2023 consultation – Supporting Responsible AI: discussion paper

Consultation response from the Institution of Chemical Engineers (IChemE)

The Institution of Chemical Engineers (IChemE) is pleased to make this submission on Safe and Responsible AI in Australia discussion paper consultation. Artificial Intelligence (AI) has made significant advancements in the last more than one decade, however along with the promise of its capabilities and opportunities, there are serious concerns regarding its risks and the lack of tighter regulation and control. This consultation raises several questions in the context of AI and ADM (Automated Decision Making) and explores measures which can increase public trust and confidence in the development of this technology. These questions have been clustered together under separate headings in the discussion paper and the responses have been prepared by the members of IChemE Digitalisation group.

Q1. Do you agree with the definitions in this discussion paper? If not, what definitions do you prefer and why?

IChemE agrees with the definitions proposed in the discussion paper. Further definitions which could also feature in the discussion paper are as follows (Deloitte 2017):

Cognitive Analytics: A subfield of AI which deals with the cognitive behaviour associated with 'thinking' as apposed to perception and motor control.

Robotics: A machine that is programmed to perform tasks by following step-by-step instructions

Smart Machines: Systems which can make and execute decisions (to some extent) by themselves, requiring no human input.

Q2. What potential risks from AI are not covered by Australia's existing regulatory approaches? Do you have suggestions for possible regulatory action to mitigate these risks?

The discussion paper broadly covers the risks associated with AI and the different regulatory or non-regulatory approaches which could be deployed to mitigate these risks. The paper further outlines governance measures (including regulatory and voluntary mechanisms) that aim to address these risks and raises questions regarding the gaps in the existing governance landscape. AI application risks within the process industry include lack of clarity around the role and responsibilities of the duty holder, skills gap, and reliability of the data used for AI technology development (HSE 2023), which may impact the reliability of the technology itself, leading to increased risk. Voluntary mechanisms can't be required, all use of AI should be able to prove governance around risk.

Chemical engineers offer significant experience in the key requirements outlined within this discussion paper. Chemical Engineers have strong expertise in risk-based assessments, particularly in the areas of high-risk process safety. IChemE Safety Centre, ISC (ICHEME, Safety Centre, 2023) a not-for-profit industry consortium focussing on improving process safety within the process industry, brings together major hazard industries, regulators, and universities and is working collectively to learn more about process safety including the risks of AI in the process industry. Chemical Engineers with their overall systems knowledge can leverage their process safety experience to review the risks associated with responsible use of AI and ISC can act as a pivot to engage IChemE members to contribute their skills in this area. We suggest, based on their expertise, that systematic risk assessments and other safety and risk management methods used in the process industries could be effectively adopted into a regulatory framework in Australia to mitigate the risk of AI.

Since there is no AI-specific enforceable regulation in Australia, several existing Australian laws can be applied to address some of the risks posed by AI technologies regarding their design, development and use. For example, the Privacy Act 1988 (Privacy Act), and the Competition and Consumer Act (2010), as well as anti-discrimination, copyright and intellectual property laws. Possible regulatory action to mitigate the specified AI risks could include a Centralised Approach, as developed by the EU, in which AI driven applications are regulated based on an inherent risk profile of the relevant technology. Where additional controls are necessary in specific areas a decentralised sector-based approach similar to the one used in the UK could be adopted. Providing a set of standard set of risk categories and classifications would could aid the consistent implementation of risk controls.

Q3. Are there any further non-regulatory initiatives the Australian Government could implement to support responsible AI practices in Australia? Please describe these and their benefits or impacts.

In addition to the regulatory initiatives discussed in this paper, the Australian government could also provide clear communication and guidance / training to the industry to ensure that the relevant laws applicable to the AI are clearly understood by the business community, i.e., the context in which they apply and how to comply with these laws. Specific examples may include privacy and data security laws, intellectual property infringement and its boundaries, transparency and limits of ADM systems decision making, processes to identify and address biased and discriminatory outcomes, and consumer laws including developers' product liability obligations (DLA Piper 2023). Providing guidance on the responsibilities of duty holders within organisations using AI tools would also be beneficial.

It may also be necessary to include boundaries to ensure against unacceptable use of technologies.

Q.14 Do you support a risk-based approach for addressing potential AI-risks? If not, is there a better approach?

Q.15. What do you see as the main benefits or limitations of a risk-based approach? How can any limitations be overcome?

The different contexts in which AI can be applied requires context specific regulatory responses. A research study on AI regulation in the UK highlights that the risks associated with AI systems and their impacts is dependent upon the AI technique and application area (Roberts et al 2023). A recent policy paper by the UK government highlights that the AI foundation models can be applied in many ways and the risks vary accordingly, for example using Chatbot to summarise a long article or taking medical advice pose different risks (Gov.UK 2023).

The industry is already seeing benefits from the use of AI , for example, Safeswim which is an award-winning public health risk system produced for the Auckland Council, whereby real-time advice is provided on the levels of risk associated with swimming at specific locations (Auckland Regional Council, 2023), and a joint partnership between a chemicals company BASF and an AI company IntelliSense.io for the deployment of an open, real-time, decision making platform for the mining industry to make the operations more efficient, sustainable and safe (BASF 2020). Further examples include, Infrastructure Australia, which talks about the role digitalisation will have on the future of Australia (Australia, 2022). This shows the need and benefits of technologies such as digital twins and AI in improving productivity across Australia moving forward.

These examples show that AI is already having significant benefit, and these are low risk examples. The key is to form the risk-based approach and ensure against unintended consequences of stifling innovation.

Q.16. Is a risk-based approach better suited to some sectors, AI applications or organisations than others based on organisation size, AI maturity and resources?

It is noted that some sectors will likely lack experience and may be resistant to regulation. Providing necessary resources and training will be important as outlined above. This is again a key driver for regulation.

Q.17. What elements should be in a risk-based approach for addressing potential AI risks? Do you support the elements presented in Attachment C?

The focus of questions 14-17 is 'Risk Based Approach' and therefore these questions have been addressed as a common theme.

IChemE is strongly supportive of risk-based approaches to any regulation effecting the development or use of AI and related tools. Risk-based approaches are expected to consider not only every conceivable consequence, but specifically to imagine and attempt to prevent or mitigate the worst possible consequences of the outputs from AI tools to ultimately evaluate their acceptability within our members' industries and the wider community. This is not dissimilar to the existing methodologies developed within the process industries such as LOPA (Layers of protection analysis) and QRA (Quantitative risk analysis) which are relied upon internationally and can be applied to meet existing risk management standards with possible relevance to AI legislation, e.g. ISO/IEC 23894. These methodologies are applied irrespective of the maturity of the operation, size of the organisations involved, and whether they are private or publicly owned. IChemE expects that AI technologies and applications would be

treated similarly. Currently low-risk engineering applications such as the gathering of data and data analysis are expected to be increasingly augmented with AI tools, potentially increasing their inherent risk level and necessitating additional awareness, assessment and management. A risk-based approach is not expected to limit the use of AI in these roles where they support existing workflows. However, any regulation should prevent the use of AI for circumvention or substitution of good engineering judgement exercised by competent persons (Such as already identified through schemes including Institution based registration systems such as within ICHEME).

Regulation should not prohibit the use of AI in industries where compensatory protections are prescribed to limit the risk. AI can be used for real-time optimisation of assets, including those in hazardous facilities. Optimisation usually means energy savings and hence the use of AI can be considered advantageous to improving the environmental sustainability of the process industries which the wider community ought to expect.

Regulation should work with and complement well-established regulations. Many critical software functions are already regulated within the process industries for example through AS IEC 61508 and 61511 ('Functional Safety') for high reliability, electronic safety systems. In particular, AI regulation should not blanketly hinder the use of AI for safety-related applications – for example a machine learning algorithm may be useful to develop some logic, which can be verified by a competent and responsible person, which is then used in a safety system, as long as it still adheres to the regulations mentioned earlier. It may be that if AI is used to create a product but is not used for the product (after product proving) when to market that product may not require disclosure.

A sector-led approach whereby existing regulators provide guidance to organisations within their respective fields to implement responsible and ethical AI practices and mitigate potential risks would be ideal. This approach would also result in lower regulatory pressures on organisations, which can often stifle innovation and result in reduced compliance.

The discussion paper outlines several elements for a draft risk-based regulation. These include impact assessments, notifications requirements, human in the loop/oversight assessments, explanations of AI decisions, training, monitoring, and documentation. These elements are all potentially relevant but are application dependent. For example, in some high-risk applications such as nuclear, human oversight may be required for safer operations. Similarly, the requirement for impact assessments would vary from company-level assessment of the business impacts of AI to an independent expert assessment, depending on the industry and application. Furthermore, organisations may need to modify their internal governance structures and policies to meet the requirements of the employee training required for the design, function, validation, and implementation of AI technologies to ensuring correct monitoring, use and documentation of the AI systems is in place to avoid any unintended bias.

The Institution of Chemical Engineers (IChemE)

The Institution of Chemical Engineers (IChemE) is a professional association with 30,000 members. IChemE is a not-for-profit, member-led qualifying body and learned society that advances chemical engineering's contribution worldwide for the benefit of society. We support the development of chemical, biochemical and process engineering professionals and provide connections to a powerful network of over 30,000 members in more than 100 countries. The Institution of Chemical Engineers in Australia has a board and staff in Australia.

This response has been produced by IChemE members in Australia and aligns with IChemE's priority topic on digitalisation, promoting the adoption and advancement of digital tools in processes, for economic and societal benefit (IChemE 2023b).

We support our members in applying their expertise and experience to make an influential contribution to solving major global challenges, including achieving the UN Sustainable Development goals.

IChemE would welcome the opportunity to provide more detailed information if required.

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