



Minerals Research Institute of Western Australia

Inquiry into technological and services
innovation in Western Australia

The Minerals Research Institute of Western Australia is pleased to make this submission, which focuses on the mining sector of the Western Australian economy.

1. Preamble

The *Minerals Research Institute of Western Australia Act 2013* (the Act) establishes the Minerals Research Institute of Western Australia (MRIWA) as a statutory corporation to foster and promote minerals research for the benefit of Western Australia.

The MRIWA commenced on 1 February 2014. The Act repealed the *Minerals and Energy Research Act 1987* with the effect that MRIWA replaced the existing Minerals and Energy Research Institute of Western Australia (MERIWA).

The functions granted to MRIWA in the Act are for the specific purpose of fostering and promoting minerals research for the benefit of the State.

2. Minerals in the WA economy

It is well known that the minerals industry is a pillar of the Western Australian economy. “In the year ending December 2013, the value of Western Australia’s resources sector reached a new record \$113.8 billion, up from \$97 billion in 2012. The value of Western Australia’s mineral and petroleum sector has been trending strongly upwards since 2005 when the value was \$38.9 billion. This represents an annual growth rate of more than 14 per cent in the last eight years. Mining (excluding alumina refining) represented 33% of the WA Gross State Product in the calendar year 2014.” (Source: DMP Annual Report 2013/14)

After several years of very substantial capital investment, the mining industry is now focused on realising a satisfactory return on that investment, in a period of declining commodity prices. This shorter-term cycle is occurring within a longer-term industry cycle of generally higher capital and operating costs per unit of metal recovered, as deposits that are easier to find, access and process are progressively depleted.

In the report “Searching the Deep Earth”, prepared by the UNCOVER group under the aegis of the Australian Academy of Science, it is noted that, “Over the same period, exploration success for new economic mineral deposits in Australia has declined sharply. Our economy is now uncomfortably reliant on mineral discoveries dating well back into the last century. These deposits are being depleted much faster than the discovery rate for new deposits. Our national prosperity, derived from mineral wealth, is at risk if our economic mineral deposit pipeline cannot be renewed and expanded.”

In this context, for a minerals industry requiring ever higher productivity to remain internationally competitive, while at the same time having to utilise mineralisation that is harder to find, mine and process than previously, a robust national capacity for innovation in technology and services to the industry is of paramount importance.

3. Innovation system

It is proposed for the purpose of this submission to refer to the generalised structure of the innovation system as depicted in *Figure 1*.



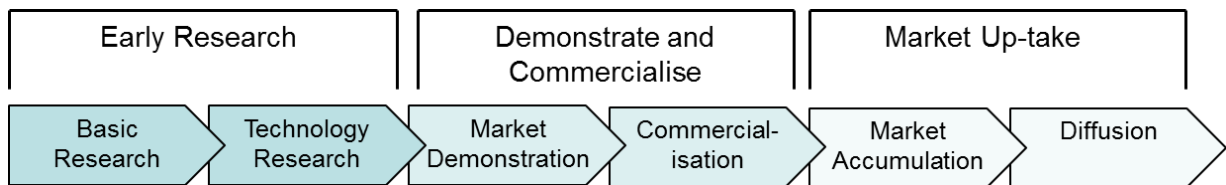


Figure 1 Generalised schema of the innovation chain

4. Characteristics of the minerals innovation system in WA

The defining characteristics of the innovation system for the minerals industry in WA, for both technology and services, are:

- The presence of the Geological Survey of WA providing world-class pre-competitive geological data.
- A small number of dominant public research entities (universities and CSIRO).
- A high level of collaboration in research, and related activities at the institutional level, between the research entities and relevant government agencies, such as GSWA, MRIWA, the Office of Science, DSD and the Department of Commerce.
- Leveraged financing used extensively by research entities and industry companies, often in conjunction with State and Federal government agencies, to provide research infrastructure (eg buildings), facilities (eg major equipment and data bases) and to support specific research programs and/or projects.
- Large operating (mining) companies have tended to conduct research in-house or on a confidential basis; mid-sized and smaller companies have tended to rely more on co-investments from public funding agencies.

Emerging characteristics of note in the minerals innovation system in WA are:

- A recent significant increase in using 'open innovation' processes in place of the traditional approaches.
- Increasing interest by private entities in investing in the 'technology research', 'market demonstration' and 'commercialisation' elements of the innovation chain.
- Companies in the Mining Equipment, Technology and Services (METS) sector being increasingly regarded by operating companies and governments as valuable and effective contributors to moving research outputs from 'early research' through to 'market up-take'.
- A lessening of funds available to government agencies for investing in the aspect of the innovation chain generally regarded as being most exposed to market failure. It is noted that there are exceptions to this generalisation, for example the new monies provided to the Mineral Research Institute of Western Australia.

5. The contribution of the technological services sector to the WA economy

Austmine is Australia's leading association of the Australian Mining Equipment, Technology and Services sector. It promotes the global advancement of technology and innovation in mining, and proactively works to raise the profile of the METS sector in Australia and abroad. (Source: 'Australia's New Driver for Growth' Austmine 2013.)

A 2013 survey by Austmine of the METS sector reported, *inter alia*:

- “The METS sector is a significant contributor to the economy. It generated some \$90 billion in gross revenue (FY12) and employs an estimated 386,000 people (FY12). This is more than mining itself and is indeed where the future jobs in mining will come from.”
- “When benchmarked against other industries, the METS sector has a strong innovation culture.”

However, a more recent survey by Austmine, ‘New Realities, Bigger Horizons’ (Australian Mining Equipment, Technology and Services (METS) National Survey June 2015) reported the needs of the METS sector with relation to innovation as being assistance to:

- Establish and nurture productive collaborations;
- Access working mines to evaluate and develop new products and services: this is crucial to overcome the wide-spread reluctance by industry companies to consider new products or services that have not been previously proven in the field; and
- Access funds for innovation from the public and/or private sector.

6. Recommendations

The schema of the innovation shown in *Figure 1* illustrates that innovation is most generally the result of productive collaboration by and among the various parties involved across the entirety of the activities of the system, eg research, financial, marketing, commercial, design, and end-user.

It is proposed that a core design principle for public policy directed to enabling technology and service innovation to expand and diversify the WA economy should be to enhance that collaboration: to make it efficient. In other words, to, “fill the gaps in, and between, public and private activities in the innovation system”.

To this end a number of possible initiatives are proposed:

- Align State policies with relevant current Federal policies (where there is a shared objective such as to increase innovation) to maximise leveraging of finances and other resources to WA. (A recent example is the Federal Government’s focus on METS as an efficient contributor in the mining innovation system.)
- Resource the ministry for innovation to provide leadership and resources to encourage aligning and integrating the State’s and private sector’s activities in the innovation system, especially in the elements of ‘market demonstration’ and ‘commercialisation’ that are notoriously difficult for innovations (both in technology and services) to successfully transition.
- Invest in attractors for parties involved in the innovation system, especially in the research-to-product transition. Utilise levers such as incentives in payroll tax, minerals royalties, and the cost and availability of finance.
- Measure the performance of the innovation system in selected sectors of the economy (eg mining) before and after levers such as those noted above are utilised.

(An example of such measurement is the study ‘Minerals Research Institute of Western Australia, Economic Impact Assessment, August 2015’ recently completed by Deloitte Access



Economics for MRIWA. The objective of the study was to measure the economic impact to Western Australia of funding for research and development activities provided by the Institute. The study concluded that the estimated economic impacts represent a significant net return to the State.)

- Establish, with necessary legislation and resources, agencies such as MRIWA for the important sectors of the WA economy to facilitate:
 - Directing the State's leveraged investments in research and innovation to the State's priority needs;
 - The various parties in the innovation systems accessing essential inputs such as enabling research, finance and commercial expertise; and
 - Establishing forums to nurture communications amongst the diversity of people necessary for a successful and vibrant innovation system.

