across different platforms and applications with accuracy and consistency. This helps improve the management of geospatial information worldwide. The private sector actively supports the development of common and efficient standards for data interoperability by taking part in the standards development

process. They also contribute to a community of practice, adopt national and international standards for their products and services, participate in national needs assessment for standards, and promote the use of available standards.

### 3.7 Partnerships

The success of the United Nations Integrated Geospatial Information Framework (UN-IGIF) implementation hinges on robust partnerships. In the region, the private sector actively collaborates with academia through joint research and development initiatives. Additionally, the private sector engages in partnerships with other industries and academic institutions for standards development, capacity-building initiatives, awareness campaigns, cross-sector and interdisciplinary projects, and international trade and business activities. Furthermore, partnerships with civil society organizations are integral. These collaborative efforts are among the key ways the private sector in the Americas region can bolster the implementation of UN-IGIF.

### 3.8 Capacity and Education

The private sector can support capacity-building initiatives through the following measures:

- Providing skill development courses to students and young professionals to enhance geospatial education.
- Offering training programs for government officials on the latest technologies and products.
- Developing a community of practitioners.
- Conducting skill gap analyses in the country concerning geospatial education.
- Establishing and contributing to innovation hubs.
- Creating new products and services based on evolving national and international geospatial standards, along with providing customer support services and documentation for their use.
- Organizing sensitization sessions, conferences, seminars, demo days, youth programs, and other similar events.
- Educating users and developer communities on the value proposition of location intelligence in solving business challenges.

### 3.9 Communication and Engagement

Geospatial advocacy is more critical now than ever, particularly when conducted by the private sector without the primary motive of selling a product or service. Numerous geospatial companies contribute to this vision through various means:

- Uniting their collective voice to form industry associations.
- Collaborating in research and development initiatives.
- Organizing conferences, seminars, and other outreach activities.
- Publishing geospatial knowledge content, including reports, articles, and blogs.
- Building and participating in diverse stakeholder engagement programs.

During the consultation, a key issue discussed was the need to overcome communication barriers by using language that resonates with users and decision-makers when explaining the benefits of geospatial information. An analogy of a car was presented to illustrate this point: a car buyer, may

not be interested in the various technologies used to build the car, but rather more concerned with its safety, reliability, and efficiency in transportation. Similarly, when communicating with a farmer in the Americas about the use of geospatial information, the private sector must speak their language and address their concerns, rather than emphasizing the technical advantages of their products and solutions.

Additionally, the private sector can play a crucial role by collaborating with national mapping agencies to persuade user departments to leverage the benefits of the United Nations Integrated Geospatial Information Framework (UN-IGIF). This can be achieved through organizing thematic meetings, training programs, or proof-of-concept demonstrations to convince decision-makers of the technology's value.

While the private sector has made significant technological advancements, decision-makers have not fully witnessed these developments. The private sector can bridge the gap from policy to implementation. Opportunities for dialogue and proactive engagement with the UN-IGIF stakeholders may prove more effective than policies alone.

## 4. Arab States

The Arab States regional consultation was attended by 39 participants representing various public, private, and academic institutions from across the region. The summary of the discussions from the regional consultation is depicted in Figure 7. The findings from each strategic pathway are elaborated in the following sections.

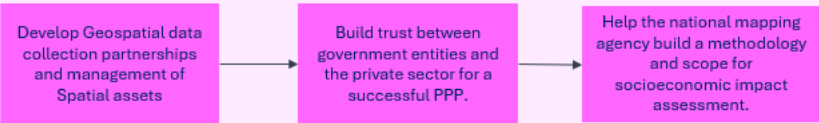
<b>GOVERNANCE &amp; INSTITUTIONS</b> <i>PSN's contribution to strengthen IGIF implementation</i>	Providing feedback to the government on governance issues      Communicating the value proposition of Geospatial Information      Actively participating in Working Groups for Geospatial Information management		
<b>POLICY &amp; LEGAL</b> <i>Policies required to enhance the role of the Private sector</i>	<ol style="list-style-type: none"> <li>1. Policies encouraging investments in the private sector and ease of doing business</li> <li>2. Open data and access policies</li> <li>3. Policies for public-private partnerships</li> <li>4. Data exchange policies</li> <li>5. Fewer regulations for the private sector</li> <li>6. Level playing field for the private sector</li> </ol>		
<b>FINANCIAL</b> <i>PPP engagement models</i>			
<b>DATA</b> <i>Top 5 data themes on the level of availability &amp; productivity improvement measures</i>	<ol style="list-style-type: none"> <li>1. Geographical Names</li> <li>2. Addresses/Buildings and Settlements</li> <li>3. Geology &amp; Soils</li> <li>4. Functional Areas</li> <li>5. Imagery</li> </ol>		
<b>INNOVATION</b> <i>Support the promotion of innovation in geospatial sector</i>	<table border="0"> <tr> <td data-bbox="438 1104 917 1254"> <b>Supporting innovation in the country</b> <ol style="list-style-type: none"> <li>1. Become an active member of an Innovation Group</li> <li>2. Be a part of the review board/process</li> <li>3. Building Innovation Programs &amp; Hubs</li> <li>4. Provide Training and Workshops on Geospatial Information</li> <li>5. Help with conducting technology needs assessments</li> </ol> </td> <td data-bbox="917 1104 1370 1254"> <b>Productivity Improvement Measures for the NMA</b> <ol style="list-style-type: none"> <li>1. Streamlining data access</li> <li>2. Increase G2G, G2B, G2C collaborations</li> <li>3. More partnerships with global entities</li> <li>4. Ensure more budgets and human resource allocation</li> </ol> </td> </tr> </table>	<b>Supporting innovation in the country</b> <ol style="list-style-type: none"> <li>1. Become an active member of an Innovation Group</li> <li>2. Be a part of the review board/process</li> <li>3. Building Innovation Programs &amp; Hubs</li> <li>4. Provide Training and Workshops on Geospatial Information</li> <li>5. Help with conducting technology needs assessments</li> </ol>	<b>Productivity Improvement Measures for the NMA</b> <ol style="list-style-type: none"> <li>1. Streamlining data access</li> <li>2. Increase G2G, G2B, G2C collaborations</li> <li>3. More partnerships with global entities</li> <li>4. Ensure more budgets and human resource allocation</li> </ol>
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<b>STANDARDS</b> <i>Initiatives are undertaken for Standards development</i>	Popularizing available standards      Participating in national standards needs assessments      Developing and participating in a community of practice		
<b>PARTNERSHIPS</b> <i>Initiatives are undertaken for Standards development</i>	<ol style="list-style-type: none"> <li>1. Standards development</li> <li>2. Cross-sector or interdisciplinary initiatives</li> <li>3. Co-funding of fundamental data themes</li> <li>4. Industry-academic collaborations for joint research and development</li> <li>5. Awareness building initiatives</li> </ol>		
<b>CAPACITY &amp; EDUCATION</b> <i>Private Sectors support in Capacity-building Initiatives</i>	<ol style="list-style-type: none"> <li>1. Undertake a skill gap analysis regarding geospatial education</li> <li>2. Providing skill development courses to students and young professionals to promote Geospatial education</li> <li>3. Providing training to government officials on the latest technologies and products</li> </ol>		
<b>COMMUNICATION &amp; ENGAGEMENT</b> <i>Efforts for Geospatial advocacy to the users promoting geospatial information</i>	<ol style="list-style-type: none"> <li>1. Collaboration for research and development</li> <li>2. Publishing geospatial knowledge content that promotes knowledge exchange</li> <li>3. Organizing periodic conferences/meetings</li> </ol>		

Figure 7: Overview of Arab States Regional Consultation

## 4.1 Governance and Institutional Arrangements

The private sector representatives from the Arab States see their main role as providing feedback to the government on governance issues that involve the widespread use of geospatial data and technology. This feedback would be from the perspective of an end-user or a service provider. They also believe in communicating the value of geospatial information as a commodity and the need for governance and institutional arrangements, inspired by frameworks such as the UN-IGIF. They think that the government should ideally lead the implementation of these arrangements. They also believe that communication between the private sector and government agencies can be facilitated through in-country working groups.

## 4.2 Policy and Legal

When it comes to policies supporting the ease of doing business in the geospatial sector in the Arab States, the private sector acknowledges that there are some good policies in place. However, these policies are not comprehensive and do not address certain important aspects. These gaps in policies become most apparent during practical applications of geospatial data, information, and technology.

The private sector strongly believes that there is a need for policies to remove barriers that hinder the private sector from collecting, sharing, and using geospatial information. These policies, ideally established at the national level, should aim to make geospatial data open, accessible, and exchangeable.

While recognizing the importance of government regulation and guidance in the sector, the private sector emphasizes the need for these regulations to be non-binding to facilitate the unrestricted growth of private enterprise. Regulatory government policies are most welcome when they focus on publishing up-to-date and authoritative baseline geospatial data that is ready to use for value addition and application development.

Furthermore, the private sector in the Arab States anticipates the implementation of policies that foster investment opportunities, promote open data access, and facilitate public-private partnerships. These stakeholders advocate for policies that support data exchange and call for reduced regulatory burdens on the private sector. Additionally, they seek the establishment of a level playing field to enable optimal growth and development.

## 4.3 Financial

The private sector representatives from the Arab States are advocating for increased investment in the geospatial industry. They believe that this investment should be channeled into projects based on Public-Private Partnerships (PPPs). They assert that any comprehensive national geospatial strategy or policy framework, possibly modeled after the UN-IGIF, should take PPPs into account as a funding mechanism. This move would legitimize and formalize the private sector's role in the overall development of the geospatial sector in the country.

Formally recognizing PPPs in a national strategy would significantly enhance trust between public and private enterprises. The private sector in the Arab States emphasizes the importance of PPPs due to the limited individual capacity within each private enterprise to establish fundamental resources and infrastructure for the widespread use of geospatial information.

Currently, the private sector is prepared to contribute to PPP projects focused on data collection, spatial data asset management, and utility service delivery. These initiatives would be further enhanced by data dissemination, analysis, and automation through AI/ML.

The private sector also believes that being closer to the ground, they are best positioned to support the government in conducting socio-economic impact assessments of geospatial information and subsequently sharing the results of such assessments with all relevant stakeholders.

## 4.4 Data

The responses from private sector representatives in the Arab States indicate that there is limited availability of authoritative datasets across various geospatial fundamental data themes as defined by the UNGGIM. This suggests that there is significant room for improvement in publishing up-to-date authoritative datasets that cover all the different data themes.

The private sector acknowledges the importance of authoritative datasets in their business activities, which often involve enhancing basic geospatial data through applications. They are calling on the government to provide authoritative datasets that are openly accessible and available for sharing and exchange. The private sector believes that government policies and regulations in the geospatial domain should primarily focus on making geospatial data and information open, accessible, and exchangeable. This could be achieved through national data standards, specifications, and policies.

Figure 8 illustrates the responses collected from the Arab States' regional consultation regarding the availability of fundamental data. Participants evaluated each fundamental data theme using a scale from 0 to 5, where 0 represented very poor quality and 5 represented very good quality.



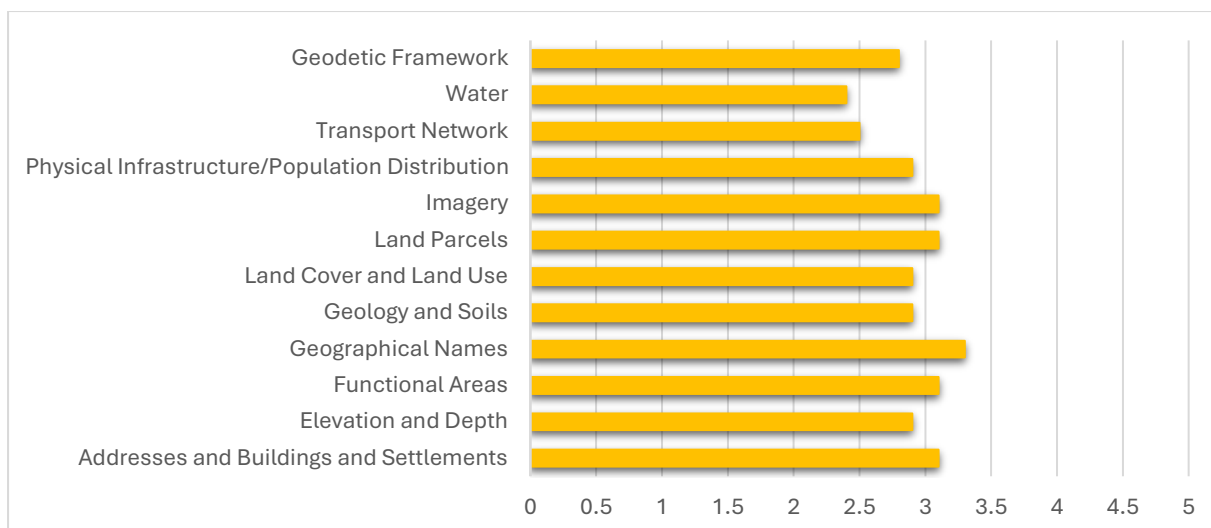


Figure 8: Level of Fundamental Data Availability in the Arab States Region

## 4.5 Innovation

In the field of innovation, the private sector in the Arab States aims to enhance the scale and detail of geospatial data as a crucial first step. The significance of data as a driver for innovation in the geospatial domain is emphasized, with a call for the development of a unified data framework to manage cross-sector utility/infrastructure data and their spatial components.

Representatives unanimously agree on the importance of seeking greater participation and collaboration from global and regional entities to promote innovation in data collection and throughout the geospatial value chain. This necessitates the formulation of policies that facilitate partnerships with external entities and the outsourcing of certain projects and tasks. The involvement of external partnerships is considered essential, especially initially, to build internal capacity and capability.

The private sector proposes establishing innovation hubs to contribute to innovation in the geospatial domain. By actively participating in these hubs, the private sector would provide data, platforms, and services to encourage further innovation.

## 4.6 Standards

The private sector from the Arab States seeks to develop and actively participate in fostering a community of practice around geospatial data and technology standards. Their role in such a community would be to participate in a recurring process of assessing the need for standards at the national level. Followed by popularizing existing and available standards and their mandates through use, compliance, and implementation.

## 4.7 Partnerships

The importance placed around the provisioning of authoritative datasets by the private sector, is once more visible under the banner of Partnerships, as they acknowledge the relevance of partnerships focused on co-funding the building and provisioning of fundamental data themes.

Apart from that, the private sector representatives from the Arab States also acknowledge the ongoing partnerships in the realm of standards development.

## 4.8 Capacity and Education

The private sector from the Arab States strongly believes in their ability to contribute to capacity-building measures in the geospatial domain. This according to them would be along three axes:

- Conducting a skill gap assessment and analysis of the prevalence of geospatial skills and education at a national level,
- Providing skill development courses and training to students and young professionals in the Geospatial domain,
- Enabling re-skilling for professionals by providing training to the latest technology paradigms, especially to professionals in the government sector.

## 4.9 Communication and Engagement

According to the private sector in the Arab States, efforts at Geospatial advocacy that seek to promote Geospatial knowledge without promoting business interests, take the following forms:

- Periodic industry-wide conferences and meetings,
- Collaborative research and development, between the private sector, academia, government, and citizenry.
- Publishing Geospatial knowledge to create a comprehensive body of knowledge for the domain.

## 5. Asia Pacific

The Asia Pacific regional consultation was attended by 28 participants representing various public, private, and academic institutions from across the region. The summary of the discussions from the regional consultation is depicted in Figure 9. The findings from each strategic pathway are elaborated in the following sections.

<b>GOVERNANCE &amp; INSTITUTIONS</b> <i>PSN's contribution to strengthen IGIF implementation</i>	Communicating the value proposition of Geospatial Information	Providing feedback to the government on governance issues	Actively participating in Working Groups for Geospatial Information management
<b>POLICY &amp; LEGAL</b> <i>Policies required to enhance the role of the Private sector</i>	<ol style="list-style-type: none"> <li>1. Geospatial information matters should rest with the highest authority in the government</li> <li>2. Policies endorsing, enforcing, and encouraging the development and adoption of geospatial standards</li> <li>3. Policies for open tendering</li> <li>4. Data access policies</li> <li>5. Open data policies</li> <li>6. Engagement policies, upskilling, and innovation policies</li> </ol>		
<b>FINANCIAL</b> <i>PPP engagement models</i>	 <pre> graph LR     A[Develop Geospatial data collection partnerships and management of Spatial assets] --&gt; B[Build trust between government entities and the private sector for a successful PPP.]     B --&gt; C[Help the national mapping agency build a methodology and scope for socioeconomic impact assessment.]             </pre>		
<b>DATA</b> <i>Top 5 data themes on the level of availability &amp; productivity improvement measures</i>	<ol style="list-style-type: none"> <li>1. Imagery</li> <li>2. Geodetic Framework</li> <li>3. Land Parcels</li> <li>4. Geographical Names</li> <li>5. Transport Network</li> </ol>		
<b>INNOVATION</b> <i>Support the promotion of innovation in geospatial sector</i>	<b>Supporting innovation in the country</b> <ol style="list-style-type: none"> <li>1. Become an active member of an Innovation Group</li> <li>2. Provide data/content/platform services for innovation hubs</li> <li>3. Help with conducting technology needs assessments</li> <li>4. Be a part of the review board/process</li> <li>5. Building Innovation Programs &amp; Hubs</li> </ol>	<b>Productivity Improvement Measures for the NMA</b> <ol style="list-style-type: none"> <li>1. Deploy dissemination platform for thematic data</li> <li>2. Publication and maintenance of standard practices</li> <li>3. Outcome-based contracts</li> <li>4. Utilize automation processes &amp; algorithms</li> <li>5. Data validation processes</li> </ol>	
<b>STANDARDS</b> <i>Initiatives are undertaken for Standards development</i>	Developing product specifications	Adopting national standards	Participating in standards development
<b>PARTNERSHIPS</b> <i>Initiatives are undertaken for Standards development</i>	<ol style="list-style-type: none"> <li>1. Industry-academic collaborations for joint research and development</li> <li>2. Capacity building</li> <li>3. Cross-sector or interdisciplinary initiatives</li> <li>4. Standards development</li> <li>5. Awareness building initiatives</li> </ol>		
<b>CAPACITY &amp; EDUCATION</b> <i>Private Sectors support in Capacity-building Initiatives</i>	<ol style="list-style-type: none"> <li>1. Undertake a skill gap analysis regarding geospatial education</li> <li>2. Establishing and contributing to innovation hubs</li> <li>3. Providing training to government officials on the latest technologies and products</li> <li>4. Providing skill development courses to students and young professionals to promote Geospatial education</li> </ol>		
<b>COMMUNICATION &amp; ENGAGEMENT</b> <i>Efforts for Geospatial advocacy to the users promoting geospatial information</i>	<ol style="list-style-type: none"> <li>1. Establishing industry associations to act as a collective voice for the geospatial industry</li> <li>2. Collaboration for research and development</li> <li>3. Building and participating in stakeholder engagement programs</li> </ol>		

Figure 9: Overview of Asia Pacific Regional Consultation

## 5.1 Governance and Institutional Arrangements

The Asia-Pacific regional geospatial private sector plays a crucial role in governance and institutional frameworks aimed at enhancing the implementation of the Integrated Geospatial Information Framework (UN-IGIF). This sector emphasizes the importance of articulating the value proposition of geospatial information and offering constructive feedback to governments on governance-related issues. Additionally, private sector entities demonstrate their support by actively engaging in Working Groups dedicated to improving geospatial information management and advocating for open and transparent processes. The Asia-Pacific geospatial private sector has proposed the establishment of national-level committees to coordinate and oversee the implementation of UN-IGIF within individual countries.

## 5.2 Policy and Legal

The geospatial private sector can serve as a cornerstone for government policies aimed at implementing the Integrated Geospatial Information Framework (UN-IGIF) to achieve various national and international development goals. Nonetheless, the regional private sector recognizes that current policies in their countries often fall short of enhancing the ease of doing business due to existing loopholes and practical impediments.

The industry advocates for geospatial policies to be governed by the highest national authorities, such as a royal commission or the president/prime minister's office, to ensure a top-down approach in mandating and streamlining the use of geospatial information across the country. Existing geospatial policies in some countries highlight the importance of spatial data sharing and utilization in a coordinated manner to create network effects. However, there is a critical need to minimize bureaucratic barriers to data sharing and address issues related to data privacy and security.

The private sector believes geospatial policies must be clear, comprehensive, transparent, and visionary. To enhance the role of the private sector in achieving the goals of the UN-IGIF, the following policies are essential:

- Policies that endorse, enforce, and encourage participation in developing international standards.
- Policies supporting an open tendering framework.
- Policies promoting the ease of data sharing and resolving data access issues.
- Policies that advocate for open data initiatives and encourage government agencies to share geospatial data with the private sector in a standardized and accessible format.
- Policies promoting the monetization of government data.
- Engagement policies.
- Data standard policies.
- Infrastructure and technology policies.
- Upskilling and innovation policies.
- Comprehensive legal policies across all domains.
- Policies advocating for wider participation.

These measures will significantly contribute to leveraging the private sector's potential in advancing the implementation of the UN-IGIF and fostering sustainable development.

## 5.3 Financial

According to respondents of the private sector survey in the Asia-Pacific (APAC) region, governments often lack a viable business model for monetizing geospatial information and assets. The private sector can provide crucial financial support to governments by assisting in data monetization. To facilitate this, the private sector requires transparent information on budgets and schemes, as well as supportive legal frameworks to promote shared funding or public-private partnerships (PPP) for geospatial projects.

Despite the potential for PPPs, the private sector notes that there are currently insufficient laws governing PPPs, limited lucrative PPP opportunities, and a lack of trust between government entities and the private sector, which impedes successful PPP conceptualization. Many private sector entities in the region are Small and Medium Enterprises (SMEs) that lack the capital to invest in large projects or bear the financial risks associated with PPPs.

However, the private sector expresses a willingness to collaborate with governments on co-funding geospatial programs, particularly in areas such as data collection partnerships, management of spatial assets, and utility service delivery. Additionally, there is significant interest in GIS data monetization pipelines and the development of Decision Support Systems (DSS).

The APAC regional private sector is prepared to support the national mapping agency in several ways, including developing methodologies and scopes for socio-economic impact assessments of geospatial information investments, conducting these assessments independently, or disseminating survey results to relevant stakeholders.

## 5.4 Data

According to the private sector, the quality of fundamental data themes available in their countries is generally of average quality, with the exception of imagery data. This situation presents a promising opportunity for collaboration between public and private entities in the capture of fundamental data themes. Furthermore, the private sector can propose to the government viable, efficient, and sustainable technology solutions for the creation, management, storage, and accessibility of data, ensuring that all stakeholders have easy access to up-to-date and reliable geospatial information.

The private sector believes that it can support its governments in enhancing geospatial data infrastructure, including hardware, software, and network systems, to improve data processing speed, storage capacity, and accessibility. There is a need to automate the data collection process, ensuring it is real-time and transparent. Additionally, it is essential to establish mechanisms for validating and approving collected data and ensuring periodic updates.

Figure 10 illustrates the responses collected from the Asia Pacific regional consultation regarding the availability of fundamental data. Participants evaluated each fundamental data theme using a scale from 0 to 5, where 0 represented very poor quality and 5 represented very good quality.

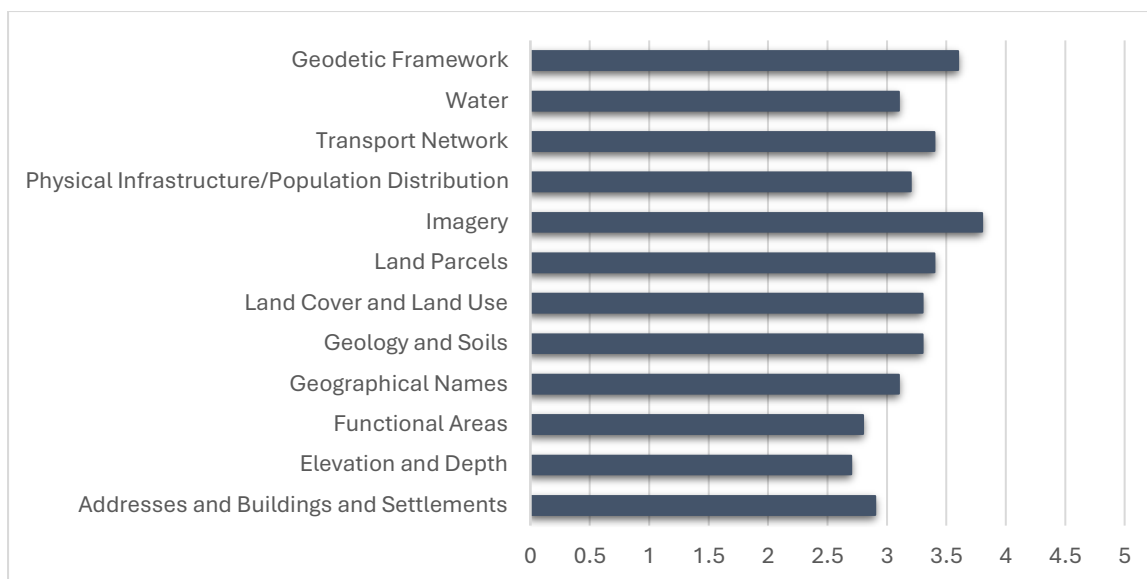


Figure 10: Level of Fundamental Data Availability in the Asia Pacific Region

## 5.5 Innovation

To enhance productivity and geospatial information management within national mapping agencies in the APAC region, the private sector proposes the establishment of a dissemination platform for thematic data consumption, utilizing existing data from government, private sector, and academic sources. They also recommend the publication and maintenance of standardized data set practices, a shift from human-days-based contracts to outcome-based contracts, the integration of land and sea data, and the use of automated data processing algorithms and workflows to streamline data validation, cleaning, and integration tasks, thereby reducing manual effort. To foster innovation, the private sector is committed to actively participating in Innovation Groups within their countries, providing data, content, platform, and cloud services for innovation hubs, and assisting with technology needs assessments.

## 5.6 Standards

The private sector in the APAC region advances standards by developing specifications for their data and products, adopting national standards for their offerings, and participating in national needs assessments for standards. Additionally, the private sector formulates best practices for geospatial information management within the UN-IGIF framework, which can be shared with other stakeholders.

## 5.7 Partnerships

The APAC region observes various forms of partnerships in the geospatial information sector, including industry-academic collaborations for joint research and development, capacity-building initiatives, and cross-sector or interdisciplinary collaborations.

## 5.8 Capacity and Education

There is a need for training and orientation programs on the Integrated Geospatial Information Framework (UN-IGIF) in the region. The private sector can support capacity-building initiatives in the following ways:

- Conducting skill gap analyses in geospatial education within the country.
- Establishing and contributing to innovation hubs.
- Providing training to government officials on the latest technologies and products.
- Educating stakeholders on new business models.
- Training rural youth in geospatial data collection.
- Organizing workshops to identify real-world problems and solutions.
- Offering training programs and workshops for government officials and stakeholders on the use of geospatial technologies for UN-IGIF implementation.

## 5.9 Communication and Engagement

The private sector in the APAC region contributes to geospatial advocacy by establishing industry associations that serve as collective voices for the geospatial industry in their countries, collaborating on research and development, and participating in various stakeholder engagement programs. The private sector can also present use cases, best practices, and success stories from their products and services across different regions and countries to support UN-IGIF implementation elsewhere.

Additionally, the private sector can develop an UN-IGIF-inspired platform for practitioners from various geospatial verticals to collaborate. National mapping agencies can further support this by establishing outreach programs, such as national geospatial offices that include a private sector component, to foster collaboration and engagement. This approach aims to unite different stakeholders within each geospatial vertical, including surveying, remote sensing, GIS, and others.

## 6. Europe

The Europe regional consultation was attended by 22 participants representing various public, private, and academic institutions from across the region. The summary of the discussions from the regional consultation is depicted in Figure 11. The findings from each strategic pathway are elaborated in the following sections.


<b>GOVERNANCE &amp; INSTITUTIONS</b> <i>PSN's contribution to strengthen IGIF implementation</i>	Actively participating in Working Groups for Geospatial Information management	Communicating the value proposition of Geospatial Information	Demanding open and transparent processes for Geospatial Information management
<b>POLICY &amp; LEGAL</b> <i>Policies required to enhance the role of the Private sector</i>	<ol style="list-style-type: none"> <li>1. Open data policies</li> <li>2. Policies promoting public-private partnerships</li> <li>3. Legal and regulatory frameworks</li> <li>4. Strong and reliable institutional frameworks</li> <li>5. Policies supporting ease of doing business</li> </ol>		
<b>FINANCIAL</b> <i>PPP engagement models</i>	 <pre> graph LR     A[Build trust between government entities and the private sector for a successful PPP] --&gt; B[Develop Geospatial data collection partnerships and management of Spatial assets]     B --&gt; C[Help the national mapping agency build a methodology and scope for socioeconomic impact assessment.]             </pre>		
<b>DATA</b> <i>Top 5 data themes on the level of availability &amp; productivity improvement measures</i>	<ol style="list-style-type: none"> <li>1. Imagery</li> <li>2. Geographical Names</li> <li>3. Land Parcels</li> <li>4. Addresses/Building and Settlements</li> <li>5. Elevation and Depth</li> </ol>		
<b>INNOVATION</b> <i>Support the promotion of innovation in geospatial sector</i>	<b>Supporting innovation in the country</b> <ol style="list-style-type: none"> <li>1. Become an active member of an Innovation Group</li> <li>2. Provide training and workshops</li> <li>3. Be a part of the review board/process</li> <li>4. Help with conducting technology needs assessments</li> <li>5. Provide data/content/platform services for innovation hubs</li> </ol>	<b>Productivity Improvement Measures for the NMA</b> <ol style="list-style-type: none"> <li>1. Sharing of open in-situ data on agriculture, water, environment, and climate</li> <li>2. Being open to new methods of data collection</li> <li>3. Keeping abreast with latest IT innovations</li> <li>4. Standardization and data homogeneity at the European level</li> </ol>	
<b>STANDARDS</b> <i>Initiatives are undertaken for Standards development</i>	Developing and participating in a community of practice	Developing product specifications	Participating in standards development
<b>PARTNERSHIPS</b> <i>Initiatives are undertaken for Standards development</i>	<ol style="list-style-type: none"> <li>1. Industry-academic collaborations for joint research and development</li> <li>2. Capacity building</li> <li>3. Standards development</li> <li>4. Cross-sector or interdisciplinary initiatives</li> <li>5. Awareness building initiatives</li> </ol>		
<b>CAPACITY &amp; EDUCATION</b> <i>Private Sectors support in Capacity-building Initiatives</i>	<ol style="list-style-type: none"> <li>1. Providing training to government officials on the latest technologies and products</li> <li>2. Providing skill development courses to students and young professionals to promote Geospatial education</li> <li>3. Developing a community of practitioners</li> <li>4. Establishing and contributing to innovation hubs</li> <li>5. Undertake a skill gap analysis regarding geospatial education</li> </ol>		
<b>COMMUNICATION &amp; ENGAGEMENT</b> <i>Efforts for Geospatial advocacy to the users promoting geospatial information</i>	<ol style="list-style-type: none"> <li>1. Organizing conferences and meetings</li> <li>2. Building and participating in stakeholder engagement programs</li> <li>3. Collaboration for research and development</li> </ol>		

Figure 11: Overview of European Regional Consultation



## 6.1 Governance and Institutional Arrangements

The private sector in the European region contributes to the governance and institutional arrangements in strengthening UN-IGIF implementation by:

- Communicating the value proposition of geospatial information.
- Advocating for open and transparent processes for geospatial information management.
- Actively participating in national Working Groups established to improve geospatial information management.

## 6.2 Policy and Legal

While most respondents of the survey believe there are sufficient policies in their countries supporting ease of doing business in the geospatial sector, a few believe that these policies are inadequate or contain loopholes and practical hindrances.

To enhance the role of the private sector in achieving the goals of the UN-IGIF, European private sector representatives seek:

- Greater clarity regarding open data and market access.
- Comprehensive open data policies.
- Involvement in decision-making bodies.
- Policies to improve collaborations and public-private partnerships (PPP).
- The establishment of robust standards and a strong legal and regulatory framework.

## 6.3 Financial

The majority of European private-sector respondents believe there are insufficient laws to promote shared funding or public-private partnerships (PPPs) for geospatial projects in their countries.

Additionally, the success rate of PPPs in many parts of Europe is perceived as poor.

Regarding a shared funding model for the foundational geospatial data value chain, respondents identified several issues: a lack of lucrative PPP opportunities, insufficient trust between government entities and the private sector, and limited capital within companies to invest in projects or assume the financial risks associated with PPPs. Another challenge cited is the public sector's lack of capability to manage PPPs effectively.

Given the opportunity to engage in a PPP model, the European private sector would be most open to working on the following:

- Geospatial data collection partnerships
- Management of spatial assets
- Setting up a CORS network or other geospatial infrastructure
- Knowledge dissemination

The European private sector recognizes the importance of conducting a socio-economic impact assessment for investing in geospatial information management. There are already some initiatives in the region curated by the UN-IGIF sustainable finance working group. The private sector is willing to participate in such assessments by assisting national mapping agencies in building methodologies and scopes, independently conducting socio-economic impact assessments of geospatial information, or sharing surveys with relevant stakeholders.

## 6.4 Data

Respondents from the European regional private sector indicated that the majority of fundamental data themes available in their countries are of high quality. This provides a significant opportunity for the private sector to utilize and innovate with this data for various economic and social purposes.

Figure 12 illustrates the responses collected from the Asia Pacific regional consultation regarding the availability of fundamental data. Participants evaluated each fundamental data theme using a scale from 0 to 5, where 0 represented very poor quality and 5 represented very good quality.

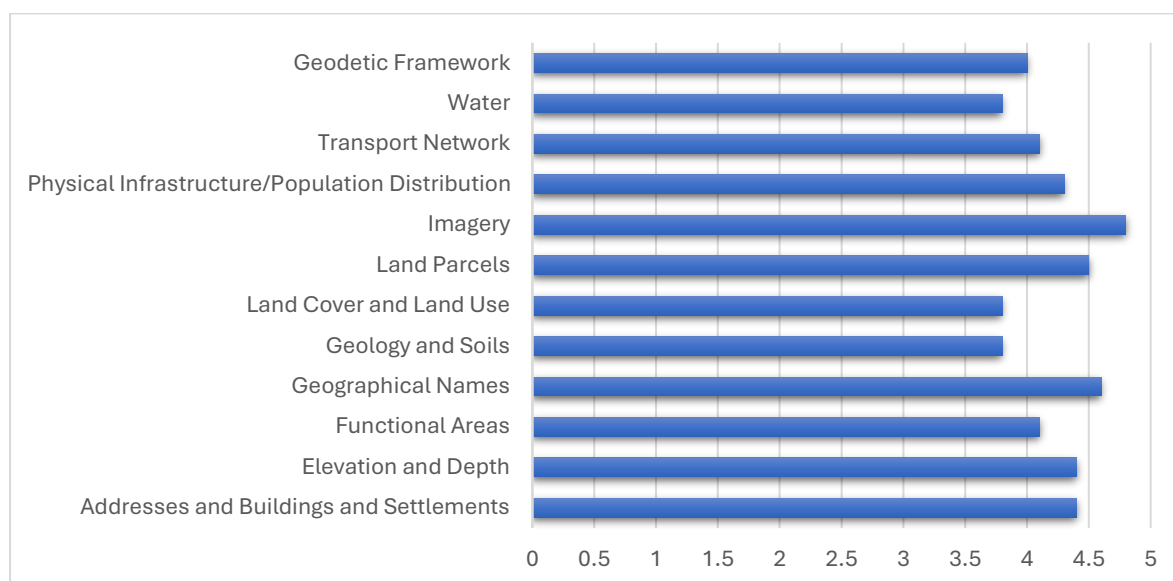


Figure 12: Level of Fundamental Data Availability in the Europe Region

## 6.5 Innovation

In relation to productivity improvement measures aimed at enhancing geospatial information management within national mapping agencies, the European private sector proposed the following recommendations:

- Facilitating the sharing of open in situ data on agriculture, water, environment, and climate.
- Embracing new methods of data collection.
- Utilizing the most recent technologies in information technology, including Generative Artificial Intelligence (GenAI).
- Promoting standardization and data homogeneity at the European level.

To foster innovation, the private sector supports national mapping agencies through active participation in Innovation Groups, provision of training and workshops, and engagement in review boards and processes.

## 6.6 Standards

The private sector in Europe actively engages in standards development processes within their respective countries. They contribute by:

- Fostering a community of practice.

- Developing specifications for the categories of data and products they offer.
- Participating in the standards development process.
- Promoting available standards through communication channels and mandates for partners.
- Developing capacities and providing training on various standards.
- Adopting national standards in their products, services, and solutions.
- Actively participating in standards needs assessments.

## 6.7 Partnerships

Europe is renowned for its robust inter-agency and cross-sectoral partnerships and collaborations in the geospatial domain. The private sector actively engages in various forms of partnerships, including:

- Industry-academic collaborations for joint research and development
- Capacity-building and awareness creation partnerships
- Participation in standards development
- Forums for debating major issues such as climate change, food security, integration of key registers, and renewable energy.
- International trade and business

## 6.8 Capacity and Education

The regional consultation with the European region underscored the necessity for training based on the Integrated Geospatial Information Framework (UN-IGIF) and its implementation. The private sector supports capacity-building initiatives through the following measures:

- Developing a community of practitioners.
- Offering skill development courses to students and young professionals to advance geospatial education.
- Providing training to government officials on the latest technologies and products.

## 6.9 Communication and Engagement

The European private sector is actively engaged in advocating for and raising awareness about geospatial information. This is achieved through organizing periodic conferences and meetings with stakeholders, collaborating on research and development, participating in various stakeholder engagement programs, releasing informative podcasts, authoring articles and papers, and communicating the significance of geospatial data in areas such as emergency response and climate change. Additionally, they share use cases and work to enhance the visibility of the Integrated Geospatial Information Framework (UN-IGIF).

Furthermore, several suggestions have been proposed to strengthen communication and engagement:

- Stakeholder engagement should be more inclusive of the private sector.
- The private sector could begin with small-scale communication and marketing initiatives, including go-to-market strategies and engagement with senior leaders.



- Enhance the visibility of geospatial activities, highlighting that geospatial functions are integral to other engineering activities.
- Conduct surveys to understand the preferences and needs of the public sector.
- Volunteer to participate in public sector working groups that are open to private sector involvement.

## 7. Summary Result of Consultations

The private sector's involvement in geospatial information management is crucial for developing a country's capabilities to achieve national and international goals. While industrial capacities vary across regions, several private sector expectations and ideas are aligned.

The consultations found that the private sector shared several commonalities in roles, expectations, and the way forward, with some regional variations. While it is up to each country to decide how to engage and benefit from the private sector, the study revealed some general insights that could serve as a starting point for deeper collaboration and value realization with the private sector in implementing UN-IGIF at the national level.

### 7.1 Stronger role in geospatial governance

Figure 13 encapsulates the unanimous feedback from global engagements, indicating that the private sector is both willing and capable of assuming a more prominent role in geospatial information governance. They can achieve this by providing feedback to their national governments on governance issues, demanding open and transparent processes for geospatial information management, articulating the value of geospatial information, and actively participating in in-country working groups. The graph illustrates that, on a scale of 0-5, where 0 indicated strongly disagree and 5 indicated strongly agree, most participants assigned a score of 4+ to the various options outlined to support their governments.

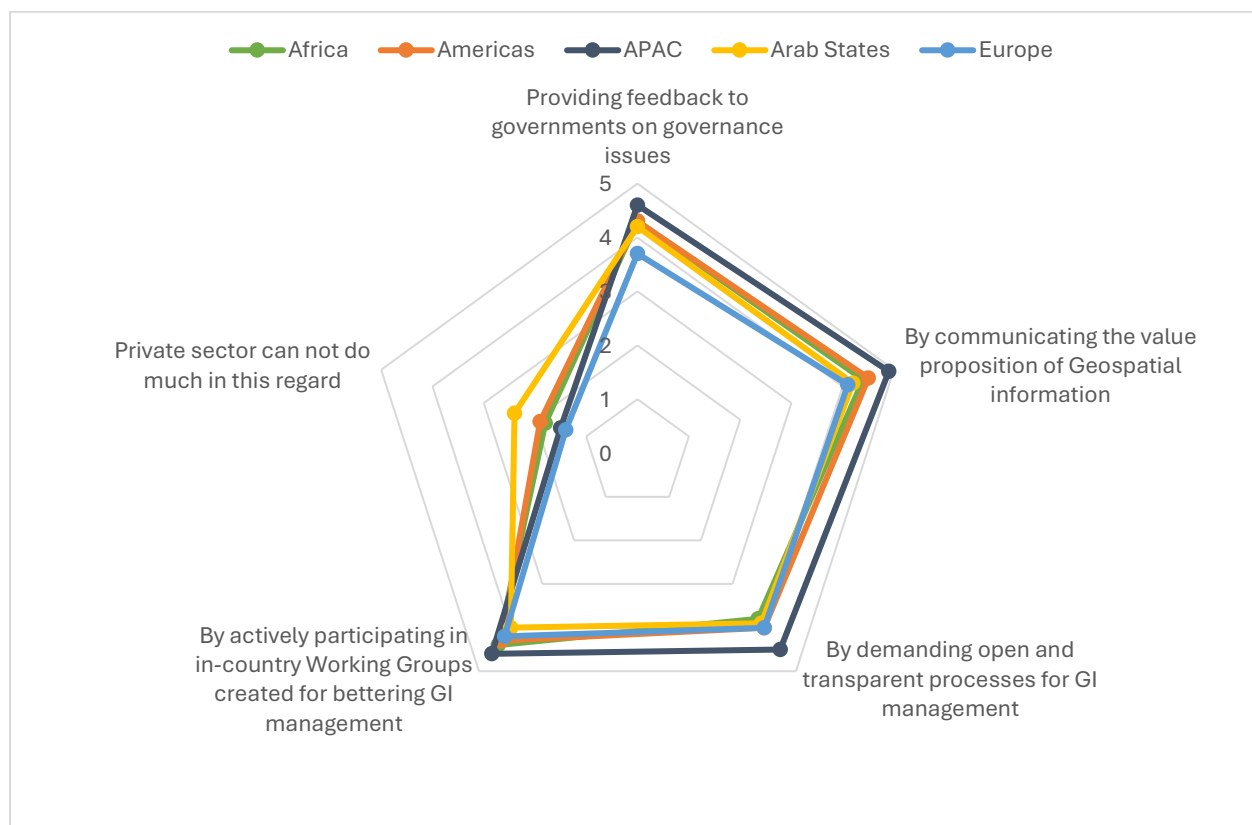


Figure 13: Private sector role in geospatial governance

## 7.2 Well-defined geospatial policies and laws

Almost 60% of the participants surveyed from all the regions agree to the fact that though there are some good policies in their countries to support ease of doing business for the geospatial private sector, more work needs to be done in this area. Only in the case of the European region, participants expressed that they believed their countries had sufficient policies in place to support the ease of doing business for the geospatial private sector. However, in most other regional consultations, the private sector expressed a need for more and better policies to support their industry. Implementing supportive policies would enable the private sector to increase their investments, expand their businesses, and actively contribute to ongoing national programs with more efficient systems and processes. This would significantly improve the quality, currency, and availability of geospatial data, tools, analytics, and solutions.

Figure 14 illustrates the percentage of responses in cumulative terms showing the variations in regional opinions on the availability of adequate policies for facilitating business operations in the geospatial private sector.

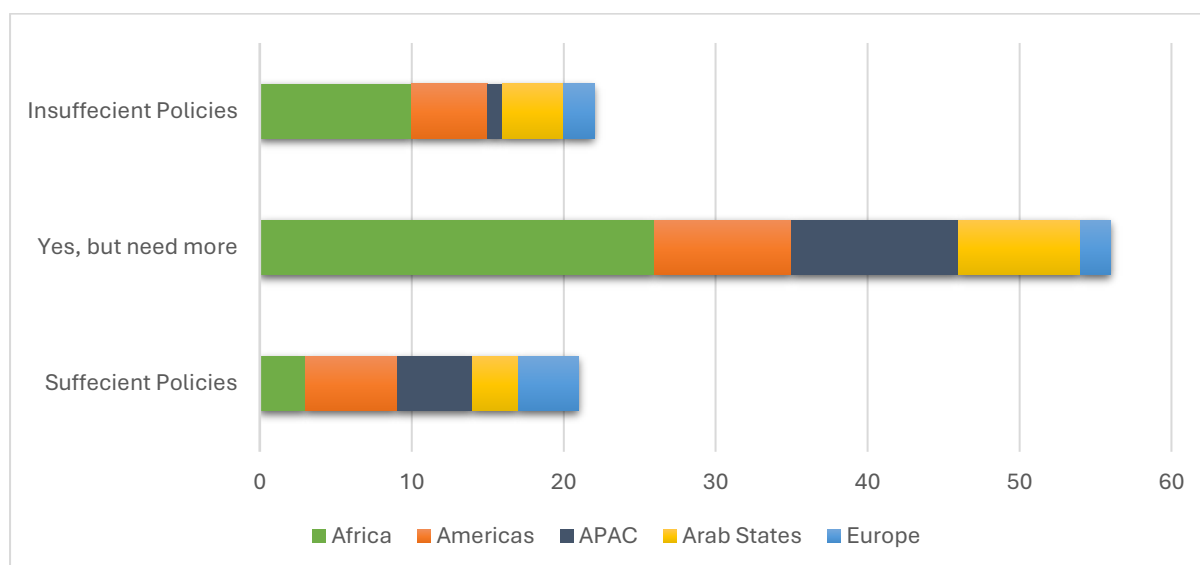


Figure 14: Regional views on sufficient policies for ease of doing business for the geospatial private sector

## 7.3 Leveraging public-private partnerships

The private geospatial sector is poised to explore new public-private partnership models as a potential business opportunity, provided that the trust issues between public and private entities are resolved. While this may not be suitable for small and medium-sized enterprises, larger companies can consider PPPs for data collection, management, storage, and distribution. Clear regulations and laws are also necessary to protect the interests of all parties involved in order to make PPPs successful.

Figure 15 illustrates the regional variations regarding public-private partnerships as a viable business model for funding geospatial projects. The horizontal axis shows the cumulative number of respondents who endorsed each statement. Maximum number of participants from all across the

regions believed that there are not enough lucrative PPP opportunities in the geospatial sector and the lack of trust between the government and private entities plays a role in developing shared funding models for geospatial projects.

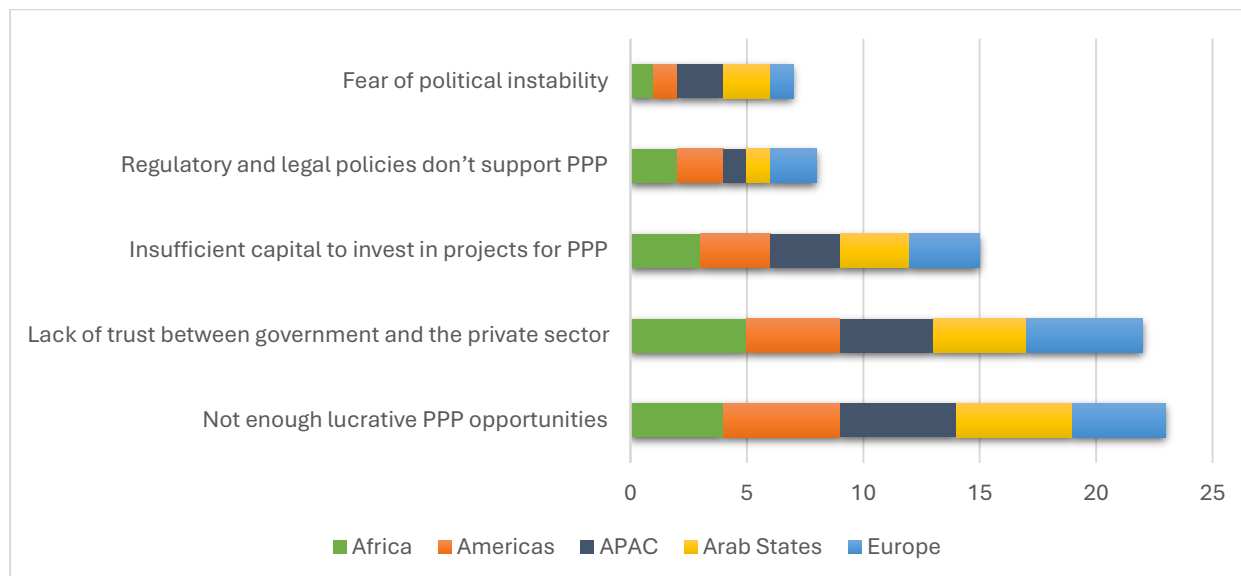


Figure 15: Issues with public-private partnerships

Additionally, Figure 16 demonstrates that a majority of respondents agreed that the optimal shared funding model with the government could involve geospatial data collection for fundamental data themes, managing spatial assets, or collaborating for service delivery.

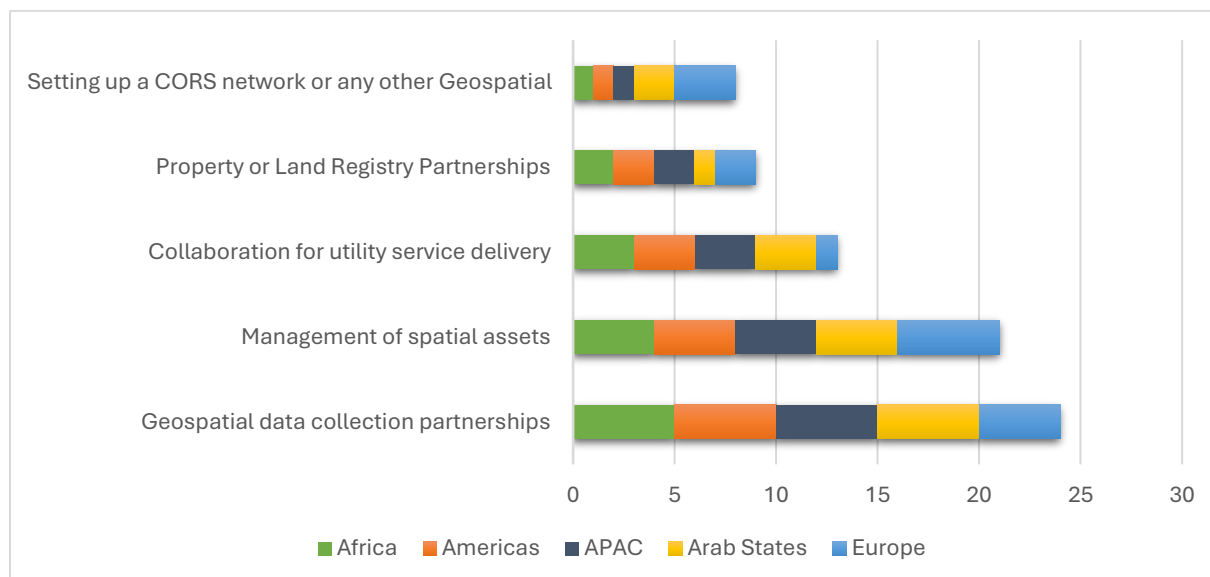


Figure 16: Public-private partnership avenues

## 7.4 Strengthening Fundamental Data Themes

During the consultations, participants were asked to rate the quality of geospatial fundamental data available in their countries on a scale of 0 to 5, where 0 described very poor quality data and 5 described very good quality data. In Figure 17, it is evident that Europe was the outlier, with most

participants giving a score of around 4-4.5 for the quality of available data. The graph highlights the variation across the five regions, indicating the necessity for countries to collaborate with the private sector to enhance the quality of their fundamental data themes.

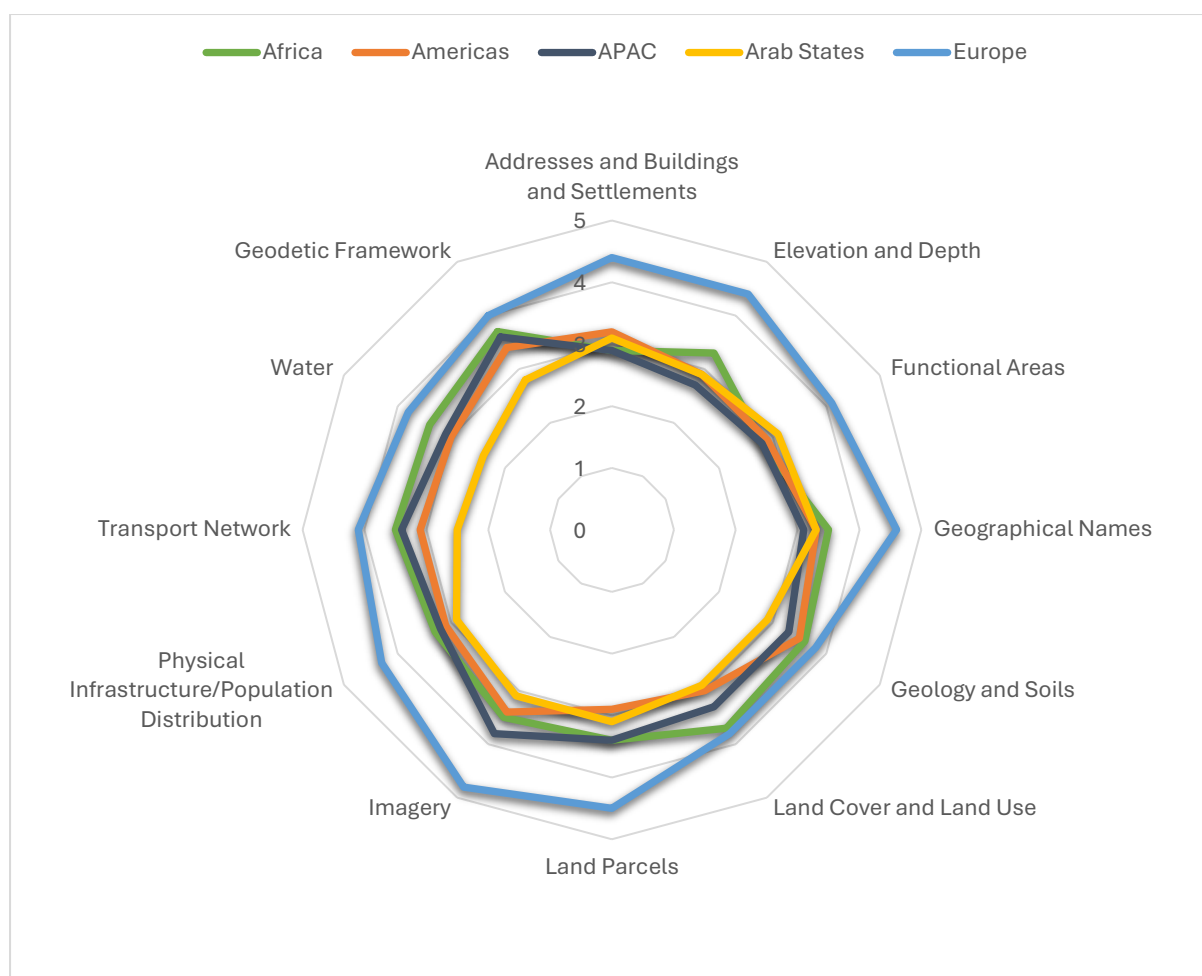


Figure 17: Level of available fundamental data themes

## 7.5 Boosting in-country innovation

Many survey participants believe that the private sector can play a significant role in enhancing innovation within the geospatial industry. This can be achieved through collaboration with national mapping agencies to establish innovation groups that organize various innovation programs and hubs. The private sector can also contribute by providing data, content, and cloud services for these programs, conducting needs assessments to address pressing societal concerns and offering training and capacity-building workshops for entrepreneurs and start-ups.

Figure 18 is a stacked bar graph that illustrates the percentage of respondents from the five regions responding on how the private sector can support national governments in boosting innovation in the field. It is evident that all the regions lay equal emphasis on becoming a member of innovation groups, followed by building innovation programs and hubs. While the idea of becoming a part of a review board is more popular in Africa and Americas, APAC region respondents gave higher preference to providing data/content/cloud services for such innovation hubs.



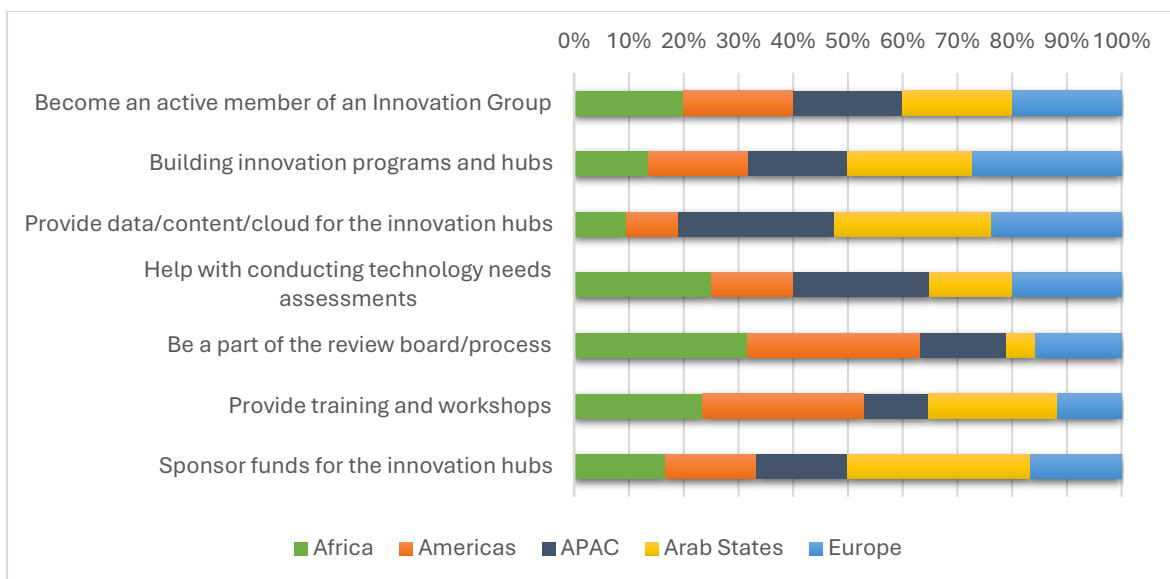


Figure 18: Private sector's role in boosting geospatial innovation

## 7.6 Ensuring geospatial common standards

Standards are crucial for managing geospatial information because they enable data interoperability and widespread use. Involving the private sector in developing standards and specifications for different geospatial technologies and processes would help to further the implementation of the UN-IGIF in countries.

Figure 19 highlights the similarities among the five regions in terms of ensuring common geospatial standards. Participants were asked to score statements (shown in Figure 19) based on how strongly they agreed or disagreed with each statement, where 0 indicated strongly disagree and 5 indicated strongly agree. Participants from the European region reported strong engagement with other stakeholders in developing standards, specifications, and a community of practice, while the other regions reported an average engagement in standards development.

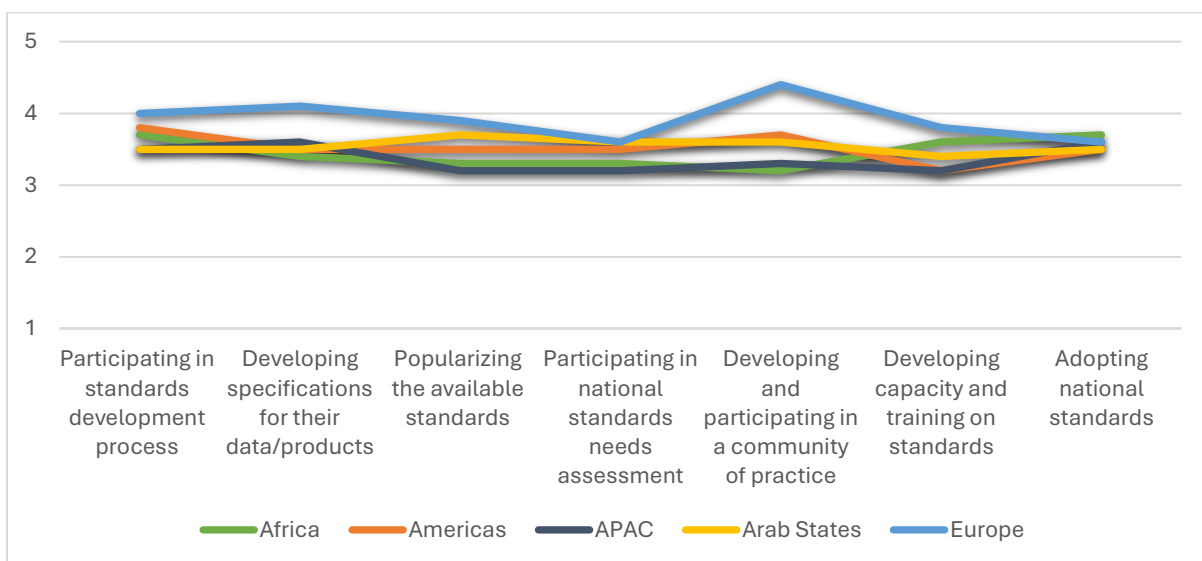


Figure 19: Efforts towards geospatial standards development

## 7.7 Stronger partnerships and collaborations

The goals of the Integrated Geospatial Information Framework cannot be fully realized without strong partnerships and collaborations in place. The private sector already engages in various partnerships and is willing to work more actively with the academic community for research and development, developing standards, building geospatial capacities in the country, initiating cross-sector or interdisciplinary initiatives, undertaking awareness-building initiatives, and more.

Figure 20 is a stacked bar graph that illustrates the collaboration preferences of five regions. It shows that the most prioritized partnership and collaboration models involve working with academia for research and development and standards development. Following closely are capacity building, interdisciplinary initiatives, and awareness building. Participants from the European and Americas regions showed more interest in forming partnerships for international trade or business, while respondents from African and Arab States placed greater emphasis on partnerships for standards development. For the APAC region, addressing capacity development is a key issue that they would like to tackle through strong partnerships.

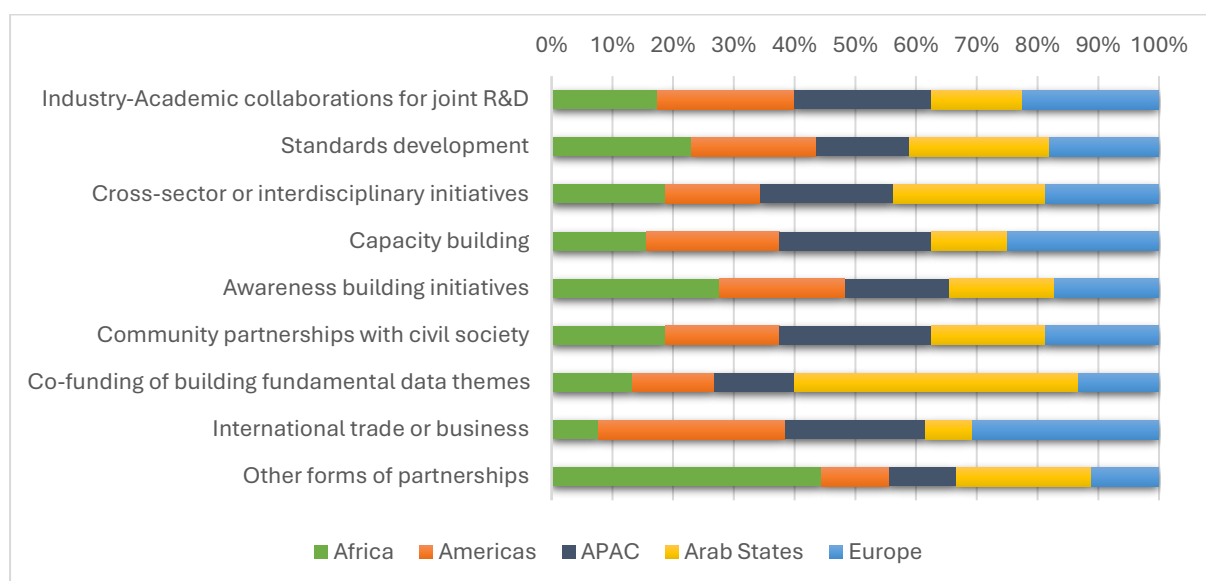


Figure 20: Forms of partnerships and collaborations

## 7.8 Role in capacity development

The private geospatial sector drives innovation and collaborates with various stakeholders to provide products and services on the ground. As technology specialists, they are uniquely positioned to share their knowledge and expertise with others, enabling more professionals to benefit from geospatial information and use it to their advantage. To achieve this, the private sector is willing to offer training programs to government officials on the latest technologies and products, as well as provide skill development courses to students and young professionals. In some cases, they are also open to conducting or supporting governments in conducting skill-gap analyses to

develop tailored courses. Additionally, the private sector can help in building a community of practitioners experienced in various tools, products, software, and systems.

Figure 21 illustrates the regional differences in respondents' perceptions of how the geospatial private sector can contribute to capacity development. The participants were asked to rank each of the given options. The graph shows that participants from Africa, the Americas, and Europe emphasize providing training to government officials on new technology and innovations, as well as offering skill development courses to students and young professionals. On the other hand, participants from the APAC and Arab States regions prioritize undertaking skill gap analysis regarding geospatial education. This would enable the private sector to collaborate with government and industry associations to develop skill-based programs that address the needs of the ecosystem.

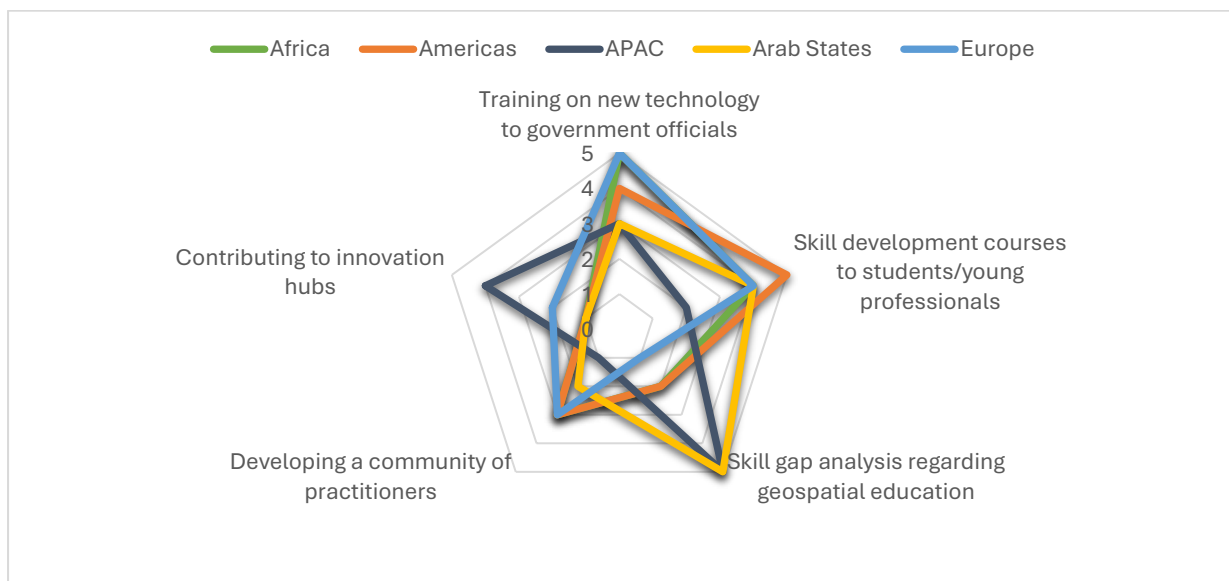


Figure 21: Private sector's role in capacity development

## 7.9 Stronger communication and engagements

The geospatial private sector plays a crucial role in improving communication and engagement on geospatial information management and related issues. Figure 22 illustrates the level of agreement of each regional participant on how the sector supports stakeholders through various communication channels and can enhance its involvement by collaborating with researchers and academia for research and development, engaging in stakeholder programs, forming industry associations to represent the sector, organizing outreach events and conferences, and publishing knowledge content such as books, reports, articles, and podcasts. The question posed to the respondents was to provide a preference on a scale of 0-5 for each of the statements, where 0 indicated strongly disagree and 5 indicated strongly agree.

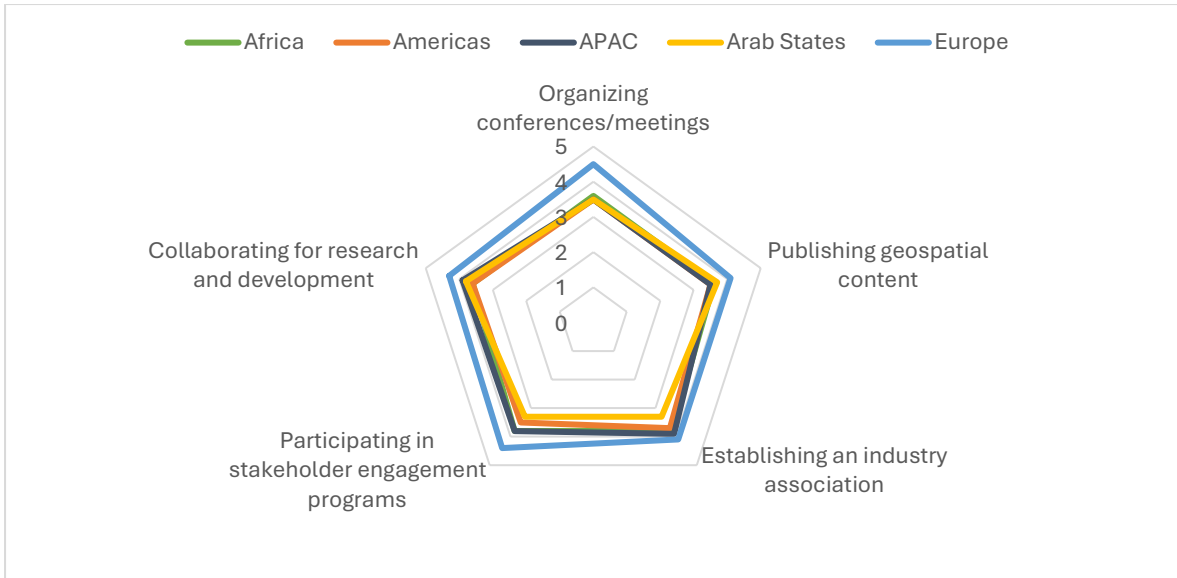


Figure 22: Building strong communication and engagement channels

## 8 Conclusion

The consultations with regional stakeholders of geospatial information from all five regions of the UN-GGIM were important for understanding the private sector's expectations and contributions to strengthen the implementation of the United Nations Integrated Geospatial Information Framework (UN-IGIF). The key outcomes of the survey have been summarized in the following sections.

S. No.	Private Sector Expectations
1.	In countries that lack institutional arrangements for private sector participation in implementing the UN-IGIF, there needs to be a method to incorporate private sector involvement.
2.	The geospatial private sector is willing to support national governments and mapping agencies in implementing the UN-IGIF.
3.	Awareness of the UN-IGIF is limited within the private sector, leading to an expectation that governments will increase outreach, communication, and educational efforts to inform about the framework, its implementation plan, and the crucial role of the private sector.
6.	National governments and mapping agencies should conduct awareness-building activities at the country level to promote the UN-IGIF, its importance, and ways to adopt it as a strategy.
7.	The geospatial private sector seeks robust policies addressing the following areas: <ul style="list-style-type: none"> <li>• Ease of doing business in the geospatial sector</li> <li>• Innovative funding models supporting public-private investments to deliver geospatial projects jointly</li> <li>• Providing data access to the private sector for non-sensitive data</li> <li>• Developing procurement framework to foster a competitive marketplace</li> </ul>
8.	Investment in geospatial innovation is crucial, and the private sector expects national governments and mapping agencies to organize programs that promote innovation with private sector support.
9.	The socioeconomic impact assessment of geospatial information can help promote its use among decision-makers and broaden the user base. National governments can collaborate with the private sector to conduct these studies.

**Table 1: Expectations of the Geospatial Private Sector**

S. No.	Proposed Steps Forward
1.	Organize brainstorming sessions to develop innovative business models suitable for both the private and public sectors. Focus on creating profitable business models for the geospatial information value chain, such as those based on public-private partnerships.
2.	Explore opportunities in country-level committees for private sector participation, where possible, to support the implementation of UN-IGIF (country-level action plan).
3.	Encourage national mapping agencies to form committees or working groups in collaboration with the private sector to address the following topics: Fostering geospatial innovation and entrepreneurship. Raising awareness about the value of geospatial information. Building awareness about UN-IGIF and the role of fundamental data themes. Providing training on new technologies and products.
4.	The availability, accessibility, and awareness of fundamental data themes are of interest to the private sector for its utilization. National governments, where possible, can engage with the private sector to seek resolution.
5.	The private sector, either independently or through industry associations, can initiate partnerships and collaborations to address issues related to awareness building, data engagement, research and development, promotion of innovation, and skill development.
6.	Creating a perfect ecosystem may be an ambitious goal, but it's important to aim for transparency, opportunities, and capabilities. The Private Sector Network provides a crucial platform for private companies working with geospatial information, giving them a voice in policymaking and connecting them with other companies and stakeholders. The global geospatial private sector needs to engage with the PSN to contribute and actively engage with the UN-GGIM.
7.	Similar surveys should be conducted with all member states to understand their expectations from the private sector. This will help build on the findings of our previous interactions.
8.	The regional private sector network can undertake initiatives to foster collaborations with the respective UN-GGIM regions.

**Table 2: Proposed steps forward to enable the geospatial private sector to strengthen the implementation of UN-IGIF in countries.**

To successfully implement the United Nations Integrated Geospatial Information Framework (UN-IGIF), a strategic approach is essential. The private sector, with its experience and expertise, plays a crucial role in reaching out to stakeholders and implementing the framework. Although the private sector is involved in data collection, raising awareness, communicating the socio-economic value of geospatial information, and driving innovation, its participation in high-level strategy formation has been limited. By establishing stronger and structured engagement channels, the private sector can significantly contribute to enabling member states to achieve the implementation of UN-IGIF that aligns with their national and international development objectives.

This report could be utilized as an input to UN-IGIF partnership pathway where private sector as an observer can play a significant role in strengthening the implementation of UN-IGIF.



## 9 Appendix: Discussion Questions

### Governance and Institutions

1. How can the private sector contribute to governance and institutional arrangements in strengthening UN-IGIF implementation?
  - a. Providing feedback to governments on governance issues.
  - b. By communicating the value proposition of Geospatial information
  - c. By demanding open and transparent processes for GI management
  - d. By actively participating in in-country Working Groups created for bettering GI management
  - e. Private sector can not do much in this regard
  - f. Others

### Policy and Legal

2. Policies in your country support ease of doing business for the geospatial sector:
  - a. Yes, we have sufficient and well-rounded policies for the purpose.
  - b. We have some good policies, but there are loopholes and practical hinderances in achieving ease of doing business in our country.
  - c. No, we don't have sufficient policies for ease of doing business.
3. What kinds of policies are required to enhance the role of the Private sector in achieving the goals of the UN-IGIF?
4. Are there sufficient laws to promote shared funding or public-private partnerships of geospatial/infrastructure projects in your country?
  - a. Yes
  - b. No
  - c. There are a few, but more is needed

### Finance

5. Chose the issue you foresee with a shared funding model (public-private partnership) for capturing/maintaining/disseminating foundational geospatial data in your country:
  - a. The private sector doesn't have the capital to invest in projects or to take the financial risk involved in a PPP.
  - b. Regulatory and legal policies in the country don't support PPP.
  - c. There is a lack of trust between government entities and the private sector for a successful PPP.
  - d. We fear political instability that may disrupt the PPP projects' future.
  - e. There are not enough lucrative PPP opportunities in the country.
  - f. Any other
6. What PPP engagement model will you be most open to working on?
  - a. Geospatial data collection partnerships
  - b. Management of spatial assets
  - c. Collaboration for utility service delivery
  - d. Property or Land Registry Partnerships
  - e. Setting up a CORS network or any other Geospatial
  - f. Any other
7. In what way would your organization be willing to participate in the socio-economic impact assessment of investing in geospatial information?
  - a. Conduct a socio-economic impact assessment of geospatial information independently.



- b. Help the national mapping agency build a methodology and scope.
- c. Share the survey with relevant stakeholders.
- d. Sponsor a grant for the survey to the national mapping agency.
- e. We will not participate.
- f. Any other, please specify.

## Data

8. Rate the level of data available in your country for the 14 fundamental data themes:
  - a. Global Geodetic Reference Frame
  - b. Addresses
  - c. Buildings and Settlements
  - d. Elevation and Depth
  - e. Functional Areas
  - f. Geographical Names
  - g. Geology and Soils
  - h. Land Cover and Land Use
  - i. Land Parcels
  - j. Physical Infrastructure
  - k. Population Distribution
  - l. Orthoimagery
  - m. Transport Network
  - n. Water
9. What productivity improvement measures do you suggest for better collection, processing, maintenance, and dissemination for the national mapping agency in your country?

## Innovation

10. How would your company be willing to support the promotion of innovation in the Geospatial Sector in your country?
  - a. Become an active member of an Innovation Group
  - b. Help with conducting technology needs assessments
  - c. Building innovation programs and hubs
  - d. Provide data/content for the innovation hubs.
  - e. Provide training and workshops.
  - f. Provide platform or cloud services to the innovators/start-ups.
  - g. Sponsor funds for the innovation hubs.
  - h. Be a part of the review board/process.

## Standards

11. What initiatives are undertaken for Standards development in your country?
  - a. Participating in the process of standards development
  - b. Developing specifications for the category of data/products they offer
  - c. Popularizing the available standards through communication channels and mandates for partners
  - d. Participating in national needs assessment for standards
  - e. Developing and participating in a community of practice
  - f. Developing capacity and training on various standards
  - g. Adopting national standards for products and services

## Partnerships

12. What forms of partnerships are common in the Geospatial information sector in your country?
  - a. Cross-sector or interdisciplinary initiatives
  - b. Industry-Academic collaborations for joint research and development
  - c. Community partnerships with civil society
  - d. International trade or business
  - e. Standards development
  - f. Awareness building initiatives
  - g. Co-funding of building fundamental data themes
  - h. Capacity building
  - i. Other forms of partnerships
13. What partnerships do you seek for the Geospatial sector in the country?

## Capacity and Education

14. Are there orientation/training programs on UN-IGIF available in your country?
15. The private sector can support capacity-building initiatives in the following ways:
  - a. Providing training to government officials on the latest technologies and products.
  - b. Providing skill development courses to students and young professionals to promote Geospatial education.
  - c. Undertake a skill gap analysis in the country regarding geospatial education.
  - d. Developing a community of practitioners.
  - e. Establishing and contributing to innovation hubs.

## Community and Engagement

16. What efforts are taken for Geospatial advocacy to the users promoting geospatial information without a motive to sell a product or service?
  - a. Organizing periodic conferences/meetings.
  - b. Publishing geospatial knowledge content that promotes knowledge exchange.
  - c. Establishing an industry association that acts as a collective voice for the geospatial industry in the country.
  - d. Building and participation in various stakeholder engagement programs.
  - e. Collaboration for research and development.
  - f. Any other, please specify.