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An investigation on the impact of knowledge, team working and digital collaborations tools on the use of innovative work practices.

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Abstract:

The purpose of this research was to understand the influences on innovative work practices within the UK construction industry. Prior research has shown that knowledge sharing and collaboration among professionals from different backgrounds are some ways to achieve innovation in complex industries. We surveyed 96 engineers from a range of organisations. Our findings show that the use of innovative work practices is associated with values and behaviour including knowledge sharing, use of digital collaboration tools and perceived safety climate which is the shared belief that safety is a priority. However, training in digital collaboration tools and perceptions of their utility vary widely.

Research aims:

The aim of this study was to examine innovative work practices in organisations operating within the construction sector. We focused on



innovative work practices which are defined as the exploration of opportunities and the generation of new ideas as well as behaviours directed towards implementing change, applying new knowledge or improving processes to enhance personal and/or business performance (De Jong & Den Hartog, 2008). Our findings contribute to developing a model of innovative work practices that can be applied to collaborations between temporary and permanent works engineers.

Research objectives:

The research had two objectives:

1. To examine the influences on innovative work practices with a particular focus on knowledge, team working, the use of digital collaboration tools and perceptions of safety climate.
2. To provide initial insights into innovative work practices that can be used as the foundation for a larger study.

Research method:

We used a quantitative research method that enabled us to examine influences on the use of innovative work practices within multiple organisations which include TWf members, as well as participants from other UK organisations in the construction sector. The online survey method enabled us to include employees who are working at home due to Covid-19.

Participants comprised 62.5% temporary works engineers and 37.5% employees in other construction-related roles. The participants were representative of the main and sub-contractor companies engaged in the construction industry. The study also included response from a number of specialist temporary works equipment suppliers. Individuals from these organisations held a range of roles such as company directors, safety engineers, BIM co-ordinators and design engineers. Thus, the sample represents a wide spectrum of professionals practising in the sector.

Each participant completed a set of items on each topic of interest. We used the data to calculate scores that could be used in statistical analysis.

Key findings:

We used linear regression analysis to examine the data.

Results show that the use of innovative work practices was associated with:

- Recognising the importance of knowledge
- Knowledge sharing within teams
- Use of digital collaboration tools, such as BIM
- Safety climate, i.e. the extent to which perceptions of health and safety policies and practices are shared among employees in an organisation (Zohar & Luria, 2005)



Qualitative data:

In addition to the items used to gather quantitative data, and with a view to developing this research programme, we included an opportunity for participants to write their responses to this question: “Please describe what digital collaboration technologies, such as BIM, mean to you.” There were four categories of comments.

Some participants were positive.

“100% the way forward.”

“Digital collaboration technologies are very significant to my company, as it gives us the chance to coordinate the projects more efficiently and it reduces the time we spent looking for information.”

Several participants saw digital collaboration tools as having potential to develop.

“An opportunity to coordinate all aspects of a building in one format. Whilst it has been implemented widely in our business, I think we are still scratching the surface of what it could be capable of if combined with other project documents like the programme, budget and quality tracking software.”

“Digital collaboration is continuing to evolve from fax and email to visual interface allowing digital trails to occur in a safe low expense environment where mistakes can occur without consequences. I feel the next phase will see supported thinking and the increased use of AI to shape our thoughts to achieve the optimum outputs to engineering challenges.”

Some responses were more focused on technical descriptions.

“A means to improve the detail, efficiency and clarity of information transferred between a project team. Ensuring as-built information is retained in an accessible format to enable future users to reuse or repurpose assets.”

“An efficient way of ensuring that all members of the team have access to the same up-to-date information and can share amongst the team.”

Others participants had negative views about digital collaboration.

“BIM rarely assists in temporary works, it’s usually a lot of time to produce a 3D version of the design and incorporating it into BIM, for temporary structures it is not worth the extra expense 9/10, and the model will not be helpful to show exactly what phase of construction will exist when the design is being implemented, but perhaps nobody would know that from how dynamic site conditions can be. The more effective collaboration tools I’ve seen are simple, like giving people the ability to work on the same excel across a team.”



“Nothing it has very little use to us whatsoever. Unless temporary works engineers adopt this software as an industry standard I see little benefit. In my opinion temporary works solutions are often required as a matter of urgency, playing around with BIM will hinder this operation.”

Recommendations:

Practices that enhance the factors that influence innovation will increase the overall levels of innovation in organisations. Examples of these practices include:

- Creating an environment where ideas are encouraged and open discussion of decisions is facilitated so that people can speak up without fear of reprisals.
- Emphasising the importance of knowledge and ensuring that there are mechanisms that enable knowledge transfer, e.g. give time in team meetings to discuss ideas; develop communication mechanisms to share knowledge across organisational divisions and with external stakeholders.
- Increasing training on BIM and other digital collaboration tools. Data showed that training on BIM per participant ranged from 0 hours to 80 hours which has implications for the use of BIM for knowledge sharing.
- Focusing on processes and practices that reinforce safety climate and ensure that safety-related values are communicated frequently.

References:

De Jong, J. P., & Den Hartog, D. N. (2008). Innovative work behavior: Measurement and validation. *EIM Business and Policy Research*, 8(1), 1-27.

Zohar, D., & Luria, G. (2005). A multilevel model of safety climate: Cross-level relationships between organization and group-level climates. *Journal of Applied Psychology*, 90(4), 616-628.