

# Sharing insights: comparing the design process in shipbuilding and construction

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It is recognised that there are cost overruns and programme delays in the construction industry due to poor design coordination. Despite the availability of digital tools like building information modelling (BIM), these issues continue to compromise project delivery. While technological solutions exist, their implementation remains inconsistent. This dissertation investigates the potential for cross-industry learning from other comparable industries. This study explores insights gained from the process of learning from another industry that has overcome an equivalent issue to understand how cross-sector learning can uncover insights that could support innovation and improve design outcomes in construction.

The shipbuilding and construction industries share many characteristics, including large, complex, and low-volume projects, strong economic influence, and critical early-stage design decisions. However, shipbuilding has experienced quicker adoption of digital tools and implemented collaborative design practices to address similar challenges faced by the construction industry. These similarities and differences between the two industries illustrate why the comparisons are being explored. Comparing the shipbuilding and construction industries by facilitating shared learning is justified to learn from other sectors' solutions to solve similar problems. This research examines whether design practices from the shipbuilding industry, particularly integrated design processes and single 3D computer-aided design (CAD) models, could provide valuable insights for construction.

To address this, the study employed a qualitative methodology. Four focus groups were conducted with 27 experienced construction industry professionals from architecture, structural engineering, mechanical, electrical, public health engineering, design, and project management. Discussions in the focus groups centred on the feasibility, challenges, and opportunities of implementing current shipbuilding practices during the construction design phase. Thematic analysis was employed to analyse the data.

From the thematic analysis, three themes emerged: cross-industry shared practices and transferable processes across industries, barriers and challenges limiting design innovation and opportunities and potential improvements through cross-industry learning.

The focus group findings revealed that while shipbuilding's integrated design approaches and using a single 3D CAD model are viewed positively, significant barriers would prevent them from being adopted in the construction industry. These barriers included: software and technological limitations, fragmented project structures and entrenched cultural behaviours. Most significantly, the study revealed that many construction professionals continue to depend on outdated and stagnated systems like paper drawings and federated models despite being aware of their inefficiencies. This highlights the importance of targeted education and industry-wide collaboration to promote innovation.

In conclusion, the focus groups provided a consensus that shipbuilding practices would improve coordination in construction projects. Therefore, the focus groups' explanations for not adopting innovations became a particularly valuable analytical focus. One key finding was that people are happy to work with known broken systems that are not perfect, but they do the job. This finding demonstrates the entrenched behaviour of resisting change and preferring the status quo in the industry. Unless people see a genuine benefit to a change, they are unlikely to adopt it willingly, despite current systems not being fit for purpose.