Bankwest Curtin Economics Centre

MINING AND MATERIALS:

Unpacking the role of the resources sector in harnessing and developing Australia's STEM capability

The resources sector makes a vital contribution as the anchor for Australia's science, research and industrial base. As the sector undergoes a structural evolution to capture a greater share of the minerals, materials and manufacturing value chain, new research commissioned by the Australasian Institute of Mining and Metallurgy (AusIMM) outlines workforce demands, demographics and mobility trends for industry.

The Bankwest Curtin Economic Centre (BCEC) report demonstrates how the resources sector can lift Australia's broader science and industrial capability by developing talent and building a workforce with expertise across a range of science, technology, engineering and mathematics (STEM) disciplines, with participation from across our community.

Engaging a breadth of STEM and other professional talent will allow our sector to extend its position as a trusted global supplier of minerals, materials and mining expertise. This is about more than a benefit to industry, it is about contributing to a national endeavour that strengthens key relationships, builds sovereign capability and underwrites Australia's place in a changing world.

For more information visit: ausimm.com

Key findings and insights

Employment growth across the mining and manufacturing value chain is strongest at the professional level

8.6% In the ten years to 2035, mining employment will grow by 8.6 per cent and mining-related manufacturing will grow by 16.9 per cent.

21.4% As industry becomes more advanced, the strongest area of growth is in professional occupations at 21.4 per cent.

This includes disciplines such as geology, geophysics, hydrology and mining, chemical and materials engineering.

40+ We have an aging professional workforce, with 25–34-year-olds under-represented and an average age of 43 years compared to 40 for the broader workforce.

Mining demands STEM skills, with engineering, geology, geophysics, materials, chemical and earth science graduates accounting for most of the sector's professional workforce

The current composition of our professional workforce provides a pointer on future areas of supply.

Traditional 'mining' specialisations are a key future talent source, but even a small increase in graduates from broader STEM fields could deliver hundreds of new professionals for the sector.

AI and technology, mathematics and data analytics all emerge as core competencies to be built at both the specialist and general workforce levels.

Arresting the declining rates of STEM course completion will be key, not only to meet future demand for our sector but to harness and develop talent for Australia's broader science and industrial base.

Female graduates and professionals represent the greatest source of future technical, managerial and leadership talent

18.7% Female representation across the mining workforce continues to lag the broader economy, at approximately 18.7 per cent.

16% This figure has remained relatively constant over time, rising from around 16 per cent in 2016. Crucially, women are more likely to be over-qualified for their current roles than male counterparts, with many women in mining holding the STEM qualifications our sector needs to stay competitive.

Skilled migrants are also a major source of supply today, and a key component of the future pipeline

1/4 Around one quarter of graduates in mining-aligned study fields are not Australian citizens, with figures ranging from as high as 34 per cent in engineering to about 20 per cent in geology and earth sciences.

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Key findings and insights

Supporting professionals to move across sectors could be the answer to building capability and meeting future demand in mining, not the problem

Mining is not the only destination for mining graduates, with some professionals spending time working across manufacturing, scientific and technical and research roles.

46%

Occupational turnover is comparable to the broader economy average at around 29 per cent, but higher than average for professionals in mining-related manufacturing at around 46 per cent (between 2001 and 2022).

Occupational change is higher for degree-qualified professionals, bucking the trend for the broader workforce. Two factors drive this: shifting into other sectors and progressing from technical to managerial and leadership roles.

This also serves as a reminder that the skills developed in mining can be deployed across the broader economy, and likewise that the skills professionals develop in other rapidly evolving industries can help us meet emerging capability gaps.

Expanding and diversifying educational pathways is essential to meet capability gaps and build long-term careers

While demand for STEM and mining-specialist graduates grows, including for niche skillsets developed at the postgraduate level, course closures and poor course completion rates show a need to diversify the range of training and educational pathways for people pursuing careers in the sector.

Support for ostensibly 'niche' regional courses, and for students moving from or studying in regional centres, are clear priorities.

As university business models come under strain, and training uptake for people in trade occupations remains low, the opportunity to support resources workers to 'graduate' into professional occupations is clear. Vocational and associate degrees, bridging courses and industry-integrated postgraduate study are the key elements of the response.

While the sector is a major employer of Aboriginal and Torres Strait Islander peoples, they are underrepresented in the professional and degree qualified cohorts of our workforce.

Key findings and insights

Raise awareness to engage talent, build understanding and offer early career opportunities

University engagement programs, student chapters, new professional networks and work-integrated learning programs for vocational and university students are a high-impact way to demonstrate the breadth of roles available in our industry, and the economic, social and scientific contributions made by the sector.

Increasing course enrolment and completion is not the only steps required to meet future workforce demand.

Competition for graduates with STEM and data skillsets will expand in coming decades, especially if industry is to capture more of the downstream value chain.

Train to retain and develop professionals and boost national STEM capability

Training pays off in the mining sector, with a very high rate of return for higher education completed by the resources sector workforce compared to the national average.

12% Whereas a trade qualification can be expected to boost income by 2 percent for the general workforce, the return is almost 12 per cent for mining workers.

14% The wage premium to resources workers with a diploma is 14 per cent, compared to 6 per cent in the broader workforce.

32% The wage premium to resources professionals with a bachelor's degree is 32 per cent.

58% Wage premium for resources professionals with a master's degree, compared to 30 per cent in the broader workforce.

But, rates of formal training for existing workers are relatively low in the sector, and people in trade occupations are less likely to complete further formal training than their degree-qualified counterparts.

Key findings and insights

Future research direction: Professional mobility, skill utilisation and mid-career professionals

As the resources sector evolves to support downstream processing, advanced manufacturing and national STEM capability, a critical evidence gap remains around the career journeys of mid career professionals. This "missing middle" includes established engineers, geoscientists, metallurgists and emerging data and technology specialists who move between mining, manufacturing, research and professional services roles.

Preliminary findings suggest mobility is shaped by job quality, training access, recognition of transferable skills, flexibility, and perceived long term career pathways, rather than pay alone.

Understanding how and why professionals shift sectors, upskill, or exit is essential to retaining capability and designing progression pathways. While datasets such as PLIDA and HILDA provide a foundation, targeted qualitative research and richer education–work linkage data will be critical to fully understand skills utilisation, mobility and workforce resilience in the decade ahead.

Future research direction: Better understanding lived experience to attract, retain and develop professional capability

Understanding lived experience is critical because headline outcomes in the resources sector mask more complex job realities. While job satisfaction in mining has, on average, been higher than in other sectors over the past two decades, this advantage is not explained by pay alone, nor is it evenly shared across job aspects.

50%

Higher wages clearly contribute and mining workers typically earn around 50 per cent more per hour than those outside the resources sector. However, even after controlling for earnings, occupation and job characteristics, mining workers report higher overall satisfaction, indicating the presence of valued non financial aspects of work.

At the same time, mining roles are associated with lower satisfaction regarding job security, flexibility and work–life balance, with pay acting largely as compensation for these trade offs. Resource aligned manufacturing workers do not receive the same wage premium and report dissatisfaction across multiple job dimensions. These findings highlight why workforce strategies must engage directly with lived experience, not just remuneration, if attraction, retention and skills development initiatives are to be effective.

Existing datasets such as the Person Level Integrated Data Asset (PLIDA) can help to answer some of these questions, but further industry-specific qualitative studies may be required.