Business models for sustainable Geospatial Knowledge Infrastructure

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Member, GKI Program Board
Content

- Business Model options and their applicability to individual nations.
- Funding sources for the infrastructure.
- Licensing mechanisms to monetize data.
- Monetization of a knowledge value chain.
- Access to development funding
Business Model

facilitates the wider use of integrated geospatial information, is compatible with the government’s fiscal policy and funding approaches, and is implemented through a financial plan – IGIF Pathway Finance

The business model identifies the sources of funding and revenue, partners, the intended user base, competition, products and services. Business models for financing vary and include government-funded cost recovery, shared funding, and full commercial models.
The National Company will be responsible for managing the product life cycle of most (if not all) foundation products and services in the Country.

- Coordinating and/or undertaking collection of new data
- Liaising with the data custodians for data sets sourced from other agencies
- Ensuring all data standards and policies are followed as established by the regulator
- Coordinating and/or undertaking the ongoing maintenance and update of data products and services
- In conjunction with the regulator, developing new surveying and geospatial products and services
- Publishing and making available such data sets to government, business, academia and the public in accordance with the policies established by the regulator for this purpose
- Facilitating value adding opportunities for Country geospatial businesses to work with the National Company to extend the value of the products and services.
A NATIONAL COMPANY MODEL  
Australian Example

GEOSCAPE (Formerly PSMA) Australia Business Model has been referenced as a potential Country Commercial model.

- GEOSCAPE aggregates and standardises data supplied under agreement from a range of Government suppliers (custodians).
- GEOSCAPE ‘value-adds’ to the National data and generates new economic value by licensing data to businesses to create new products and services.

- User-Pays Business Model
- Revenue supports further business activity and maintenance of national data.
- Government is the MAJOR shareholder of the National Company
**GEOSCAPE (Australia) Board Structure and Vision/Mission and Values**

• The board is required to protect and enhance long term shareholder value
  • Not less than three directors, nor more than twelve
  • Each shareholder may nominate a Director
  • Plus up to three directors independent of any shareholder
  • Independent directors to have a blend of expertise in finance, accounting, law and/or marketing
  • Chair selected from the independent directors
GEOSCAPE (Australia) Private Sector Network
National Company Building National ASSETs

“National Data Underpins the $42 Billion Government Investment into Next Generation Broadband”

NBN Co will use Australia’s geocoded national address file, G-NAF, for address information to support the planning, roll-out and operation of the national broadband network.

Posted: 3 April 2012

“National Company generates new innovative products in partnership with Industry”

Geoscape: Recording Australia’s built environment

PSMA CEO Dan Paul outlines ambitious Geoscape project to record what exists at every address in Australia.

Posted: 18 October 2016
A Proposed National Company (Operator) BUSINESS Model

Regulator Invests in National Standards and Policies for Access

Creation of Official National Data, Products and Services

Data Licensed and Enhanced for Specific Industry Use

National Use of Geospatial Data, Products and Services

Collection and Processes for Supply of Data

Standardised for National Use

Licensed Data applied for Industry Use

National Data Embedded into National Products and Service Platforms

Invest to Regulate

Invest to Capture

Invest to Build National Products

Licensed Businesses Invest to Customise

$ Implementation of a User Pays Model

National Company reinvests into building national products

Licensed businesses pay National Company access and royalty fees

Users pay for the use and benefit of nationally consistent data

Geospatial Knowledge Infrastructure
National Company Partnering with Private Sector for Growth

The National Company will:

- Harmonize the disparate and duplicated geospatial data to produce high quality national products and services
- Maintain national products to meet industry and Government needs
- Ensure timely access and delivery of national products and services
- Support localization of skills and jobs by strengthening innovation opportunities to leverage national data
- Generate more value-adding business opportunities for the private sector
Example: Value Added Geospatial

**Singapore:** Singapore’s Urban Redevelopment Authority (URA) has launched a new map-based app using GIS technology to ease information search on general planning decisions. “If you wish to buy or lease a property, you will want to know more about the property, e.g. The approved use and storey height of the building, whether it has been approved for major renovation works in the past, and the approved use of the surrounding properties,” said Khaw Boon Wan, National Development Minister.
## Products and Services: Data Product Themes and Services

|-----------------------------------------------------------------------|---------------------|----------------|-------------------------------|-------------------------------------|------------------------|---------------------------|---------------|-------------|-------------|---------------|----------------|------------------------|-----------|----------------|----------------|------------------------|--------------|--------------------------|----------------|---------------------------------|---------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------|
Products and Services: Datasets

- Land Parcel Boundaries
- Coordinated Cadastre
- Land Registry Information
- National Address File
- Address Points and/or Coordinates
- National Border
- Provincial Boundaries
- Municipal Boundaries
- Maritime Boundaries
- Emergency Service Districts/Operational Zones
- Postcode Boundaries
- Health Service Zones
- Educational District Zones
- National Statistical Unit Boundaries
- Mineral and Petroleum Extraction Licenses
- Mineral and Petroleum Exploration Licenses
- Major Projects Areas
- Place Names
- Gazetteer
- Gazetteer - Official Roman Translation
- Place Names Pronunciation
- Geodetic Survey
- National Geoid
- National Horizontal Reference System
- Local Horizontal Reference System
- National Vertical Reference System
- Local Vertical Reference System
- Tide Gauges
- Datum Transformations
- National Map Projection
- Map Sheet Indexes
- Image Index – Satellite
- Aerial Image Index
- Harmonized Multi-Resolution Grid
- Bathymetry
- Reefs
- Navigation Infrastructure (lights, buoys, etc.)
- Navigation Hazard Data
- Tidal Information
- Notices to Mariners
- Coastline
- Wadis
- Waterbodies and Lakes
- Swamp
- Topological Watercourse Network
- Reservoirs
- Channels
- Groundwater Data
- Groundwater Bore Locations
- Groundwater Bore Data
- Digital Elevation Model (DEM)
- Digital Surface Model (DSM)
- Contours
- LiDAR
- DEM - Derived Products (slope, aspect etc.)
- Road Centerlines
- Road Intersections
- Navigable Transport Network
- Road Infrastructure
- Railway Lines
- Metro
- Airports
- Runways
- Ports
- Bridges, Tunnels
- Building Footprints
- Building Points
- 3D Building Representation
- Government Buildings
- ESO Locations
- Hospitals and Health Centers
- Mosques
- Tourist Attractions
- Businesses (Hotels, Shopping Centers)
- Schools
- Satellite Imagery
- Aerial Imagery
- Agricultural Areas
- Forests
- Built Surfaces
- Swamps and Wetlands
- Plantation
- Waterbodies
- Current Land Use Classification
  - (Residential, Industrial, Commercial, Recreation, etc.)
- Planning Boundaries
- Land Tenure
- Heritage sites
- Cultural Sites
- National Parks
- Environmentally Sensitive Areas
- RAMSAR Wetlands
- UNESCO World Heritage Sites
- Geology
- Soil
- Mineral and Petroleum Resources
- Landforms
- Bores
- Mining and Extractive Industries
- Geophysics
- Gravity Surveys
- Geological Hazards (Earthquakes, Volcanoes)
- Census Data
- Statistical Units
- Electricity Supply Networks
- Water Supply Networks
- Sewerage Networks
- Telecommunications Networks
- National Geoportal
- National CORS
- Underground Utilities
Products and Services: Custodians

- Land Department
- Transport Department
- Communication Department
- Coastal Department
- Emergency Department
- Health Department
- Geology Department
- Weather Department
- Agriculture Department
- Water Department
- Local Government Department
- Utilities Department

- Environment Department
- Data Coordination Department
- Home Security Department
- Statistics Department
- Planning and development Department
NATIONAL Company  Commercial Model

User-Pays Business Model (as applicable)

- Standardised Data Licensing
- Network of value added resellers
- Standard product catalogue
- Ongoing research and innovation
- Customised services on demand
- High quality and trustworthy

Collection and Processes for Supply of Data

Standardised for National Use

Licensed Data applied for Industry Use

National Data Embedded into National Products and Service Platforms
Private Sector Inclusion Strategy

01 Market potential assessment

02 Geospatial industry promotion

03 Consultancy services for RDC and strategic collaborations

04 Startup/SME capability development and infrastructure support

05 Geospatial business accreditation

06 Funding support, fiscal and non-fiscal incentives

07 Strategic partnerships and industry community network

08 Global alliances and achievement awards
### Agile Research-Industry Ecosystem

**OBJECTIVES**

1. To provide a highly conducive environment for continuous geospatial research activities.
2. To establish and implement Public Private Partnership (PPP) to spur development of the local geospatial industry.
3. To create a supportive and vibrant ecosystem for local private sectors to venture and grow in the local geospatial industry.

### FOCUS AREAS (FA)

- **RDC**
- **INDUSTRY DEVELOPMENT**

### INITIATIVES

<table>
<thead>
<tr>
<th>FA</th>
<th>INITIATIVE</th>
<th>PROGRAMME ID</th>
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<tbody>
<tr>
<td>1: Strengthening of RDC Ecosystem</td>
<td>1</td>
<td>Geospatial R&amp;D Committee Establishment and Implementation</td>
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<td>National Geospatial Centre of Excellence Spin-Off</td>
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<td>2: Industry Development (Private Sector Focus)</td>
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</table>
## Agile Research-Industry Ecosystem

**Chapter 5: page 118-120**

### Strengthening of RDC Ecosystem

<table>
<thead>
<tr>
<th>Geospatial R&amp;D Committee Establishment and Implementation</th>
<th>National Geospatial Centre of Excellence (NGCoE) Spin-Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Setting up of Geospatial R&amp;D Committee</td>
<td>B Facilitate the industry on R&amp;D, commercialization and investment programmes</td>
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</table>

**Implementation Timeline:**

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
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<tr>
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**Benefits:**

- Consolidated formulation, review and prioritization of research and development programmes relating to geospatial
- Establishment of government-business-academia collaboration effort facilitated by the Geospatial R&D Committee
- Establishment of leadership and expertise in research, development and commercialization of geospatial solutions
- Access to geospatial-related consultancy/advisory services
- Self-sustain geospatial specialist centre through a viable business model
SP3I-2: Industry Development (Private Sector Focus)

P3-3
Private Sector Inclusion Strategy

A Assess market potential
B Promote geospatial industry to other sectors
C Develop consultancy services to promote R&D, strategic collaboration and commercialisation activities
D Provide capability development support for start-up/Small Medium Enterprises (SME)

Implementation Timeline:

Year 1 Year 2 Year 3 Year 4 Year 5

A

B

C

D

Benefits:

- Products and services that meet private sector demand
- Awareness and interest generation among private sectors and research organizations to participate in geospatial sector
- Positioning of geospatial as a high growth economic sector
- Availability of geospatial consultancy/advisory services for the private sector
- Entrepreneurship development programmes for local geospatial players
### Agile Research-Industry Ecosystem

<table>
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<tr>
<th>Year 1</th>
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<tr>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
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**Industry Development (Private Sector Focus)**

**Private Sector Inclusion Strategy**

- **E** Geospatial Business Accreditation
- **F** Provide funding support for research and innovations
- **G** Establish strategic partnerships to leverage on existing initiatives
- **H** Establish local geospatial industry community network

**Implementation Timeline:**

**Benefits:**

- Standardised geospatial product and service delivery assessment for private sector
- Establishment of funding model for geospatial private sector players
- Establishment of strategic collaborations with other ministries or agencies by leveraging on existing private-sector development initiatives
- Engagement of private sector through establishment of geospatial industry association
# Agile Research-Industry Ecosystem

## Industry Development (Private Sector Focus)

### P3-3
Private Sector Inclusion Strategy

<table>
<thead>
<tr>
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<th>J</th>
<th>K</th>
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<tr>
<td></td>
<td>Establish global alliances</td>
<td>Provide infrastructure support; geospatial hub</td>
<td>Provide fiscal and non-fiscal incentives</td>
<td>Reward excellence and achievements</td>
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### Implementation Timeline:

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<tr>
<td><img src="image" alt="I" /></td>
<td><img src="image" alt="J" /></td>
<td><img src="image" alt="K" /></td>
<td><img src="image" alt="L" /></td>
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### Benefits:

- Access to export market for geospatial private sector
- Geospatial hub for startups and Small Medium Enterprises (SME)
- Geospatial incentive programme
- Awards and recognitions programme for geospatial industry
- Positioning of private sector companies for international awards programme
- Development of global champions
# Agile Research-Industry Ecosystem

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<tr>
<th>PROGRAMME</th>
<th>2022</th>
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<th>2024</th>
<th>2025</th>
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<td>2: Establishment of National Geospatial Centre of Excellence &amp; Spin-Off</td>
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<td>2.00</td>
<td>2.00</td>
<td>10.00</td>
<td>10.00</td>
<td>$24M</td>
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<tr>
<td>3: Private Sector Inclusion Strategy</td>
<td>2.00</td>
<td>5.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.00</td>
<td>$21M</td>
</tr>
</tbody>
</table>

**TOTAL**: $55M
### Business Model Canvas

**6 – Key Partners**
- Who are our Key Partners?
- Who are our key suppliers?
- What are we getting from them?

**7 – Key Activities**
- What Key Activities do we require?
- Manufacturing?
- Software?
- Supply chain?

**1 – Value Propositions**
- Which of our customer’s problems are we helping to solve?
- Which customer needs are we satisfying?
- What are the Key Features of our product that match customer problems/needs?

**4 – Customer Relationship**
- How will we Get, Keep and Grow Customers?
- What is the relationship with the customers?

**8 – Key Resources**
- What Key Resources do we require?
- Financial, physical, IP, HR?

**3 – Channels**
- Through which Channels do our Customer Segments want to be reached?

**2 – Customer Segments**
- Who are our most important customers?
- What are their archetypes?
- What Job do they want us to get done for them?

**9 – Cost Structure**
- What are the most important costs inherent in our business model?
- Fixed?
- Variable?
- How are costs allocated?

**5 – Revenue Streams**
- How do we make money?
- What’s the revenue model?
- Pricing tactics?
- IP?
- Shares?
### Business Model Canvas-Filled

<table>
<thead>
<tr>
<th>KP - Key Partners</th>
<th>KA – Key Activities</th>
<th>VP – Value Propositions</th>
<th>CR – Relations (Customer Relationship)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Government</td>
<td>• Investment, Management and maintenance of Geodetic Infrastructure</td>
<td>• Risk Sharing: The risk of Infrastructure investments is shared between the Federal Government and State Governments, Private Sector and Academia</td>
<td>• Government network</td>
</tr>
<tr>
<td>• Private Sector</td>
<td>• Research and development</td>
<td>• Mutually Beneficial Strategic Partnership: Preferential access to know-how and high tech geospatial infrastructure (labs, simulators, testbeds, etc.) which are not otherwise readily available to the participants, as well as assistance in identifying partners.</td>
<td>• Academic network</td>
</tr>
<tr>
<td>• Academia</td>
<td>• Capacity Building</td>
<td>• Faster Time to Market: Improving the prospects for successfully marketing and supporting the developed commercials products and services to end-user</td>
<td>• Private sector network</td>
</tr>
<tr>
<td></td>
<td>• Advisory Services</td>
<td>• Trusted Advisor: For other Federal government departments to enable geospatial capability and capacity</td>
<td>• International network</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KR - Key Resources</th>
<th>CH – Channels</th>
<th>CS – Co-Creators (Customer Segment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• GM of the agency as the Chair of the NSDI</td>
<td>• Strategic Collaboration and Partnerships between user segment Ministries in the Federal and Emirate Government</td>
<td>• Local Small to Medium Enterprises</td>
</tr>
<tr>
<td>• Geospatial, Hydrography, Geodesy resources</td>
<td>• Promoting Local Technologies in in-country and overseas</td>
<td>• Local Corporate Companies</td>
</tr>
<tr>
<td>• Working groups</td>
<td>• Search for International partners</td>
<td>• Geodesy enabled business initiatives and services</td>
</tr>
<tr>
<td>• NSDI Staff</td>
<td></td>
<td>• Multi-National Companies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C$ - Cost Structure</th>
<th>O$ – Outcome/Revenue Streams</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Initial funding from Federal / State government for start-up.</td>
<td>• NSDI will foster economic growth by encouraging technological innovation and entrepreneurship and stimulating high value-added R&amp;D and commercialization.</td>
</tr>
<tr>
<td>• NSDI to self sustain within three years of initial funding</td>
<td>• Developing a affordable pricing for subscribers of the NSDI Products and services.</td>
</tr>
<tr>
<td>• Create a united funding model from Government, Private Sector, Academia for additional revenue models for sector specific projects</td>
<td>• Development of Location Intelligence APIs utilizing the NSDI for sectors such as Logistics, Transportation, Construction...</td>
</tr>
<tr>
<td></td>
<td>• Revenue generation from targeted capacity building program internal and external stakeholders.</td>
</tr>
</tbody>
</table>
Business Canvas Exercise
Thank You
zaffarmgsm@gmail.com