

CONSTRUCTION ENGINEERING MASTERS DISSERTATION ABSTRACT

Barriers to innovation in the UK construction industry. A case study of exoskeletons to boost productivity in the specialised trades

The construction sector matters, it is one of the largest in the world economy, with approximately \$10 trillion spent on construction related goods and services every year. There is a widespread perception that the construction industry is poor at innovation (Winch, 2003). The industry's productivity has trailed behind other sectors for decades, leaving a \$1.6 trillion opportunity to close the gap (Barbosa et al., 2017).

The purpose of this research is to explore and highlight the barriers to innovation within the UK construction industry by selecting an emerging innovation and investigating the challenges faced from two separate perspectives; suppliers of the innovation and the construction industry.

This research was completed by selecting an emerging innovation and conducting semi-structured interviews, with a sample selected from firms commercialising the innovation and the construction industry.

Through exploring both perspectives, this research seeks to expose barriers to innovation which are not clearly understood, expressed and overlooked. Highlighting these barriers will increase awareness of the challenges and actions needed to improve innovation.

Exoskeletons, the selected innovation, are defined as robotic wearable devices, providing augmentation for body parts. Exoskeletons for industrial applications include devices such as arm support, back support, leg support, and tool holding for work at warehouses, factories, construction sites, and surgical rooms, among others. Exoskeletons for industrial usage are mostly passive and flexible, as they have advanced ergonomic design, which allow them to adjust according to the body shape and structure, transferring load to the ground in standing or kneeling positions, which facilitates the usage of heavy tools.

The structure of the construction industry, with a low degree of vertical integration, might make it challenging to adopt a radical innovation, such as exoskeletons. However, exoskeletons represent an innovation which can be adopted within one firm and not the entire supply chain. The 'task has not changed' or necessarily 'the person performing it'.

Despite considerable evidence of productivity, health, safety & well-being benefits delivered by exoskeletons, this technology has not yet been widely tested or adopted across the UK construction industry.

The results of this research have demonstrated, with supporting evidence, the existence of significant opaque barriers, which must be overcome to allow the construction industry to benefit from this and other innovations more rapidly. Overcoming these barriers requires leadership agility and versatility from multiple stakeholders.

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