



## NLA International–Seabed 2030

## **Phase 3: Benefits Analysis Workstream**

## Document 2: Seabed 2030 Value Chain Document

December 2022



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#### SECTION ONE: INTRODUCTION TO THE DOCUMENT

#### **1.1 CONTEXT**

The Nippon Foundation-GEBCO Seabed 2030 Project's vision to map the world's oceans by 2030 is insightful and ambitious setting a challenging timeline to address the 80% of the oceans that have yet to be charted to the required gridded resolution. The "Wind in the Sails" (WITS) proposal supports the Seabed 2030 Project by providing empirical evidence to enable the development of a prioritised, targeted survey strategy. The aim of this three-phase project is to unite the global hydrographic community and operators within the marine and maritime domains around an agreed global seabed mapping priority list, underpinned by a robust evidence base that articulates the true need and value of mapping the seabed in its entirety to a defined gridded depth variable resolution.

WITS phases are: (Bold text current phase highlights the current phase of activity, Phase 3)

- Phase 1: Rapid evidence review and fast action priority list.
- Phase 2: Detailed modeling, benefit extrapolation and prioritisation of need.
- Phase 3: Benefits analysis and targeted community engagement to determine Prioritisation.

## **1.2 'WIND IN THE SAILS' PHASE 3 TASK – PHASE 3: BENEFITS ANALYSIS AND TARGETED COMMUNITY ENGAGEMENT TO DETERMINE PRIORITISATION**

WITS Phase 3 work builds on top of the phase 1 and 2 outputs and is also informed by the grounding evidence Phase 1 community engagement survey findings. Phase 3 activities undertaken across FY 2022 address two key areas of focus:

- <u>Benefits analysis workstream</u>, producing a series of Seabed 2030 parameters for use in seabed mapping benefits analysis and to be available for use in future prioritisation decision-making, and the articulation of Seabed 2030 seabed mapping programme benefits through the production of benefits documentation, including Value Chain, Executive Fact Sheet, Value Proposition, and a set of Use Case Evidence, and,
- <u>Targeted community engagement</u>, to provide grounding evidence for prioritisation decisions, through:
  - Seabed 2030 Management Engagement Ongoing: Fortnightly progress meetings, plus nominated peer to peer calls on for to inform / review documentation iterative development (to validate scope and focus as documents develop).
  - National body community engagement survey questionnaire: Global national bodies (Hydrographic Offices (HOs)) with responsibilities for hydrographic mapping/safety of respective national waters will be requested by letter to provide own views on the quantitative analysis and prioritisation of users from the WITS online survey. A survey and question set will be established for online responses by individual HOs / vested bodies and the results will be amalgamated with pre-existing "users" results to develop a combined and validated global prioritisation list.
  - **Communications & Informed User Engagement:** One article and one press release to be written during WITS Phase 3 Objectives 6 & 8 being completed, with NLAI attending and presenting at the Map the Gaps symposium on 27th October 2022.

A further Phase 3 workstream and area of focus, 'Seabed 2030 Prioritisation', which is currently planned to be addressed in FY 2023, will develop the phase 2 proposed prioritisation approach into a documented prioritisation methodology (Level 3 business process documentation produced), and provide a tool review and design, with a prototyping of a tailored prioritisation tool workflow for Seabed 2030.

#### **1.3 DOCUMENT PURPOSE & STRUCTURE**

This document is the second of six document deliverable outputs, [Document 2], from the Phase 3 benefits analysis workstream work, where:

- Document 1: Seabed 2030 Regional Segmentation Document [Explainer document], is a guidance document, and informs Seabed 2030 towards adopting a 'Regional Segmentation' of the Global Oceans into Regional Areas of Interest for the purposes of benefits analysis and seabed mapping prioritisation.
- **Document 2: Seabed 2030 Value Chain [Explainer Document]**, *this document*, is a guidance document, and describes a proposed value chain for Seabed 2030. The value chain informs benefit analysis / value analysis and is also available to inform Seabed 2030 organisation operating model future evolution.
- **Document 3: Seabed 2030 Economic Impact Sectors Document**, *target submission at the end of December 2022*, is a guidance document, and describes a set of economic impact sectors for ongoing use in the Seabed 2030 benefit analysis and economic value assessment work.
- Document 4: Document set of Use Cases [Up to 12 use cases], target submission at the end of January 2023, collates and documents a set of Seabed 2030 use cases. The use cases inform the Seabed 2030 benefits analysis model, evidence the evolving Seabed 2030 business case, and are available to support ongoing Seabed 2030 knowledge sharing activities and strategic communications.
- Document 5: Seabed 2030 Executive Fact Sheet (Focus: Seabed 2030 seabed mapping), target submission at the end of February 2023, is a Seabed 2030 Executive Fact Sheet on the Seabed 2030 mapping programme.
- Document 6: Seabed 2030 Seabed Mapping Programme Value Proposition Document, *target submission at the end of February 2023*, is a Seabed 2030 Value Proposition Document for the Seabed 2030 mapping programme.

**Document readership** potentially include Seabed 2030 management, decision makers, and practitioners. The wider benefits analysis and prioritisation modeling are being developed with the same readership in mind (Seabed 2030 management, decision-makers, and practitioners), and additionally are being produced with researchers and future donors / funding bodies in mind.

#### Document 2 structure is as follows:

- Section 1: 'Introduction to the Document' providing Seabed 2030, and WITS Phase 3 context and provides the purpose and layout of the report.
- Section 2: a summary of the approach adopted in developing a Seabed 2030 Value Chain.

- Section 3: provides background and purpose details of value chains generally, and signposts readers to useful benchmark value chain examples drawn from the wider geospatial data and seabed mapping communities. These are the same examples used during and informing the Seabed 2030 value chain workshop [November 2022].
- Section 4: presents a proposed Seabed 2030 Value Chain. The Seabed 2030 Value Chain is documented, defined, and described in this section.
- Section 5: 'Benefits Analysis Collation of Recommendations', providing a table of recommendations identified during the value chain development work for carry across into the WITS Phase 3 wider seabed mapping benefits analysis delivery, and for Seabed 2030 ongoing reference / use as applicable.
- Section 6: WITS phase 3 next steps.
- Annex 1: Seabed 2030 Data Centre Heads November 2022 Workshop Documented Value Chain (Providing a Tactical/Operational View Value Chain).
- Annex 2: Glossary Definition of Terms.
- Annex 3: References.

#### SECTION TWO: SEABED 2030 VALUE CHAIN DEVELOPMENT- SUMMARY OF APPROACH

This section presents a summary of the approach adopted in developing a Seabed 2030 Value Chain.

#### 2.1 SEABED 2030 VALUE CHAIN DEVELOPMENT – SUMMARY OF APPROACH

The purpose of the Seabed 2030 Value Chain development activity is to design and produce a Seabed 2030 Value Chain, a value chain that can be used to inform benefit analysis / value analysis, and to be available to inform Seabed 2030 organisation operating model future evolution. The Value Chain was workshopped with Seabed 2030 data center management heads through a dedicated workshop meeting [14 November 2022], and then documented and described in this report - please see section 4 further below.

The value chain development activity is informed by the two earlier Phase 2 Benefits Analysis Workstream Reports:

- Catalogue of Premium Models for Seabed Mapping Benefits Analysis [January 2022], and
- Proposed model for Seabed 2030 Seabed Mapping Benefits Analysis and Prioritisation [April 2022].

With additional desk study and stakeholder engagement primarily through the dedicated 'workshop', and wider stakeholder engagement, where applicable, and through the fortnightly Seabed 2030 management WITS project progress meetings.

The value chain development activity was undertaken through the following logical steps,

Step 1: [Desk study] Review phase 2 guidance on Value Chain.

**Step 2:** [Desk study] Document a definition and purpose of Value Chain's as generally adopted in the context of benefit / value analysis and informing an organisation level operating model.

**Step 3:** [Desk study] Identify and review benchmark Value Chain examples (examples deemed useful to potentially inform the development of a Seabed 2030 Value Chain).

**Step 4:** [Desk study] Produce a draft version Seabed 2030 Value Chain, via some initial preparation work followed by value chain workshopping with Seabed 2030 Data Centre Management Heads [Workshop 14 November 2022] – see below.

**Step 5:** [Stakeholder engagement] Workshop the draft Seabed 2030 Value Chain with Seabed 2030 Data Centre Management. Addressing, as per the workshop draft agenda:

Workshop Seabed 2030 Value Chain [workshop & group discussion]

- Value chain – key purpose of a value chain and Seabed 2030 context setting.

- 'Seabed Mapping' value chain 'stages', blending a data value chain with wider practice, e.g., AusSeabed Value Chain.

- Adding a wrapper to the value chain to reflect Seabed 2030 'entity' i.e., consider / identify any additional value areas, e.g., capacity building, among others to be discussed, etc.

- Review the value chain to capture example key industries and sectors at the different value chain stages [The workshop did not have time to address this item, and the consultants have added these details post workshop].

- Review the value chain to identify any key exclusions / missing value areas.

**Step 6:** [Desk study] Collate workshop findings/outputs and update the Seabed 2030 Value Chain. Review the updated Value Chain with Seabed 2030 in a fortnightly meeting [November], and then document and describe the resulting Seabed 2030 Value Chain, making any associated recommendations for Seabed 2030 consideration.

**Step 7:** [Desk study & Stakeholder engagement] Finalise the draft version deliverable, Seabed 2030 Value Chain Document [This document], and issue draft version for Seabed 2030 management review.

**Step 8:** [Stakeholder engagement] Meet with Seabed 2030 management to discuss the value chain document output and any associated recommendations, with the objective to reach a consensus for adoption initially for the current WITS work and for potential future use for seabed mapping benefits analysis.

**Step 9:** [Desk study & Stakeholder engagement] Update the Value Chain document to take account of Seabed 2030 management review comments, finalise, and make available for benefits analysis workstream use.

#### SECTION THREE: VALUE CHAIN BACKGROUND DETAILS, PURPOSE, AND USEFUL BENCHMARK VALUE CHAIN EXAMPLES

This section provides a definition, [Section 3.1 below], and purpose, [Section 3.2 below], of Value Chain's as generally adopted in the context of benefit / value analysis and for informing organisation operating models. These definitions are followed by a high-level review of three reference benchmark Value Chain examples. These examples are useful to the current study, and inform the development of a Seabed 2030 Value Chain presented later in Section 4, and include:

Value Chain Benchmark I [Section 3.3 below]: UK HMG Cabinet Office Geospatial Commission - Geospatial Data Market Study [Geospatial Data Value Chain].

**Value Chain Benchmark II** [Section 3.4 below]: European Global Navigation Satellite Systems Agency (GSA) - GNSS Market Report – Maritime Value Chain [GSA (since publication) have become part of the 'European Union Agency for the Space Programme'].

Value Chain Benchmark III [Section 3.5 below]: Seabed Mapping Data Value Chain [AusSeabed adopted].

To aid the reader Value Chain benchmarks are presented using a common table approach, and include the following review details:

- Entity / Programme Name
- Reference applicable website URL
- Value Chain Graphic
- Value Chain Overview
- Seabed 2030 Value Context

#### **3.1 VALUE CHAIN DEFINITION [GENERAL]**

A Value Chain is a set of activities that an organisation carries out to create value for its customers.

A Value Chain is a key part of benefits analysis and economic value assessment, as it provides the base from where value is being generated from and to whom.

#### **3.2 VALUE CHAIN PURPOSE [GENERAL]**

A Value Chain's purpose is to identify a set of activities that an organisation carries out to create value for its customers. In terms of benefits analysis and economic value assessment, this is fundamentally important as it identifies how / where value is created by the organisation and addresses the economic logic of why an organisation exists.

If we were to apply 'Porter's Value Chain' [a good practice approach] to the Seabed 2030 Organisation, we would be identifying the operating model of the Seabed 2030 entity. Whilst this would be useful in terms of Seabed 2030 having a full range of functions being identified in their operating model, from a benefits analysis / economic value assessment perspective we are more interested in considering the Seabed 2030 entity and how it enables economic value. The latter (benefits analysis / economic value assessment) is the main thrust and focus of the consultant review and the value chain development activity.

This focus and Seabed 2030 context, drives us towards defining a value chain including:

- Seabed 2030 Data Producers
- Seabed 2030 Data Users, while,
- Enabling and aligning with any to be adopted 'Economic Sector' hierarchy (these sectors are considered in further details as part of the WITS benefits analysis workstream next task [task 6.3 Seabed 2030 economic value sectors].

In Section 4, a proposed Seabed 2030 Value Chain is defined and described, whilst ahead and in the rest of this section [sub-sections 3.3, 3.4 and 3.5 below] we review three useful benchmark reference value chains that provide readers with useful value chain background context and inform the development of the proposed Seabed 2030 Value Chain.

## **3.3 VALUE CHAIN BENCHMARK I REVIEW – UK HMG Cabinet Office Geospatial Commission - Geospatial Data Market Study [Geospatial Data Value Chain]**

This Value Chain benchmark review is provided to inform the development of the proposed Seabed 2030 Value Chain. Our focus here is on a value chain for geospatial data as adopted by UK HMG Geospatial Commission, Frontier Economics Study. *Ref: Frontier Economics, Geospatial Data Market Study. Report for the Geospatial Commission, September 2020.* 

#### Lead Authority: [UK] HMG Cabinet Office Geospatial Commission

Study: Frontier Economics Study, Geospatial Data Market Study. Report for the Geospatial Commission, September 2020

References – applicable website URLs

Access HMG Geospatial Commission website here: https://www.gov.uk/government/organisations/geospatial-commission

Access reference study reports here: <u>https://www.gov.uk/government/publications/enhancing-the-uks-geospatial-ecosystem</u> and;

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/9 37025/Frontier\_Economics\_-\_Geospatial\_Data\_Market\_Study.pdf

Value Chain Graphic

**Graphic I: Geospatial Data Ecosystem** 



• Geospatial capabilities underpin a range of key areas, such as financial services, adtech, proptech, agritech, automated mobility, construction, manufacturing, and public services. [Seabed mapping is cross-cutting and provides impact in multiple sectors and industries].

The Geospatial Commission reported that "building on Frontier's work, the Geospatial Commission's report and the UK's Geospatial Strategy, it's clear that the value of creating, using and harnessing location data can generate societal benefits and will be crucial to addressing major challenges and supporting a flourishing economy."

The geospatial data ecosystem (graphic 1 above): Frontier Economic reports that it is more appropriate to think of a geospatial ecosystem as containing many individual submarkets which are based on specific groups of products and services. [This maps across to our logic of direct use and value add use of seabed mapping data by a variety of actors/vendors for different applications in different marine/maritime sector settings. Further, there is a broad distinction between 'supply' of geospatial data and 'demand' within any specific geospatial market, as is the case in seabed mapping.

Several activities sit within both the overarching supply and demand sides of each market. On the supply side this includes data collection, packaging up data and the creation of geospatial data products and services. Building on wider research (Frontier Economics and others), relevant supply-side stages can be presented in the value chain (see Graphic 2), noting that Frontier Economics report states that this is a useful way to conceptualise the provision of geospatial goods and services for their study [and for the purposes of assessing economic value], and also allows consideration of *(and differentiation between)* the role of specific stakeholder groups.

Frontier Economics divides the supply-side, geospatial data value adding process into five steps (graphic 2), and reports:

- Firstly, value is created via the generation of geospatial data via primary collection or acquisition.
- Next the data is transformed into a more useful format and is processed.
- This refined geospatial data is sometimes (but not always) linked with other forms of information which may not be geospatial.
- Commercial organisations may then use this aggregated and processed information good or service as a means to inform organisational decisions and add value internally.
- In other cases, the geospatial data may be included with a retail product or service which is valued by end users. In these cases, geospatial data forms a key intermediate good which is a component of a final good.

It is these products and services (both final and intermediate in nature) that constitute the relevant sets of economic markets. For example, one specific market in the geospatial ecosystem is the provision of mapping services to commercial users which are developing a consumer-facing application that includes a geographic contextualisation. And in this scenario, there are multiple providers who offer variants of this service across both the private and public sectors.

#### Seabed 2030 Context:

There is potential synergy between the Geospatial Data Market Study geospatial data value chain and seabed mapping value chain development, including:

- Seabed 2030 and seabed mapping data also operates within an ecosystem as opposed to a single sector or industry.
- The Geospatial Data Value Chain presented in Graphic 2 is directly relevant and can be applied in / tailored to develop a seabed mapping data value chain.
- Linkage with other forms of information also applies to seabed mapping data value generation.

- Public and private sector organisations will use aggregated data and processed information goods and services based on seabed mapping data as a means to inform organisation decision-making and add value internally.
- Seabed mapping data may be included with a retail product or service which is valued by end users. In these cases, seabed mapping data forms a key intermediate good which is a component of a final good. [We identify this scenario as value add data in the Seabed 2030 mapping value chain].
- Multiple offerings may be available to users from multiple providers, and each offering is providing added value based on the same [original source] seabed mapping data.
- Seabed mapping users also include both Public and Private sectors not in any one sector/industry but in multiple marine/maritime sectors and industries.

# 3.4 VALUE CHAIN BENCHMARK II REVIEW - European Global Navigation Satellite Systems Agency (GSA) - GNSS Market Report – Maritime Value Chain [GSA now part of European Union Agency for the Space Programme]

This Value Chain benchmark review is provided to inform the development of the proposed Seabed 2030 Value Chain. Our focus here is on the European Global Navigation Satellite Systems Agency (GSA) - GNSS Market Report – Maritime Value Chain, which is essentially a GNSS Technology Value Chain for the Maritime Domain. Ref: GNSS Market Report, Issue 6, copyright © European GNSS Agency, 2019. Please note that since publication the GSA has now become part of the 'European Union Agency for the Space Programme (EUSPA).

Entity / Programme Name: European Global Navigation Satellite Systems Agency (GSA) - GNSS Market Report – Maritime Value Chain [GSA now part of the European Union Agency for the Space Programme]

Study – GSA GNSS Market Report, Issue 6, 2019, informed by study a 'Report on Maritime and Inland Waterways User Needs and Requirements Outcomes of the European GNSS User Consultation Platform').

Reference – applicable website URLs

Access European Union Agency for the Space Programme (EUSPA) website here: <u>https://www.euspa.europa.eu/</u>

Access reference study report here: <u>https://www.gsc-europa.eu/news/european-gnss-agency-gsa-</u> releases-6th-gnss-market-report

Source: GNSS Market Report, Issue 6, copyright © European GNSS Agency, 2019 Value Chain Graphic: (Overleaf)

Graphic 1: GNSS Market Report – Maritime Value Chain



#### Source: GNSS Market Report, Issue 6, copyright © European GNSS Agency, 2019

#### Value Chain Overview:

The GSA's mission is to support European Union objectives and achieve the highest return on European GNSS investment, in terms of benefits to users and economic growth and competitiveness.

For context the GSA market report explains what GNSS is and what the user requirements are. It also presents quantification on future shipments, revenues and installed base for the GNSS market as a whole. It considers 'Macrotrends' affecting GNSS presenting trends such as Climate Change & Circular Economy, Big Data, Artificial Intelligence, Silver Economy, etc. that lead to the development of new information-intensive services and impact the adoption of GNSS solutions. Further the report reviews GNSS market segments with this review forming the core of the report. This market segment review includes GNSS for maritime and within this a tailored value chain is presented.

The GNSS Market Report, Issue 6, 2019, can be considered a market study and was informed by a wider study a 'Report on Maritime and Inland Waterways User Needs and Requirements Outcomes of the European GNSS User Consultation Platform'). This consultation platform includes extensive engagement including with representatives from all the identified maritime segment EU community areas and across all areas of value chain.

To summarise, the GNSS Maritime value chain is presented as a linear sequence of activities, starting with the 'maritime organisations' [Lefthand side]. These include a range of organisations,

e.g., agencies through to industry associations, organisations that drive regulation and practice [GNSS for maritime] – We call these contributors. Then moving through the value chain [Centre], we see 'components and receiver manufacturers', these are the GNSS equipment and technology OEMs,' and then 'system integrators' activities, these are activities that integrate GNSS technology 'solutions'. Finally, at the downstream end of the value chain we have users, both 'Users' of GNSS technology, these being direct use, and 'users of positioning information or 'value add use'.

#### Seabed 2030 Context:

This GNSS Maritime Value Chain is a useful reference benchmark, and exhibits synergy with seabed mapping and the proposed Seabed 2030 Value Chain developed as part of this study:

- The value chain is a linear sequence of activities with 'supply' and 'users' at upstream and downstream value chain areas, respectively.
- The value chain is both a 'technology-driven' and 'data-driven' value chain.
- The value chain identifies 'key' global and European companies involved in GNSS upstream/downstream activities, as well as 'Communities of Users' for the different Value Chain activities.

#### 3.5 VALUE CHAIN BENCHMARK III REVIEW – Seabed Mapping Data Value Chain [AusSeabed adopted]

This Value Chain benchmark review is provided to inform the development of the proposed Seabed 2030 Value Chain. Our focus here is on a Seabed Mapping Data Value Chain, as adopted by AusSeabed, *Ref: The value of Australian seabed mapping data to the blue economy, Geoscience Australia, Deloitte Access Economics, October 2021.* 

#### Entity / Programme Name: Seabed Mapping Data Value Chain [AusSeabed adopted] Reference – applicable website URLs

Access Geoscience Australia website here: https://www.ga.gov.au/

Access the AusSeabed, national seabed mapping coordination program website here: <u>https://www.ausseabed.gov.au/</u>

Access reference study report here:

https://www.ausseabed.gov.au/resources/news/latest-news/new-report-shows-the-value-of-seabedmapping

and;

https://www2.deloitte.com/au/en/pages/economics/articles/value-of-australian-seabed-mappingdata-to-blue-economy.html

#### Value Chain Graphic: (overleaf)

**Graphic 1: Seabed Mapping Data Value Chain [AusSeabed Model],** *Ref: The value of Australian seabed mapping data to the blue economy, Geoscience Australia, Deloitte Access Economics, October 2021. [P17]. Source: Deloitte Access Economics; AusSeabed Strategic Plan 2030* 





#### Value Chain Overview:

**Background context:** The Deloittes study reports that seabed mapping within Australia and internationally has steadily increased with the arrival of high-resolution multibeam echosounder technology in the 1970s. Motivated mainly through a combination of scientific curiosity, legal obligations for Australia's maritime jurisdiction, and commercial interests, a wide range of government agencies, not-for-profit organisations and private sector firms have contributed to mapping the Australian seabed. This clearly suggests a diverse range of sources of seabed mapping apply at national scale, and this is ever more so when considering global data coverage scale up as is the case with Seabed 2030.

**Seabed Mapping Data Value Chain (Graphic 1):** Deloittes reports (P17) that seabed mapping data producers include those who are directly involved in acquiring, processing, and delivering seabed mapping data; either independently or through collaboration.

The process of data capture, processing, delivery, and utilisation form the data value chain (as shown in figure Graphic 1). Further, it is noted that seabed mapping data is provided under

commercial or open access licences and is employed across a wide variety of industries that generate economic activity.

The AusSeabed Model Seabed Mapping Value Chain identifies 5 'Data Production' Value Chain Activities:

- I. Survey Planning
- II. Data Collection
- III. Data Processing
- IV. Data Collation and Management, and
- V. Data Distribution

Data Distribution is the intersection point between data producers (on the left-hand side or upstream), and data users (to the right-hand side or downstream) on the value chain. For the purposes of the AusSeabed model seabed mapping value chain users are simply identified as data users. Deloittes segments users further towards their economic contribution, but for the value chain purposes keeps them simply as 'data users'.

**Seabed Mapping Supply Chain (Graphic 2):** The Deloittes study (Report P13) identifies that public and private organisations are involved in the production of seabed mapping data. The value chain and study terms these as 'producers.' The second graphic then addresses the seabed mapping supply chain through identifying key contributors [within Data Producers/Upstream] and data use activities and key industry linkages [within Data Users/Downstream].

#### Seabed 2030 Context:

**The AusSeabed Model Seabed Mapping Data Value Chain (Graphic 1)**, is logical and can readily be applied towards Seabed 2030 scenario, subject to it being supplemented with wider ancillary activities undertaken by the Seabed 2030 entity to promote and facilitate seabed mapping at a global scale. [In addition to data production / data use range of activities, the Seabed 2030 Value Chain includes example ancillary activities - the assessment of global coverage seabed mapping value, prioritisation of seabed mapping, the provision of a readily accessible knowledge base on seabed mapping, and the engagement, promotion, and brokerage of seabed mapping data to facilitate and enable the global seabed mapping data coverage].

**The AusSeabed Model Seabed Mapping Supply Chain (Graphic 2)**, is logical and is a useful benchmark reference to validate the mapping across of the range of 'activities', 'contributors', and 'industry linkages', [both for the purposes of the Seabed 2030 value chain and economic sector review work]. These are addressed in the proposed Seabed 2030 Value Chain (presented in section 4), and in the future task 3 (economic sector definition work).

In the AusSeabed study (P14), **Deloittes defines that the economic value of seabed mapping data is generated through four channels:** 

- I. Data production
- II. Data enabled industries (data users)
- III. Data enhanced industries (data users)
- IV. Non-market benefits

The distinction between these channels is useful to inform the estimate of the economic contribution. [This maps across well and informs the proposed Seabed 2030 Value Chain, where we have adopted:

- Seabed 2030 Data Producers.
- Seabed 2030 Data Users, including 'direct use', 'value add use', 'economic spillover' [use], whilst for Seabed 2030 purposes we propose the alignment of the value chain towards

identified, (and to be assessed and prioritised in the benefits analysis workstream), 'Economic Value' Sectors.]

#### SECTION FOUR: SEABED 2030 VALUE CHAIN DESCRIPTION

This section documents and describes the proposed Seabed 2030 Value Chain. This includes the value chain purpose, definition, and description by subsection below.

#### 4.1 Seabed 2030 Value Chain Purpose

The **key purpose of the Seabed 2030 Value Chain** is to provide a Value Chain 'model' for Seabed 2030 that can be used to (i) inform the ongoing Seabed 2030 benefit analysis activities, (ii) inform any future economic value analysis, and (iii) to be available to inform Seabed 2030 organisation operating model future evolution.

The **Seabed 2030 Value Chain brings together and presents** a value chain that combines seabed mapping data 'production' and 'use' supplemented with key 'Ancillary Services' as provided by the Seabed 2030 entity.

This approach merges a 'data ecosystem' based value chain with key organisational 'mandate' services that are associated with the enabling or generation of value in a single unified Seabed 2030 value chain.

The proposed Seabed 2030 Value Chain is tailored towards providing a strategic perspective and strategic level tool, as opposed to a tactical or technical operating perspective view and tool.

The Value Chain is presented, defined, and described in Section 4.2 below.

#### 4.2 Seabed 2030 Value Chain Definition and Description

This section presents the proposed Seabed 2030 Value Chain definition as developed by the benefits analysis workstream activities. The Seabed 2030 Value Chain Graphical View is presented below followed by key definitions and descriptions. The description is based on presenting a set of grounding principles behind the Value Chain design and are tailored to principles that can be used for the purpose of economic value assessment. Please note that further user context description details will be included in the value proposition document, to include and draw on seabed mapping use case details, that are to be produced in the follow-on benefits workstream activity task 6.4, 6.5, and 6.6.

#### Graphic 1: The Seabed 2030 Value Chain



#### Contributors:

# National Government agencies with Hydrographic responsibilities & interests.

# Industry. E.g., Hydrographic Survey and Marine/Maritime Infrastructure & Operations Service Providers. Also, enabling vessel and technologies

(equipment, hardware & software) OEMs.

#Scientific Programmes (direct and indirect).

#Philanthrophic exploration programmes (direct and indirect). #Crowd Sourcing / Citizen Science.

FCrowd Sourcing / Citizen Science.

Users include: Public, Private, NGO/INGO, Research & Academic Institutions, and Citizens.

#### Established Sectors:

# Marine & Coastal Fisheries & Aquaculture# Marine Science and Research# Marine & Coastal Tourism# Marine & Coastal Ecosytem Services# Oil & Gas# Climate Change# Shipping & Ports# Disaster Management & Disaster Risk# Cable & PipelinesResilience# Defence and Maritime Affairs (Safety and# Renewable Energy I - Offshore Wind EnergySecurity)# Renewable Energy II - Tidal and Wave

Science & Emerging Sectors -

The seabed 2030 value chain comprises value generating activities that build in sequence and are codependent and are a set of enabling value generating activities that can be considered and reflect Seabed 2030 mandate as an organisation. Grounding principles behind the Value Chain design include:

#### **Sequential Value Generating Activities:**

These include upstream data production (Producers) activities, and downstream Data Use (or Users) activities that generate value. Data Production (Producers) and Data Use (Users) are described separately in turn below.

**Data Production (Producers):** include seabed mapping data acquired and produced and to be made available for use as a specified product / service, compromising:

**#Prioritisation & Value:** including Seabed 2030 prioritisation of areas of the seabed to be mapped, and the benefits and economic value assessment activities with regard for attaining global ocean coverage of seabed mapping by 2030.

**#Data Collection**: including the collection / acquisition of seabed mapping input data (both enabled or facilitated by Seabed 2030 entity, and/or delivered through the Seabed 2030 partner community, (e.g., hydrographic survey data acquisition etc.)

**#Data Holding & Dissemination**: including the hosting and distribution of seabed mapping data for use, and in various formats as applicable.

**#Data Management**: including seabed mapping data management cross cutting all areas of data production. This is assumed to include data QC as an inherent function of data management.

Note data processing is not a Seabed 2030 entity mandate activity and typically resides in the Seabed 2030 partner community. Consequently, it is proposed this sits outside of the Seabed 2030 Value Chain and can be considered a delivery function supporting the production of seabed mapping wherever this resides in GEBCO community and/or wider contributor networks.

Contributors to Data Production and the enablement of Value Generated through Data Production activities include:

# National Government agencies with Hydrographic responsibilities & interests.# Industry. E.g., Hydrographic Survey and Marine/Maritime Infrastructure & Operations Service Providers. Also, enabling vessel and technologies (equipment, hardware & software) OEMs.

#Scientific Programmes (direct and indirect).

#Philanthrophic exploration programmes (direct and indirect).

#Crowd Sourcing / Citizen Science.

**Data Use (Users\*):** include any user of seabed mapping grid data (direct use (e.g., of published seabed mapping data in its readily available format) / indirect use (value add data processing) and economic spillover value generation, comprising:

**#Direct use of product**, including use of seabed mapping product in its unaltered form [Published Grid].

**#Value add production of product by third parties**, an indirect use of the seabed mapping data product, centred on the use of seabed mapping product use in an altered form [Published Grid+ processed / modified].

**#Economic spillover**, including non-market benefits, where the use or existence of seabed mapping results in value benefit being generated in other areas of the economy, areas of the economy away from the intended purpose or original use of seabed mapping.

\*Users include Public, Private, NGO/INGO, Research & Academic Institutions, and Citizens. Users can be grouped by sector which for the purposes of Seabed 2030 economic value assessment are grouped and presented as: **Established Sectors:** # Marine & Coastal Fisheries & Aquaculture # Marine & Coastal Tourism # Oil & Gas # Shipping & Ports # Cable & Pipelines # Defence and Maritime Affairs (Safety and Security) Science & Emerging Sectors: # Marine Science and Research # Marine & Coastal Ecosystem Services # Climate Change # Disaster Management & Disaster Risk Resilience # Renewable Energy I - Offshore Wind Energy # Renewable Energy II - Tidal and Wave

#### **Enabling Value Generation Activities:**

Towards the middle of the proposed value chain and at the point of intersection between data production and data use we see a set of key activities undertaken by Seabed 2030 that enable the generation of value. We are terming these Enabling Value Generation Activities.

These activities can be cross cutting the Value Chain, but primarily are positioned between data production producers (upstream) or 'supply' and data use 'users' (downstream). These activities reflect Seabed 2030 entity activities to enable and facilitate seabed mapping towards achieving global ocean coverage of seabed mapping by 2030. Enabling Value Generation activities include:

**#Enage & Collaborate**: including Seabed 2030 Engagement and Collaboration with the seabed mapping stakeholder community (including stakeholders involved in seabed mapping data provision and data use, and wider stakeholders such as those involved in seabed mapping investments and funding, and philanthropic organisations, among others).

**#Promote & Inspire**: including Seabed 2030 'promotion' of seabed mapping activities and the promotion of the Seabed 2030 mission, and 'inspiring' new and expanded use of seabed mapping e.g., in emerging sectors, among others, as well as 'inspiring' the finding of solutions to seabed mapping challenges (for instance the challenges associated in achieving global coverage seabed mapping data in time for 2030, and the global scale ramp up challenges this mission presents).

**#Brokerage**: including Seabed 2030 working towards and accommodating the needs of users to access, understand and be able to use seabed mapping data, as well as brokering in a financial sense, for example investigating, identifying, and pursuing new funding streams towards ensuring Seabed 2030 mission success.

**#Knowldge Base**: including Seabed 2030 provision of informing documentation and to be an industry point of reference as a source of knowledge on seabed mapping. For instance, this may include the provision of seabed mapping reference case study details, grounding evidence and generation of information guidance documentation on the use of seabed mapping and the Seabed 2030 mission.

**#Seabed Mapping Data [Grid]:** This is the supply of or provision of seabed mapping grid data to users.

#### **Objective-orientated Value Generation Activities.**

This area of the Value Chain represents the 'end result' or the 'key target areas for Value Generation' enabled by or supported be seabed mapping data. For the purposes of the proposed value chain at this time, and the Seabed 2030 WITS economic value assessment work these include:

#Target the use of Seabed Mapping Data for Key Socio-economic Impact.
#Evidence Marine/Maritime Policy.
#Enhance Marine Scientific Knowledge & Understanding.
#Promote Seabed Mapping Data for Use in Marine/Maritime Applications.
#Accelerate GEBCO Mission to map the Seabed by 2030.

This result / target set is not exhaustive and is to be expanded on through the value proposition development work [benefits analysis workstream task 6.6] and is to be aligned with other Seabed 2030 market-facing strategic messaging development work currently underway in amongst the Seabed 2030 management team.

#### SECTION FIVE: BENEFITS ANALYSIS WORKSTREAM COLLATION OF FINDINGS/RECOMMENDATIONS

This section provides a table of recommendations identified during the benefits analysis workstream Seabed 2030 Value Chain development work for carry across into the WITS Phase 3 wider seabed mapping benefits analysis delivery, and for Seabed 2030 ongoing reference / use as applicable.

There are 3 recommendations, all aimed towards the WITS Phase 3 ongoing benefits analysis workstream delivery activities.

Ref.ID	Recommendation	
1.	The Seabed 2030 Value Chain developed proposed is used to inform the delivery of the WITS Phase 3 benefits analysis workstream follow-on activities generally, and specifically for the economic sectors and use case production work - please see items 2 and 3 further below.	
2.	The Value Chain development activities identify users of seabed mapping map including: Public, Private, NGO/INGO, Research & Academic Institutions, and Citizens. The same diversity / range of users is recommended for use in the benefits analysis workstream economic value assessment work.	
3.	<ul> <li>benefits analysis workstream economic value assessment work.</li> <li>The Value Chain development identifies that users of seabed mapping map can be drawn from a wider range of marine / maritime sectors, including: [Established Sectors]:</li> <li># Marine &amp; Coastal Fisheries &amp; Aquaculture</li> <li># Marine &amp; Coastal Tourism</li> <li># Oil &amp; Gas</li> <li># Shipping &amp; Ports</li> <li># Cable &amp; Pipelines</li> <li># Defence and Maritime Affairs (Safety and Security)</li> <li>[Science &amp; Emerging Sectors]:</li> <li># Marine &amp; Coastal Ecosytem Services</li> <li># Climate Change</li> <li># Disaster Management &amp; Disaster Risk Resilience</li> <li># Renewable Energy I - Offshore Wind Energy</li> <li># Renewable Energy II - Tidal and Wave</li> <li>These identified sectors are recommended / proposed used in the identification seabed mapping economic sector definitions [the benefits analysis workstream task 6.3 activity], the identification of seabed mapping use cases [the benefits analysis workstream task 6.4 activity]), and generally in the wider seabed</li> </ul>	

#### **SECTION SIX: WITS PHASE 3 NEXT STEPS**

This report is the WITS Phase 3 benefits analysis workstream deliverable document on Seabed 2030 Value Chain. It is a guidance document and describes a proposed value chain for Seabed 2030. The value chain informs the Seabed 2030 benefit analysis / economic value analysis activities and is also available to inform Seabed 2030 organisation operating model future evolution.

The projects next steps are to progress with the Phase 3 benefits analysis workstream activities with a short-term focus on the definition / production of a set of Seabed 2030 Economic Impact Sectors, while continuing the seabed mapping benefit analysis use case production work.

The project Phase 3 benefits analysis workstream will close with the issue of the six deliverable documents that together represent the WITS Phase 3 benefits analysis workstream outputs. Together the documents also include a set of recommendations for Seabed 2030 consideration relating to Seabed 2030 benefits analysis and mapping area prioritisation.

## ANNEX 1: Seabed 2030 Data Centre Heads November 2022 Workshop Documented Value Chain (Providing a Tactical/Operational Perspective View Value)

A Seabed 2030 Value Chain Development Workshop was held in November 2022. These findings of the workshop were documented and collated to present a tactical / operational perspective view Seabed 2030 value chain, which has since been compressed back to provide a strategic level view Seabed 2030 value chain as presented in section 4 of this report.



Abbreviation	Term	Definition
<mark>To be added</mark>	To be added	To be added (TBA) as a single set from all phase 3 reports

#### **ANNEX 2: GLOSSARY / DEFINITION OF TERMS**

#### **ANNEX 3: REFERENCES**

Extensive referencing to Entity and data provider websites and content is used in this report with URL references provided throughout.