



CASE STUDY

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The Challenge

The UK manufacturing sector, contributing £206bn GVA in 2022 and employing 2.6 million people, is central to economic growth, innovation, and jobs. To remain competitive, manufacturers must adopt new methods and technologies. While advances in AI and the availability of data drive digitalisation, widespread adoption remains a significant challenge.

In partnership with the AMRC, I planned to address two key research questions to facilitate digital technology adoption in the manufacturing sector: How can data-driven design frameworks be tailored to the needs of manufacturing? What are the requirements, challenges, and opportunities for AI in design within the manufacturing context?

Innovation

The RiR project used a co-creation approach combining academic research with hands-on collaboration through workshops and interviews with AMRC and their industrial partners. Two main workshops were delivered:

- Data-Driven Design Workshop: introduced and validated a data-driven framework tailored for manufacturing, enabling firms to explore how data can enhance design decision-making.
- AI in Design Workshop: identified practical opportunities and challenges for AI adoption in manufacturing, highlighting human and governance barriers such as trust, privacy, and security.

In response to the findings of the workshops, the project team developed a data, human, governance framework to understand their interaction, which is validated through interview studies with the Catapult and several industry partners.

Collaborative outputs included a published paper at the International Conference on Engineering Design (ICED25), a joint brochure on digital adoption challenges in manufacturing, and a further journal publication in progress.

Result

The project delivered tangible research and engagement outcomes:

- A validated Data-Driven Design Framework tailored for manufacturing, supported by strong positive feedback from industry partners.
- Identification of key real-world AI and data adoption barriers, including data, trust, privacy, and human factors.
- Progressed on a second paper, proposing a newly developed data, human, governance framework.
- A manufacturing sector challenge section, included in Digit Lab's Case study brochure.
- Strengthened collaboration between the University of Exeter and AMRC, leading to ongoing discussions for further funding opportunities.
- Dissemination of the project outcomes through academic and industry channels, including academic conferences and publications, industrial events, and other outreach activities.

Impact

The project highlighted governance and human issues as critical barriers to AI and data adoption in the manufacturing sector. It has shifted industry and academic understanding of AI and data adoption in manufacturing by identifying three main challenges: data, human, and governance. This finding has directly informed ongoing research activities for the RinR team and their wider research group, ensuring future work addresses real industry concerns. The project also influenced teaching within the RinR team. Insights are being integrated into teaching materials, linking theory with real-world challenges in digital adoption and enriching classroom discussions on the human and governance dimensions of AI in manufacturing.

Dissemination has begun through the published ICED25 paper, a joint brochure on digital adoption challenges, and further publications in preparation. Workshops attracted strong industry interest, opening opportunities for collaboration and joint funding proposals. This project has contributed to a more responsible, human-centred approach to digital transformation, helping UK manufacturing move towards safer, data-driven and AI innovation.

The project created a foundation for joint research and innovation between the RinR and Catapult host team. For the RinR team, it expanded networks, built new skills in industry engagement, and created pathways for career development. For the host Catapult team, it provided access to cutting-edge academic insights and reinforced its role in shaping digital adoption practices in manufacturing.



AMRC - HVM Catapult

Ji Han

“The collaboration with The University of Exeter DIGITLAB has been a mutually beneficial partnership involving the sharing of expertise, experience and resources such as the AMRC’s reach into industry, and The University of Exeter’s expert knowledge.”

“Collaborating with the host Catapult team at the Advanced Manufacturing Research Centre (AMRC) has been pivotal in grounding our research on AI and data-driven design in real industrial practice.”