11-12 October 2021

Funders Forum

How do funders work with measuring effects of the research financing?

Dr Anne-Maree Dowd
Executive Manager
CSIRO

Praxis and experience on impact management/ assessment in research financing foundations

Our strategy at a glance

Australia's National Science Agency

Purpose

Solving the greatest challenges through innovative science and technology.

Vision

Create a better future for Australia.

Objectives

Primary activities to deliver our purpose

1. Conduct and encourage the translation of Australia's world-class scientific research into impact
2. Create and manage Australia's national laboratories
3. Stimulate innovation for Australian industry, academia and government

Challenges and missions

Six challenges we're helping the nation to solve including large-scale collaborative research missions

- Health and wellbeing
- Food security and quality
- A secure Australia and region
- Resilient and valuable environments
- Sustainable energy and resources
- Future industries

Strategic pillars

The core areas that guide our operations

- Deliver real solutions from excellent science and technology
- Improve innovation from greater collaboration
- Bring out our best from thriving culture and teams

Values

The centre of our cultural vision

- People first
- Further together
- Making it real
- Trusted

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Our first steps

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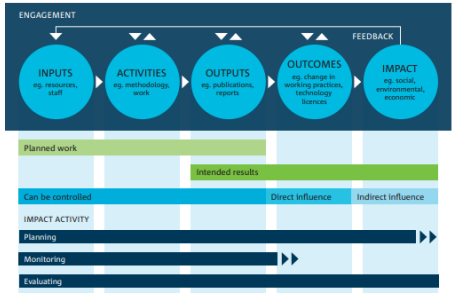
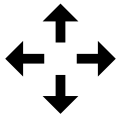
BARRIERS

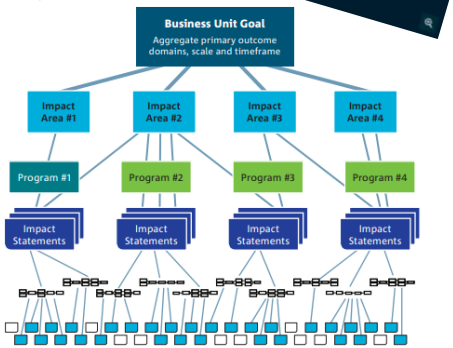
PEOPLE	LEADERSHIP	SYSTEMS

1. Choose a framework

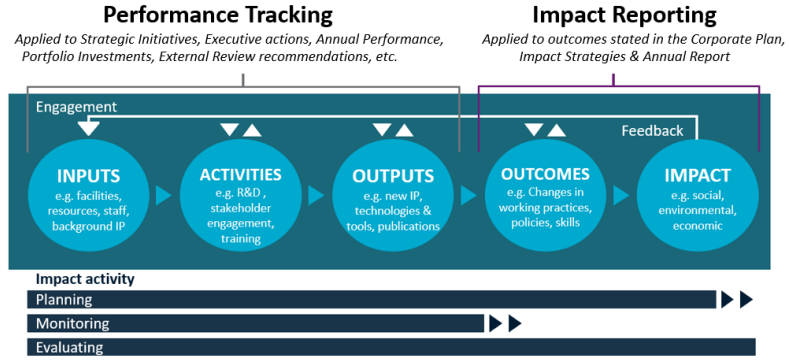




2. Link to strategy & cascade



3. Embed in performance management



CHALLENGES

Establishing a common language around your framework

Shift your culture to be mission-driven and impact focused

Establish impact as the core focus of your strategy

Must drive the impact portfolio down the organisation

Must conduct and build credible & rigorous impact data

Include impact data in investment decision making

MINERALS

Strategy on a page

Purpose

Solving the greatest challenges through innovative science and technology

Vision

Create a better future for Australia

Goal

Deliver science and technology options for the discovery and safe, sustainable development of Australia's mineral endowment and enable flow-on benefits to the nation

Objectives

Primary activities to deliver our purpose

1. Conduct and encourage the translation of Australia's world-class scientific research into impact
2. Create and manage Australia's national laboratories
3. Stimulate innovation for Australian industry, academia and government

Challenges

Directing our efforts on Australia's biggest problems

- Health and wellbeing
- Food security and quality
- A secure Australia and region
- Resilient and valuable environments
- Sustainable energy and resources
- Future Industries

Impact areas

Focus of our research and development activities

Growing Australia's resource base

Develop technologies that unlock currently stranded resources and make them available for mining, and exploration concepts that lead to new discoveries through their deployment by industry to transforming the industry's approach to design and control in mining, material management and processing with commensurate improvements in one recovery and waste generation

Driving social and environmental performance

Improve environmental performance and footprint across the value chain through precision and in-place mining of mental extraction, develop technologies that improvement mining safety, and supporting both regions and industries to navigate Australia's transition to net zero emissions while protecting and growing the market position of our most valuable exports

Increasing Australia's global competitiveness

Develop sensing and automation technologies that facilitate the remote management of mining and ore-waste sorting, integrate technology solutions for measurement, modelling and optimization of mineral processing creating additional value from resources, and create new industries that transform raw mineral commodities into unique higher-value products

Measuring success

Key achievements to be delivered by 2023-24

People

- 50% of staff having newly acquired digital and data skills
- Capability profile and leadership closely aligned with technology programs and commercial framework

Science

- Reputation as Australia's most prominent research organization working across minerals value chain
- Integrated science program delivered across CMR and integrated with CSIRO around key priorities
- Effective business integration of Future Science outcomes

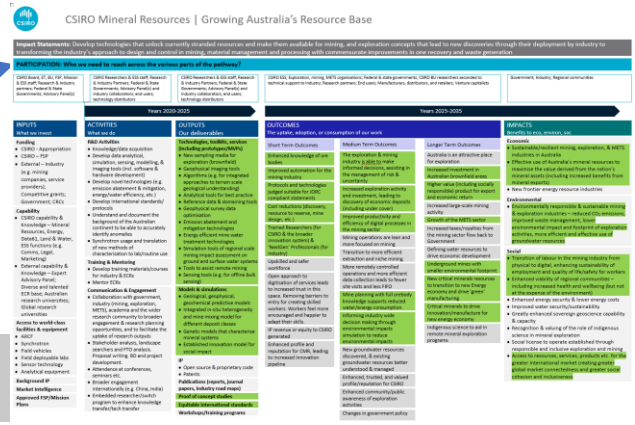
Impact

- New spin-out technologies returning IP revenue to CSIRO
- Process developments to enhance Australia's position as a supplier of critical metals
- Growing resource and technology exports
- Pilot deployment of new technologies for sustainable mining systems and environmental performance

Minerals

GOAL: *Delivering science and technology options for the discovery and safe, sustainable development of Australia's mineral endowment to enable flow-on benefits to the nation*

Each *Impact Area* underpinned by an impact pathway



IMPACT AREAS	IMPACT STATEMENTS	INVESTMENT DELEGATE	OTHER SUPPORTING BUSINESS UNITS
Growing Australia's Resource Base	**Exploration through cover**: Australia's resource base hidden under cover is effectively explored and available for development. The major challenge for mineral exploration in Australia – the depth of cover – is now being overcome. Discovery at depth is delivering major minerals development opportunities of national importance	Sandi Occhipinti	EN, D61, LW, MF, FSP
	Deep Earth Imaging Future Science Platform: The tools required to enable exploration for, and management of, resources at depth are developed and widely deployed	Rob Hough	EN, LW, D61
	Unlocking Australian Ores: Challenges to mine feasibility/expansion due to resource complexity or grade limitations are overcome through application of novel processing workflows and methods. Recovery of resources from complex or stranded Australian orebodies is enabled, creating additional value from Australian resources	Louise Fisher	D61, FSP
Increasing Australia's Global Competitiveness	**Critical Energy Metals Mission**: New industries transform raw material commodities into unique higher-value products, building Australia's value-added offering, creating jobs and securing sovereign supply	Jerad Ford	MF, LW
	Orebody Knowledge: Rapid, multi-scale and multi-modal resource characterization underpins social-environmental and commercial input to mine planning, design, development and closure. Increased data density in orebody, models, and the delivery of digital tools that support and enhance decision making, transforms the industry's approach to design and control in mining, material management and processing with major improvements in ore recovery and waste generation	David Miljak	D61, EN, FSP
	Sustainable Mining Systems: Precision and in-place mining technologies allow the mining industry to better exploit inherent orebody variability. Coupling and integration of digital resource twins, sensing and mining technologies lowers mining costs and reduces waste, water and energy footprints of mining and enables systems for ore-waste sorting improving productivity and safety	Hua Guo	AF, EN, D61, LW, MF
Driving Social and Environmental Performance	**Process Optimisation**: Integrated technology solutions linked to measurement, modelling and optimization of mineral processing support increased productivity in mineral production, creating additional value from resources at sit, commodity and/or industry scale - Australian commodities are valued and competitive on global markets	Andrew Jenkins	LW, EN, D61, FSP
	Towards New Zero for Resources Industry and Agriculture Mission: Integrated technology solutions are supporting both regions and industries to navigate Australia's transition to net zero emissions while protecting and growing the market position of our most valuable exports	Warren Flentje	D61, MF, LW
	Water, Energy and Environment: Integrated technologies have driven improvements in safety and reduced environmental impacts of mining. Enhanced environments and social benefits from mining sustain the industry's social licence to operate	Ewan Sellers	LW, D61, MF, M

Other Business Units key

AF – Agriculture and Food
D61 – Data61
EN – Energy
FSP – FSP
LW – Land and Water
MF – Manufacturing
M – Missions

Impact Commitments & Delivery

Mineral Resources

GOAL

Deliver science and technology options for the discovery and safe, sustainable development of Australia's mineral endowment and enable flow-on benefits to the nation

CHALLENGES

Directing our efforts on Australia's biggest problems

- Health and wellbeing
- Food security and quality
- ✓ A secure Australia and region
- ✓ Resilient and valuable environments
- ✓ Sustainable energy and resources
- ✓ Future industries

OUR SUCCESS

What impact we delivered

FY21 Impact Case Study: Chrysos Photon Assay

Photon Assay is a new form of mining technology. It uses a high-powered, electronic X-ray source as a means of identifying gold atoms in mineral samples, providing an accurate, low-cost reading of the gold content of a mineral sample to inform mining operations.

ECONOMIC IMPACT	*ENVIRONMENTAL IMPACT*	*SOCIAL IMPACT*
• Improved plant efficiency **Net benefit of $161.1m** **BCR of 10.6:1**	• Reduction in hazardous lead-contaminated waste and carbon dioxide emissions	• Improved workplace safety

Key insights for CSIRO: Lessons learnt from Energy impact assessments

1. The impacts are likely much larger in the longer term, based on higher uptakes of the technology and the potential for further disruption of mining processes.
2. The export opportunities for the technology would also lead to higher benefits, although due to data limitations, these could not be quantified.

DRIVING IMPACT

Focus of our research to achieve our goal

3 Impact Areas

9 Impact Statements

Growing Australia's Resource Base	Exploration through cover
	Deep Earth Imaging Future Science Platform
	Unlocking Australian Ores
Increasing Australia's Global Competitiveness	Critical Energy Metals Mission
	Orebody Knowledge
	Sustainable Mining Systems
Driving Social and Environmental Performance	Process Optimisation
	Towards New Zero for Resources Industry and Agriculture Mission
	Water, Energy and Environment

SUPPORTING IMPACT

Deployment of our capability adds value

7 Business Units

12 Impact Areas

21 Impact Statements

Business Unit	Impact Area	Impact Statement
CASS	New services, products, experiences, and market niches	**Space and Earth Observation**
	Growing our Space Capabilities	**Developing new space technologies and capabilities**
Data61	Reinventing scientific discovery through digital technologies	**AI for Science**
Energy	Electricity Transition	**Flexible generation, use and storage**
	Industry and Transport Transition	**Transition fuels**
		Low emission transport
		Decarbonised Australian industry
	Community and Environment	**Community engagement**
		Environmental performance
L&W	Sustainable Industries	**Zero Harm Industry**
		From Waste to Wealth and Health
	Sustainable Water Futures	**Water Security and Adaptation**
		Safe Water
Manufacturing	Transforming Australian manufacturing into sustainable, technology-driven, high-value businesses	**New devices, products and materials**
		Manufacturing process efficiency
NCMI	Realising future prosperity through biodiversity and marine resources	**Maritime resources and sovereignty**
Services	Invigorate Australia's scientific literacy	**Science awareness and appreciation**
		Indigenous achievement in STEM
		Scientifically literate Australia
	Boost innovation in industries	**Facilitating industry connection to research**
		Create new billion-dollar businesses

Understanding our impact maturity & optimisation

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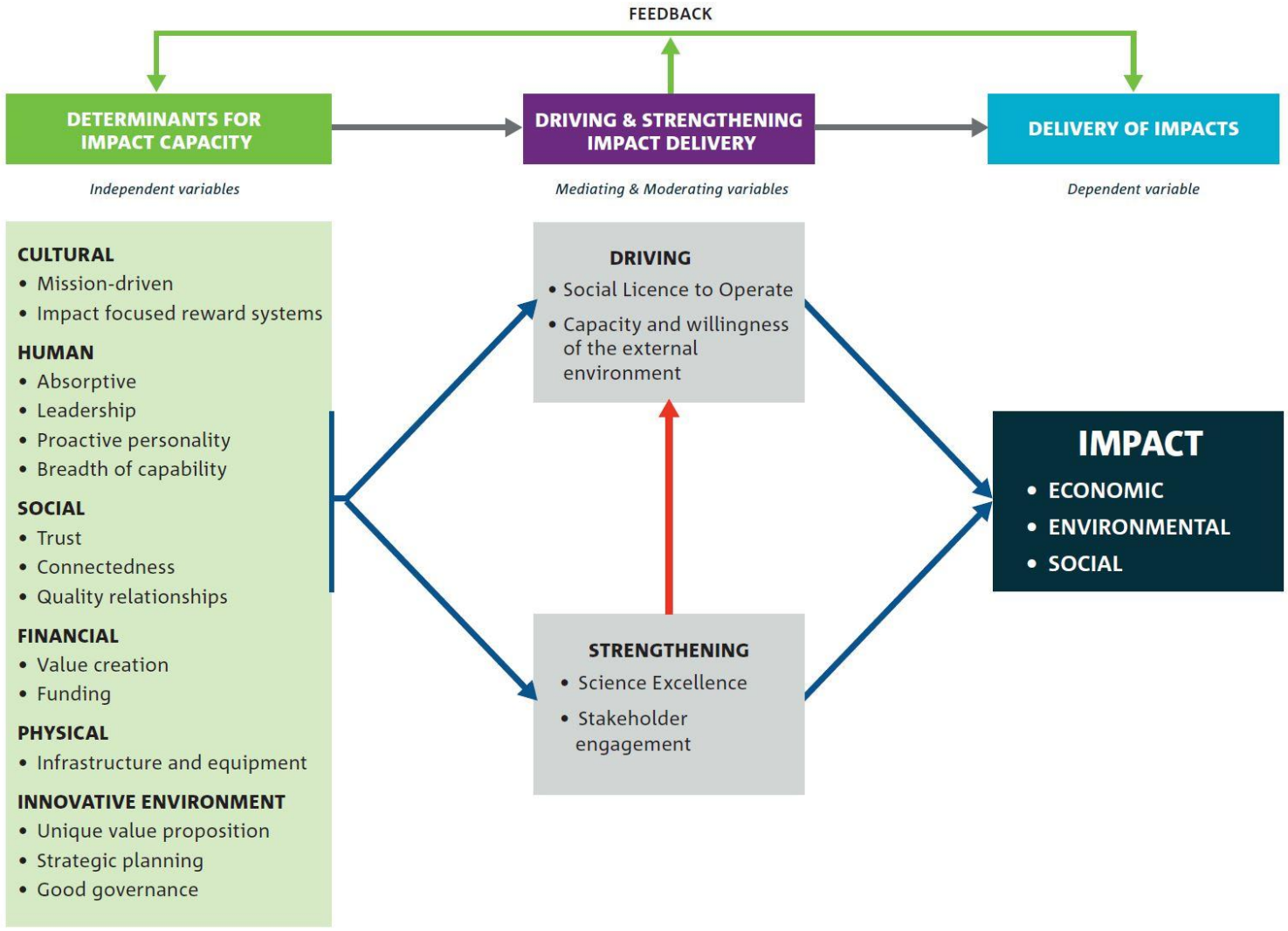

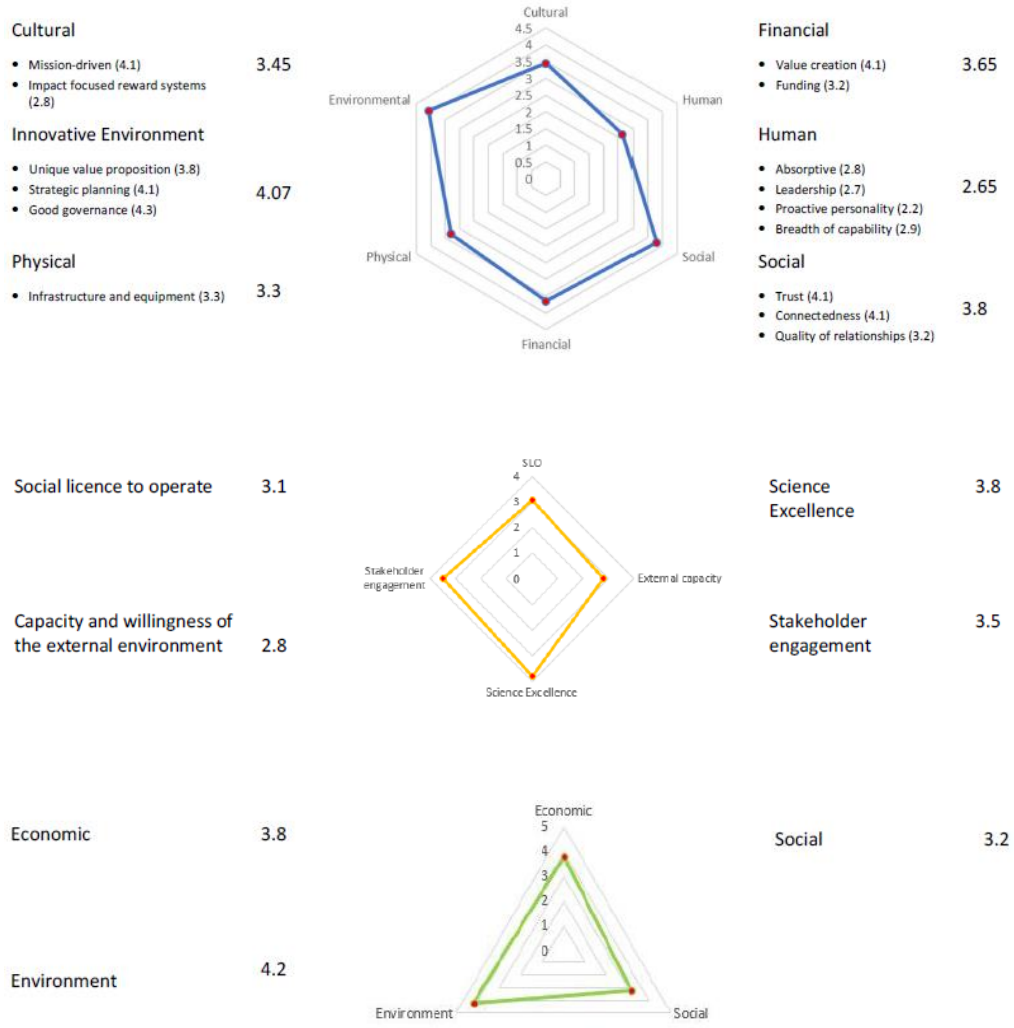

Our lessons learned

1. Social & human capital is pivotal	*Relationships trump all - establish trust and quality relationships*
2. Clear & commonly understood research problems	*Focus scope and target solutions to real and relevant challenges*
3. Impact planning is essential	*Identify "value" across the research value chain*
4. Engagement plans can strengthen delivery	*Optimise the valuable role boundary spanners play in the uptake and adoption*
5. Tracking critical pathways is key	*Remain focused on the minimal viable product and reduce the tendency to chase any or all opportunities/ideas*