MONASH University

University-led mission-oriented research and innovation

A Framework for catalysing large-scale transdisciplinary research

Monash University continues to acknowledge that its main campuses are located on the unceded lands of the Kulin nations and that we live and work on the unceded lands of other Indigenous Nations within and outside Australia and pay their respects to Elders past and present. We recognise their enduring leadership, knowledge systems, and strength in caring for Country for countless generations.

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A note on terminology

In this Report, we use the terms *mission-oriented* and *challenge-led* research interchangeably. We are using the term 'mission' in its contemporary form in the way it is used in mission-oriented innovation theory and practice (see: Section 2). The authors acknowledge the historical use of the term 'missions', especially in the Australian context of colonisation, hence also use challenge-led research in some instances. This is a complex and ongoing discussion about terminology, research impact and power asymmetries in the global knowledge hierarchy. We continue to critically explore the language we use; this reflects the iterative process of the framework and is intended to be an interactive and ongoing process. This is an open conversation we continue to have as we explore this way of thinking by working with and celebrating Aboriginal and Torres Strait Islander peoples, culture and knowledge.

We deliberately use the term *'trans*disciplinary' research in this Report, rather than interdisciplinary or multidisciplinary. Transdisciplinary research approaches seek to transcend disciplinary boundaries, integrating diverse perspectives and knowledges into a unified framework to address complex problems. This goes beyond *multi*disciplinary approaches (which involve multiple disciplines working independently on a common problem, each contributing insights from their own specialised perspective) and *inter*disciplinary approaches, which integrate insights from different disciplines to address a problem. Importantly, transdisciplinary research always involves non-academic partners and stakeholders throughout the research cycle as meaningful collaborators.

Executive summary

In response to the growing calls for universities to play a more proactive role in addressing societal challenges, this Report presents a framework for encouraging mission-oriented research and innovation initiatives within university settings.

Missions are characterised by their bold ambition, problem-driven and solutions-oriented focus, and explicit, time-bound impact goals, undertaken through deep, sustained partnerships with academic and non-academic stakeholders. Most scholarship and practice has focused on government-led missions and industrial policy.

This Report fills a gap in scholarship and guidance on the roles of universities in catalysing and stewarding mission-oriented initiatives. It explores the opportunities and constraints of university research ecosystems to catalyse, lead, and steward missions with the aim to support and guide others embarking on university-led challenge research initiatives. It shares empirical insights and lessons learned and gathered from an in-depth analysis of 12 case studies spanning 15 years at Monash University.

By sharing empirical insights and best practices, our aim is to support and guide others embarking on university-led challenge research initiatives.

A Framework for catalysing university-led mission-oriented research is presented. The seven elements include: (1) research excellence and impact; (2) transformational leadership; (3) external partnerships and consortia; (4) an entrepreneurial spirit; (5) institutional supports and innovation; (6) tiger teams to deliver; and (7) thinking and working politically. Rather than a simple step-by-step 'how to' guide, the Framework with its interconnected seven elements seeks to strengthen systems, cultures and capabilities — at a range of levels — for responsibly growing university-led research missions. Furthermore, the Framework offers a typological schema that categorises mission-oriented endeavours into four main types — discovery, practice, policy and community — reflecting there is no 'one size fits all', with a diversity of drivers aligned with the specific nature of the problems and potential solutions evident.

The tensions and challenges inherent in implementing mission-oriented research within university settings are also explored. Challenges include providing transition phase support, enhancing delivery capabilities, offering effective stewardship of partnerships, and aligning academic workloads with mission activities. Addressing these challenges necessitates the evolution of organisational structures and systems, the implementation of talent development initiatives, and the adoption of innovative approaches to external partnerships.

The Framework offers a tool for university leaders, administrators, academics, research staff, funders, and policymakers who are embarking on university-led challenge research initiatives or seeking to navigate the complexities of advancing mission-oriented endeavours. Furthermore, this Report contributes to the scholarly discourse surrounding mission-oriented research and innovation, shedding light on the roles of universities and their researchers within the innovation ecosystem and the opportunities to address sectoral and societal challenges in tandem with fundamental discovery-driven research.

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1. Introduction

Over the past three decades, 'grand challenge' research and innovation approaches have emerged as catalysts for addressing wicked societal problems. This paradigm, often referred to as 'challenge-led' or 'mission-oriented' research, prioritises ambitious goals aimed at tackling significant societal challenges such as mitigating and adapting to climate change, reversing biodiversity loss, addressing illness and disease, and reducing poverty and inequalities. Challenge-led research embodies a deliberate and concerted effort to align academic endeavours with the urgent needs and priorities of society. It emphasises transdisciplinary collaboration, cross-sector partnerships, and a solutions-oriented mindset to drive scholarly outcomes as well as research impact.

"As important players in the knowledge economy, universities have taken on, or been forced to accept, new missions and objectives beyond their traditional tasks of teaching and research. Notably, this includes expectations to contribute to technological innovation, regional development, and solutions to societal problems."

Anders Broström, Guido Buenstorf & Maureen McKelvey, 2020, p145

Universities as hubs of research excellence and impact

Within this context, universities play a pivotal role in catalysing, designing, and delivering challenge-led research and innovation initiatives. As hubs of knowledge creation and dissemination, universities are uniquely positioned to convene diverse stakeholders from multiple sectors (i.e. government, industry, non-profit, community), mobilise resources, and foster a culture of innovation. By leveraging their intellectual capital, research infrastructure, and public-purpose underpinnings, universities can serve as catalysts for initiating, leading, and stewarding ambitious grand challenge initiatives aligned with the Sustainable Development Goals (SDGs). Through strategic coordination and collaboration, they can harness the collective expertise of researchers, students, policymakers, and industry and community partners, to address pressing societal issues underpinned by rigour and research excellence. Universities are unique hubs of innovation as they are places of inherent curiosity, where serendipity is fostered and supported, enabling a multiplicity of pathways to advance knowledge and its application.

Challenge-led, mission-oriented research endeavours are characterised by their inherent complexity and transdisciplinary nature, which pose significant hurdles to their realisation. They build on and extend fundamental, curiosity-driven, discovery research models that are the dominant model of research in universities. They require the incorporation of diverse knowledges, methodologies, and perspectives from various academic disciplines, as well as input from non-academic stakeholders, including communities and individuals with firsthand experiences.

If missions were easy, everyone would be doing them

However, prevailing structures, systems, cultures, and incentivisation mechanisms within universities often present significant barriers to transdisciplinary research initiatives. Collaborating across entrenched disciplinary boundaries, as delineated by faculties/colleges/departments, can prove challenging, impeding the effective integration of expertise from different fields. Inter- and transdisciplinary collaboration is also challenging due to the systemic issues associated with how different disciplines are funded and how excellence is measured. Academic reward systems frequently favour disciplinary modes of inquiry and prioritise scholarly outputs such as peer-reviewed journal articles. Traditional research funding frameworks prioritise disciplinary or, at most, interdisciplinary investigations, often on relatively short timeframes (i.e. 1–3 years), with a predominant focus on curiosity-driven or discovery-oriented research, which, while crucial, may not immediately translate into tangible societal impacts beyond academia in the short term.

"Better understanding the organisational structures that have encouraged problem-solving, risk-taking and horizontal collaborations is thus key to understanding the wave of future radical change."

Mariana Mazzucato, 2021, p77

We must also critically examine the role of universities as institutions with complex histories intertwined with the history of colonialism and their role as powerful institutions in contemporary society. We need to recognise and confront power imbalances across geographic, economic, and social divides, and avoid a 'saviour' approach to knowledge production, education, and problem solving. Universities can and do play a central role in expanding access to education and knowledge. In catalysing missions we must critically review whose and what types of knowledge are valued, prioritised, and seen as important. It is crucial that diverse knowledge systems beyond Western science, such as First Nations knowledges, have a central place in this conversation as they have much to contribute in terms of research practices, methodologies, and ways of knowing.

Despite these tensions and challenges, there is a growing recognition among universities, governments, research funding bodies, and society of the imperative to expand support for challenge-led research initiatives (Box 1). Yet, there is surprisingly little scholarship or practical guidance about what it takes to catalyse, design, and deliver such ambitious inter- and transdisciplinary research initiatives. How can these inherent system hurdles be overcome? Do the spillovers and additionalities from mission-oriented approaches outweigh the extra effort and costs? What strategies and tactics are opportune for catalysing ambitious, transdisciplinary research initiatives aligned with wicked societal challenges, at a scale beyond conventional projects and programs?

Aims, objectives, and scope

This Report aims to fill a gap in knowledge on strategies for catalysing university-led, mission-oriented, grand challenge research. There are two objectives. The first is to support researchers, research funders, and university leaders and administrators embarking on university-led challenge research by providing new practical knowledge on strategies and tactics. The second is to contribute to the scholarly field of challenge-led, mission-oriented research and innovation from the perspective of the roles of universities and their researchers in the innovation ecosystem.

This Report draws from 15 years of experience at Monash University in catalysing grand challenge research initiatives. Monash University is a global university founded in Melbourne, Australia in 1958, named after prominent World War I General Sir John

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Monash. Monash is Australia's largest university with approximately 18,000 staff and 86,000 students, and has nine campuses: four in Australia and one in each of Malaysia, Indonesia, China, India, and Italy. It is a comprehensive and research-intensive public university, and is consistently globally ranked within the 'Top-50'. Monash's long term strategic plan, *Impact 2030*, was launched in September 2021 and calls for a greater number and scale of challenge-led research initiatives to address three global challenges: climate change, geopolitical security, and thriving communities.

This Report is based on a structured, collaborative internal assessment project that sought to codify practices and draw lessons learned from Monash's experience in catalysing 12 ambitious challenge-led, mission-oriented research programs over the past 15 years. The project was undertaken between January 2022 and June 2023. The scope focuses on the design and conception phase of the 12 case studies. Building off the empirical findings from the cases, a Framework for catalysing university-led mission-oriented research is presented.

The Report adds to the burgeoning number of guides and 'playbooks' that have been published in recent years which outline how to catalyse, govern, and implement mission-oriented initiatives (Box 2). Most of this literature is anchored in government-led missions, and therefore this Framework extends the field by providing the unique perspective of university-led mission initiatives.

Box 1: **Trends in research ecosystems driving increasing interest in mission-oriented research approaches**

Demonstrable societal impact research
Increasing government and societal expectations for university research to more explicitly implement and demonstrate the societal impact and value of research investments

Consortia funding models
Expanding beyond bi-lateral funding relationships, with a shift to multi-party consortia with complementary capabilities, requiring more robust and shared governance and alignment of purpose and vision

Evolving rankings and metrics
Expansion of ranking systems to include a broader suite of metrics around research impact, interdisciplinary research, and contributions to the SDGs

Increasing ambition
Increasing calls from the global scientific community, funders, and partners to raise the level of ambition of university research, aligned with the SDGs, to solve global problems

Deeper research-industry partnerships
Greater emphasis on research commercialisation and focus on industry/ university collaboration to stimulate the translation of research into breakthrough products and innovations for economic growth

Increasing professionalisation of philanthropy
Increasing concentration of wealth by a minority resulting in a significant uplift in permanent charitable capital and the greater prominence of professionally administered foundations set up to tackle societal challenges

Constrained national research funding
Volumes of conventional competitive research funding not growing in many regions and countries, and becoming increasingly competitive, and requiring deeper and more meaningful non-academic partnerships and engagement to support discovery research

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2. Mission-oriented research and innovation

The Apollo moon landing of the 1960s is often cited as an example of mission-oriented innovation, illustrating the potential for transformative societal impact through collaborative research and innovation. Its success underscored the importance of setting audacious, high-risk, specific, and time-bound goals (i.e. to put a person on the moon and return them safely back to earth by the end of the decade) that require transdisciplinary collaboration and aligning of resources to achieve a unified vision.

This historic mission not only aimed to land a man on the moon but also spurred technological advancements with far-reaching spillover effects, for example innovations in computing, materials sciences, nutrition, and telecommunications.[1,2] The complexity and scale of the Apollo program exemplifies the challenges inherent in mission-oriented endeavours, demanding coordinated action across multiple sectors and stakeholders, over a sustained period of time.[3]

Drawing from the Apollo experience, along with many others since, contemporary scholarship and practice on mission-oriented research and innovation emphasise the need for intentional goal-setting, strategic collaboration, and bold, solution-focused initiatives to address pressing societal challenges. This model of innovation foregrounds the role of government and public institutions in 'shaping' innovation systems, rather than 'fixing' market failures. In doing so it encourages the alignment of diverse stakeholders towards common public-purpose objectives and seeks to foster dynamic and collaborative innovation environments with directionality and intentionality.[4]

Mission-oriented research in universities

Mission-oriented concepts have permeated the higher-education sector. Over the past four decades the sector has evolved beyond its two traditional roles of teaching and research to become key players in supporting broader economic development and innovation goals. The 'triple helix model' highlights the emergence of the 'entrepreneurial university,'[5] which actively contributes to economic and industrial development, knowledge transfer, and the cultivation of competitive regional innovation ecosystems.[6,7] In recent years, universities have expanded their focus to include addressing societal challenges such as inequality and environmental sustainability. This shift is reflected in the adoption of 'fourth purpose' objectives, positioning universities to contribute to solving 'grand challenges' through challenge-led approaches.[8,9] These shifts have in part been spurred on by the articulation and adoption of universally-agreed global

"Achieving the transformative vision of the SDGs by 2030 requires an urgent realignment of most countries' and actors' priorities and resources towards longer-term, more collaborative, and drastically accelerated action. It also requires game-changing collective action within science systems and funding globally."

Sir Peter Gluckman, President
International Science Council, 2021

mission-oriented goals,[10] notably the Millennium Development Goals (2000–2015) and the current Sustainable Development Goals (2015–2030) which have tools to shape research and innovation ecosystems at multiple levels.[11,12] There is also increasing interest in universities as place-based living labs for mission-oriented innovation, experimentation and learning, with calls for greater attention to questions of governance to align diverse interests, expectations, and timeframes for the successful design and delivery of place-based missions.[13]

There is a growing consensus on the need for transformation within the global scientific research and innovation ecosystem to play a role in effectively addressing the complex challenges outlined in the 2030 SDGs.[14] The International Science Council (ISC) spearheaded a global commission on sustainability science, which scrutinised the limited efficacy of academic research in advancing the SDGs. The commission's inaugural report, 'Unleashing Science: Delivering Missions for Sustainability' (September 2021), advocated for a fundamental shift in scientific research practices, including catalysing, funding, and execution. It contends that existing research frameworks are ill-equipped to tackle the SDGs and emphasises the importance of a mission-oriented approach.

The subsequent report, 'Flipping the Science Model: A Roadmap to Science Missions for Sustainability' (September 2023), built upon this call, urging reforms in research institutions and funding mechanisms to embrace an impact-driven, transdisciplinary, and process-oriented ethos, moving away from narrowly defined academic outputs. This approach requires deepening the capabilities of universities to integrate academic expertise together with expertise from industry, government, and community organisations in 'prac-ademic' models that maintain research excellence while stretching for societal impact.[15]

The World Mosquito Program first began releasing Wolbachia mosquitoes in Brazil in 2014. The insects now cover an area with a population of more than 3 million across five municipalities.

What is mission-oriented research and innovation?

What is the definition of mission-oriented research and innovation? Is it the same as challenge-led research? In short, there is no singular or widely accepted definition. There is considerable scholarship and theoretical debate surrounding what missions are, and what they could be, across different geographical, economic, and cultural contexts. For our purposes, as outlined above, the underpinnings of mission-oriented and challenge-led research are seen as broadly complementary in nature. They are delivered through a portfolio approach, linking the political agenda setting and civic engagement, with a clear mission goal, and a portfolio of projects and bottom-up experimentation activities (see Figure 1 for an example). This Report utilises the International Science Council definition of 'mission-oriented' as:

> *"singularly goal-oriented and solutions focused science conducted for a limited period of time until a substantial challenge has been successfully addressed. Missions are of sufficient size, scope, and ambition; and while focused on a clearly defined topic, question or goal, require interdisciplinary and transdisciplinary approaches…and direct engagement with those who will enact policy and practical changes in response to the generated knowledge"* (International Science Council, 2021, p16).

Building from this, **six key features characterise university-led mission initiatives** relevant to this study:

1. **Ambitious:** The initiatives are ambitious, representing bold endeavours that seek transformational change and entail higher risk due to their uncertain impact pathways, especially in their initial stages.

2. **Goal-focused:** They are goal-focused, with a clear set of measurable and time-bound targets.

3. **Solutions-oriented:** They are solutions-oriented, aiming not only to understand problems but also to test solutions iteratively, often through rapid testing, learning, and intervention to enact change.

4. **Time-bound:** They are typically longer-term initiatives, spanning five or more years, and may evolve into new institutional arrangements that serve as reliable spaces for innovation.

5. **Highly collaborative:** They are highly collaborative across sectors, academic disciplines, research institutions, and geographic boundaries, drawing on diverse actors and tools beyond their immediate networks.

6. **Discovery and impact:** They combine both discovery research and societal impact, rigorously studying problems and experimenting and testing potential solutions, while actively working towards solutions using multiple methods, thereby assuming a stewardship role within the system.

A central tenet of mission-orientated theory and practice is the pivotal role of the state and public institutions as 'market shapers' to provide directionality and intentionality to science, technology and innovation (STI) investments.

Mission-oriented innovation in practice

It is important to highlight that there is a diversity of theoretical and practical approaches in the emergence and legitimacy of missions. In some cases, university-led missions are catalysed and align with existing state-led missions and strategic research initiatives, becoming part of a broader effort to solve societal problems. For example, University of California Berkeley's Brain Initiative was developed in alignment with the USA State Department's Brain Research Through Advancing Innovative Neurotechnologies (BRAIN) Initiative. In other cases, university-led missions align with larger development frameworks such as the 17 SDGs agreed in 2015 and running until 2030. In some cases, missions are driven from 'bottom-up' initiatives involving community groups, non-government organisations (NGOs), and civil society, where universities and research institutions are collaborators but not necessarily leading missions, for example place-based initiatives in Sweden and Denmark (Box 2). These different approaches to catalysing missions lead to variable legitimacy of specific missions across actors in the innovation system.

A central tenet of mission-oriented theory and practice is the pivotal role of the state and public institutions as 'market shapers' to provide directionality and intentionality to science, technology, and innovation (STI) investments, and the belief that mission-oriented approaches generate spillovers and additionalities beyond the core mission. Caution must be taken, however, to avoid the 'STI trap', where public investment in science, technology, and innovation fails to translate into commensurate economic or societal dividends such as economic growth, productivity enhancements, or societal progress due to being too narrowly techno-focused.[16] Policy frameworks must be articulated and enacted to incentivise innovation pursuits, alongside the development of educational and human capital, ensuring the cultivation of a skilled workforce adept at navigating the intricacies of contemporary innovation landscapes.

Proponents of missions argue that, from a policy perspective, a key advantage of missions is that they can be 'tractable' within a certain time period, longer than business as usual but not too distant.

Proponents of missions argue that, from a policy perspective, a key advantage of missions is that they can be 'tractable' within a certain time period, longer than business as usual but not too distant. 'Tractable' helps actors and actions to be mobilised, as opposed to other approaches which either look for solutions that are actionable now (thus not necessarily leading to deeper systems change but rather addressing 'low-hanging fruit'), or solutions that are future imaginaries, which are usually (but not always) too far away from the immediate which can make it hard to mobilise actors, and, can lead to inertia and disappointment.

In many cases, new institutions and governance systems have been established to drive mission-oriented endeavours. Notably, in the United States the Advanced Research Projects Agency (ARPA) model is widely utilised, originally in Defence (D-ARPA) and now evident in other sectors such as health (ARPA-H). The key elements of the ARPA model include significant organisational flexibility and agility, and empowered program directors (portfolio managers) leading missions that have significant authority to design programs, select projects, and actively manage projects.[17] Australian examples include the Australian Institute of Sport and more recently the Medical Research Future Fund (MRFF) which includes a pillar with eight missions.[18] The European Union Horizon Research program — with five missions relating to climate change, cancer, oceans and

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water, carbon-neutral cities and soil health — is another notable example. Core motivations for establishing such institutions, structures, and funding mechanisms are to strengthen internal innovation and learning cultures within systems or around missions, and to coordinate portfolios of projects to maximise investments across disciplines, geographies, and sectors.

Missions are not a panacea

A range of criticisms of mission-oriented innovation exist. From a philosophical perspective, many have questioned the ethical and societal implications of missions. The scale, directionality, and intentionality of missions prompts philosophical reflections on the ethical responsibilities of governments, institutions, and civil society as well as raises questions about the distribution of resources, decision-making and priority setting for missions. Contemporary accounts of the Apollo moonshot, for instance, often disproportionately emphasise the positive spillovers it generated, such as technological advancements and national pride, while paying less attention to the ethical and socio-political questions arising from directing substantial resources towards space travel when juxtaposed with pressing social issues such as poverty, inequality, and civil rights here on Earth. Such critical thinking invites reflection on the values underlying mission-oriented initiatives, exploring whether the pursuit of scientific and technological feats should take precedence over addressing immediate social needs and injustices, and concerns around how mission-oriented solutions may actually exacerbate existing challenges instead of mitigating them.[19]

On a more practical level, it is widely accepted that there is a lack of evidence on how to best govern, finance, and steer government-led mission-oriented innovation policies.[20] Anecdotal evidence from high-income countries suggests that there is a clear gap between what missions promise and what is actually achieved (there is even less evidence for university-led missions and missions in low- and middle-income countries).[21,22] There is limited evidence if missions do deliver more than the sum of the parts and mitigate the coordination cost of convening and taking this new approach. Missions have been criticised for their normativity bias, top-down governance optimism, stakeholder monotony, and limited success in picking winners.[23]

Navigating the landscape of mission-oriented research and innovation also presents several tensions deeply rooted in historical contexts and contemporary complexities, including the challenge of the 'saviour' narratives and mindsets that can be inherent in mission-oriented endeavours.[24] To many, the term 'missions' itself carries with it a fraught history, entwined with colonialism, expansion of western knowledge systems, and the marginalisation of traditional knowledge and research practices, thereby raising questions about equity, epistemological justice, and how to break down western-centric systems of knowledge production across north-south contexts.[25] Moreover, as mission-oriented initiatives involve diverse stakeholders, including academia, industry, government, and communities, power dynamics need careful and explicit foregrounding in mission design (and implementation), to ensure inclusive decision-making processes and equitable distribution of benefits.

"Solutions-focused, time-bound, substantial at scale, and ambitious in the intended impact, this approach emphasises the need for science to directly engage with society, policymakers, civil society."
International Science Council:
Flipping the Model, 2023, p8

Addressing these tensions requires careful consideration of power and the equitable distribution of resources, particularly concerning Indigenous or local knowledge systems and across north-south geographies. Aspects of international discussion about Responsible Research and Innovation (RRI) offer valuable insights to explore these challenges.[26,27] By foregrounding questions about societal values and priorities, RRI provides a lens through which to critically assess the alignment of research with societal needs and power structures. RRI might also mitigate the risks of a 'saviour' approach to mission-oriented knowledge production, education, and problem solving. Additionally, RRI frameworks can facilitate the cultivation of collaborative and inclusive research environments, promoting equitable participation and decision-making among stakeholders, and ensuring the respectful acknowledgement of diverse forms of knowledge to ensure strong outcomes.

Established in 2021 through a philanthropic grant, the Monash Centre for Consciousness and Contemplative Studies (M3CS) builds upon Monash University's internationally recognised expertise and leadership through research, education, and community engagement.

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Box 2: **Mission-oriented innovation frameworks and guides**

Over the past few years, a number of organisations, scholars, and practitioners have developed frameworks and guides drawing on their experiences and lessons learned with designing and implementing challenge-led, mission-oriented models. Almost all involve the mission concept applied to government-led innovation and industrial policy.

This Report fills a gap in scholarship and guidance on the roles of universities in catalysing and stewarding mission-oriented initiatives. The opportunities and constraints of university research ecosystems to catalyse, lead, and steward missions remains underexplored. By sharing empirical insights and best practices, the aim is to support and guide others embarking on university-led challenge research initiatives.

European Commission (2018) *Mission-oriented research & innovation in the European Union – A problem-solving approach to fuel innovation led growth*

Context: European Union, Public policy and research investment strategy.

In this foundational report, Mariana Mazzucato outlines a mission-oriented approach in the EU. It outlines the five dimensions of mission goal setting and proposes a missions framework, cascading from the goal, to sectors, through to the portfolio of projects and activities.

data.europa.eu/doi/10.2777/360325

Vinnova (2022) *Designing missions. Mission- oriented innovation in Sweden – A practice guide by Vinnova*

Context: Sweden, Government-led innovation model, Design-led approach.

This guide describes how Vinnova, the Swedish government's innovation agency, devised and tested an approach to mission-oriented innovation, from 2019 to 2022. It includes the background to the work, in terms of innovation policy, strategic design, and the local context in Sweden.

www.vinnova.se/en/publikationer/mission-oriented-innovation---a-handbook-from-vinnova

CSIRO (2022) *Convening missions: A playbook for collective implementation of mission-oriented innovation.*

Context: Australia, National Science-Agency, 'Agency convened' mission approach.

This guide outlines CSIRO's (Australia's national science agency) model of missions. It represents key insights from three years of delivery about designing, implementing, and governing 'agency convened' missions.

www.csiro.au/en/about/challenges-missions

OECD (2020) *Mission-Oriented Innovation policies online toolkit.*

Context: OECD, Public policy, Mission-oriented industrial policy.

This interactive online policy toolkit targets government policy makers with theory on the design, governance and implementation of mission-oriented industrial policy (MOIP) initiatives. It includes explorable dashboards by challenge, country and type of MOIP, as well as case studies.

stip.oecd.org/moip

Box 2 continued: **Mission-oriented innovation frameworks and guides**

Danish Design Centre (2021) *Missions Playbook: A design-led approach to launching and driving missions.*

Context: Denmark, Non-profit foundation, Design-led, collaboration approach.

This playbook outlines a design-driven approach to missions. It considers three important pillars to any mission – setting direction, mobilising ecosystems, and building capacity.

ddc.dk/wp-content/uploads/2021/10/Missionplaybook_A4_hojformat.pdf

Institute for Innovation and Public Purpose (2021) *Mission-oriented innovation in action: 2021 casebook. IIPP; London, UK.*

Context: EU, UK, Scotland, Spain and Australia. Public agency-led mission model.

This casebook comprises eight cases of ongoing missions led by public agencies. It describes their political context, the implementation approach, the challenges faced, and lessons learned to date on mission design and implementation.

ucl.ac.uk/bartlett/public-purpose/publications/2022/jan/moin-casebook-2021

Popowitz, M., & Dorgelo, C. (2018) *Report on University-Led Grand Challenges. UCLA: Grand Challenges.*

Context: United States, Grand challenge initiatives in universities.

This resource provides an overview of the attributes, opportunities and challenges of university-led grand challenge initiatives. Drawing from case studies from almost 20 universities in the United States of America, the Report outlines strategies for universities considering challenge-led initiatives.

escholarship.org/uc/item/46f121cr

Transformative Innovation Policy Resource Lab (2023)

Context: Global.

This online, interactive toolkit ('Resource Lab') supports the design of transformation systems change initiatives. The Lab contains five components: understanding a system and defining desirable changes; experimentation; monitoring, evaluation and learning; capabilities; and community building

tipresourcelab.net/resource/tip-resource-lab-user-guide

Burkett, I. (2023) *Challenge-led Innovation: Organising for systems innovation at scale.*

Context: Australia, global. Challenge-led innovation for systems transformation.

This report shares Griffith University's experience and learnings on challenge-led systems innovation. It outlines a learning journey approach to designing collaborative initiatives, and identifies tools, such as the impact canvas, to stimulate thinking, practice, and further adaptations.

griffith.edu.au/__data/assets/pdf_file/0033/1881573/GCSI-Challenge-Led-Innovation-Workbook.pdf

Figure 1: A mission for plastic-free oceans. Based on: Mazzucato and Mikheeva (2020).

Political agenda setting and civic engagement

Clear targeted missions

Cross-sectoral innovation

Portfolio of projects and bottom-up experimentation

Clean Oceans

A Plastic-Free Ocean

Reduction of 90% of plastics entering the marine environment and collection of more than half of plastics present in our oceans, seas and coastal areas by 2025.

Chemical Industry

Social Innovation

Biotech

Marine Life

AI Technology

Design Sector

Waste

Automonous ocean stations to remove plastic pollution

Re-usable and biodegradable plastic substitutes

Plastic and micro plastic digestion mechanism

Re-use of packing items through personalised collection services

Image recognition, waste separation system for domestic and marine waste

3. Methodology

Aims and scope

This study was guided by an implementation science approach which focuses on understanding and promoting the uptake of evidence-based practices and interventions. By leveraging implementation science principles, the study sought to develop a deeper understanding of the factors influencing the success of mission-oriented research initiatives and identify strategies for enhancing their effectiveness. The objective was to develop new knowledge to inform future institutional strategies and planning, and provide knowledge to support others embarking on similar initiatives.

The study scope was limited to the inception/catalysing phase of the initiatives: the time period from ideas formation and refinement, team establishment and development, problem scoping and research design, through to securing and starting the initiative. Implementation of the initiatives is not addressed in the study or this Report. The focus was not a monitoring or evaluation of program performance or implementation. This is an important limitation of the study, as implementation research and the outcomes are incredibly important and also worthy of investigation, which we explore in Section 5: Reflections and implications.

Three guiding hypotheses shaped the study's scope, questions, and analysis, informed by internal observations and anecdotal evidence within the organisation. First, it was hypothesised that the unique experiences within the Monash ecosystem warranted examination due to their relatively large scale and level of ambition. Second, it was suggested that many initiatives originated largely through chance, serendipitous, and often one-off opportunities rather than explicit institution-wide strategies and supports. Last, it was posited that scaling up and facilitating the initiation of new mission-oriented initiatives would require reforming collaboration systems and cultural structures.

Methods and case study selection

The methodology adopted for this study employed a comparative case study approach. Initially, a long list of 36 mission-oriented initiatives led by Monash University over the past decade was compiled. From this initial pool, 20 potential cases were short-listed based on six primary criteria. First, emphasis was placed on the initiatives' level of ambition, with a focus on articulating bold problems and seeking transformational change, while also navigating uncertain impact pathways (Criterion 1). Second, the initiatives were evaluated for their goal-focused nature, requiring a clear 'north-star' goal with measurable targets (Criterion 2). Third, the solutions-oriented aspect was considered, evaluating how initiatives concurrently developed and tested solutions while understanding the problem (Criterion 3). Fourth, the study prioritised long-term initiatives, extending beyond the conventional 5+ year research project/program timeframe (Criterion 4). Collaboration breadth was another key criterion, necessitating involvement from multiple faculties and disciplines at Monash, alongside numerous external

> **Our objective was to develop new knowledge to inform future institutional strategies and planning, and provide knowledge to support others embarking on similar initiatives.**

12
CASE STUDIES

$1B
RESEARCH INVESTMENT

1,200+
RESEARCHERS

40+
ACADEMIC INSTITUTES

partners and funders (Criterion 5). Finally, the initiatives were evaluated based on their ability to combine discovery research with societal impact and assume a stewardship role within the broader system (Criterion 6).

Following a comprehensive evaluation process, the final 12 cases were selected to ensure diversity across disciplines, problem/solution types, funding modalities, and opportunity origination. Collectively, the 12 cases comprise over AU$1 billion of research investment to date and involve approximately 1,200 researchers from more than 40 academic institutions. It should be noted that these 12 mission-oriented initiatives grew in the absence of a formalised, university-wide mission-oriented framework and thus represent a 'learning by doing' approach over many years.

Each case study was comprehensively analysed across nine thematic areas of interest. First, the 'Origins' of the initiative were explored, delving into the key factors, individuals, and systemic elements that influenced its development. Second, the 'Talent and capability' involved in the initiative were examined, including who participated, when and why, and which skills were most crucial. Third, 'Internal capability and coordination' within the organisation were assessed, focusing on how different parts of the institution were mobilised around the opportunity. Fourth, the dynamics of 'Research collaboration' were scrutinised, investigating how research design and approaches were negotiated and agreed upon. Fifth, the nature of 'External partnerships' was explored, including how external collaborators were engaged and mobilised. Sixth, the 'Funding' mechanisms driving the initiative were examined, distinguishing between inbound and outbound opportunities and exploring how consortium funders were assembled. Seventh, the 'Governance' structures of the initiative were analysed, including how potential governance models were explored and negotiated with partners. Eighth, the effectiveness of different 'Models' employed by the initiatives was evaluated, identifying lessons for future initiatives. Lastly, the 'Most critical elements' contributing to the success of each initiative were identified, focusing on the three most significant factors that catalysed its progress.

The study employed a collaborative, qualitative case study analysis approach, conducted between January 2022 and June 2023 under the auspices of the Office of the Deputy Vice Chancellor Research. The time period under investigation for the cases was until end-2021. Participation in the study was voluntary, with research leads from the 12 proposed case studies invited to collaborate, all of whom agreed. Semi-structured conversations were conducted with a total of 51 individuals, including leaders and senior teams of the 12 initiatives, senior Monash staff involved in their inception, and significant external collaborators. These conversations, conducted between July and November 2022, lasted approximately one hour each and were predominantly held via video conferencing due to the COVID-19 pandemic. Concurrently, desktop research was undertaken to examine publicly available project documents, monitoring and evaluation reports, and project communications materials. The insights gathered from both the conversations and desktop research informed the iterative development of case

This study was primarily a collaborative analysis to inform internal organisational strategy… The Framework presented in this study is dynamic and intended for ongoing refinement.

study reports, which were finalised in collaboration with the respective leaders. These reports comprised a narrative history of each initiative and detailed specific 'lessons learned' for each case (note that the full case studies are not included in this Report).

The Framework development employed an inductive approach, wherein the analysis of the 12 cases involved an iterative thematic coding process to discern commonalities, differences, and underlying patterns in their specific narratives and lessons learned. A draft Framework was subjected to member checking, a process involving the presentation of the Framework to project leads and senior Monash staff in December 2022 for testing and feedback. This step advanced the rigour and validity of the analysis through triangulation, corroborating the Framework's findings with insights from the cases.

Limitations

There are a number of notable limitations. This study was primarily a collaborative analysis to inform internal organisational strategy; it was not a traditional academic research project. Our focus on successful cases may have introduced bias, overlooking initiatives that failed to secure catalytic funding or inward-bound funding opportunities. Additionally, while our cases were diverse, they do not represent a comprehensive sample, cautioning against simplistic comparisons. The case studies relied on interviews with key stakeholders, mostly senior research leaders and external partners, offering practical insights but limited to their perspectives. Furthermore, they predominantly address the inception phase of initiatives, with less emphasis on their delivery and scalability in university settings. Understanding the key success factors for implementation is equally important and warrants further study (see: Section 5).

It is important to note that the Framework presented in this study is dynamic and intended for ongoing refinement. As additional case studies are conducted, including by external researchers, adjustments to the Framework will be necessary to accommodate new insights, contexts, and perspectives. While not all programs may exhibit all seven elements identified in the Framework, their thematic presence justifies their inclusion as essential components.

Table 1: Summary of 12 cases

PROJECT	DATES	SDGs	GRAND CHALLENGE	AMBITION	KEY DISCIPLINES	KEY PARTNERS	NOTABLE FEATURES
World Mosquito Program	2008–2016 (Eliminate Dengue); 2017+ (WMP)		Mosquito-borne viral diseases are a public health threat in 100+ countries and kill more than 700,000 people annually.	Protect communities from mosquito-borne diseases including dengue, Zika, yellow fever, and chikungunya using a naturally occuring bacteria called Wolbachia.	Entomology, Epidemiology, Genetics, Public Health, Environmental Science, Microbiology	Governments of Australia and New Zealand, National Institues of Health, The Bill & Melinda Gates Foundation, Australian National Health and Medical Research Council, The Wellcome Trust	• Transition from discovery research to large-scale global expansion • Progressive evolution and growth over time, with carefully selected teams and collaborators • Consortia funding
INHALED OXYTOCIN Inhaled Oxytocin	2008+		Postpartum haemorrhage (severe bleeding after childbirth) is the leading cause of maternal mortality, overwhelmingly in low- and middle- income countries.	Provide a safe childbirth for women everywhere, through developing an affordable, heat-stable, non-invasive, simple to use, inhaled form of oxytocin for the prevention of postpartum haemorrhage.	Pharmacology, Endocrinology, Drug Delivery, Clinical Research, Obstetrics and Gynecology, Biomedical Engineering	The Bill & Melinda Gates Foundation, USAID, McCall MacBain Foundation, Grand Challenges Canada, Planet Wheeler Foundation, GlaxoSmithKline, Johnson and Johnson	• Initiated with philanthropic funding • Partnerships with the pharmaceutical industry • Strong understanding of impact pathways developed over time to inform ongoing strategy and partnerships
ASPREE ASPirin in Reducing Events in the Elderly (ASPREE)	2010–2024		The ageing population means we need to maintain health and independence for as long as possible. Aspirin is widely used for this purpose but its safety and effectiveness for this population is unknown.	Develop a capacity to undertake large-scale community based clinical trials to the highest industry standard. These are increasingly needed to provide the evidence base for preventative interventions.	Public Health, Geriatrics, Cardiology, Clinical Pharmacology, Statistics and Biostatistics	National Institutes of Health (USA), National Health and Medical Research Council (Australia), National Institute on Ageing (USA)	• Created a major change to international prevention guidelines • Created a major US-Australian partnership and facilitated access to multiple research collaborations

PROJECT	DATES	SDGs	GRAND CHALLENGE	AMBITION	KEY DISCIPLINES	KEY PARTNERS	NOTABLE FEATURES
Climateworks Centre	2009+		Urgent action is needed at scale to meet global climate goals.	Accelerate the transition to net zero emissions for Australia, Southeast Asia, and the Pacific, by developing new solutions in climate change and international development to build consensus around the low carbon transition.	Public Policy, Business, Economics, Environmental Science, Law, Urban Planning, Engineering	Myer Foundation. Initiated through a philanthropic partnership with sustained philanthropic funding over 15 years as well as support from corporate and government partners.	• Ambitious research translation to drive decarbonisation • Blended funding arrangements • Co-governance with philanthropic partners
Partnership for Australia-Indonesia Research	2012–2018 (AIC); 2019+ (PAIR)		Governments spend billions improving physical links between roads, rails, seaports, and airports to move people and freight. Yet, experience shows that local communities remain disadvantaged if the investment is not people-centred.	Empower young people and marginalised communities to transform their lives and livelihoods. Create an evidenced-based approach to community-led, sustainability advocacy.	Public Policy, Community Development, Sociology, Anthropology, Economics, Environmental Science	Department of Foreign Affairs and Trade (Australia)	• Multi-university and stakeholder consortium • Strong connections and engagement with the main donor • Challenging dominant global north-south research hierarchies
Woodside Monash Partnershtip	2016+		Solving energy challenges requires interdisciplinary collaboration to develop solutions for a sustainable future.	Accelerate the development and deployment of new solutions to global energy challenges.	Engineering, Environmental Science, Geoscience, Computer Science and Data Analytics, Business and Management, Chemistry	Woodside Energy	• One of the largest industry-academia partnerships in Australia • Blended funding with philanthropic and contract research • Industry, commercialisation, enterprise focus

PROJECT	DATES	SDGs	GRAND CHALLENGE	AMBITION	KEY DISCIPLINES	KEY PARTNERS	NOTABLE FEATURES
rise Revitalising Informal Settlements and their Environments	2017–2027		One billion people live in informal settlements (slums) with inadequate water and sanitation.	Transform human and environmental health in urban informal settlement via nature-based, water sensitive revitalisation in Fiji and Indonesia.	Urban Planning and Design, Architecture, Civil Engineering, Environmental Science, Public Health, Epidemiology, Ecology, Biological Sciences, Health Economics	The Wellcome Trust, Department of Foreign Affairs and Trade (Australia), Ministry of Foreign Affairs and Trade (New Zealand), Asian Development Bank	• Ambitious transdisciplinary research design • Leadership is critical to catalyse initiatives in complexity conditions • Funders drawn to bold effort that combines discovery research with research translation and societal impact
FIRE to FLOURISH Fire to Flourish	2020–2025		Communities are too often left out of disaster and reconstruction efforts, entrenching cycles of disadvantage.	Support Australian communities to lead their own recovery, co-create foundations for long-term resilience, and disrupt cycles of entrenched disadvantage. Foreground communities' lived experience and local leadership to trial a new model of community-led resilience practices.	Ecology, Sociology, Public Health, Community Development, Climate Science, Policy and Governance, Conservation Biology, Cultural Ecology	The Paul Ramsay Foundation, Metal Manufactures, Lowy Foundation, The Australian Centre for Social Innovation and the communities of Tenterfield, Clarence Valley, Eurobodalla, and East Gippsland.	• The value of deep and open co-creation with philanthropic partners • Entrepreneurial and bold leadership supported by a tiger team/pursuit team from Monash central portfolios • Organisational agility and flexibility to catalyse ambitious initiatives
SAEF Securing Antarctica's Environmental Future	2021–2027		If we can't protect Antarctica, we can't protect the future of the planet.	Develop innovative ways to forecast, mitigate, and manage climate and biodiversity changes in Antarctica, to understand past, present, and future change in the region to help make the best decisions for its future, and ours.	Climate Science, Biology, Glaciology, Oceanography, Geology, Environmental Science, Public Policy	Australian Research Council, the Australian Antarctic Division and university, government, and international partners	• Consortium building through long-term networking in academic and non-academic settings • Co-development reflecting geopolitical issues and gaps in research translation • Leadership as central to consortium building and program concept

PROJECT	DATES	SDGs	GRAND CHALLENGE	AMBITION	KEY DISCIPLINES	KEY PARTNERS	NOTABLE FEATURES
Building 4.0 CRC	2020–2027		The Australian building industry employs 1.4 million people and represents around 13% of GDP. However the industry is under strain from rising costs, stagnant productivity, high waste, low margins, and increasing environmental performance and compliance standards.	Transform the construction value chain to unlock opportunities for growth and productivity, reduce greenhouse gases, and create buildings that are more affordable, liveable, and environmentally friendly.	Urban Planning, Architecture, Engineering, Materials, Public Policy, Business and Economics	Cooperative Research Centre (Australian Government), Industry partners	• A Cooperative Research Centre (CRC) which is a specific model, anchored with industry • Strong research translation and co-design approach with non-academic partners • Driven leadership, strong faculty support, and 'crowding in' of partners
National Centre for Healthy Ageing	2020–2025		As people live longer, they do not necessarily live better. The risk and prevalence of chronic disease and dementia increases, leading to more time spent in hospitals and more need for health care and aged care support and services.	Create better integrated care models to promote health and wellbeing across people's lifespan.	Medicine, Gerontology, Public Health, Nursing, Psychology, Social Work, Nutrition and Dietetics, Exercise Physiology, Occupational Therapy	Australian Government, Peninsula Health (local area health network)	• A pioneering initiative generated in Monash's largest faculty delivered in close partnership with Peninsula Health • Ambitious vision delivered with agility • A portfolio of experimental research projects and programs
M3CS Monash Centre for Consciousness and Contemplative Studies	2021+		Consciousness science is a highly interdisciplinary international research endeavour to address one of the great unresolved scientific challenges: the nature of consciousness.	Help us wake up to ourselves, each other, and the planet. By making contemplative practices central to our conscious connection with each other and our environment, we can better solve the many challenges the world confronts.	Philosophy, Psychology, Neuroscience, Cognitive Science, Spirituality, Anthropology, Education, Health Sciences	Three Springs Foundation	• Donor-initiated and philanthropy-led inward-bound opportunity • Short timeframe for catalysing the initiative • Strong support from Monash senior leaders • Interdisciplinary, spanning STEM and HASS

4. Framework for catalysing missions in universities

With seven foundational elements, the Framework serves as a blueprint for advancing mission-oriented, challenge-led transdisciplinary research initiatives within universities. Each element is elaborated into three key sub-elements, offering insights into their underlying characteristics. The seven key elements comprising the Framework are:

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The Framework encompasses various levels of the ecosystem, spanning from the sector of higher education research to institutions and their constituent units, such as schools, faculties, departments and institutes, and down to the individual level of academics and researchers. This holistic approach underscores that the opportunities and responsibility for catalysing new initiatives are not solely on individual researchers or research teams; institutions also play a crucial role. This institutional role is particularly evident in Element 5 (institutional supports) and Element 6 (tiger teams), which highlight the significance of institutional systems, processes, executive sponsorship, and investments (both monetary and in-kind) in driving the initiation of new initiatives.

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Importantly, the Framework provides guidance for similar initiatives while recognising the need for customisation. Institutional history, size, resources, and existing partnerships shape the composition and emphasis of elements. Moreover, the interconnected nature of the elements highlights their collaborative synergy. For instance, leadership capabilities in building external partnerships (Element 2.1) complement the institution's ability to showcase its strengths effectively (Element 3.3).

While the Framework is derived from empirical findings from 12 case studies, not all cases exhibit all seven elements to the same extent. Various factors such as funding sources and volumes, the transdisciplinarity of research problems and solutions, disciplinary characteristics, and the origin of opportunities influence the prominence and significance of each element within a given initiative. For example, initiatives categorised as 'accelerators,' like the World Mosquito Program, may prioritise certain elements such as transformational leadership (Element 2), while initiatives focused on complex systems transformations, like Fire to Flourish, may emphasise entrepreneurial spirit (Element 4). However, Element 7, thinking and working politically, was observed across all 12 cases, underscoring the importance of sector engagement, alignment with policy cycles, and preparedness to create and seize opportunities, irrespective of mission type.

As the Framework evolves, its flexibility allows for adaptation to diverse stakeholder needs and funding sources. It serves as a foundational tool, open to refinement through continued use and testing in various contexts. Ultimately, the Framework's utility lies in its ability to inspire innovation and collaboration and lift ambitions for scholarly and societal impact beyond conventional incremental research projects and programs.

Element 1: Research excellence and impact

The first element underscores the critical importance of research excellence as the cornerstone for catalysing mission-oriented research initiatives. It emphasises the need to leverage past experiences and capabilities, showcasing a strong track record in research excellence and interdisciplinary collaboration. Additionally, it highlights the significance of organisational capability to operate at scale and the meaningful adoption of responsible research practices. Clear research translation pathways are essential to maximise broader societal benefits and secure buy-in of non-academic collaborators and funders. Overall, combining world-leading research excellence with 'intentionality' (the deliberate and purposeful pursuit of objectives) and 'directionality' (the clear orientation or trajectory towards specific goals) for societal impact is fundamental to attracting partners, investment, and expertise to catalyse bold, large-scale mission-oriented endeavours within academic institutions.

1.1 Building on experiences and capabilities

Leverage research legacies: Successful initiatives build upon a strong existing research environment, extending, deepening, and scaling up existing partnerships, research projects, and programs rooted in world-leading research excellence.

Capability to operate at scale: Potential funders and partners seek a track record of research achievements that provide evidence of the organisation's ability to undertake research at a scale comparable to the proposed initiative.

Strategic talent recruitment: Strategic recruitment of talent and capability — academics, graduate students, Indigenous leaders, and professional staff — with a strong track record is an effective tactic to swiftly enhance or establish capabilities in key focus areas.

1.2 External partners value a track record in research excellence

Lead researcher(s) track record: Funders and partners prioritise researchers with a strong record of achievement based on research performance metrics and a history of leadership, particularly valuing the expertise and profile of the Principal Investigator (PI).

Research team track record: Increasingly, funders and partners evaluate the broader senior Chief Investigator (CI) team, necessitating a high level of expertise and access to necessary skills across all team members' respective fields.

Interdisciplinary research capability: Past collaborations and interdisciplinary engagements of the CI team serve as important indicators of readiness for investment.

1.3 An explicit focus on sectoral and societal impact

Beyond academic impact: Initiatives must be developed and driven by the ambitions and goals partners have for sectoral and societal impact beyond academia, and often involve a portfolio of experiments co-created and delivered with partners.

Explicit translation pathways: Successful initiatives require explicit identification and communication of research translation pathways, articulating the theory of change and an associated end-state vision for sectoral and societal impact.

Responsible research: Increasing attention is being given to the need to facilitate active societal involvement and address system inequalities in and through research, shifting from ensuring social licence to creating social value (i.e. gender equality and inclusion, equitable north-south partnerships and decolonised research practices).

"We must supplement and rebalance our current scientific model. This requires incentivizing collaboration and outcomes between scientists, and of scientists, with other stakeholders, especially civil society, on large-scale sustainability challenges. Furthermore, the current model should shift from intense competition and fragmented science, both in terms of disciplines and funding, to building collaborative science communities."

International Science Council: Flipping the model, 2023, p7

Element 2: Transformational leadership

Transformational leadership underscores the pivotal role of visionary and proactive leadership in catalysing mission-oriented research initiatives. It emphasises the necessity of leaders with a deep understanding of their field who can co-create and articulate compelling visions, mobilise diverse resources, and inspire stakeholders towards common goals. Such leaders foster cultures of innovation and risk taking, cultivating environments and processes that encourage creativity, experimentation, and learning from failures and setbacks.

While transformational leadership is indispensable for galvanising collective action and navigating the complex challenges inherent in mission-oriented endeavours, it should not be interpreted as always relying on a single charismatic leader. Instead, it often necessitates a collaborative 'team science' approach, where leadership is distributed across diverse stakeholders, fostering synergy and shared responsibility in driving forward ambitious research agendas.

2.1 'Bench to Boardroom' capability

Inspirational: Leadership that co-creates a compelling long-term vision, inspiring diverse stakeholders to transcend individual interests and motivations and contribute to transformative agendas.

Executive acumen: Academic leaders with conventional research 'bench' capabilities as well as non-academic executive 'boardroom' skills, including financial literacy, which allow them to navigate sectors outside academia.

Sensitive stewardship: Leadership that adeptly steers the inception phase, reporting progress effectively, and taking ownership to address challenges and setbacks.

2.2 Executive leadership to crowd in partners

Boundary spanning capability: Ability to engage across sectors (i.e. government, industry, community, non-profit) by speaking to external partners in their own language, working to their timeframes, and by 'matchmaking' interests towards common goals.

Aligning across organisations: Ability to align partner timelines, expectations, and priorities to maintain cohesion and momentum even during periods of uncertainty.

Trust building: Leadership that cultivates trust with funding partners, instilling confidence in the institution's and research team's capacity to deliver on its vision and commitments.

2.3 Sensitive and strategic convening capability

Convening research excellence: Capability to bring together researchers from across faculties, institutes, centres, and other universities to forge a bold, transdisciplinary research agenda within a plurality of knowledge systems and research practices.

Focus on impact: Elevating the vision of program partners, research teams and professional staff beyond individual disciplines.

Navigating differences: Leadership adept at navigating interpersonal differences and institutional dynamics, resolving conflicts between disciplines and personalities to foster collaboration.

"The conditions for growing the sorts of leadership and culture needed for challenge-led innovation cannot rely on strong political power and singular charismatic leaders...There is a need for cultural conditions that foster experimentation, learning and subsidiarity of decision-making."

Ingrid Burkett, 2023, p45

Element 3: External relationships and consortia

Cultivating long-term partnerships that transcend transactional project or program-led collaborations is paramount. Mission-oriented initiatives often need a mixed pool of partnerships and funding (e.g. government, philanthropy, corporates) to ensure maximum societal impact and buy-in for long-term sustainability. This can be achieved by working collaboratively with partners and stakeholders to identify and address their needs, deeply understanding partner priorities, fostering generosity in knowledge-sharing, and building interpersonal trust to nurture collaborative relationships for mutual benefit.

Additionally, this element highlights the need for a strategic approach to 'crowd in' partners around mission-oriented opportunities, leveraging external expertise, funding, and governance models to catalyse new initiatives. Moreover, it stresses the importance of proactively showcasing an institution's capabilities and partnership approach and capabilities, seizing opportunities to demonstrate its track record and legacy of successful programs to potential funders and partners.

3.1 Cultivating and maintaining partnerships

Deep understanding of partners: Developing a robust understanding of partner priorities and the niche opportunities where a university can make a significant difference, cultures and operating style, before clear funding or partnership opportunities emerge.

Mutual respect: Nurturing existing partnerships by freely and respectfully sharing information and expertise without a transactional agenda.

Build interpersonal trust: Developing person-to-person relationships with key leaders in partner organisations built on trust and mutual respect.

3.2 Crowding in partners with opportunities

Strategic partner acquisition: Strategically pursuing new partners as opportunities arise with an open ended stance. Bringing in expertise, funding, and gravitas to strengthen the capability to pursue new missions/programs.

Smart governance models: Co-designing governance structures that accommodate partner needs while enhancing trust and meeting internal operational requirements.

Leveraging partnerships for growth: Leveraging existing funding and partnerships to secure further funding and create new opportunities.

3.3 Showcasing capabilities with humility

Strategic showcasing: Seizing opportunities to highlight capabilities and successful initiatives and governance models during interactions with potential funders and partners.

Showcasing delivery capability: Demonstrating a legacy of challenge-led research to partners, to build trust and confidence in operational delivery capability.

Commitment to co-owning missions: Recognising power asymmetries and the need for responsible research across geographies and consortium partners, and demonstrating a commitment to co-owning missions and impact pathways.

> "The conditions for carrying out mission-oriented innovation demands a shift in the understanding of the interactions within the ecosystem. A demand to move away from 'what can I offer you and you offer me' to 'what can we – together – offer the mission'."
>
> **Christian Bason, 2021, p13**

> "The wrong question is: how much money is there and what can we do with it? The right question is: what needs doing and how can we structure budgets to meet those goals?"
>
> **Mariana Mazzucato, 2021, p6**

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Element 4: Entrepreneurial spirit

At its heart, entrepreneurial spirit is essential to navigate uncertainty and complexity. This element champions the importance of being bold, challenging conventions, embracing calculated risks, and demonstrating personal and organisational resilience in the face of setbacks and changes. It requires an environment and capabilities that nurture innovation through flexibility, agility, and support to venture beyond the conventional academic career trajectory. External networks help identify societal challenges and co-develop leading research questions through inclusive co-design. Iteration, experimentation, and rapid prototyping are valued, guided by agile monitoring, learning and evaluation (MEL) frameworks. But it also requires interrogating risk levels across different groups, especially the implications for communities and the most vulnerable who often have more to lose if missions don't fully meet their ambitions.

4.1 Embracing ambition and risk

Setting a high bar for ambition: Identifying a critical challenge, and pioneering, world-leading research questions worthy of study, and developing a bold vision for sectoral and societal change — and evolving the research questions as the theory of change is refined.

A higher risk appetite: Demonstrating a willingness to pursue opportunities that are uncertain, risky, or may have implications for conventional research outputs or career trajectories or organisational performance and reputation.

Cultivating a risk-sensitive culture: Being prepared to take calculated risks and learn from failures, while at the same time recognising university privilege and managing risks collaboratively with partners and stakeholders, including communities and the most vulnerable.

4.2 Flexibility and agility

Customising academic trajectories: Readiness to support and step outside regular academic career pathways and performance metrics and work in new ways (which may be still emergent) that value sectoral and societal impact alongside scholarly impact.

Agile monitoring, learning and evaluation: Developing and using fit-for-purpose monitoring frameworks and tools, endorsed across different disciplines and stakeholder groups, to course correct in a timely manner.

Leveraging networks: Accessing 'on-demand', timely external expertise and advice through networks, enabling informed decision-making and strategic planning, especially in understanding funder and partner motivations.

4.3 Co-design with partners and end-users

Meaningful co-design: Collaborating with partners and funders in the design phase, while maintaining reflexivity and humility, and managing trade-offs and potential conflict, to align with stakeholder needs and priorities.

Navigating uncertainty: Being comfortable with the inherent uncertainty of the inception phase, including the ambiguity surrounding project outcomes, funding prospects, and stakeholder involvement, while persevering through challenges.

Iterative refinement: Employing pilot initiatives and proofs of concepts to test, iterate, and refine strategies and theories of change in an agile manner, supported by rapid learning systems that facilitate course corrections when necessary.

"Putting old wine in new bottles won't work. We must allow missions to genuinely interact with the new types of complex problems societies face, as well as incorporate the new knowledge we have on how innovation comes about in their design: it is serendipitous, non-linear and very high risk."

Mariana Mazzucato, 2018, p10

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Element 5: Institutional supports and innovation

Mission-oriented research initiatives rely on more than just individual academics — they require comprehensive institutional backing. Creating an environment conducive to transdisciplinary collaboration necessitates working across traditional vertical boundaries (e.g. disciplines, faculties, schools) to foster horizontal integration across an organisation. Research institutes and centres can provide these collaborative spaces. Senior leadership support and buy-in also plays a crucial role. They can navigate institutional dynamics, address conflicts, mobilise support and resources, and overcome internal bureaucratic hurdles.

5.1 High-level leadership support and pathway facilitation

Timely strategic sponsorship: Endorsement and backing from senior institutional leaders (i.e. the President/Vice Chancellor, Deputy Vice Chancellors, Deans) providing essential support at critical junctures.

Navigating institutional dynamics: Navigating bureaucratic hurdles and resolving challenges to ensure smooth progress, safeguarding against potential obstacles that could derail the initiative.

Nurturing transdisciplinary momentum: Senior-level advocacy and support to foster collaboration across disciplines, utilising proofs of concepts to sustain and amplify momentum behind the initiative.

5.2 Institutional contributions

Seed funding: Provision of initial cash resources for the co-design phase, covering salaries and operational expenses, and facilitating essential activities such as partner meetings and field trips.

Leveraging in-kind resources: Allocation of staff time and other resources to support the development phase, including secondments from various business units such as finance, HR, and procurement, demonstrating institutional commitment and leveraging external funding.

Co-investment during implementation: Offering matching funds or in-kind contributions to demonstrate institutional investment and incentivise external donors, enhancing fundraising efforts and fostering collaboration (i.e. graduate scholarships).

5.3 Structures for interdisciplinary collaboration

Cross-organisational collaboration: Utilise horizontal collaboration mechanisms, such as research institutes and centres, to facilitate the design of transdisciplinary programs, leveraging their expertise in research impact and faculty foundations.

Agility and autonomy: By embedding initiatives within institutes and centres, visibility, autonomy, and flexibility are enhanced, facilitating rapid adaptation to evolving needs and circumstances.

Strategic alignment with partner priorities: Investment in inter-organisational institutes and centres is guided by partner preferences, recognising their significance in facilitating transdisciplinary research at scale and achieving rapid research translation goals.

"The SDGs provide a unique opportunity for universities and the scientific community in general to re-interpret institutional strategies and determine the structures and mechanisms needed to strengthen engagement with governments and communities."

Fadi El-Jardali, Nour Ataya and Racha Fadlallah, 2018, p3

Element 6: 'Tiger teams' to deliver

Comprising specialised expertise blending business development, leadership, strategy, and research design skills, 'tiger teams' are small and agile, ready to pursue opportunities when they arise, keep the momentum, and strategise effectively with the leadership to convert opportunities. The term 'tiger team' originated from the attributes associated with tigers (such as strength and speed) and became widespread through WWII codebreaking and intelligence efforts, referring to a group of highly skilled individuals assembled to tackle complex, novel, strategically important tasks with agility, precision, and tenacity. In university mission settings, equally important are the ethics of care, compassion, and connection. Unlike traditional grant initiatives, tiger teams working on university research missions also focus on agenda setting and market creation. The scale, complexity, and ambition of these missions, coupled with extensive co-design with government, industry, non-profit partners, and communities (as in Element 3), necessitate strong collaboration skills in negotiation, conflict resolution, and managing trade-offs.

6.1 Dedicated, diverse, and resourced tiger teams

A tiger team: Cross-functional experts brought together to advance the initiative on a day-to-day basis, supporting the academic team and spanning boundaries between the internal and external environments.

Small, nimble, and agile: Committed, nimble, agile teams ready to pursue opportunities when they arise, keep the momentum, and help strategise.

Alignment with Project Leader: Tiger team lead works best when there is a direct line of communications with the Project Leader / Chief Investigator on a day-to-day basis.

6.2 Excellence, expertise, and experience are essential

Commitment to excellence: As with the academic team, the professional tiger teams must be high-performing, driving for excellence, and with proven experience in business development, leadership, strategy, and research design.

Small but diverse: Small teams that grow in size only when additional skill sets are needed. Diversity of expertise and networks is important.

Willingness to stretch: Team members should be 'generalists,' as well as possess specific skills and technical knowledge related to the mission. They should stand ready to undertake diverse tasks, such as administrative duties, to ensure swift product delivery and momentum maintenance.

6.3 Ability to strategically work across the organisation

Political acumen: Deep understanding of the university's political and operational landscape empowers tiger teams to mitigate risks and overcome political obstacles.

Senior and respected: To execute, members need to occupy positions with some degree of seniority and authority, to be able to advance work in a timely and independent manner.

Beyond project management: Their task is not just project management (i.e. calling meetings, developing project plans). Tiger teams contribute to strategy formulation by translating academic visions, concepts, and ideas into actionable plans and materials for iteration.

"Don't break your silos down — master them. Though hierarchical and siloed institutions can inhibit collaboration, sometimes it is more effective to navigate them than to break them down entirely or simply ignore them."

Mission-Oriented Innovation Network (MOIN), 2022, p45

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Element 7: Thinking and working politically

Understanding power dynamics is crucial for mission success. Inspired by 'thinking and working politically' in international development, this element recognises the importance of nuanced navigation of political factors. To achieve sustainable impact, universities must cultivate effective relationships with power holders and influence decision-making, policy, and investment processes beyond their immediate sphere of influence.

Thinking and working politically requires understanding the systemic factors shaping the landscape — navigating stakeholder interests, incentives, and power relations. It also encompasses traditional tactics such as lobbying, advocacy, and leveraging personal networks to generate interest, effect policy change, and secure co-investment. Mission-oriented initiatives, characterised by directionality and intentionality, inherently require political engagement to achieve lasting impact.

7.1: Sector scanning of headwinds and opportunities

Systematic mapping and horizon scanning: Deliberate and consistent analysis of sector trends and headwinds to guide strategic planning, identify potential opportunities, and inform influencing tactics.

Sector leadership engagement: Active involvement in sectors and networks enables the leverage of emergent knowledge and relationships for intelligence gathering, market analysis, and the initiation of agenda-setting activities.

Ongoing and active listening: Continuous and attentive listening to the needs of partners, especially government entities, to understand funding requirements, research translation, and policy impact pathways.

7.2: Engagement with external ecosystems trends

Build and maintain trusted relationships: Establishing and maintaining trusted relationships with key stakeholders across diverse political, industrial, philanthropic, and non-profit sectors to enhance reputation and influence.

Alignment with policy cycles: Understanding and aligning with government policy cycles and priorities, at a range of levels, to ensure strategic adaptation to changing sector trends and investment opportunities.

Readiness for opportunities: Being sufficiently prepared to seize unexpected opportunities when they arise by proactively developing a suite of proposals and ideas, ensuring readiness to capitalise on windows of opportunity.

7.3: Harnessing interpersonal connections and networks

Interpersonal connections: Utilising personal connections and interactions to cultivate relationships and gain insights into sector trends and opportunities, at a range of levels.

Recruiting talent with strategic networks: Attracting individuals with strong external networks to expand an organisation's influence and reach within various sectors.

Strategic use of business-as-usual systems: Intentionally leveraging existing tools and activities, such as conferences, high-profile events, honorary appointments, advisory boards, and technical panels, to build relationships and foster collaboration.

"There is always a design phase; the issue is whether it is done consciously or not. An unconscious design phase is likely to be full of assumptions, missed opportunities, and limited engagement. It will tend to reinforce business-as-usual rather than transformation, and negative outcomes rather than positive co-benefits. We must instead define and engage an active and participative design process for missions."

Hill et al, 2022, p51

5. Reflections and implications

The Framework provides a tool for a range of actors, including university leaders, administrators, academics, research staff, funders, and policymakers, to assess both the challenges within higher education institutions and the opportunities presented by a mission-oriented approach. Its versatility invites diverse application, including to inform talent enhancement programs, professional development initiatives, recruitment strategies, the formalisation of initiative pipelines, and the enhancement of internal and external communication strategies. Additionally, it may be useful to facilitate assessments of organisational 'mission readiness' and the identification of emerging opportunities and ideas.

The Framework prompts critical inquiry regarding the desirability and feasibility of expanding mission-orientated approaches in universities.

The Framework prompts critical inquiry regarding the desirability and feasibility of expanding mission-oriented approaches in universities and devising realistic pathways to complement prevailing research project and program models. While outside the scope of this study, it would be opportune to investigate the feasibility and suitability of mission-oriented approaches in different types of universities (i.e. size, research intensity), as well as gain a deeper understanding of the distinct cultural, structural, and strategic features in the higher education sector shaping mission applicability. For example, the strategic intent of most university research agendas are loosely formed to accommodate academic freedom, posing questions on how mission-oriented agendas are driven from bottom-up, top-down, or both. Likewise, university researchers are highly opportunistic in responding to accessible sources of research funding, especially in relation to resources that are aligned with national agendas and priorities, posing questions on the implications of securing aligned, fit-for-purpose, sustainable funding over the life cycle of missions. Furthermore, the nature of a university's capability base and the motivations of its workforce, with academic and professional staff often moving institutions over their careers, have implications on the ability to 'stay the distance' on long-term initiatives (i.e. 7+ years duration).

The Framework also raises questions about how to... accommodate a diversity of mission typologies.

The Framework also raises questions about how to navigate the diversity of initiatives outlined in the 12 cases and develop strategies and plans that accommodate a diversity of mission typologies. It prompts consideration of the institutional policies, investments, and reforms necessary to establish supportive frameworks and capabilities to make catalysing missions mainstream (or at least easier), and to be able to deliver them as well. Additionally, the Framework provides a basis to explore the applicability of a mission-oriented approach across different university contexts, geographic regions, cultural settings, and research funding landscapes.

No one size fits all: towards a typological schema

The case studies and Framework presented above demonstrate that there is no 'one size fits all' for catalysing university-led mission-oriented initiatives. A mixture of strategies and tactics is required. The nature and composition of these depend on several variables, including: the problem to be addressed; potential solutions and research questions; the level of ambition and overall goal; as well as the number and scope of collaborators, funders, industry, and community partners involved.

From the empirical findings of the 12 case studies, four idealised typologies emerge, elucidated in the schema in Figure 2. These typological 'drivers' delineate entry points and focus areas for university-led mission initiatives: discovery, practice, policy, and community.

The **'Discovery'** driver is characterised by a motivation to advance fundamental knowledge about the nature of a problem while retaining a line of sight to research translation and societal impact. An exemplar of this typology is the US NIH funded ASPirin in Reducing Events in the Elderly (ASPREE) Trial, which aligned with the internationally recognised priority of maintaining health and independence of the growing population of older people. Initiatives anchored in the **'Practice'** typology aim to modify everyday practices. For instance, the Inhaled Oxytocin initiative endeavours to enhance childbirth safety by reforming childbirth and neonatal practices, particularly in low- and middle-income countries. Meanwhile, missions aligned with the **'Policy'** typology strive for broad-scale change through public policy reform. The Climateworks Centre serves as a notable example, dedicated to accelerating action to achieve net zero emissions in alignment with global warming targets. The **'Community'** typology focuses on collaborative problem definition and solution co-design with affected communities and individuals with lived experiences. Initiatives like Revitalising Informal Settlements and their Environments (RISE) and Fire to Flourish exemplify this approach.

Learning by doing

It is imperative to underscore that the emergence of the 12 cases within the Monash ecosystem transpired in the absence of a formalised mission-oriented framework, investment plan, or strategic blueprint. While Monash did have various institutional strategies during this period, notably 'Focus Monash (2015–2020)' strategy, which outlined support for interdisciplinary research to tackle global challenges, there was not a comprehensive, institution-wide framework and associated investments dedicated to nurturing mission-oriented initiatives.

The genesis of these endeavours, therefore, primarily occurred opportunistically, largely outside the structured confines of formal governance and investment frameworks prevailing at the time. Notable examples include instances of strategic recruitment (World Mosquito Program), leveraging philanthropic opportunities as they arose (Monash Centre for Consciousness and Contemplative Studies, Fire to Flourish, Climateworks), targeted engagement with governmental bodies (National Centre for Healthy Ageing, Australia-Indonesia Centre), and participation in large-scale open grant calls (Revitalising Informal Settlements and their Environments).

All cases exhibit features of all four focus areas to some extent. This suggests that while different entry points reflect the underlying motivation, and may influence the design and composition of initiatives, university missions invariably traverse multiple drivers.

This iterative, opportunistic 'learning by doing' approach evolved organically as Monash advanced capabilities and fostered an environment conducive to large-scale transdisciplinary research endeavours. It appears that gradually, this approach morphed into an iterative process, with each subsequent initiative building upon the insights gleaned from preceding endeavours and building systems and capabilities to operate at this large scale.

Emerging from this opportunistic, experiential learning approach, several recurrent challenges have come to light (Box 3). These areas stem from the distinctive operational landscape inherent to university environments. They are crucial for the successful replication and scalability of programmatic mission-oriented research initiatives and thus deserve further study.

Figure 2: Typologies of university-led mission-oriented initiatives.
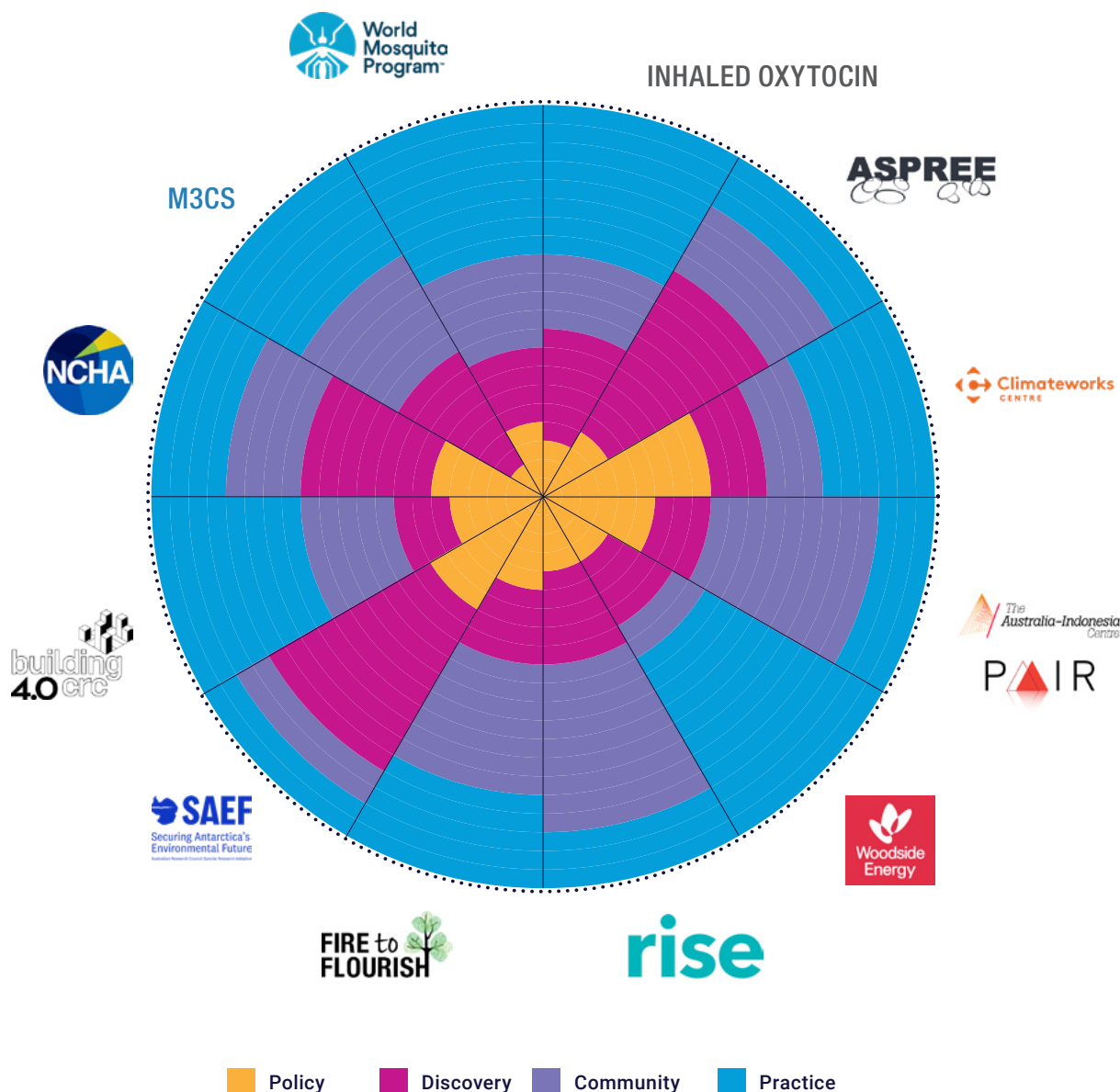
Policy Discovery Community Practice

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Notably, as indicated in Figure 2, all cases exhibit features of all four focus areas to some extent. This suggests that while different entry points reflect the underlying motivation, and may influence the design and composition of initiatives, university-led missions respond to multiple drivers. For example, the National Centre for Healthy Ageing (NCHA) sought to develop better integrated care models using discovery research that informed policy changes in allied health services. Similarly, Securing Antarctica's Environmental Future (SAEF) is anchored in climate and biodiversity scientific discovery while also aiming to impact policy changes on climate change and adaptation. The World Mosquito Program carefully selected collaborators and teams to strengthen the capacity of local communities to protect against mosquito-borne diseases. Thus, this typology schema should be interpreted with a view that while different entry points shape the design, composition of the consortium, and relative focus and core motivations, university-led missions necessarily span across multiple drivers.

This typological schema presents opportunities to diversify university-led missions beyond discovery science. It enables missions to pursue multifaceted goals, and hold multiple motivations, such as generating new knowledge, effecting practice and policy changes, and fostering community engagement and impact. For diverse research communities, funders, and partners, this schema underscores the flexibility to operate using various models.

While different entry points shape the design, composition of the consortium, and research questions and focus, university missions span across multiple drivers, always underpinned by discovery and impact ambitions.

Revitalising Informal Settlements and their Environments (RISE) co-design infrastructure with communities to address pressing water and sanitation infrastructure to improve human health.

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Box 3: **Common challenges with catalysing mission-oriented research in universities**
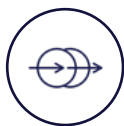
Academic performance frameworks
Prevailing academic performance frameworks often fail to align with the demands of mission-oriented research activities. Inadequate recognition and incentivisation of interdisciplinary collaboration, project management, and translational research efforts hinder engagement and impede the timely realisation of project goals.

Transition phase
Successfully securing funding and launching the mission marks just the initial step; transitioning from the grant acquisition phase to effective program implementation poses significant challenges. Establishing operational structures, assembling teams and building culture, and aligning objectives with deliverables are crucial but often overlooked aspects that require attention and resources.

Partnership stewardship
Sustaining productive relationships with donors, funders, and partners necessitates dedicated resources and meticulous management and leadership. Insufficient attention to ongoing engagement and stewardship can lead to diminished support and hinder the scalability of mission-oriented initiatives.

Education integration
Integrating mission-oriented research initiatives into undergraduate and postgraduate education programs remains underdeveloped and a potential untapped opportunity. Leveraging these initiatives to enrich academic curricula, provide experiential learning opportunities, and foster transdisciplinary collaboration may enhance educational outcomes and cultivate a pipeline of future researchers and innovators.

Risk appetite and management
The inherent risks associated with challenge-led research initiatives often surpass conventional research project risk appetite and risk management frameworks. There are also usually greater risks for communities and those most vulnerable which need to be recognised and taken into account. A mission-oriented approach requires a higher institutional risk appetite. Implementing comprehensive risk assessment strategies tailored to the unique complexities of these endeavours is paramount.

Delivery capability
Translating ambitious mission promises and commitments during the design phase into tangible outcomes in the delivery phase presents formidable hurdles. Challenges in human resources, financial management, legal compliance, and procurement processes can hamper efficient project execution.

Cross-border collaboration
Facilitating responsible research partnerships across geographic and cultural boundaries presents multifaceted challenges. Overcoming cultural, regulatory, and logistical barriers requires concerted efforts and innovative approaches to ensure equitable collaboration and mutual benefit, particularly in bridging divides between the global north and global south.

6. Future directions

To facilitate the advancement of challenge-led research within university contexts and streamline its replication and scalability, effort in three main areas would be opportune.

Strengthen organisational cultures, systems, and supports for challenge-led approaches

There is a pressing need to evolve organisational systems, structures, and cultures to foster transdisciplinary challenge-led approaches on a larger scale. This evolution would entail strengthening governance frameworks to operate more effectively across various organisational units such as faculties, institutes, centres, and the broader research community (Element 5). Enhancing the capability and capacity of cross-university tiger teams (Element 6) is essential for effective collaboration and coordination of such mission endeavours. Additionally, a critical review of academic and professional performance metrics is warranted to incentivise and support challenge-led research endeavours (Element 2). This may involve establishing explicit supports for academics engaged in mission development.

> **Particular attention should be given to the involvement of early- and mid-career researchers in missions, Indigenous researchers, as well as students and postgraduate students, especially PhDs… so they can positively benefit from involvement in larger-scale initiatives.**

Systematising mechanisms for investment and senior sponsorship is required to support academics in building cohesive teams and seeking funding partners and collaborators for challenge-led research initiatives (Element 4). Additionally, there is a need for investment in early-stage, high-risk 'blue sky' ideas across organisational units to facilitate the development of 'proof of concept' for potential breakthroughs. Principles for co-investment and transparent and well-governed on/off ramps are crucial to maximise the impact of investment while minimising transaction costs and the burden on researchers, and effective functioning and deployment of tiger teams (Element 6).

Particular attention should also be given to the involvement of early- and mid-career researchers in missions, Indigenous researchers, as well as students and postgraduate students, especially PhDs. For these groups, it is essential to not only ensure that their careers are not unduly hindered by their engagement in missions, but more importantly to expand opportunities so they can positively benefit from involvement in larger-scale initiatives, building depth in their discipline speciality as well as their breadth across disciplines and sectors.[28]

Deepening the capabilities of universities to integrate academic expertise together with expertise from industry, government, and community organisations in 'prac-ademic' models is important to bridge across sectors with ambitions for societal impact.

Uplift talent capability and reform performance frameworks

Extending challenge-led research at scale necessitates a substantial uplift in the talent capability and performance frameworks of research and professional staff (Elements 2 and 4). Initiatives aimed at talent development, such as mentoring programs tailored for mid-career and senior academics and professional staff, the cultivation of internal 'communities of practice', and the acknowledgement and celebration of transdisciplinary capability are crucial. Moreover, there is a need to nurture a greater diversity of career pathways beyond the conventional academic trajectory to attract and retain talent and grow enterprising, entrepreneurial capabilities (Element 4). Deepening the capabilities of universities to integrate academic expertise together with expertise from industry, government, and community organisations in 'prac-ademic' models is important to bridge across sectors with ambitions for societal impact.

While size and complexity are not necessarily the only determinants of what qualifies as mission-oriented, it is nonetheless the reality that mission-oriented initiatives are by nature, relatively larger in size, are more complex, and involve a high number of partners and stakeholders, with explicit translation requirements. This represents a step-change compared with business-as-usual project and program-based research administration and management. It calls for the explicit building of organisational and human capability and systems to design, develop, and deliver large-scale mission initiatives. This must be done in a synergistic manner with prevailing business as usual to ensure fundamental discovery research remains supported and celebrated as a non-negotiable core role of universities (Element 6).

Mature approaches to external partnerships and reflexive monitoring

Third, scaling up challenge-led research requires a maturation of approaches to external partnerships and reflexive monitoring (Element 3). This entails complementing existing project and program-level interactions with longer-term partnerships and monitoring systems aligned with commitments to mission areas. Achieving this goal necessitates a refined and professional approach to strategic and coordinated partnership management, underpinned by effective systems and processes (i.e. utilisation of customer relationship management systems). This includes thinking and working politically (Element 7), with various stakeholders including philanthropic organisations, development partners, governments, community groups, and non-profits. More effective participatory and reflexive monitoring and learning systems, not only when missions are implemented but also in the way they are initiated and co-designed, are needed.[29]

Mission-oriented initiatives are by nature, relatively larger in size, are more complex, and involve a high number of partners and stockholders, with explicit translation requirements. This represents a step-change compared with business-as-usual project and program-based research.

Further research is needed regarding what makes 'receptive partners'. Operating in mission-oriented consortia, with diverse partners, requires careful matching, and some organisations may not be suitable partners due to misalignment of values, resources, timelines, and/or expectations. University ambitions will be hard to realise if like-minded partners do not stay engaged.

An additional implication is that the universities, and the higher education sector more broadly, would benefit from developing a much more sophisticated understanding of its differentiated role in the innovation system. It should seek to nurture

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capabilities to engage with novel governance arrangements for meaningful cross-organisational collaboration in mission-oriented innovation endeavours. There is a real risk of 'mission-washing', where disparate university-anchored projects and programs are rebranded as missions without the requisite integration with partners and into the governance of innovation systems. As more universities enter this space, it will be important to move beyond the prevailing competitive posture, reinforced by conventional competitive research funding, to nurture genuinely collaborative 'science communities' around common challenges. This implies that scaling up a mission-oriented approach may look more like universities and their researchers connecting to initiatives across a system or contributing to mission-oriented industrial policy initiatives led by others. An unchecked proliferation of university-led missions risks fragmenting efforts and resources, potentially undermining sector-wide innovation outcomes.

ASPirin in Reducing Events in the Elderly (ASPREE) is a long-term multi-centre, bi-national study of aspirin and health in older adults. During the study period, several mobile laboratory 'Biobuses' traveled more than 200,000 km across rural and regional areas around Australia to collect, process, and store samples from study participants.

Limitations and potential future work

This study was confined to examining 12 case studies, focusing primarily on the design and catalysing phase of the initiatives within the context of one institution and its campuses located in Australia. To enhance the Framework, four areas for future investigation are proposed.

First, there is value in systematically documenting the **implementation experience** of these and other similar initiatives. Understanding what aspects were successful and which encountered challenges during delivery, as well as identifying unexpected consequences resulting from decisions made during the inception phase, would provide valuable insights to refine the Framework.

Second, **broadening the scope to include a diverse range of institutions and geographic contexts** would enrich the Framework. Comparing the experiences of the 12 initiatives at Monash with those from other institutions could reveal additional insights and identify any essential elements missing from the Framework. There are also questions regarding how to situate the mission-oriented efforts of universities in a larger portfolio of work that addresses the specific challenge. Universities are not the only actors; there are efforts led by national and local governments, development agencies, Non-Government Organisations,, as well as by commercially driven innovators and others in conjunction with state-led and -supported missions. How can and should universities connect to these portfolios and ensure additionality?

Third, **assessing the impact of mission-oriented approaches** is crucial. While there is an assumption that such approaches lead to greater scholarly, sectoral, and societal impact, empirical evidence to support this claim is lacking. Future studies are needed to evaluate the impact of mission-oriented initiatives to develop a more robust monitoring and evaluation framework and understand the level of additionality of a mission-oriented approach over and above conventional research programs and projects.

Finally, **deeper analysis of specific elements** of the Framework is warranted. This could involve examining leadership dynamics (Element 2), partnership-building strategies and consortia governance models (Element 3), trust-building mechanisms (Element 7), and the effectiveness of transdisciplinary research approaches (Element 1).

There is a real risk of 'mission-washing', where disparate university-anchored projects and programs are rebranded as missions without the requisite integration with partners and into the governance of innovation systems… An unchecked proliferation of university-led missions risks fragmenting efforts and resources, potentially undermining sector-wide innovation outcomes.

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7. Twelve case studies
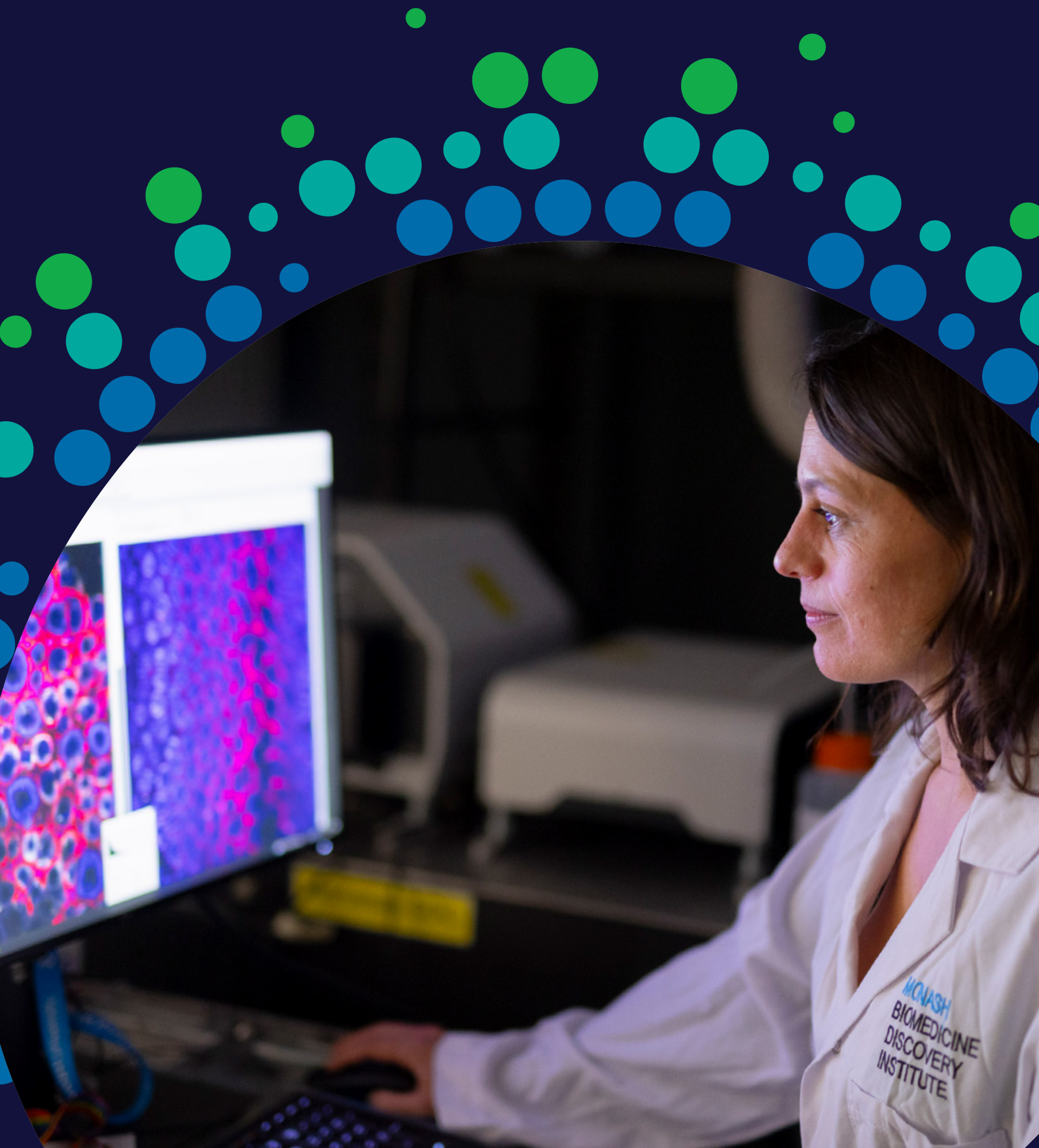
CASE STUDY 1

World Mosquito Program

- Transition from discovery research to large-scale global expansion.
- Progressive evolution and growth over time, with carefully selected teams and collaborators.
- Consortia funding including from government and philanthropy.

Description	The World Mosquito Program (WMP) works to protect communities from mosquito-borne diseases including dengue, Zika, yellow fever, and chikungunya using a naturally occuring bacteria called *Wolbachia*.
Timeframe	Eliminate Dengue: 2004–2017; World Mosquito Program 2017–2021; WMP Limited: 2022+.
Vision / mission / impact pathway	WMP is committed to improving health conditions and strengthening the capacity of local communities to reduce the threat of mosquito-borne diseases including dengue, Zika, yellow fever, and chikungunya. At December 2021, WMP has released Wolbachia-carrying mosquitoes to reach more than 11 million people, significantly reducing the incidence of dengue and chikungunya.
Locations	Program delivery in 14 countries across Oceania, Asia, Europe, and the Americas. Offices established in Australia, Vietnam, and France.
Monash	Previously located in the Faculty of Science, the program moved in 2016 to the Institute of Vector-Borne Diseases. In 2022, WMP became a wholly owned entity of Monash named WMP Limited.
Consortium partners	National and international government partners; Department of Foreign Affairs and Trade; New Zealand Foreign Affairs and Trade Program; Foundation for the National Institutes of Health; Bill & Melinda Gates Foundation; National Health and Medical Research Council; Wellcome Trust; USAID.
Website/key documents	www.worldmosquitoprogram.org
Key publications	Utarini, A et al. (2021) *Efficacy of Wolbachia-Infected Mosquito Deployments for the Control of Dengue*, New England Journal of Medicine, June, 384:2177-2186 Gesto JSM, et al. (2021) *Large-Scale Deployment and Establishment of Wolbachia Into the Aedes aegypti Population in Rio de Janeiro, Brazil.* Frontiers in. Microbiology; 12:711107

CASE STUDY 2

Inhaled Oxytocin Project

- Initiated with philanthropic funding.
- Partnerships with the pharmaceutical industry.
- Strong understanding of impact pathways developed over time to inform ongoing strategy and partnerships.

Description	A specialist team at Monash Institute of Pharmaceutical Sciences, led by Professor Michelle McIntosh, has developed an innovative, heat stable powder formulation of oxytocin that when inhaled, aims to provide the same protection against PPH (postpartum haemorrhage) as an intramuscular (IM) injection, the current global standard. Inhaled Oxytocin Project aims to provide a product that reliably delivers the required dose of oxytocin to prevent PPH independent of the need for cold-chain storage conditions or additional consumables such as needles and syringes.
Timeframe	2008–2009: Concept developed and basic research conducted at Monash. 2010–2014: Initial external funding and significant media exposure. 2014+: Partnering with pharmaceutical companies.
Vision / mission / impact pathway	Oxytocin is the standard therapy for the prevention and treatment for postpartum haemorrhage, but currently only exists as an injection product that requires refrigerated supply and storage to maintain quality and skilled healthcare workers for safe administration. The Inhaled Oxytocin Project seeks to improve access to oxytocin in low- and middle-income countries by designing and developing an effective inhaled oxytocin that is: heat stable, requiring no refrigeration; non-invasive with no need for syringes, needles, or other consumables; self-contained; simple to use; and affordable.
Locations	Monash Parkville, Melbourne, with implementation research conducted in Ethiopia, Myanmar, and India.
Monash	Faculty of Pharmacy and Pharmaceutical Sciences.
Consortium partners	GSK; Janssen Pharmaceutica N.V. (a part of the Janssen Pharmaceutical Companies of Johnson & Johnson); The Bill & Melinda Gates Foundation; McCall MacBain Foundation; Grand Challenges Canada; Saving Lives at Birth; Planet Wheeler.
Website/key documents	www.monash.edu/iop
Key publications	Lambert P, McIntosh MP et al. (2020) *Oxytocin quality: evidence to support updated global recommendations on oxytocin for postpartum hemorrhage.* J Pharm Policy Pract. Gajewska-Knapik K, Kumar S, Sutton-Cole A et al. (2023) *Pharmacokinetics and safety of inhaled oxytocin compared with intramuscular oxytocin in women in the third stage of labour: A randomized open-label study.* Br J Clin Pharmacol

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CASE STUDY 3

ASPirin in Reducing Events in the Elderly (ASPREE)

- Created a major change to international prevention guidelines.

- Created a major US-Australian partnership and facilitated access to multiple research collaborations.

Description	ASPirin in Reducing Events in the Elderly (ASPREE) was a randomised clinical trial of aspirin in 19,100 healthy older adults. Its purpose was to determine whether daily aspirin prolongs survival free of dementia or physical disability.
Timeframe	ASPREE clinical trial: 2010–2024.
Vision / mission / impact pathway	Aspirin has been the most widely used of all preventive drugs, however lack of knowledge of its risk/benefit profile in older people was of increasing concern. The vision of the ASPREE trial was to definitively resolve this question through one of the largest preventative medicine trails yet undertaken.
	The principal results were published in three papers in the New England Journal of Medicine in September 2018. Its results led to a major change to international guidelines regarding the use of aspirin as a preventive agent in the elderly. All three NEJM papers were listed in Altimetric top 100 research publications for 2018.
Locations	16 study sites in Victoria; Tasmania; South Australia; NSW; and the ACT. 22 US sites across Alabama; District of Columbia; Georgia; Illinois; Iowa; Louisiana; Michigan; Minnesota; New York; North Carolina; Pennsylvania; Rhode Island; Tennessee; and Texas.
Monash	Initiated and led by the Monash Department of Epidemiology and Preventive Medicine (DEPM), School of Public Health and Preventive Medicine.
Consortium partners	GSK; Janssen Pharmaceutica N.V. (a part of the Janssen Pharmaceutical Companies Australia: Monash University; Menzies Institute for Medical Research (Tasmania); Australian National University; University of Adelaide. USA: Berman Center for Outcomes and Clinical Research (Hennepin Healthcare Research Institute); Massachusetts General Hospital (MGH)/Harvard; Rush Medical Center; University of Iowa; FAVER - Emory University. Lives at Birth; Planet Wheeler.
Website/key documents	aspree.org/aus
Key publications	McNeil et al (2018) *Effect of Aspirin on Disability-free Survival in the Healthy Elderly.* N Engl J Med 2018; 379:1499-1508
	McNeil et al (2018) *Effect of Aspirin on All-Cause Mortality in the Healthy Elderly.* N Engl J Med 2018; 379:1519-1528.
	McNeil et al (2018) *Effect of Aspirin on Cardiovascular Events and Bleeding in the Healthy Elderly.* N Engl J Med 2018; 379:1509-1518

Climateworks Centre

- Ambitious research translation to drive decarbonisation.
- Blended funding arrangements.
- Co-governance with partners.

Description	Climateworks was co-founded by Monash University and the Myer Foundation to bridge the gap between research and climate action. Climateworks sits within the Monash Sustainable Development Institute (MSDI) and is accelerating the transition to net zero emissions for Australia, Southeast Asia, and the Pacific. Climateworks is committed to the UN Sustainable Development Goals, with a focus on climate action.
Timeframe	Program inception: 2008–2009; program delivery 2009+.
Vision / mission / impact pathway	Climateworks' mission is to accelerate action to achieve net zero emissions within Australia, Southeast Asia, and the Pacific, aligned with the global goal of limiting warming to 1.5 degrees. After more than 10 years working with influential sectors to shift to low or zero-emissions solutions, Climateworks entered the 'transformational decade' with an understanding that, to achieve our mission, we needed to scale up — increasing our ambition and impact. To meet this challenge, Climateworks is growing their team across seven key systems: food, land and oceans; cities; sustainable corporates; sustainable finance; industry; energy; sustainable economies.
Locations	Offices in Melbourne, Canberra, Perth, and Jakarta; with mission focus on Australia; Southeast Asia; the Pacific.
Monash	Monash Sustainable Development Institute (MSDI).
Consortium partners	The Myer Foundation and various donors.
Website/key documents	www.climateworkscentre.org

CASE STUDY 5

Partnership for Australia-Indonesia Research

(PAIR, formerly Australia-Indonesia Centre (AIC))

- Multi-university and stakeholder consortium.
- Strong connections and engagement with the main donor.
- Challenging dominant global north-south research hierarchies.

Description	The Australia-Indonesia Centre (AIC) is a bilateral collaborative research initiative established by the Indonesian and Australian governments in 2013. Its mission is to advance people-to-people links in research, science, innovation, and culture. The Partnership for Australia-Indonesia Research (PAIR) is the flagship program designed and delivered by the AIC in Phase 2 of the Centre (2018–2023). PAIR facilitates and deepens the research linkages between both countries and builds on the Centre's earlier work in Phase 1 (2014–2018).
Timeframe	Phase 1 (AIC): 2014–2018; Phase 2 (AIC with PAIR): 2018–2022.
Vision / mission / impact pathway	PAIR's objective is to contribute to sustainable development priorities through evidence-based decision-making. The vision is for PAIR research to be utilised to address sustainable development challenges and for the PAIR evidence-to-policy model to be replicated or scaled-up in other provinces.
Locations	Melbourne; Brisbane; Perth; Java; South Sulawesi.
Monash	AIC and PAIR are located within the Monash Global Engagement portfolio.
Consortium partners	University partners: Universitas Airlangga; Universitas Gadjah Mada; Universitas Hasanuddin; Universitas Indonesia; IPB University; Institut Teknologi Bandung; Institut Teknologi Sepuluh Nopember; The University of Queensland; The University of Melbourne; The University of Western Australia. Policy partners: Department of Foreign Affairs and Trade (Australia); Ministry of Education, Culture, Research and Technology (Indonesia); National Innovation and Research Agency (BRIN); South Sulawesi Provincial Government; Ministry of Transportation (Indonesia). Partners for impact: The Conversation; Knowledge Sector Initiative; OpenLearning Limited.
Website/key documents	australiaindonesiacentre.org
Key publications	Sebastian, E, et al., 2020, _PAIR Annual report 2019-2020_, The Australia-Indonesia Centre, Melbourne Sebastian, E, et al. 2021, _PAIR Annual report 2020-2021_, The Australia-Indonesia Centre, Melbourne

CASE STUDY 6

Woodside Monash Partnership

- One of the largest industry-academia partnerships in Australia.
- Blended funding with philanthropic and contract research.
- Industry, commercialisation, enterprise focus.

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Description	The Woodside Monash Partnership is a strategic research partnership between Monash University and Woodside Energy to advance energy solutions for a lower carbon future. The partnership consists of two components: the Woodside Energy FutureLab at Monash (2016–2025) and the Woodside-Monash Energy Partnership (2021–2025). The FutureLab focuses on innovative solutions in materials science and data science. The Energy partnership was established as a broader university-wide partnership with a focus on novel technologies in the hydrogen value chain and carbon abatement.
Timeframe	FutureLab inception: 2014–2016; FutureLab implementation (Phase 1): 2016–2020; FutureLab (Phase 2): 2021–2025. Woodside Monash Energy Partnership inception 2018–2019; Partnership delivery: 2019–2024.
Vision / mission / impact pathway	The FutureLab focuses on solving today's challenges using the knowledge and technologies arising from additive manufacturing, materials engineering, and data science. The Woodside Monash Energy Partnership focuses on the energy transition to a lower-carbon future, with a three-pillar approach: affordable, bulk clean energy; carbon abatement; and thought leadership.
Locations	Melbourne; Perth.
Monash	Faculty of Engineering; Faculty of Information Technology; Faculty of Science; Faculty of Business and Economics.
Consortium partners	Woodside Energy.
Website/key documents	monash.edu/woodside monash.edu/woodside/futurelab monash.edu/woodside/energy-partnership

CASE STUDY 7

Revitilising Informal Settlements and the Environments (RISE)

- Ambitious transdisciplinary research design.
- Leadership is critical to catalyse initiatives in complex conditions.
- Funders drawn to bold effort that combines discovery research with research translation and societal impact.

Description	A transdisciplinary research program working at the intersections of health, environment, and water and sanitation. RISE is trialling a new water sensitive approach to water and sanitation management in informal settlements.
Timeframe	Preparation phase: 2015–2017; program delivery: 2017–2027.
Vision / mission / impact pathway	RISE is co-designing location specific solutions that integrate green infrastructure, such as constructed wetlands, to strengthen the whole-of-life water and sanitation cycle.
Locations	Makassar, Indonesia and Suva, Fiji.
Monash	Led by Monash Sustainable Development Institute, with expertise from six Monash faculties: Art, Design and Architecture; Medicine, Nursing and Health Sciences; Engineering; Business and Economics; and Law.
Consortium partners	The Wellcome Trust; New Zealand Ministry of Foreign Affairs and Trade; Australian Department of Foreign Affairs and Trade; Asian Development Bank, Hasanuddin University; the City of Makassar; the Ministry of National Planning; the Ministry of Public Works and Housing; and the Indonesia-Australia Partnership for Infrastructure. In Suva, Fiji, by the Ministry of Housing and Community Development; the Water Authority of Fiji; Fiji National University; The University of the South Pacific and Live & Learn Environmental Education. Research draws on expertise from Stanford University, Emory University, The University of Melbourne, University of Cambridge and the Wellcome Sanger Institute, South East Water, iota, and Melbourne Water pioneer our water sensitive, nature-based approaches.
Website/key documents	RISE (2021) Annual Report rise-program.org/research-highlights rise-program.org/news
Key publications	Brown et al (2018) *Improving human and environmental health in urban informal settlements: the Revitalising Informal Settlements and their Environments (RISE) programme.* The Lancet Planetary Health, May 2018 Leder K, et al (2021) *Study design, rationale and methods of the Revitalising Informal Settlements and their Environments (RISE) study*: BMJ Open French, M et al (2021) *A planetary health model for reducing exposure to faecal contamination in urban informal settlements: Baseline findings from Makassar, Indonesia.* Env. Intl., Vol 155

Fire to Flourish

- The value of deep and open co-creation with philanthropic partners.
- Entrepreneurial and bold leadership supported by a tiger team/pursuit team from Monash central portfolios.
- Organisational agility and flexibility to catalyse ambitious initiatives.

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Description	Fire to Flourish is a five-year transdisciplinary research project working at the intersection of disaster resilience and community development. Fire to Flourish aims to support communities to lead their own recovery, co-create foundations for long-term resilience and wellbeing, and disrupt cycles of entrenched disadvantage.
Timeframe	Preparation phase: 2019–2020; program delivery: 2020–2025.
Vision / mission / impact pathway	Enabling communities to lead effective action for equitable, inclusive, and resilient futures. End-of program outcomes: (i) Focus communities have strengthened their disaster resilience in ways that address inequalities; (ii) Self-sustaining national systems of community connection and learning strengthening resilience; (iii) Strengthened system conditions and capabilities for community-led resilience that addresses inequities.
Locations	Working with vibrant communities from four local government areas (LGAs) across New South Wales and Victoria, in Tenterfield, Clarence Valley, Eurobodalla and East Gippsland.
Monash	Initiated and led by the Monash Sustainable Development Institute (MSDI), with the Faculty of Education; Faculty of Art, Design and Architecture; Faculty of Arts; Faculty of Science; Faculty of Medicine, Nursing and Health Sciences; Faculty of Information Technology; Monash Business School, Monash Accident Research Centre.
Consortium partners	Paul Ramsay Foundation; Metal Manufactures Limited; The Lowy Foundation; The Australian Centre for Social Innovation; Clarence Valley Council; Eurobodalla Shire Council; Tenterfield Shire Council; East Gippsland Shire Council.
Website/key documents	monash.edu/msdi/initiatives/fire-to-flourish monash.edu/news/articles/monash-university,-paul-ramsay-foundation-and-metal-manufactures-pty-ltd-partner-to-reimagine-community-resilience-in-new-$50-million-program
Key publications	Fire to Flourish (2021) Annual Report. Fire to Flourish (2021) National Survey: Disaster Preparedness and Resilience.
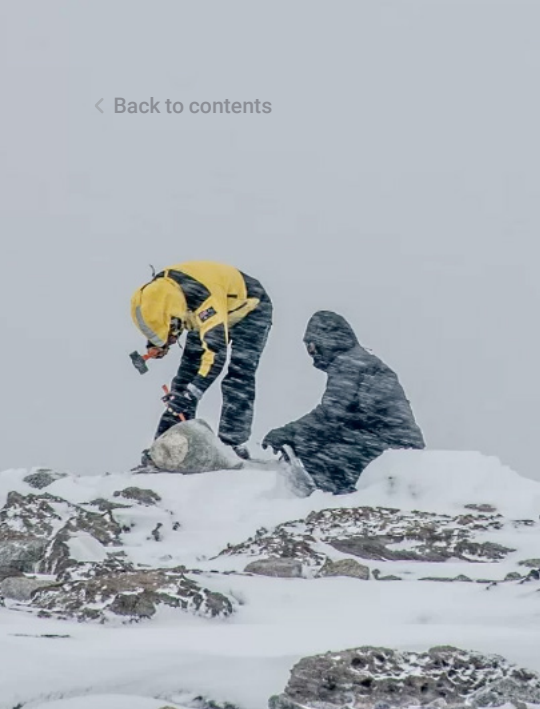
CASE STUDY 9

Securing Antarctica's Environmental Future (SAEF)

- Consortium building through long-term networking in academic and non-academic settings.
- Co-development reflecting geopolitical issues and gaps in research translation.
- Leadership as central to consortium building and program concept

Description	SAEF is an ambitious research initiative seeking to understand changes taking place in the climate and biodiversity of the Antarctic region, and their implications for the Earth System. SAEF develops innovative ways to forecast, mitigate, and manage these changes, and will collaborate with policymakers to help make decisions for Antarctica's future and adaptation to its effects on the Earth System.
Timeframe	Preparation phase: 2018–2020; program delivery: 2021–2030.
Vision / mission / impact pathway	SAEF delivers advanced science alongside data-to-decision support tools that ensure new evidence can be deployed to strengthen Antarctic and broader climate policy and governance in a time of rapid environmental and geopolitical change.
Locations	Antarctica; Melbourne; Wollongong, Brisbane; Sydney; Townsville; Adelaide; Canberra; Perth; Auckland; Dunedin; Wellington; Hamilton (NZ); Berkeley; Boulder; New Orleans; Exeter; Cambridge (UK); Majorca; Pretoria; Santiago; Tromsø (Norway).
Monash	Faculty of Science (School of Biological Sciences; School of Earth, Atmosphere and Environment); Faculty of Medicine, Nursing and Health Sciences (BDI, Department of Microbiology).
Consortium partners	Main university partner nodes at the University of Wollongong and Queensland University of Technology. Thirty partners in Australia and abroad including universities, museums, government bodies, and international Antarctic research programs.
Website/key documents	arcsaef.com
Key publications	arcsaef.com/about-saef/#annual-reports

Building 4.0 CRC

- A Cooperative Research Centre (CRC) which is a specific model, anchored with industry.
- Strong research translation and co-design approach with non-academic partners.
- Driven leadership, strong faculty support, and 'crowding in' of partners.

Description	Aiming to develop an internationally competitive, dynamic and thriving Australian advanced construction manufacturing sector. Through research-industry-government collaboration and new technologies of the 4th industrial age, Building 4.0 CRC will catapult the building industry into an efficient, connected and customer-centric future, delivering better buildings at lower cost along with the human capacity to lead this future industry.
Timeframe	Program inception: 2017–2019; program implementation: 2020–2027.
Vision / mission / impact pathway	Building 4.0 CRC will benefit industry partners through increased profitability and productivity and generate collaborative partnerships with leading industry, government, research, education and training stakeholders. It will achieve this through its four focus areas: People, Processes and Culture; Sustainability; Digitalisation; and Industrialisation.
Locations	Melbourne; Sydney; Brisbane.
Monash	Monash Art, Design & Architecture; Faculty of Business and Economics; Faculty of Law; Faculty of Engineering; Faculty of Information Technology.
Consortium partners	Eighteen commercial and industry partners including Lendlease; BlueScope; Sumitomo Forestry; uTecture; Bentley Homes; Salesforce; A.G.Coombs; Coresteel Buildings; Ultimate Windows; Hyne Timber; M-Modular; Fleetwood; AWS; Taronga Ventures; Ynomia; Viridi; Schiavello. Peak Industry Partners and Associations: Master Builders Association Victoria; Green Building Council of Australia; PrefabAUS; Standards Australia. Research Organisation Partners: Monash; University of Melbourne; QUT. Vocational Education and Training Partner: Holmesglen Institute. Government Partners: Victoria State Government Jobs, Precincts and Regions; Victorian Building Authority.
Website/key documents	building4pointzero.org
Key publications	Bulidng 4.0 CRC (2021) Annual Report

CASE STUDY 11

National Centre for Healthy Ageing (NCHA)

- A pioneering initiative generated in Monash's largest faculty delivered in close partnership with Peninsula Health.

- Ambitious vision delivered with agility.

- A portfolio of experimental research projects and programs.

Description	This partnership between Peninsula Health and Monash University aims to create better integrated care models to promote health and wellbeing across people's lifespan, and drive improvements in the way people seek out and access care.
Timeframe	Preparation phase: 2017–2019; program delivery: 2020–2025.
Vision / mission / impact pathway	NCHA's mission is to become Australia's leading integrated healthcare research, development, and implementation hub focused on healthy ageing. Through data collection and analysis, real-world and real-people testing, and future-focused simulated environments, the Centre empowers collaborative action that delivers significant, evidence-based, lasting outcomes, to help ageing people in Australia and around the world live healthy and productive lives.
Locations	Melbourne, Australia.
Monash	Faculty of Medicine, Nursing and Health Sciences (MNHS).
Consortium partners	The Australian Government, Peninsula Health.
Website/key documents	monash.edu/medicine/national-centre-for-healthy-ageing

University-led mission-oriented research and innovation: A Framework for catalysing large-scale transdisciplinary research

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CASE STUDY 12

Monash Centre for Consciousness and Contemplative Studies (M3CS)

- Donor-initiated and philanthropy led inbound opportunity.
- Short timeframe for catalysing the initiative.
- Strong support from Monash senior leaders.
- Interdisciplinary, spanning STEM and HASS.

Description	The Monash Centre for Consciousness and Contemplative Studies (M3CS) brings together experts in philosophy, neuroscience, medicine, and education as well as inter-faith and secular dialogues.
Timeframe	Program inception: 2020–2021; program delivery 2021+.
Vision / mission / impact pathway	The M3CS vision is to make contemplative practices central to our conscious connection with each other and our environment, thus enabling us to better solve the many challenges the world confronts. The M3CS mission is to conduct research across humanities, philosophy, psychology, medicine, and neuroscience, to deliver innovative, experiential, and evidence-based education on contemplative practices, to promote interfaith and secular dialogue, and to engage with contemplative communities and partner organisations.
Locations	Melbourne.
Monash	M3CS is a university research centre sitting within the School of History, Philosophy and International Studies in the Faculty of Arts, with Professor Craig Hassed seconded from the Faculty of Medicine, Nursing and Health Sciences.
Consortium partners	Three Springs Foundation.
Website/key documents	monash.edu/consciousness-contemplative-studies/home

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