Preparing National Science Ecosystems for AI – the Policy Perspective

ISC Centre for Science Futures

26 January 2025 | Muscat, Oman

About the Centre for Science Futures

An ISC in-house think tank to explore where science and its organization are taking us in the future.

Launched in May 2023

The Centre serves the ISC, its members, and the global scientific community by:

- Carrying out analytical work, and compiling resources
- Shaping necessary discussions on the future of science
- Providing options and tools for appropriate action

Advisory Council

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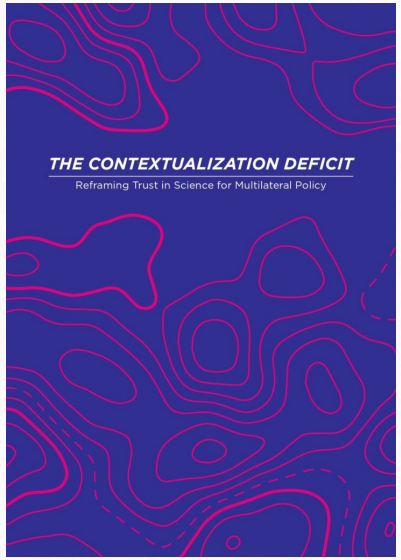
About the Centre for Science Futures

Projects



Science Fiction and Science Futures: podcast series

Science Systems Futures – March 2024-March 2027

1. Preparing National Science Ecosystems for AI - 'AI for Science'
2. Emerging technologies and transformations
3. Digital Journeys
4. STI – Industry relations

IDRC · CRDI
International Development Research Centre
Centre de recherches pour le développement international

Canada

Workshop goals

1 | For the Centre to hear inputs from country representatives and exchange openly on current developments on AI and its implication on science and research in respective countries.

2 | Provide feedback on the results from the Centre working paper and provide guidance on its further development. The workshop will feed directly into the third version and conclusions of the project.

3 | Create, strengthen and enlarge the network of experts on AI including in the Middle East and North Africa for the Science Systems Futures project.

4 | Provide networking opportunities in the region on AI for science and research if not already existent.

Workshop format

- Participation of all is important
- Chatham House Rule
- Free exchanges (notes but no minutes)
- Recording

Program

No	Time	Agenda item	Lead/chair (TBC)
1	9:00	**Welcome and round of introductions** 1. Opening by Vanessa McBride including goal and structure of the day. 2. Brief presentation about AI concept and definitions. (5 min) by David Castle 3. Round of introductions by the participants, including highlights of countries' achievements and challenges (5 minutes max., no slides).	Chair: Vanessa Speaker: David Moderator: Dureen
2	10:30	**Presentation of the ISC Centre for Science Futures, AI for science project and Science Systems Futures:** Centre paper: "Preparing National Research Ecosystems for AI: strategies and progress in 2024" (by David Castle, Vanessa McBride, Dureen Eweis)	Chair: Vanessa Speaker: Dureen
	11:00	**Break**	

Program

No	Time	Agenda item	Lead/chair (TBC)
3	11:30	**Theme 1: Research funding, skills and infrastructure** AI (and ML) have been part of scientific R&D for many decades, but recent advances and publicity are reshaping national priorities. How are national R&D agendas responding as they assess technologies and develop strategy? Many questions arise about what impact AI is having, or is anticipated to have, for example: impact on funding practices, the need for capacity building and infrastructure; research securing considerations; priority sectors for AI uptake, and international collaboration.	Chair: David Moderator: Vanessa/Dureen
5	13:00 – 1400	**Lunch**	
6	14:10-15:30	**Theme 2: Methods and practice of science** AI is anticipated to have impact on the methods and practice of science. Some impacts are anticipated to have both positive and potentially negative impacts on how science is organized and conducted. What are the likely impacts on scientific integrity in terms of commission of fraud, fabrication and plagiarism, but also detection and resolution of claims of misconduct? Are scholarly publications likely to be affected and how? What new oversight and accountability frameworks are likely needed? How will the scientific workforce be most affected, both positively in terms of efficiencies and acceleration of science, but also negatively through workforce reduction?	Chair: David Moderator: Vanessa/Dureen

Program

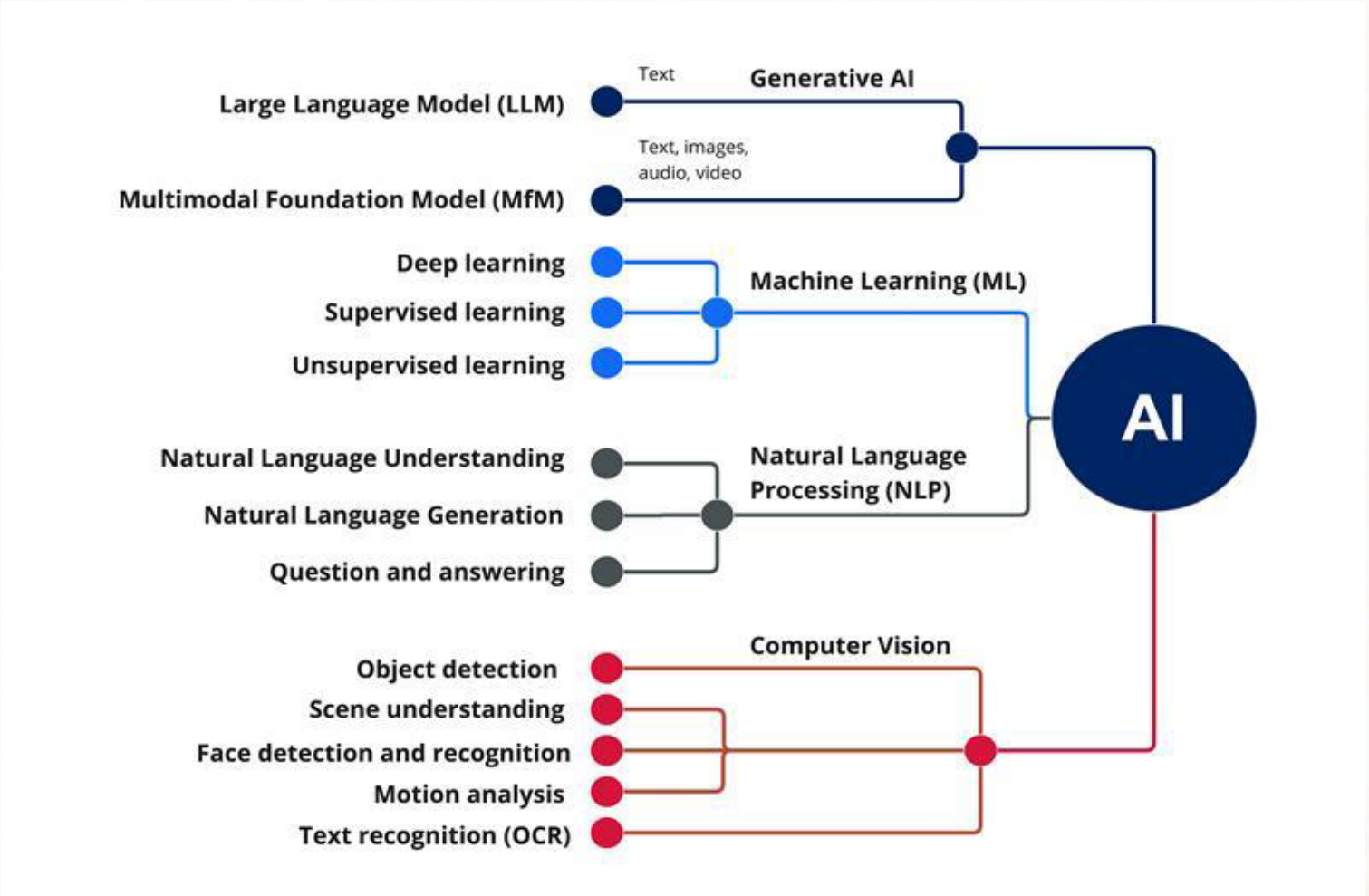
No	Time	Agenda item	Lead/chair (TBC)
	15:30	**Break**	
7	15:45	**Theme 3: Policy and regulation** Many countries are already considering or implementing regulations to address concerns about AI. These will impact scientific practice if regulations, technical and design standards, and private sector governance and self-regulation become realities. What should we anticipate about data quality, data management, the potential for policy and regulatory impact on science, and the consideration of national and international standards to address the aspects of AI?	Chair: David Moderator: Vanessa/Dureen
8	16:45	**Wrap up and next steps** Key takeaways from the discussions; what are the priorities, major challenges and immediate next steps	Vanessa
	19:00	**Dinner – Invitation to all workshop participants**	

Proposed AI Definition for this workshop

OECD AI Principles overview:

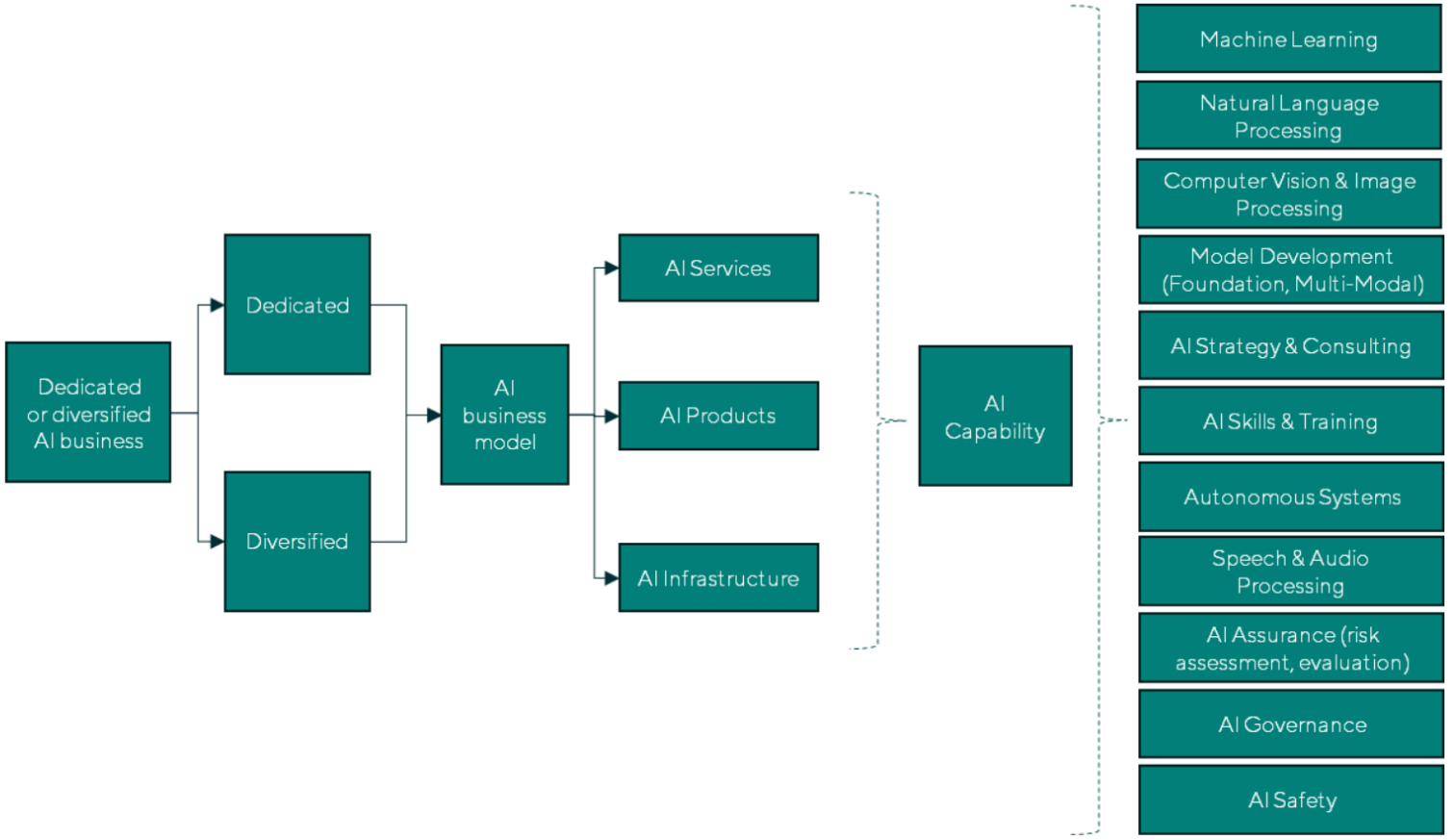
AI “is a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical real or virtual environments. Different AI systems are designed to varying levels of autonomy and adaptiveness after deployment.”

Proposed AI Definition for this workshop



Proposed AI Definition for this workshop

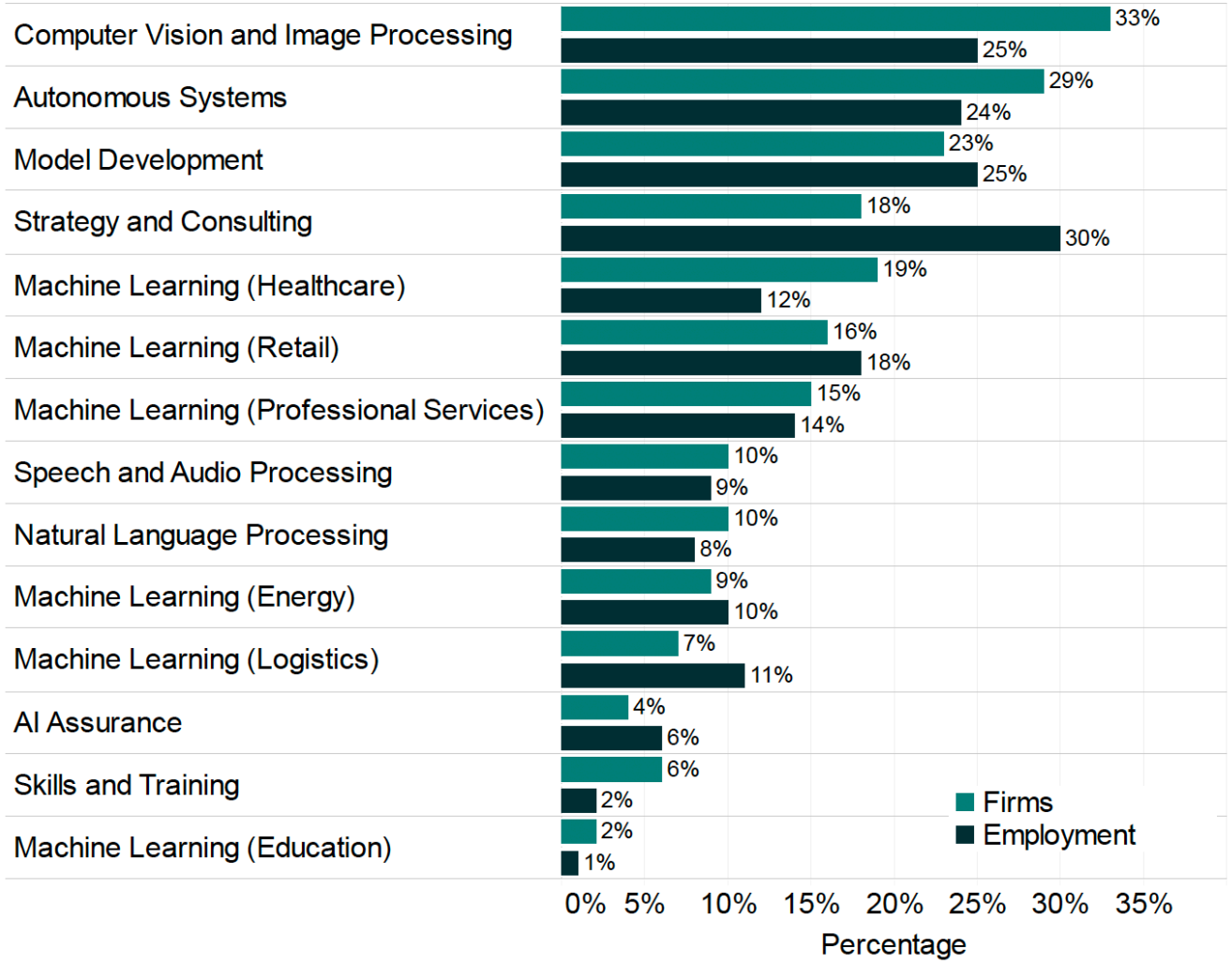
Figure 2.1 – UK AI Taxonomy



Source: Perspective Economics

Proposed AI Definition for this workshop

Figure 2.7 – AI Capabilities



Round of introductions

- Affiliation and how you are involved in preparing your country's research ecosystem for AI
- What you regard as your country's achievements in integrating AI in science thus far, as well as the challenges and bottlenecks
- What are the next steps?

Paper: Preparing National Science Ecosystems for AI – strategies and progress in 2024

ISC Centre for Science Futures

Preparing national research ecosystems for AI

Goals of the project

- Help shape a discussion among the international scientific and policy communities on the critical issues that AI raises for the organization of science and research
- Gather basic knowledge and information about the issues, and the countries' efforts to prepare science and research systems for AI (literature review and country case studies)
- Help countries as they develop roadmaps for the uptake of AI in their science systems
- Create regional and global networks of people involved in the reflections on adaptation and implementation of AI for science

Preparing national research ecosystems for AI

THEME 1: R&D agenda setting, technology assessment, foresight and science advice

- FUNDING PRACTICES
- CAPACITY BUILDING AND RETENTION
- PRIORITY SECTORS
- INFRASTRUCTURE

THEME 2: Public engagement, science communication and public accountability

- SCIENTIFIC INTEGRITY IN THE CONDUCT OF RESEARCH
- ENVIRONMENTAL IMPACT
- SCIENTIFIC PUBLISHING

THEME 3: Regulation, standards, private sector governance and self-regulation

- DATA QUALITY
- DATA MANAGEMENT AND GOVERNANCE
- DATA STANDARDS
- LAW, REGULATION AND POLICY

Preparing national research ecosystems for AI

Countries included in v1:

- Australia, Benin, Brazil, Cambodia, Chile, China, India, Malaysia, Mexico, Oman, Uruguay, Uzbekistan

Countries included in v2:

- Colombia, Dominican Republic, Palestine, Panama, Pakistan, South Africa.
- Updated case studies: Australia, Brazil, China, Malaysia

Value of versioning --> Version 3 by June 2025

Preparing national research ecosystems for AI

KEY LEARNINGS

- Countries at different levels, from leading development to observation.
- Priority industries included agriculture, healthcare and education
- Variety of sectors mentioned by authors signals country-specificity and versatility of AI for science
- Many nations focus their AI efforts on a few specific areas. Challenges of addressing all the dimensions required for holistic AI development.

Challenges:

- Understanding data needs for AI for Science
- Sustainability in AI adoption

Preparing national research ecosystems for AI

NEXT STEPS

AI for Science

•Clarification papers

1.Types of AI for Science
2.AI and Sustainability
3.Data for AI in Science

•Project timeline

- Regional workshop in Muscat, Oman – 26 January 2025
- Publication of version 2 of the paper – 12 February 2025
- Consultations for version 3 of the paper – February 2025
- Development of clarification papers – February 2025
- Publication of version 3 of the paper – May 2025
- Publication of clarification papers on AI for Science – July 2025

Science Systems Futures

1

AI FOR SCIENCE

Understand how AI is transforming STI systems, and how countries, particularly in the Global South, can take advantage of them.

Outputs: Consultations, regional workshops and working paper + clarification papers.

2

EMERGING TECHNOLOGIES AND TRANSFORMATIONS

Shaping necessary reflections on the next wave of critical transformations for STI systems globally and their possible impact in the Global South.

Outputs: Strategic Retreat, preparation and outcome documents

3

DIGITAL JOUNRYES

Gathering knowledge and experience about effective and impactful support of Global South STI actors in pursuing digital maturity.

Outputs: digital strategy and vision, training programme, capacity-building of participating stakeholders.

4

STI – INDUSTRY RELATIONS

Establishing a reflexive community of practice between public and private STI organizations focused on emerging technologies and identifiying of practices leading to science as a global public good.

Outputs:

SUMMARY

Theme 1: Fundings, skills & infrastructures

- Challenges of getting governments to invest
- Use cases can be powerful motivators
- Regional groups can provide a benchmark for individual countries
- Individual country investment essential to drive the agenda
- “Data is the oil of AI”
- Mobility programmes to upskill across the regions
- Is infrastructure in situ required, or are there more innovative solutions such as federated clouds, edge learning for the region?
- Issues around open data, research security and national and international considerations
- Need for standards to maintain data quality, protection for AI

SUMMARY

Theme 2: Methods and practice of science

- AI will be used as a tool in teaching and research
- Should be accommodate by rethinking assessment and evaluation
- AI to be used in more efficient research management
- AI is a tool for productivity. Scientific integrity maintained through keeping a record of the use of AI in science.
- PRINCIPLE: no outsourcing of critical thinking and creativity to AI
- IP issues and legal personality of AI may become contentious issues in the short term

SUMMARY

Theme 3: Policy and regulations

- Need for holistic guidelines and high level principles to guide AI design, development, use and regulation
- Agile regulations due to rapid changes/evolution of AI
- Ethical training of AI and development of ethical AI
- Future and forward looking regulations that not only focus on today's use or understanding of AI
- Need to involve all stakeholders including non-computer science/IT (philosophy and social sciences and humanities)
- International standards for data and AI
- Regional collaboration to safeguard culture and societal needs

CENTRE FOR SCIENCE FUTURES

International Science Council

حوار المعرفة العالمي مسقط

Muscat Global Knowledge Dialogue

Thank you!

Contact us at **csf@council.science**