5 July 2023

Dr Claire Patterson
Director, Industry Development
Department of Jobs, Tourism, Science and Innovation
1 William St
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Dear Dr Patterson

WA'S DIGITAL ECONOMY – DISCUSSION GUIDE

The Chamber of Minerals and Energy of Western Australia (CME) is the peak representative body for the resources sector in WA. CME is funded by member companies responsible for more than 87 per cent of the State's mineral and energy workforce employment, ranging from mining (mineral and petroleum commodities) to manufacturing (alumina, basic inorganic chemicals and explosives) and supporting services. Within WA, the sector is vast and complex, comprising operations across a diverse range of commodities and project lifecycles from exploration to production and closure.

The resources sector remains a reliable provider of jobs in WA. Nationally, the sector has experienced an overall positive 24 per cent employment growth from February 2018 to February 2023,[1] which has trebled since 2005. More than 70 per cent of employees also hold a qualification.[2]

As industries across the board embrace digital trends and increase uptake of technologies, we are witnessing a growth in the need for tech workers, with tech sector jobs growing by 66 per cent since 2005 – almost double the growth rate for all jobs in the Australian economy.[3]

CME appreciates the opportunity to provide this submission and our sector's insights regarding opportunities and challenges for WA's digital economy, transformation and growth. We acknowledge this initial discussion is undertaken as part of scoping for developing the Digital Economy Strategy for WA, and we look forward to participating in future consultation stages.

Key Opportunities

WA's mining and resources sector remains more important than ever. Our sector will contribute the raw materials needed for economies worldwide to transition to net zero, and our world-class minerals and energy sector will continue to lead the way through research, innovation and environmental, social and governance (ESG) standards. For example, the broader application of ESG standards and climate change mitigation technologies is expected to create jobs for the sector globally.[4]

As part of continuous improvement, the WA mining and resources sector is finding ways to work safer, smarter and cleaner. This includes initiatives to improve physical and mental health outcomes for workers at the hundred or so operations around the state, investment in a wide range of renewable energies, and the develooment of technology that will help drive the jobs of the future.

Our sector has long relied on technology and innovation to improve safety, drive greater productivity, and deliver better sustainable development. The digital economy provides significant opportunities to improve outcomes across all of these sectors of the industry to make our work smarter, safer and cleaner:

- Safer: Safety is at the forefront of the industry in everything we do. By using technology, individuals can be kept away from hazardous situations. Technology also assists in anticipating and simulating operational adjustments for enhanced safety. It helps even further to improve training outcomes – to

[1] Australian Government, Labour market insights, mining industry, last updated 7 June 2022.
[2] National Skills Commission, *Australian Jobs Report – 2021 Edition*; Australian Bureau of Statistics (ABS), *Labour Force, Australia*, table 6, March 2022.
[3] Tech Council of Australia, *Australia's Tech Jobs Opportunity – Cracking the Code to Australia's Best Jobs*, March 2022.
[4] World Economic Forum, *The Future of Jobs Report 2023*, mining and metals industry profile, 30 April 2023.

ensure that the workforce is adequately prepared to carry out tasks securely. For example, mining has the highest use of information and communication technologies (ICT) for workplace health and safety purposes by industry.[5]

- Smarter: Our sector is using technology to enhance productivity, which not only aids in discovering new resources but also has the potential to optimise the efficiency of existing resources with the same level of input. One report has valued productivity improvements in adopting digital and technological innovation of up to 23 per cent.[6]
- Cleaner: The industry is committed to reducing its carbon emissions. Technology will continue to drive this change, including the shift in energy generation from diesel to renewable energy sources at the site, implementing and advancing battery electric vehicles and machinery, and investing in cleaner energy alternatives. Additionally, WA will play an increased role in producing essential battery minerals required for global efforts to achieve net zero emissions.

The digital economy will play a role in the sector's future and it is important for all stakeholders to collaborate in realising these opportunities to maximum effect.

Emerging Digital Trends and Technologies

Our industry is a leader in investment in emerging technologies. While the precise amounts fluctuate year-on-year, the most recent figures show our sector spent almost $890 million in research and development (R&D) for the 2019-20 financial year.[7] However, these figures are well below the historic high of $4.3 billion in 2008-09. Since 2005, Australia's resources industry has invested over $30 billion in R&D.[8]

Yet these statistics understate the industry's level of investment. Our sector undertakes broader innovation activities, such as engineering development and plant experimentation, to optimise processes that are not accounted for in the ABS figures. The sector adopts technological developments made elsewhere and invests in advancing those developments to achieve positive outcomes for application in Australia. Again, that investment is not accounted for in the R&D statistics. Excluded still is exploration expenditure, which involves extensive use of high-tech equipment, predictive modelling and often innovative approaches.

Our industry's significant investment includes engagement with cutting-edge digital technologies. By no means an exhaustive list, we are witnessing industry efforts to employ the following:

- Artificial intelligence
- Augmented and virtual reality
- Big data analytics – Second highest user by industry[9]
- Blockchain technology
- Digital twins[10]
- Electrification and battery electric vehicles
- Hydrogen and renewable energy
- Integrated automation and robotics
- Internet of Things – Third highest user by industry[11]
- Liquified Natural Gas and
- Wearable technologies.

In all of its current and planned activities, WA's resources sector is actively working with technologies of the future, investing heavily to integrate these technologies and remain internationally competitive.

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[5] ABS, *8167.0 Characteristics of Australian business*, 2021-22 financial year reference period, 22 June 2023, table 5.
[6] EY, *The Future of Work: The economic implications of technology and digital mining,* February 2019,
[7] ABS, *Research and Experimental Development – Businesses, Australia*, 2019-20 financial year reference period, 3 September 2021.
[8] Ibid.
[9] ABS, *8167.0 Characteristics of Australian business*, 2021-22 financial year reference period, 22 June 2023, table 1.
[10] World Economic Forum, *Digital twins can boost mining output to drive the energy transition, here's how*, 14th Annual Meeting of the New Champions, article by Leurent T and Kratsis S, 20 June 2023.
[11] ABS, *8167.0 Characteristics of Australian business*, 2021-22 financial year reference period, 22 June 2023, table 1.

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Challenges

WA accounts for almost 33 per cent of Australia's land mass, occupying a total area of 2.5 million square kilometres.[12] Mining and energy projects can be found across WA's nine regions, from the Kimberley to the South West. Consequently, the site operations of WA's minerals and energy companies include some of the most remote in the country and the world.

Regarding emerging technologies, there is an increasing reliance on connecting devices to networks locally and via cloud platforms. It becomes increasingly essential, therefore, for the necessary infrastructure to be in place to facilitate these connections. For example, issues with speed and reliability were equally tied to insufficient staff capability as a factor in limiting the use of ICT by mining businesses across Australia.[13]

Digital connectivity infrastructure is a critical asset, but the poor-quality mobile and internet coverage experienced by many regional, rural and remote areas impacts social participation, service delivery and economic growth.[14] The current status of WA's digital connectivity, particularly in regional WA, presents challenges for the industry. Mobile coverage in regional and remote WA is highly variable and patchy, with 1,750 registered mobile blackspots.[15] A mix of new and legacy technologies results in inconsistent performance, with some areas experiencing slow, unreliable and costly internet services.[16]

Other challenges are highlighted later in this submission. We note the challenges around access to appropriately skilled workers and the numbers required to satisfy a growing and evolving workforce.

Skills and Talent Development

Digital transformation is changing our workforce needs across the economy. The rise of the above list of technologies is fuelling demand for tech workers, and in the years 2018 and 2024 alone, it is estimated that the demand for tech workers in Australia will grow by 100,000.[17] The mining and energy industry is also impacted by this transition, with as much as 77 per cent of jobs enhanced or redesigned by technology.[18]

The industry has invested in upskilling existing workers and increasing apprenticeships and trainees to meet demand. However, labour market tightening in both the State and national economy is placing pressure on local businesses. Despite ongoing efforts, further investment will be needed to unlock the benefits of the digital economy. Estimates suggest that to support the successful integration of new technologies, an additional investment of up to $12.8 billion across the industry nationally will be required to unlock the potential productivity gains identified.[19]

And whilst every effort to secure a local workforce is made, the large and complex nature of resource sector projects highlights an ongoing requirement to source experienced and highly skilled professionals from international talent pools. The workforce needs of the mining and energy industry will continue to evolve as the industry progressively adopts and uses digital technologies. The required skillsets of the workforce are already changing. Throughout the value chain, there will continue to be new skills required alongside the adaptation of existing skills to fill the workforce gaps effectively.

The future industry workforce will need new, technically-capable workers to be employed alongside more traditional operators. These additional workers will integrate their technical mining expertise with proficiency in digital technologies while emerging roles like data scientists and modellers will be required to provide core functional assistance.[20] For the resources sector globally, workplace upskilling and reskilling priorities over the next four years will include 'systems thinking', 'manual dexterity, endurance and precision', 'dependability and attention to detail' and 'analytical thinking'.[21]

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[12] Australian Government, Geoscience Australia, *Area of Australia – States and Territories*, last updated 7 June 2023.
[13] ABS, *8167.0 Characteristics of Australian business*, 2021-22 financial year reference period, 22 June 2023, table 3.
[14] Infrastructure WA, *Foundations for a Stronger Tomorrow, State Infrastructure Strategy*, July 2022.
[15] Department of Communications and the Arts, *Community reports of poor or no mobile coverage* [data set], Australian Government, 2018.
[16] Infrastructure WA, *Foundations for a Stronger Tomorrow, State Infrastructure Strategy*, July 2022.
[17] Deloitte Access Economics, *ACS Australia's digital pulse,* 2020.
[18] EY, *The Future of Work: the Changing Skills Landscape for Miners*, February 2019.
[19] EY, *The Future of Work: The economic implications of technology and digital mining*, February 2019.
[20] Ibid.
[21] World Economic Forum, *The Future of Jobs Report 2023*, skill profiles, 30 April 2023.

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One example is the advent of autonomous transport and the requirement for employees with new skill sets across data processing, digital literacy and technical planning.[22] Throughout this transition, employers in the sector have supported employees to develop new capabilities and to adapt, acquire new skills, diversify existing skills, and undergo training for different roles. This change will not necessarily result in a reduction in the number of operators. Still, it will shift in the way work is carried out, with a rise of workers in remote and integrated operating centres working alongside those workers in onsite mining operations.[23]

To support the changing skills profile across our sector and the need for additional workers to meet current and future needs, ongoing efforts will need to be directed towards training and development as well as encouraging the update of science, technology, engineering and mathematics (STEM) subjects to address the declining rates of enrolments in engineering and mining-related degrees.[24]

Policy and Regulatory Environment

To compete strongly in a global market with a continual fluctuation of commodity prices, it is fundamental that the resources industry can maintain a low-cost operational base. Cost escalation and uncertainty of future regulatory costs can have significant impacts, affecting cash flows across the long life of a project asset. This can also have a flow-on effect on other projects, as increased costs bring forward the end of life and reduce the ability for margins to be used to expand existing projects or invest in new projects. Certainty in a stable, low-cost environment will give the industry the confidence to continue digital investment.

However, several headwinds exist which could impact this continued confidence to invest. The cost of capital has increased substantially as central banks combat inflation by tightening monetary policy, with the Reserve Bank of Australia increasing the cash rate target by 25 basis points again to a current rate of 4.10 per cent.[25] Further, while we appreciate the WA Government's continued commitment to no new increases in taxes or royalties, we are alive to escalating costs and the imposition of cost recovery models, fee increases and other charges, which impose a disproportionate burden on the resources sector.

The cumulative effect of these costs, and the burden of government regulation, affects the sector's competitiveness, posing a barrier to unlocking new opportunities. For example, WA's Policy Perception Index as a determinant of mining investment attractiveness declined almost six points from 4th to 10th because of concerns over the taxation regime, uncertainty regarding environmental regulations and regulatory duplication and inconsistency.[26]

The economy thrives when we reduce the cost and regulatory burden on the industry; both private and public resources (time and money) can be invested into more productive economic activities such as ICT upgrades. The digital economy would benefit from the same reduction in cost and regulatory burden.

International Competitiveness

The global innovation of 132 different international jurisdictions is ranked yearly by the World Intellectual Property Organisation through their Global Innovation Index (GII) initiative.[27] Envisioned to capture as complete a picture of innovation as possible, the GII comprises around 80 indicators, including measures on each economy's political environment, education, infrastructure, and knowledge creation. In doing so, the GII provides a comparative analysis of countries with similar income standards.

For 2022, Australia ranked 25th globally and 24th compared to others in our income group. However, in terms of performance, Australia ranked above expectations for our level of development, with Australia ranking 1st for 'total number of years that a person of school entrance age can expect to spend within the education system' and 3rd for the 'highest ratio of total tertiary enrolment as a percentage of the population'. Despite this, Australia was ranked 64th for government funding per secondary pupil, and 81st for the number of graduates in STEM as a percentage of total tertiary graduates. This suggests opportunities for improvement exist in this area.

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[22] Global Mining Guidelines Group, *Rio Tinto's experience with automation improving safety for employees and creating value*, Autonomous Mining Skills Migration Case Study, 15 March 2021.
[23] EY, *The Future of Work: The economic implications of technology and digital mining,* February 2019.
[24] Minerals Council of Australia, Minerals Tertiary Education Council: Key Performance Measures Report, 2018.
[25] Reserve Bank of Australia, Statement by Philip Lowe, Governor: Monetary Policy Decision, 6 June 2023.
[26] Fraser Institute, *Annual Survey of Mining Companies 2022*, 4 May 2023, p 32.
[27] World Intellectual Property Organisation, *Global Innovation Index*, 2022.

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Australia's mining equipment, technology and services (METS) sector, particularly in WA, has built a global reputation for being innovative across many technology platforms and commodity segments.[28] Because of our sophisticated mining industry and high levels of collaboration, our METS sector has enjoyed success on the world stage for many years. However, it is noted the landscape for Australian METS companies is increasingly competitive as other nations also take up digital and technological change. This is partly a result of reduced barriers to entry as the digital economy makes it easier for more companies to participate.[29]

For the Australian METS sector to sustain its global leadership in innovation, a supportive ecosystem is required, and providing that ecosystem is the shared responsibility of the Government and industry. Actions include addressing the challenges raised in this submission, and broader action towards enhancing our position in the digital economy will directly benefit the competitiveness of our METS sector.

Diversity and Inclusion

Diversity allows organisations to leverage strengths through the differences between people working together.[30] The benefits of diversity can extend through all facets of work, including the digital economy.

The mining and energy industry has committed to increasing workforce diversity and inclusion (D&I). Positive trends suggest that the initiatives introduced by the sector have influenced women's participation.[31] The participation of Aboriginal and Torres Strait Islander peoples in the WA resources sector has risen 0.5 per cent since 2019, now sitting at 5.2 per cent at 3,879 employees. By contrast, the employment figure of Aboriginal and Torres Strait Islander peoples in the broader WA workforce is 1.6 per cent.[32]

Despite industry-wide efforts to improve D&I outcomes, evidence suggests some way to go. For example, women are underrepresented in key decision-making roles across all industries in the Australian workforce.[33] This is despite the GII ranking Australia as 5th for the percentage of females employed with advanced degrees out of the total people employed.[34]

While the focus on corporate social responsibility is often discussed in the context of workforce D&I, the WA resources sector continues to take a holistic approach towards impactful social change, beyond recruitment and retention to initiatives supporting the workforce and the community.[35]

The timeline model of sustainability contained in CME's most recent diversity report provides organisations with example focus areas to improve the diversity of talent at each phase, with opportunities to discuss and re-configure decisions to enhance business models. This includes, but is not limited to:

- role modelling and developing an understanding of the resources sector at the early education level
- partnering industry with primary and secondary schools
- a focus on the quality of tertiary higher education and
- providing continuous training and workplace opportunities in the early-career workforce.

The timeline model of sustainability also outlines focus areas as distinguished by the various career stages:

- supporting graduate/traineeship programs and educating the workforce on diversity at the early career stage
- supporting D&I policy through leader-led initiatives and lifelong learning in the mid-career
- having leadership and expert-level professionals engage in collective decision-making to ensure the voice of employees at all levels is heard and
- facilitating the mentoring of young professionals by those near or at retirement.

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[28] CSIRO, *Mining Equipment, Technology and Services A Roadmap for unlocking future growth opportunities for Australia*, May 2017.
[29] Ibid.
[30] Cletus HE, Mahmood NA, Umar A & Ibrahim AD, *Prospects and challenges of workplace diversity in modern day organizations: A critical review.* HOLISTICA–Journal of Business and Public Administration, 2018.
[31] CME, *Diversity in Western Australian Resources Sector Report*, 2023.
[32] Ibid.
[33] Workplace Gender Equality Agency, *Women in Leadership*, 2022.
[34] World Intellectual Property Organisation, *Global Innovation Index*, 2022.
[35] CME, *Diversity in Western Australian Resources Sector Report*, 2023.

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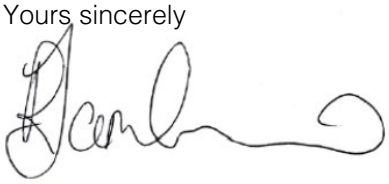
The above highlights that every person in an organisation has a role to play in promoting D&I in the workforce. Each of the above applies insofar as the digital economy is concerned, and the WA resources sector maintains an active commitment to embracing and enhancing D&I within its workforce.

Conclusion

The growth of the digital economy, and the sustained rate of that growth, will have impacts across all industries in some way, shape and form. The mining and energy sector is acutely aware of how these changes will impact the status quo, and we are investing and engaging heavily with the latest digital technologies.

We support the WA Government's efforts to map out the opportunities and challenges for our State's digital economy, transformation and growth. We wish to thank the WA Government for its continued engagement with industry, and we look forward to continuing our discussions in developing the State's strategy.

Yours sincerely



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