SYNTHESIS, THEMES, COUNTRY CONTEXTS AND PROVOCATIONS

In the realm of eScience, we find ourselves at a pivotal moment. The papers presented highlight some unique examples of how the five organisations represented today are making an impact and also provide a shared vision: the transformative potential of data and computer science innovations and cross sectoral collaborations. And yet, as we delve into these papers, we see that this vision is not without its challenges. But these challenges are by no means insurmountable. In fact, I think they do a great job of they illuminating the path forward, emphasising the need for interdisciplinary collaboration, skill development, and community and industry engagement.

We are fortunate to have insights from authors across the globe—Australia, North America, the United Kingdom, and beyond. Each paper reflects unique international contexts and approaches, showcasing how different regions navigate the integration of eScience into industry and academia. Therefore, these perspectives offer a rich tapestry of strategies that underscore the global trend towards creating effective and supportive environments for innovation.

And while there are resonant themes and similarities, the distinct regulatory frameworks and cultural nuances in each context impact how organisations and partners collaborate and innovate. But these differences also present opportunities for collaboration and the cross-pollination of ideas and practices, enriching the global discourse on eScience.

For example, At RIDL, we're piloting a unique version of NICD and Barry's Data Innovation Bootcamp. We're collaborating with Griffith's business and ICT schools to source students, and due to Griffith's financial situation, we're asking industry partners to sponsor the program. This approach not only covers our costs but also transforms the impact of their existing scholarships. Instead of benefiting 1-2 students, the same investment can now support 10 students, providing them with hands-on learning experiences. This expands our partners' reach/impact by 5x to 10x and offers them valuable returns, such as MVPs from the bootcamp and access to potential interns or graduates. This triple benefit for students, Griffith University, and industry partners is incredibly appealing, and I eagerly anticipate hosting our first bootcamp upon my return to Australia.

Key themes:

1.**Integration of eScience in Industry and Academia**: All papers emphasise the transformative role of eScience in enhancing research capabilities, innovation, and operational efficiency across various sectors. They highlight the need for integrating advanced computing, data analytics, and collaborative tools to drive industry advancements and academic research.

2.**Bridging the Data Skills Gap:** The papers stress the importance of addressing the data skills shortage through education and collaboration between universities and industry. Programs like the Data Innovation Bootcamp and partnerships at institutions like NICD and RIDL are examples of efforts to equip the workforce with necessary data skills.

3. **Collaborative Ecosystems and Community Building:** Creating data-centric communities and fostering collaboration among diverse stakeholders are recurring themes. Papers discuss the importance of building partnerships and ecosystems that support data sharing and innovation, as seen in initiatives like FaceBase and the collaborative models at RIDL and NICD.

4. **Socio-Technical-Economic Considerations:** The papers highlight the need for a holistic approach to technology deployment, considering socio-technical-economic factors. This includes engaging stakeholders from academia, industry, and government to ensure successful implementation and public trust in new technologies and the safety of AI and ML in autonomous systems, particularly in the context of autonomous vehicles (AVs).

As I mentioned, we’ve heard from presenters from Australia, The United Kingdom and the United States and while there are many similarities between our nations there are also some interesting differences. I am by no means an expert on all of these countries but I thought it might be useful to briefly set the stage for our upcoming panel discussion with a bit of an overview of each country and then provide some provocations to get the ideas and questions percolating away in your heads so that we can have a robust and interesting discussion. The key international approaches to the regulation, ethics, safety, and adoption of AI in Australia, the states and the UK all reflect a diverse set of strategies that align with the themes and topics covered in the five papers presented.

Let's begin with \*\*Australia\*\*, a nation on the brink of transformation. According to a report from the Tech Council of Australia, AI has the potential to create up to 200,000 AI-related jobs by 2030. This transformation is expected to boost productivity significantly, with PwC Australia's 2024 AI Jobs Barometer revealing that sectors more exposed to AI are experiencing almost five times higher growth in labor productivity. However, as we heard a significant skills gap persists, with many employers unable to find the AI talent they need. For example,the same PwC report, states that 75% of Australian employers struggle to find AI and data science talent.

Despite this challenge, there's a strong push towards upskilling. Deloitte's research highlights that 58% of students are already utilising generative AI technologies, pointing to widespread use in educational settings. This trend is mirrored in the workforce, with over half of Australian professionals actively using or experimenting with generative AI in their work environments.

Turning our gaze to the \*\*United Kingdom\*\*, we see similar challenges and opportunities. The demand for data science skills has surged dramatically, with job postings for Data Scientists and advanced analysts increasing by 231% , whereas other job postings only increase 36% over the same 5 year period according to a study by the UK’s Royal Society. The UK government has implemented initiatives to address these gaps, but skepticism about AI's productivity benefits remains among workers. PwC's research shows that the UK AI market is projected to grow significantly (80+ billion pounds) by 2035, highlighting the economic potential of this sector and technology.

Across the Atlantic, the \*\*United States\*\* presents a different narrative. The adoption of AI varies significantly across regions, with some areas experiencing declines in employment ratios due to automation. According to a study by Acemoglu et al., establishments that increase job postings related to machine learning skills simultaneously reduce vacancies unrelated to ML. However, they couldn't detect aggregate effects on employment, suggesting that AI's impact might be more about job transformation than outright displacement at the moment. From an regulatory point of view and within an increasingly dense legislative environment, US President Joe Biden issued an executive order (EO) on the 'Safe, Secure, and Trustworthy Development and Use of AI' on 30 October 2023. It builds on earlier work,

such as an executive order directing agencies to combat algorithmic discrimination and the securing of voluntary commitments from major US companies (such as Amazon, Google, Meta, Microsoft and OpenAI) to drive safe, secure, and trustworthy AI development. The order covers eight policy fields.

A common theme emerges across these nations: AI holds immense promise for economic growth and job creation, yet it also presents formidable challenges in terms of skills development and workforce adaptation.

But these challenges are compounded by geopolitical considerations. The absence of universal AI regulation creates an uneven playing field where those who disregard ethical considerations may gain an unfair advantage. This scenario threatens not only economic stability but also global security and democratic values.

Regulation is crucial not just for ensuring ethical AI deployment but also for maintaining trust and transparency in technological advancements.

As I wrap up this synthesis, I would like to say a BIG thank you to all the presenters today your papers collectively highlight the necessity for collaboration, partnership and regulatory frameworks that balance ethics, innovation and safety. And they also stress the importance of addressing critical skills gaps and fostering effective and actionable ecosystems. Therefore, by breaking down informational silos and promoting data access, linkage, sharing, together all of us can we can drive evidence-based advancements while ensuring ethical and safe adoption of AI and eScience technologies.

As we conclude, let us consider a few provocations or questions, but more importantly we want to hear from you and what you’re doing and the questions you have for us, but I’ll leave you with these four questions before I hand over to Paul who will chair the panel discussion.

1. How do we balance the potential for AI to augment human capabilities with the risk of job displacement?

2. Can our educational systems keep pace with the rapidly evolving skill demands of an AI-driven economy?

3. How do we ensure that the benefits of AI are distributed equitably, both within nations and globally?

4. What role should universities and international bodies play in creating universal standards for AI development and deployment?

Thank you for listening and attending.