SARGASSO SEA COMMISSION

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Sargasso Sea Commission & NLA International Ltd

Governance of High Seas Ecosystems & Big Data

Virtual Workshop

to discuss progress & draft interim report

29 November 2021

Kevin Fleming & Kieran Bjergstrom

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Agenda

1. Report Purpose & Methodology
2. (Interim) Conclusions
3. Key Emerging Themes
4. Focused Questions
5. Next Steps

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Report Purpose & Methodology

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(Interim) Conclusions

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Kieran Bjergstrom

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(Interim) Conclusions (1)

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- The provision of contemporary good Ocean Governance and Technology underpinned by “Big Data/AI” are inextricably linked.
- The Technology exists today to generate suitably diverse, relevant, and sufficient ocean data. This “Big Data” can be analysed using Artificial Intelligence to:
  - Generate the necessary understanding of the relationships between human activities and their impact on the complex ocean biological and environmental ecosystems.
  - Provide compelling evidence to establish the need for good Ocean Governance by informing decision-makers responsible for creating good Ocean Governance policies.
  - Generate convincing, near-real time, maritime domain awareness to enable enforcement of human-related activities and where appropriate underpin subsequent judicial action.
  - Provide suitable Measures of Effectiveness of in-place Ocean Governance policies to allow for subsequent review, revision, and release.

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(Interim) Conclusions (2)

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- A consistent barrier to justifying and implementing ocean governance is data availability, quality and utility.
  - Establishing a Big Data picture is part of building the evidence necessary to justify policy. This is currently unnecessarily challenging and costly.
  - Effective data cataloguing and sharing is the first step towards a solution, and a pre-requisite for the use of AI, and even broader traditional models.
  - There are a variety of technical and non-technical barriers to data sharing and utility.
    - Technically ocean ecosystem data needs to be standardised across disciplines and collection methods, especially regarding meta-data, data format, metrics of certainty, temporal information, depth regimes, and ocean spatialisation/gridding. This is to make data sharable, interoperable, and comparable.
    - At a human level there are access issues; data availability should be as close to ubiquitous as possible. Data needs to be interpretable to domain experts, not data scientists. Lastly, data quantity is vast – knowing what to use is a major challenge.
  - Data sharing and analytics platforms, combined with a drive for open data, is foundational to technologization.

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(Interim) Conclusions (3)

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- A key challenge of is building trust in new solutions. This is especially the case for data and AI, which carry the risk of translating bias of numerous forms, and can lack intuitive methods for verification and validation.
- Data (and information) trust is an old issue, it is important but well understood.
  - Technically, trust is established through peer review and validation by neutral experts.
  - National (and sectoral) rivalries can be an issue in data trust; this is best circumvented by independent entities leading in data collection, and by example in demonstrating solution acceptance.
  - Those who have a hand in producing data tend to trust it. Co-operation is key to acceptance, whether between institutions and nations, or through distributed methods of data collection such as platforms of opportunity.
- Establishing trust in black-box methods, such as most AI analytics, invokes its own issues.
  - There are two core, related, problems: It is not possible (or feasible) to view the core workings of a black-box system, and the processes within may not be deterministic.
  - Black-box test, verification, and validation is a mature domain, with multivariate solutions.
  - Designing for trust and for verification is paramount; systems should not hide malbehaviour.
- Trust needs to be built alongside solutions, working towards hybrid systems with fall-backs and fail-safes.

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Key Emerging Themes

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Key Emerging Themes

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- Ocean Governance: Needs and Barriers
- Enabling *policy formulation* through technology: data -> evidence
- Enhancing *governance and enforcement* through technology: data -> evidence
  - Remote sensing
  - “Big Data” and AI

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Understanding Ocean Governance

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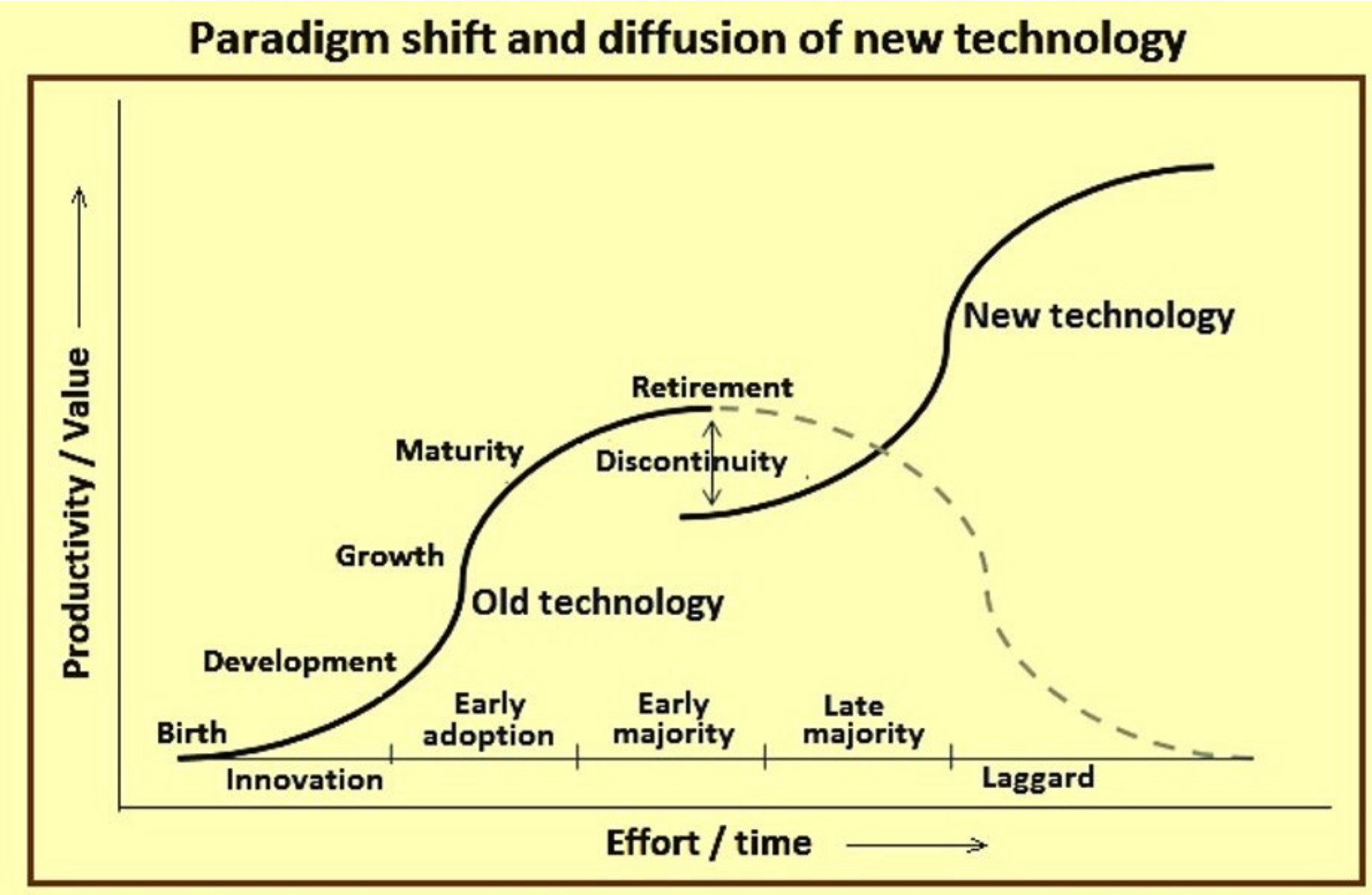
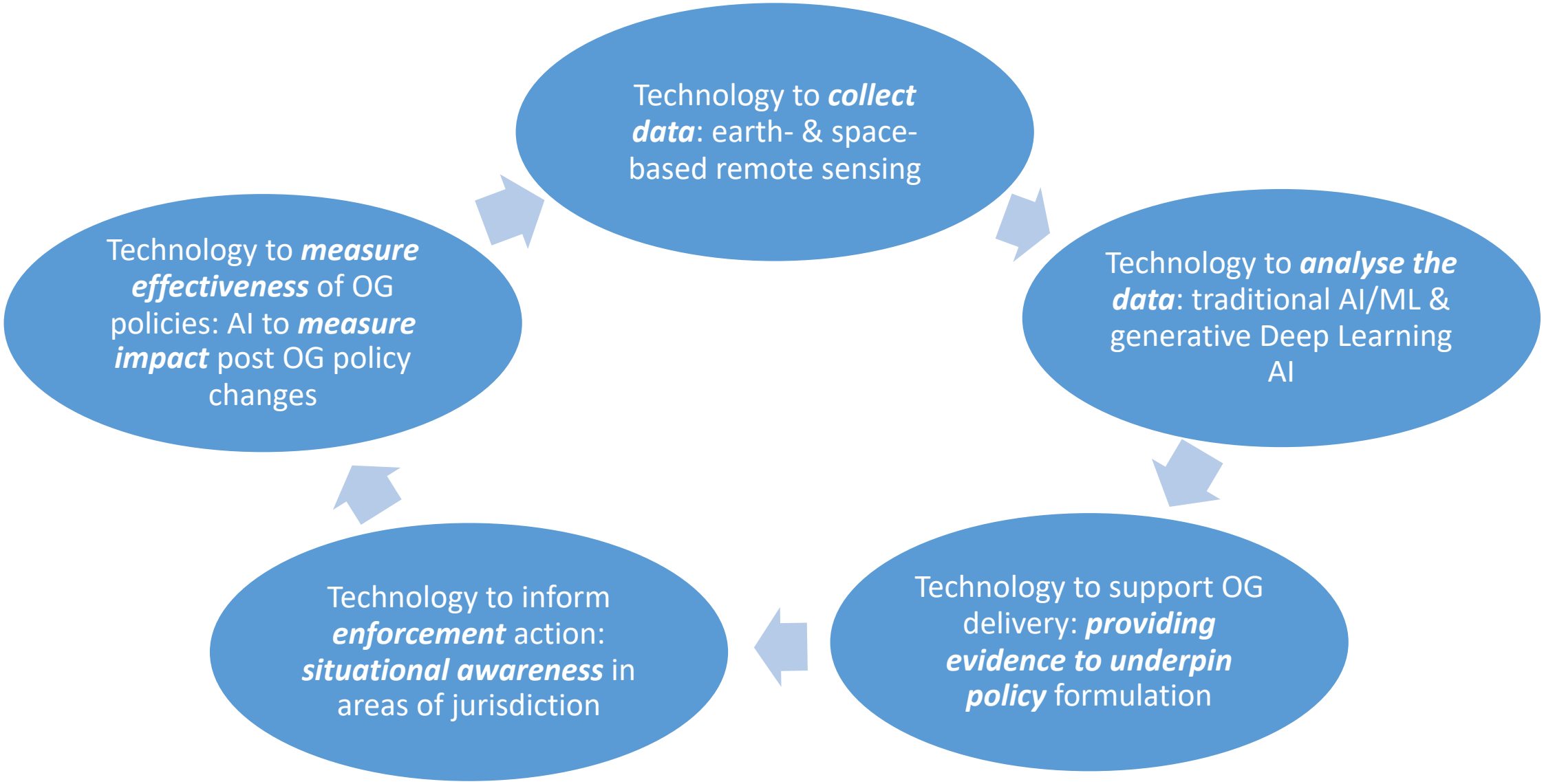
- Consultation through questionnaires and interviews to establish a definition of Ocean Governance for the current stakeholder group.
- *Ocean governance is a strategy used to manage human activities in an ocean towards sustainable use and ecological regeneration. It is informed by, and includes, a whole range of economic, scientific, ecological, and financial activities and policies, covering all activities in the ocean space, at local, regional, national, and global levels. The process of establishing governance is granular, transparent, consultative, and ultimately evidence based. Ocean governance necessarily involves action, response, and enforcement, requiring physical implementation at the lowest level, typically for remote sensing and responsive enforcement.*
- Appetite for governance in the high seas for several reasons:
  - Problems that start outside of EEZs can migrate inside.
  - Inequity between those with global and local reach.
  - Vital ecological issues, growing in scope increased industrial use of the oceans.
- Technology fulfils four roles: Establishing the evidence for policy; Enabling and implementing scientifically justified management; implementing and enhancing enforcement; and deepening ecosystem understanding.

Paradigm shifts, policy, and technology

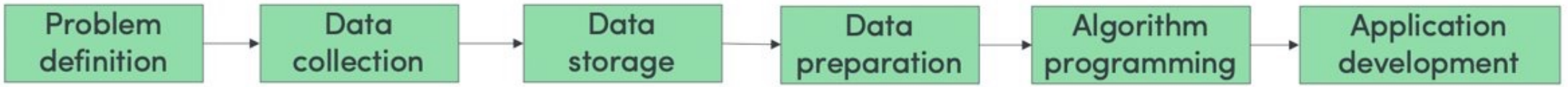


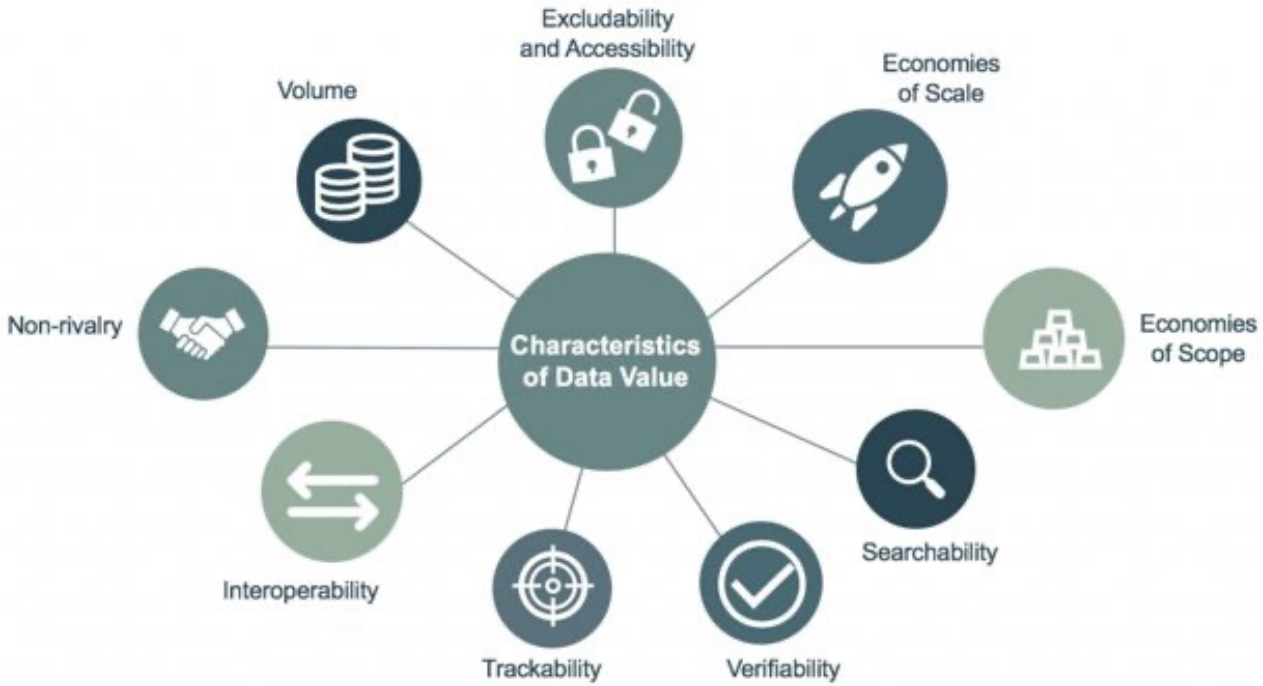
Technology-enabled cycle to create and sustain good Ocean Governance

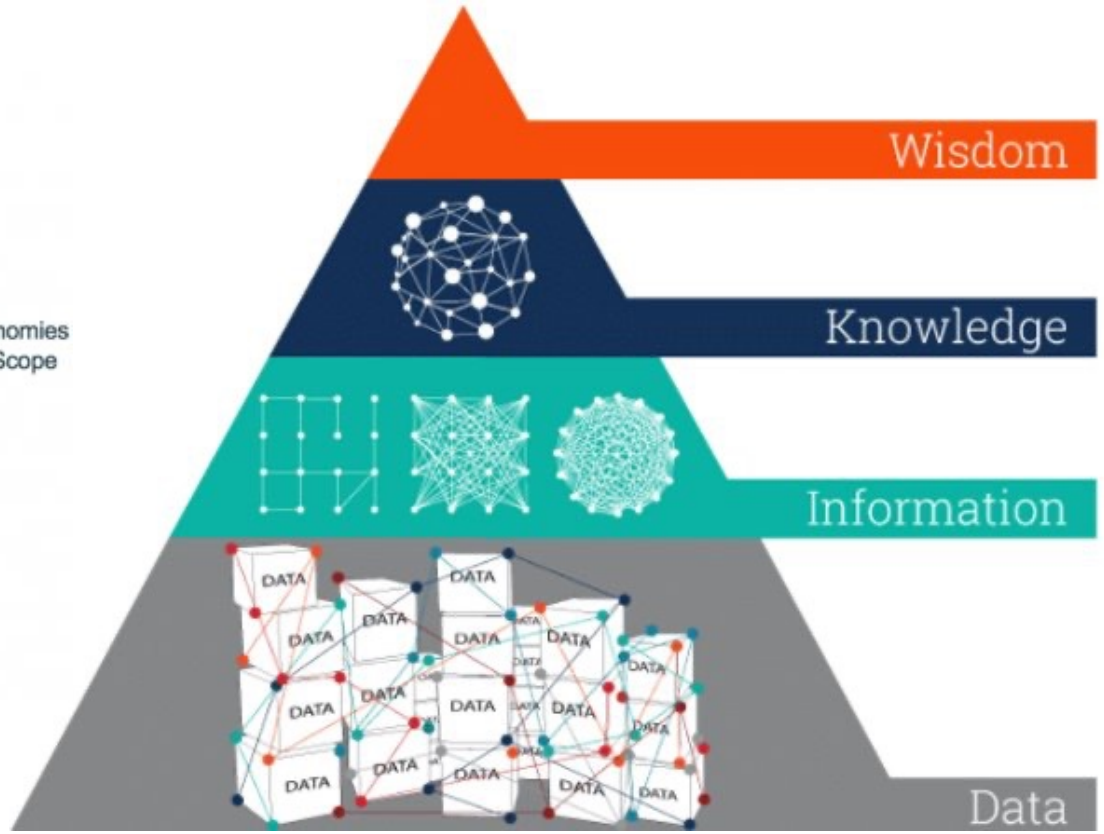


The value and utility of data

The machine learning value chain







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Focused Questions

Kieran Bjergstrom

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Focused Questions

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- Explore some of the topics and themes introduced in this session
- Guide the final draft, especially the conclusions and recommendations
- Link current thinking to next steps

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Focused Questions

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- To what extent does the Ocean Governance community want to be:
  - Technology Innovators
  - Technology Implementors
  - or End-Users?

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Focused Questions

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- If co-operation is a key path to trust:
  - Are we good at it?
  - How does it look for technologized governance of the Sargasso Sea?
  - Whom does it involve (or not)?

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Focused Questions

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- How do we prioritise? E.g.,
  - Addressing human activities vs ocean biology, physics, and climate?
  - Sensor development and deployment vs. AI and analytic tools?
  - New/more data vs. Consolidation and sharing?
- To what extent do we need to prioritise, and are any of these in conflict?
- What does the development roadmap look like?

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Focused Questions

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- AI and Big Data driven regulation could be dynamic, responsive, and targeted, based on continuous learning, evolving, and understanding. How beneficial would this be? What problems would it introduce?

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Focused Questions

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- What are the right next steps?

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What we would like you to do now …

Kevin Fleming

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Thank you so much for your time!