Innovating Like Silicon Valley in Asset-Intensive Industries

A Research Proposal

THE CENTRE FOR FUTURE ENTERPRISE

1. The Innovation Challenge Facing Asset-Intensive Industries

Practically every industry benefits to some degree from technological innovation, but innovation-related processes happen very differently in different sectors. So-called low- and medium-technology industries—a category that typically includes asset-intensive industries like mining, energy, and railways—often struggle to behave in ways that lend themselves to the development and deployment of novel technologies. Asset-intensive sectors frequently take decades to adopt promising innovations that are readily absorbed and applied by other industries in a fraction of the time (Hirsch-Kreinsen, Hahn, & Jacobson, 2008; von Tunzelmann & Acha, 2006).

This difference is especially pronounced in Australia, where asset-intensive sectors represent more than 20 per cent of the economy (Australian Trade Commission, 2023). Policymakers and the media have tended to concentrate disproportionately on the approximately 8% of the Australian marketplace that is high-tech (Australian Trade Commission, 2023) [1], but less attention is often paid to how innovation happens throughout the asset-intensive sectors that play an outsized role in the country's economic output, thereby contributing to Australia lagging behind other nations in several innovation-related metrics (e.g., McDuling, 2017).

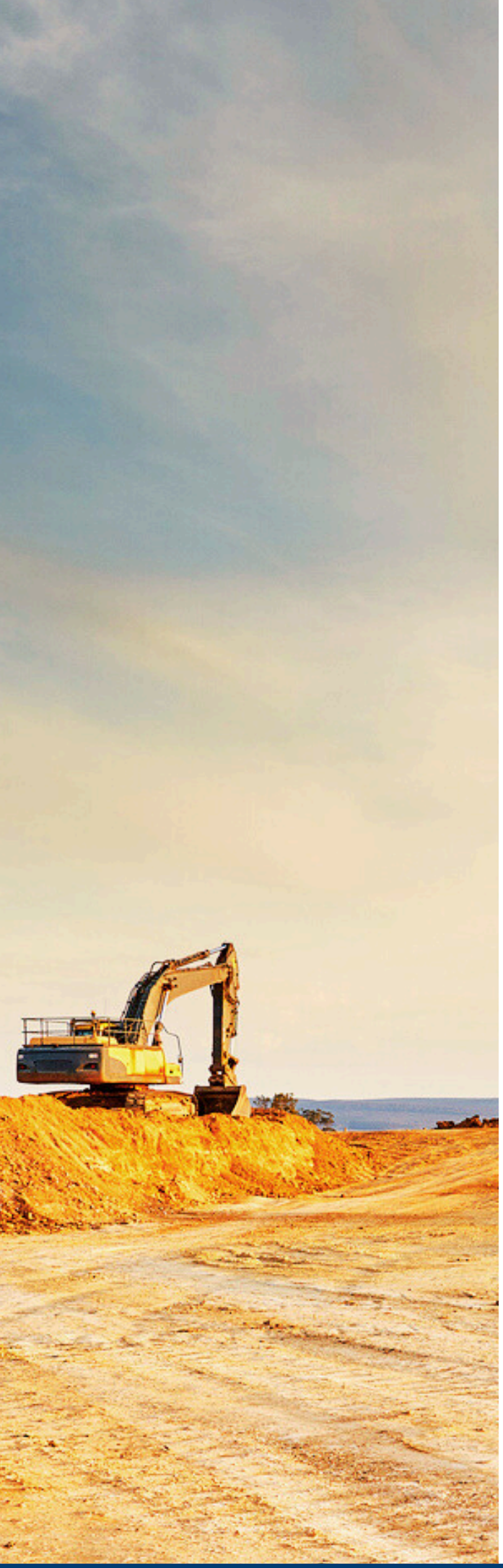
Things can't stay that way, however. Whereas innovation may have been a nice-to-have feature in the past, these sectors are now facing huge challenges—like, for example, the meteoric rise of digital technologies (Maroufkhani, Desouza, Perrons, & Iranmanesh, 2022), the need to mine unprecedented quantities of ores (Ali et al., 2022), or the imperative to reduce the carbon footprint of the world's energy systems (Perrons, 2021)—that leave little doubt that innovation will be mission-critical in these sectors' future. In short, asset-intensive industries need to learn how to innovate with the same sense of urgency that Silicon Valley does.

2. Proposed Research Project

Several research initiatives in the past have successfully unlocked how one industry's secrets for excellence can be modified and adapted so that they can be effectively used in other sectors (e.g., Henderson & Newell, 2011; Murman et al., 2016). By carefully studying and deconstructing the organisational tools and behaviours that deliver a culture of innovation at Silicon Valley giants like Google, Amazon, IBM and Intel, and then translating them to become appropriate for the targeted sectors, this research project aims to give Australia's asset-intensive industries the tools and strategies that will allow them to innovate more aggressively, effectively, and quickly. In so doing, this project will offer a fresh approach to improving innovation in foundational parts of the Australian economy.

This three-year research program is intended to begin in 2025 and conclude in 2028, and will essentially consist of three phases that each last approximately one year.

[1] This 8% was calculated by dividing the $167 billion (the fraction of the Australian economy classified by the Commonwealth Government as being in the "technology sector" on p. 21 of the report) by $2.2 trillion, the total size of Australia's Gross Domestic Product (p. 8).



Phases of the research program

YEAR 1 | Mapping Innovation Environment and Current Processes in Asset-Intensive Industries

Based on a review of current practices and interviews with key stakeholders, this phase would give us a deep understanding of how innovation-related practices currently happen within these sectors and the environmental factors that shape why they do what they do.

Both of the Chief Investigators leading the project have considerable experience with researching innovation processes in these industries (e.g., Maroufkhani et al., 2022; Perrons, 2014), but this phase would provide an up-to-date understanding of current challenges and issues facing these sectors.

YEAR 2 | Mapping Innovation Environment and Current Processes in Silicon Valley Organisations

This phase would entail a careful deconstruction of innovation processes in digital giants like Google, Amazon, IBM and Intel to understand the organisational designs, cultural elements, tools, and deployment strategies that deliver their famous innovation successes.

Study tours will be arranged for designated individuals from participating asset-intensive organisations. Participants will have the opportunity to visit collaborating Silicon Valley companies to meet with innovation leaders and see in person how innovation-related processes happen differently in that sector.

YEAR 3 | Translation and Embedding the Tools

Asset-intensive industries clearly aren't just like those found in places like Silicon Valley. So how would the innovation principles distilled in Silicon Valley need to be modified in order to be deployed in Australia's asset-intensive sectors?

This phase of the project will be focused on translating the lessons learned from Silicon Valley so that they can be effectively installed in the target industries. Beyond merely reporting what the new tools and approaches should be, this phase will also include working closely with the target industries to ensure that the tools and know-how are embedded in a way that takes root permanently.

3. Deliverables and Outputs

This project would usefully extend the innovation management tools available to practitioners within asset-intensive sectors while also advancing the theoretical underpinnings of this area. These objectives would be achieved in three ways:

TRAINING TOOLS

Practitioner-focused publications, how-to videos, training, executive coaching, and change management tools, enabling participating organisations to successfully apply and embed the developed skills and tools.

Both of the project's Chief Investigators have significant experience consulting and working with a broad range of organisations, and are seasoned hands at helping your organisation to make use of the project's findings.

EXTENSION OF ISO STANDARDS 56,000

ISO standards have been put together for asset management (ISO 55,000) and innovation management (ISO 56,000). What is missing, however, is a body of ISO-endorsed guidelines for innovation management that reflect the specific challenges and constraints often faced by would-be innovators in the asset-intensive domain.

This project will fill this gap by providing a focused subset to the recently authored ISO 56,000 standards.

SCHOLARLY PUBLICATIONS

Publications that extend the theoretical dimensions of this domain. Research questions that will be investigated will include:

- An improved schema for characterising high/medium/low technology environments that more faithfully reflects the fact that, in real-world organisations, "firms in all sectors depend on a mix of technologies of many vintages" (Robertson, Smith, & Von Tunzelmann, 2009, p. 445).

- Deepening our understanding of the processes through which more successful innovators in the low- to medium-technology space have reaped better rewards from their innovation-related activities than other organisations (Robertson et al., 2009, p. 445).

4. Collaborate with us

We invite you to join this collaborative research project.

The Australian Research Council (ARC) offers a Linkages funding scheme that allows funding from partner organisations to leverage additional funding from the Federal Government. Every dollar from partner organisations can leverage up to four dollars from the ARC. Contributions are eligible for the AusIndustry R&D tax concession, allowing deductions of up to 124% of qualifying expenditure incurred on R&D activities. In exchange for financial and in-kind support over three years (2025-2028), QUT offers access to intellectual property and commercialisation opportunities resulting from research and development.

How would a budget like this work?

For a total cash research budget of up to $360,000 per annum, three partners could each contribute $30,000 cash per annum and $50,000 of in-kind contributions. With these partner investments, the ARC cash contribution would add up to $240,000 per annum.

5. Project Partners

This research project is led by the Queensland University of Technology (QUT) and the Asset Institute. The Asset Institute began its operations in January 2014 as the successor of CIEAM, a ten-year Australian cooperative research centre focused on infrastructure and asset management. Due in large part to CIEAM, Australia has become a world leader in asset management innovation, and the Asset Institute now plays an important role in supporting and deepening the country's expertise in this area.

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Prof. Robert K. Perrons

Prior to joining QUT in 2011, Rob worked in a wide variety of roles and locations for Shell International's Exploration & Production division. He started his career in Shell's Strategy & Economics team in 1997, and then worked for several years as a production engineer in the company's overseas operations (offshore and onshore). He then left Shell for three years to work as an Industrial Research Fellow at the University of Cambridge, but re-joined Shell again in 2004 to become the company's Executive Coordinator of Global Research & Development in The Hague.

He has a B.Eng. in mechanical engineering from McMaster University in Canada, a Master's degree in Technology & Policy from the Massachusetts Institute of Technology (MIT), and a PhD in engineering from the University of Cambridge, where he was a Gates Cambridge Scholar. He is a Fellow of both the UK's Institution of Mechanical Engineers (IMechE) and Engineers Australia, and is chartered as a Eur. Ing. in Europe. Additionally, he serves as an adviser to Unearthed Solutions, EnergyLab, and several energy and resource sector technology startups around the world.

Rob was named as a Fulbright Scholar in 2020, is a member of the United Nations Resources and Energy Expert Group, and serves the Australian Government on an ad hoc basis as a member of their Expert Network to advise on matters related to innovation and emerging technologies in the energy and resource sectors.

Prof. Kevin C. Desouza

Professor of Business, Technology and Strategy in the School of Management at the QUT Business School. He is a Non-Resident Senior Fellow in the Governance Studies Program at the Brookings Institution, and is a Distinguished Research Fellow at the China Institute for Urban Governance at Shanghai Jiao Tong University. He has held tenured faculty appointments at the University of Washington, Virginia Tech, and Arizona State University. In addition, he has held visiting appointments at the London School of Economics and Political Science, Università Bocconi, University of the Witwatersrand, and the University of Ljubljana.

Desouza has authored, co-authored, and/or edited nine books. He has published more than 130 articles in journals across a range of disciplines including information systems, information science, public administration, political science, technology management, and urban affairs. A number of outlets have featured his work including Sloan Management Review, Stanford Social Innovation Research, Harvard Business Review, Forbes, Businessweek, Wired, Governing, Slate.com, Wall Street Journal, USA Today, NPR, PBS, and Computerworld. Desouza has advised, briefed, and/or consulted for major international corporations, non-governmental organisations, and public agencies on strategic management issues ranging from management of information systems, to knowledge management, innovation programs, crisis management, and leadership development. Desouza has received over $1.8 million in research funding from both private and government organisations.

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