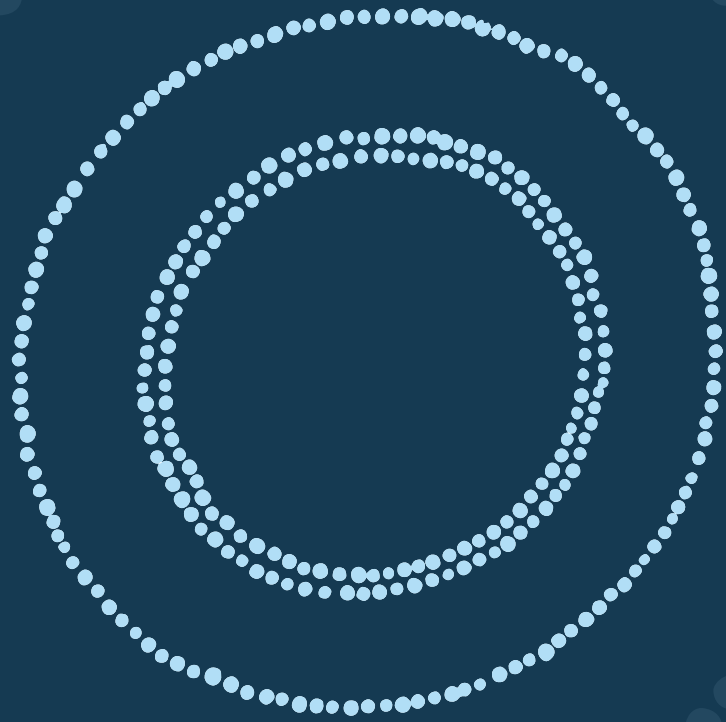
NCI AUSTRALIA

STRATEGIC PLAN 2020



Gadi - “to search for” in Ngunnawal language

Artist: Lynnice Letty Church

Tribes: Ngunnawal, Wiradjuri & Kamilaroi (ACT and NSW)

January 2020 for Gadi Supercomputer

CONTENTS

STRATEGIC PURPOSE

NCI AUSTRALIA

NCI is Australia's preeminent computing facility - delivering on the critical national need for high-performance data, storage, and computing services.

OUR MISSION

Our mission is to radically enhance the high-performance computational methods (HPC) and capabilities available to Australian researchers.

OUR USERS

NCI empowers government agencies, universities, and industry across multiple domains of research.

OUR OUTCOMES

Our integrated hardware, services, and expertise drive high-impact research and groundbreaking outcomes for Australia.

OUR FUNDAMENTAL COMPETITIVE & DISTINCTIVE ASSETS:

1. We have built up the core skills to transform HPC in Australia.
2. We host Australia's most powerful supercomputer & associated datasets.

PUBLIC POLICY OBLIGATION

NCRIS
National Research Infrastructure for Australia
An Australian Government Initiative

NCRIS Objectives

NCRIS supports a national network of high quality infrastructure that is intended to drive innovation in Australian research and the wider economy, and to empower Australian researchers to address key national and global challenges through collaboration.

COMPUTING & DATA FACILITIES

- National Computational Infrastructure
- Pawsey Supercomputing Centre

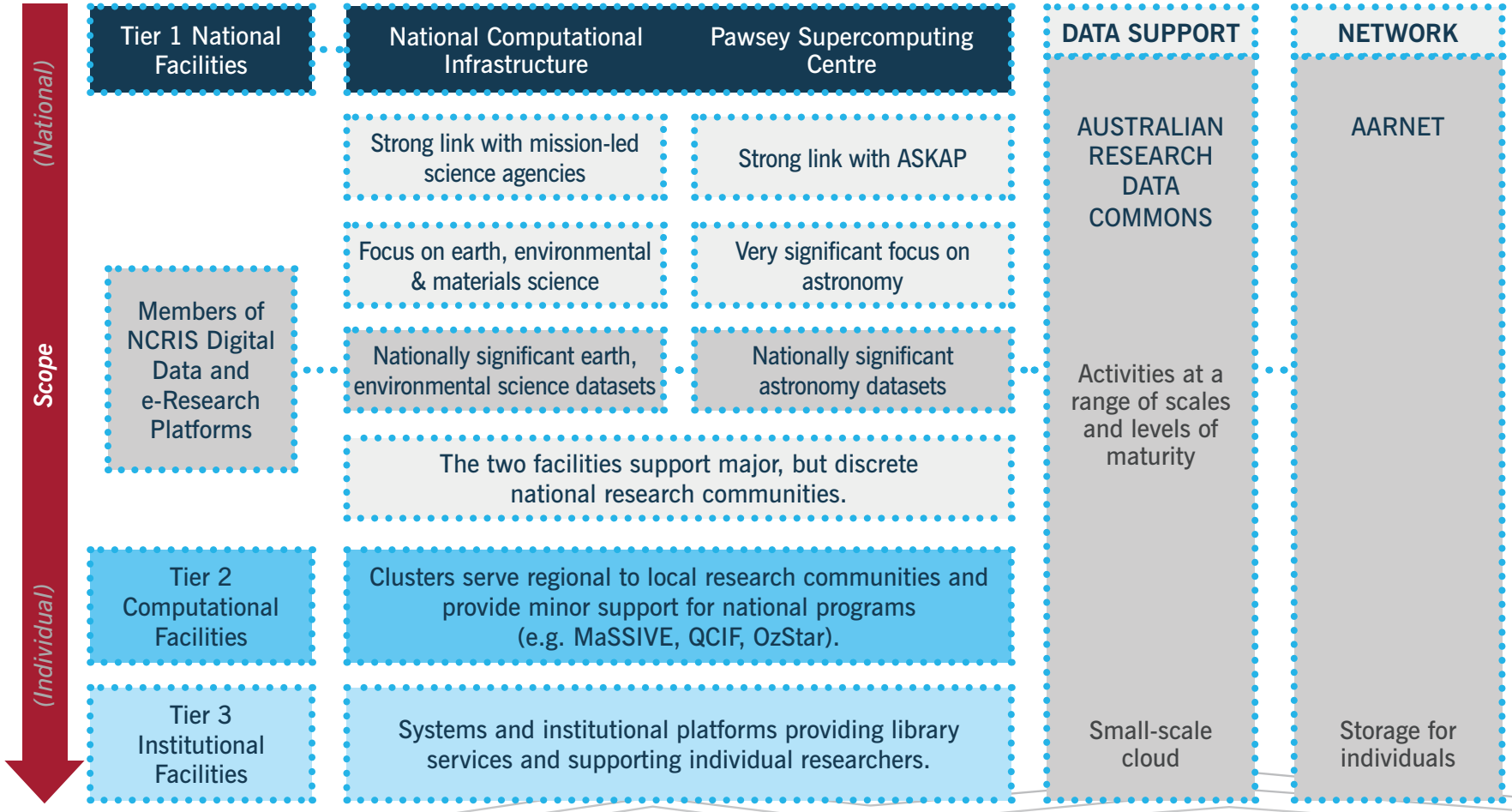
DATA-INTENSIVE FACILITIES

- Astronomy Australia
- AusScope
- Australian Animal Health Laboratory
- Australian National Fabrication Facility
- Australian Phenomics Network
- Australian Plant Phenomics Facility
- Bioplatforms Australia
- Integrated Marine Observing System
- Groundwater
- European Molecular Biology Laboratory
- Heavy Ion Accelerator
- Microscopy Australia
- National Deuteration Facility
- National Imaging Facility
- Nuclear Science Facilities - Bragg Institute
- Translating Health Discovery

DATACENTRIC FACILITIES

- Australian Research Data Commons
- Atlas of Living Australia
- Terrestrial Ecosystem Research Network
- Population Health Research Network
- Australian Urban Research Infrastructure Network

A NATIONALLY DISTINCTIVE FACILITY



OUR VALUES

OUR MISSION

We radically enhance the high-performance computational methods and capabilities available to Australian researchers.

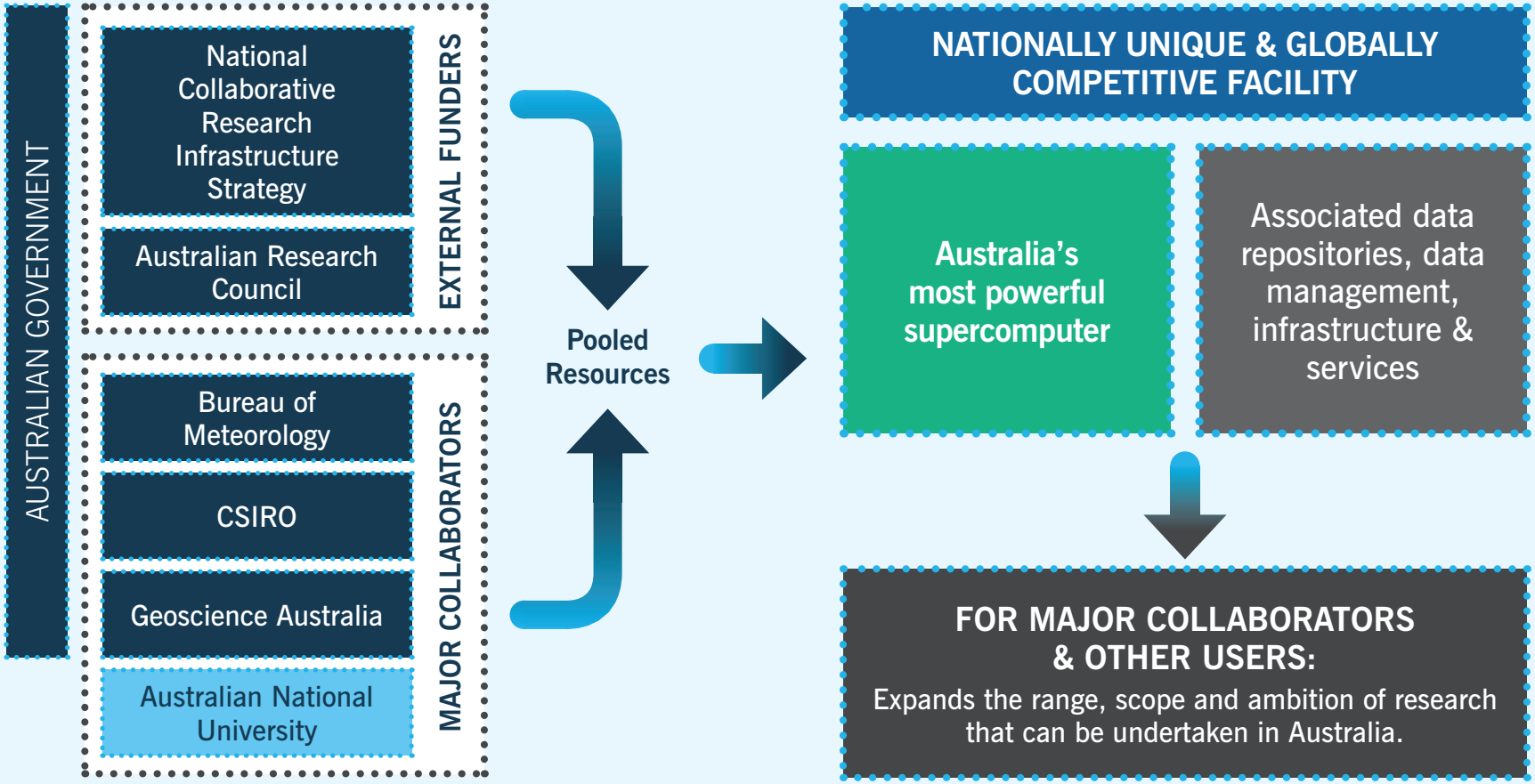
PRINCIPLES

I
We add value to Australian society.

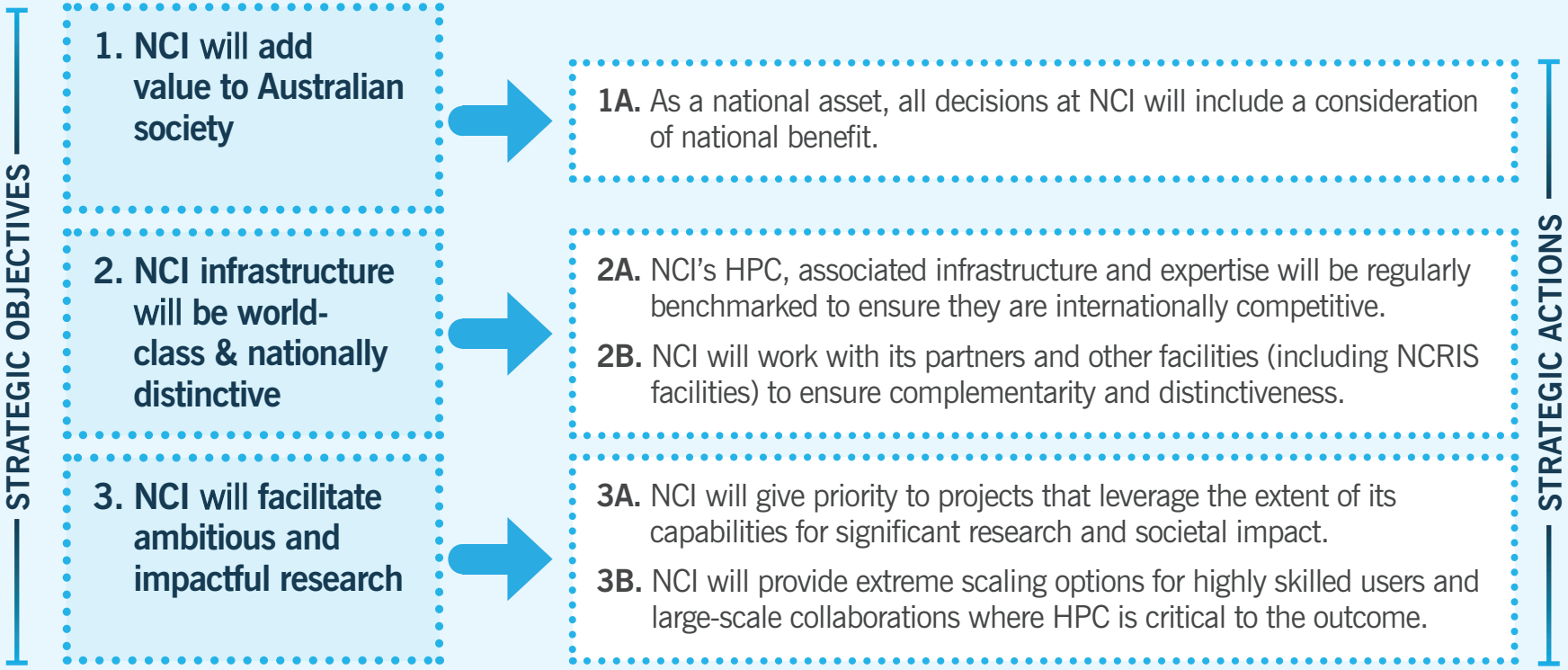
II
We fulfil the needs of our collaborators.

III
We enable transformative ideas.

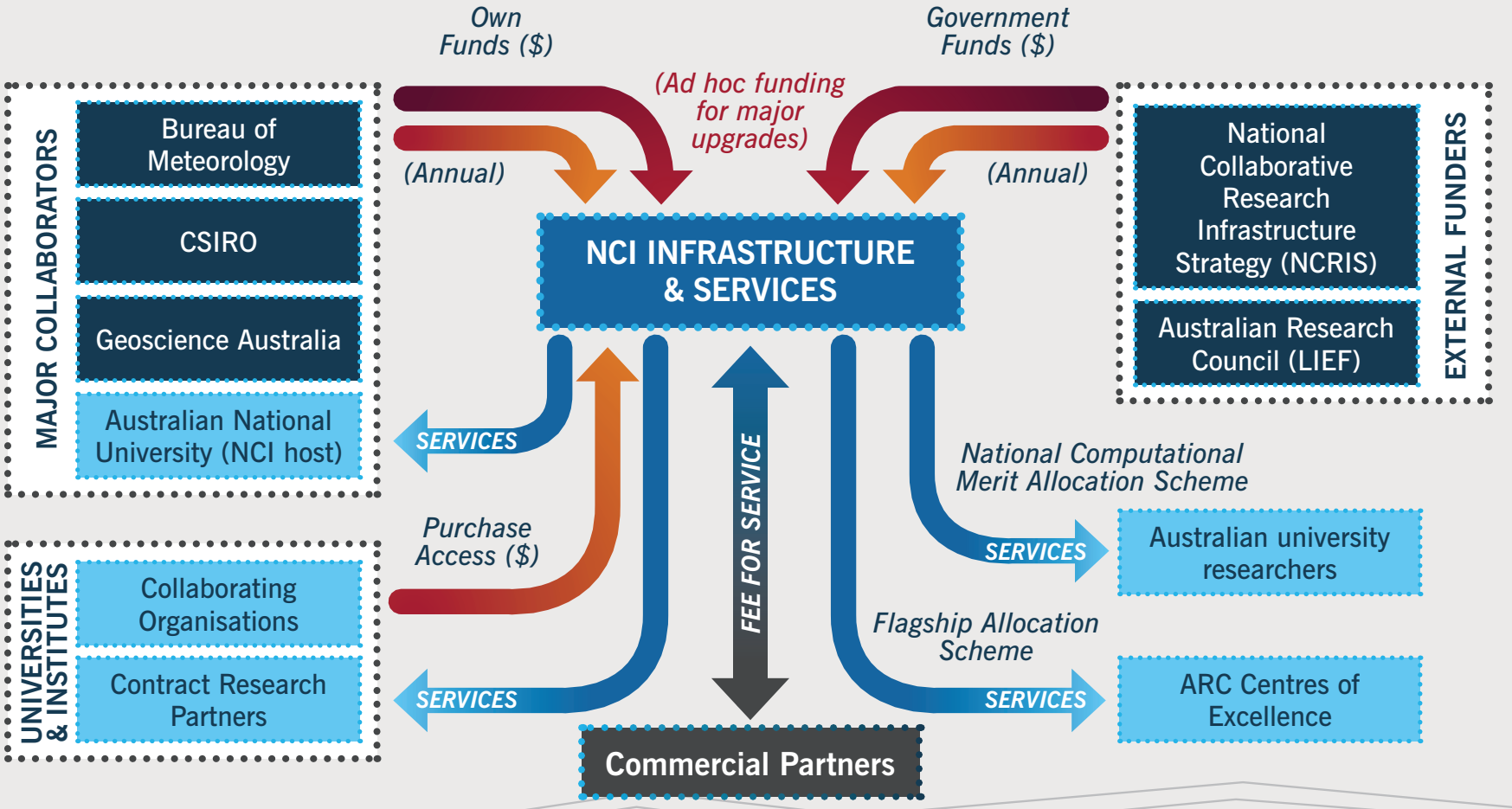
I. CORE VALUE PROPOSITION



IMPLICATIONS OF THE VALUE PROPOSITION



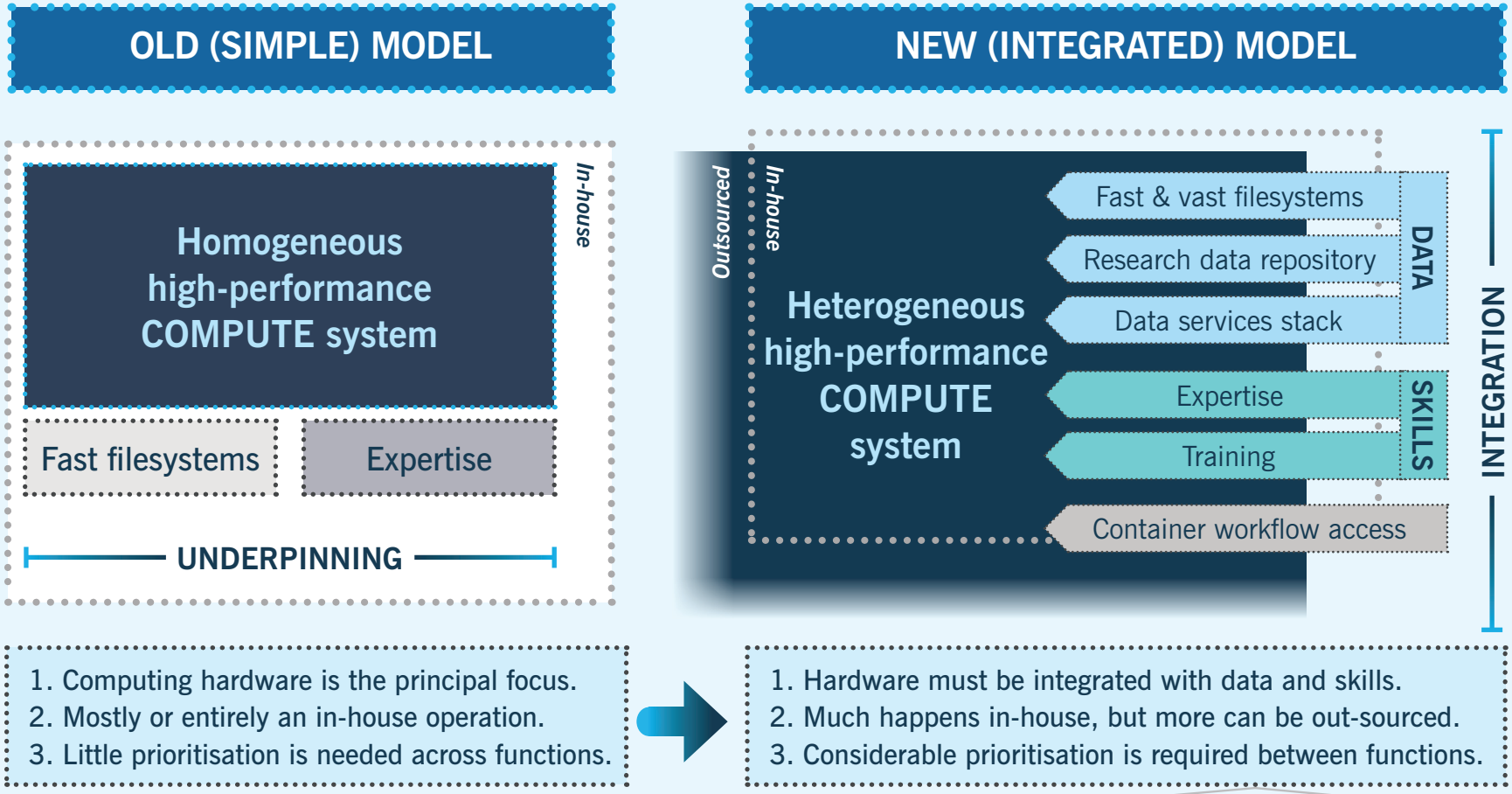
II. CURRENT OPERATING MODEL



IMPLICATIONS OF THE OPERATING MODEL

STRATEGIC OBJECTIVES	STRATEGIC ACTIONS
4. NCI will develop a sustainable and predictable funding model	**4A.** NCI will articulate a new funding model that reflects the changing delivery and use of HPC and reduces the need for ad hoc funding. **4B.** NCI will engage with government and other partners to attract the operating and capital investments needed to maintain world-class status.
5. NCI will convince government, its collaborators, the research community and Australian society of its value	**5A.** NCI will promote its achievements in infrastructure delivery, and the impact and value of the work its partners undertake on its facilities. **5B.** NCI will always ensure that it meets its obligations to its major collaborators while engaging with its many and diverse users.
6. NCI will provide an outstanding service to its diverse user community	**6A.** NCI facilities will run with minimal down-time, high reliability, outstanding user support, and best-practice security. **6B.** NCI will lower technical barriers for users, and train and work with them to ensure they are getting the most from the facilities.

III. CHANGING DELIVERY MODEL



1. Computing hardware is the principal focus.
2. Mostly or entirely an in-house operation.
3. Little prioritisation is needed across functions.

1. Hardware must be integrated with data and skills.
2. Much happens in-house, but more can be out-sourced.
3. Considerable prioritisation is required between functions.

IMPLICATIONS OF THE NEW DELIVERY MODEL

STRATEGIC OBJECTIVES

7. NCI will boost functionality without losing sight of its core business

8. NCI will raise additional resources to cover new functions

9. NCI will partner to enhance its services

STRATEGIC ACTIONS

7A. NCI will introduce new capabilities into its services, but only where this makes sense to enrich its integrated HPC environment.

7B. NCI will decide on its offerings, in consultation with collaborators and funders, with a view to making it nationally distinctive.

8A. NCI will deliver national thought-leadership on the changing nature of HPC and its intensifying integration with data, skills, and analytics.

8B. NCI will negotiate ear-marked funding from partners for new capabilities that enhance its high-performance computing offerings.

9A. NCI will collaborate with vendors and users, and other HPC providers to develop the complex, integrated systems its users need.

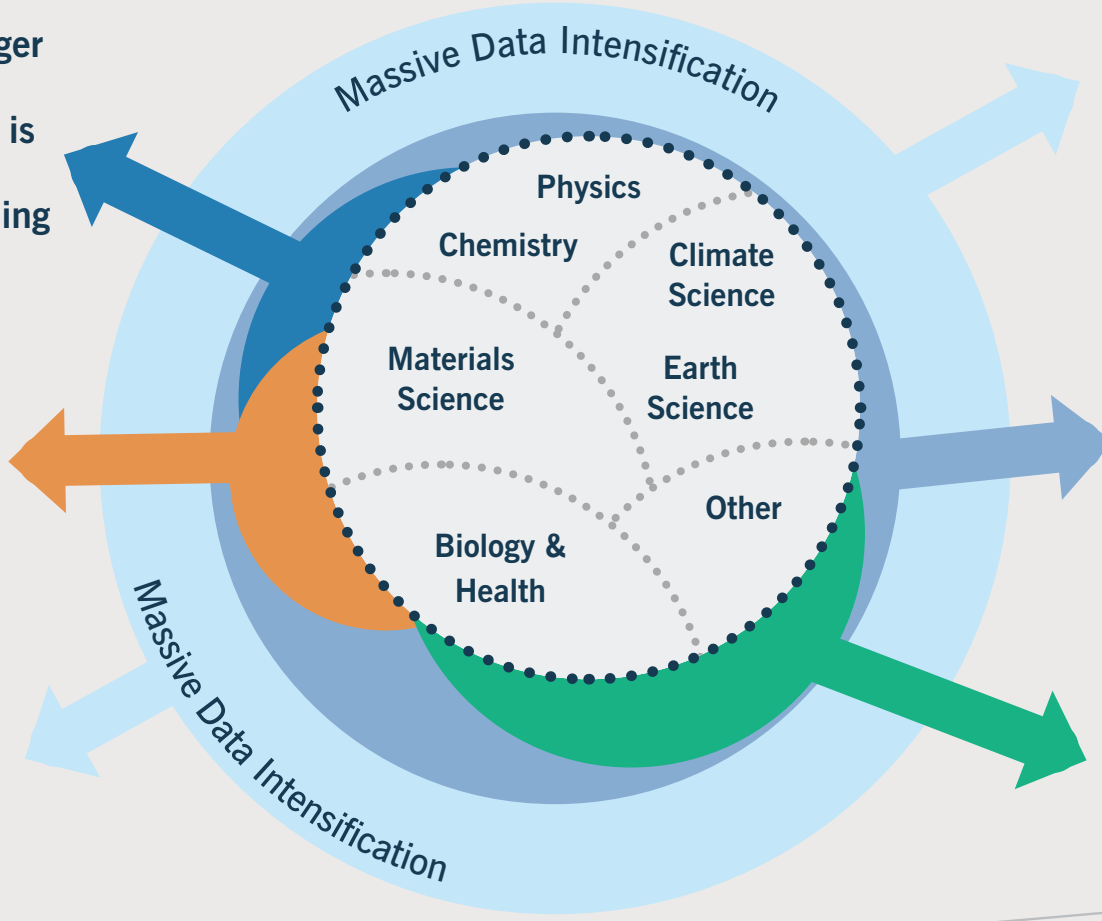
9B. NCI will always consider delivery via external partnerships, including international ones, when weighing investments in new capabilities

IV. CHANGING USE MODEL

Compute is no longer restricted to interpretation and is now informing experimental planning and workflows.

The distinction between HPC and high-throughput computing is blurring.

Datasets are so large that analytics has become a compute-heavy job.



Data is exploding across every domain.

AI and IoT are combining data with compute across a host of disciplines.

Entirely new domains have become computationally intensive.

IMPLICATIONS OF THE NEW USE MODEL

STRATEGIC OBJECTIVES

10. NCI will be able to accommodate new disciplines

11. NCI will be innovative and able to support new paradigms

12. NCI will continue to expand the sophistication of its user base

STRATEGIC ACTIONS

10A. NCI will undertake domain specific consultations when scoping new capabilities, segmenting services by domain where needed.

10B. NCI will support high-throughput as well as HPC activity, but only in high-impact domains that integrate data and compute at scale.

11A. NCI will develop novel information architectures, software, and datasets to adapt its services to changing needs.

11B. NCI will identify and seek to remedy impediments that are limiting utilisation of its HPC services in emerging disciplines and paradigms.

12A. NCI will actively seek out new Australian partners active in areas experiencing growing HPC demand (e.g. AI and genomics).

12B. NCI will support merit-based researchers with a new emphasis on novelty and new paradigms.

V. OBVIOUS RISKS & UNCERTAINTIES

POLITICAL RISKS

The Australian Government's spending capacity and desire to support research in general, and computing infrastructure in particular, may wane as other political needs take priority.

FINANCIAL RISKS

Partner capacity to pay and input cost variability (e.g. due to energy prices, exchange rate impacts on purchasing power, and labour scarcity) may jeopardise NCI's future financial sustainability.

SECURITY RISKS

Cyber attack has become a critical risk for all organisations, but a national supercomputer with extensive data repositories is an especially tantalising target.

COMPETITIVE RISKS

New technologies (in classical and quantum computing) and the provision of low-cost commercial computing services via cloud may present an alternative for NCI's user base.

WORKFORCE RISKS

Systemic gaps in Australia's education model may lead to staff shortages at NCI and diminish Australia's research community so that there are fewer researchers capable of benefiting from NCI's services.

RESPONSE

1. NCI will prioritise planning and business development activities to mitigate its political and financial risks.

2. NCI will develop a formal risk evaluation process as an ongoing input to its strategy.

PRIORITIES ARISING FROM CURRENT RISKS

TOP 3 PRIORITIES

4. NCI will develop a sustainable and predictable funding model

NCI will articulate a new funding model (**4A**) and engage with government and other partners to attract the operating & capital investments needed (**4B**).

8. NCI will raise additional resources to cover new functions

NCI will deliver national thought-leadership on the changing nature of HPC (**8A**) and will negotiate ear-marked funding from partners for new capabilities (**8B**).

12. NCI will continue to expand the sophistication of its user base

NCI will actively seek out new Australian partners active in areas experiencing growing HPC demand – e.g. AI and genomics (**12A and 12B**).

FIRST STEPS FOR IMPLEMENTATION

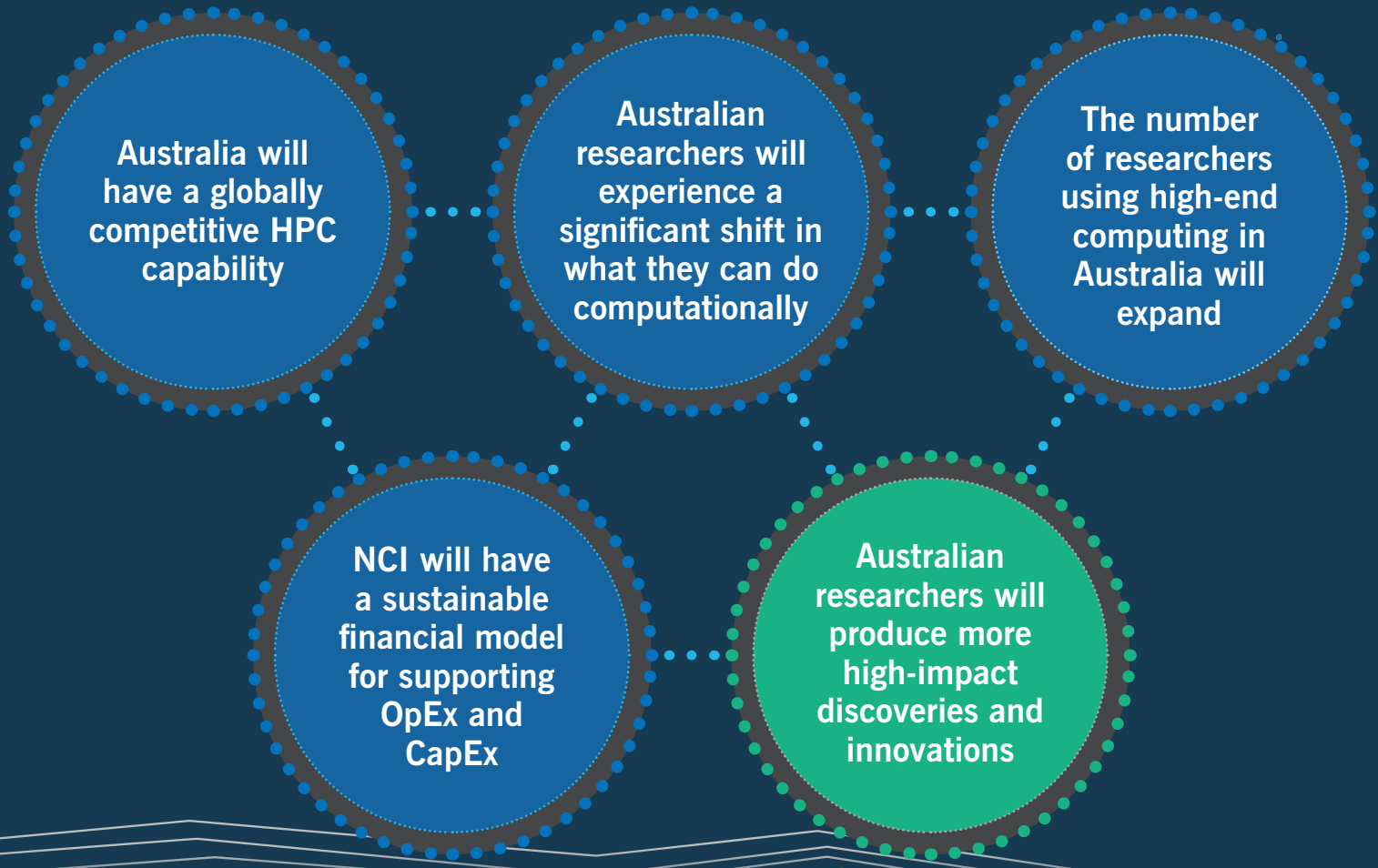
Consistent with its new strategy and these 3 priorities, NCI will first need to:

- **Create a new, proactive business development plan;**
- **Work up options for a new funding model; and**
- **Evolve and develop the way it connects with partners and funders.**

OUR STRATEGY

1. NCI will add value to Australian society
2. NCI infrastructure will be world-class & nationally distinctive
3. NCI will facilitate ambitious and impactful research
4. NCI will develop a sustainable and predictable funding model
5. NCI will convince government, its collaborators, the research community & Australian society of its value
6. NCI will provide an outstanding service to its diverse user community
7. NCI will boost functionality without losing sight of its core business
8. NCI will raise additional resources to cover new functions
9. NCI will partner to enhance its services
10. NCI will accommodate new disciplines
11. NCI will be innovative and able to support new paradigms
12. NCI will continue to expand the sophistication of its user base

TOP FIVE OUTCOMES



IMPACT

Australian researchers will produce more high-impact discoveries and innovations