



# CircAI – Artificial Intelligence and the Circular Economy

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## What did the research aim to address?

The Artificial Intelligence and the Circular Economy (CircAI) project aimed to address the understanding of how artificial intelligence (AI) is currently used in the circular economy (CE) in Ireland. Despite increased levels of research and attention on AI and the CE, there is currently not enough familiarity with this topic for most of its stakeholders to understand the overall benefits. The innovation in this research arises from considering current state-of-the-art international best practice on AI within the CE and providing best practice guidance for future implementation and integration of AI into CE processes. Our research is of particular importance and relevance to Irish small and medium-sized enterprises (SMEs) that are considering the integration of AI into their existing CE processes. Indeed, the CircAI project can inspire stakeholders to explore relevant opportunities for AI applications for the CE, based on a strong understanding of both what AI can do and its limitations, as well as an appreciation of how CE principles could apply to their domain of interest or industry.

## What did the research find?

The CircAI project used structured interviews, literature reviews, technical analysis and engagement workshops with stakeholders from across the AI and CE sectors as well as members of the public. The adoption of AI within the CE in Ireland, as identified and highlighted by these stakeholders, is hampered by the lack of opportunities for education and training on AI. Education and training, for all stakeholder groups, is urgently required on AI applications, the societal and economic benefits of AI and the limitations of AI. In a similar way, AI developers and experts also require an increased understanding of the challenges faced by industry within the CE, which require specialized and nuanced solutions. Increased funding support for research and development in AI-driven CE models is needed at this time to stimulate innovation and ensure that technological advancements align with sustainability goals. Governments, not just in Ireland, must also provide financial incentives to SMEs to help them adopt AI for CE practices, given that SMEs often face higher barriers to entry to these technological domains due to cost constraints.

## How can the research findings be used?

There are several ways that the research findings of CircAI can be implemented. First, as the development of AI continues at pace, it is necessary for governments and industry to develop expert-led taskforces or advisory groups that bring together AI and CE experts to advise policymakers and others on the integration of AI into sustainability practices. This is required to ensure that the policy and implementation timeline remains aligned with the fast pace of constant progress, evolution and development of AI. Furthermore, from a CE perspective, collaborative efforts among businesses, policymakers and academia are crucial to ensure that regulatory frameworks support the adoption of CE practices and foster innovation. Despite increased levels of research on AI and the CE, there is still a gap in the knowledge of most stakeholders, including the public, on these topics. Policymakers themselves can face significant challenges due to their lack of understanding and proper education in this area, which prevents the development of effective policies that encourage industrial adoption of AI for the CE. Research funding agencies are encouraged to provide funding programmes that support development of educational and training platforms for both AI and the CE going forward.

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