

JUST IN TIME IN CONSTRUCTION: DESCRIPTION AND IMPLEMENTATION INSIGHTS

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1 BACKGROUND AND IDENTIFICATION OF PROBLEM /KNOWLEDGE GAP

Several authors address the fact that productivity in the construction industry has improved significantly but is still lagging behind other industries (Pheng and Chuan 2001; Asri et al. 2016). Having greatly aided the manufacturing sector, the paper investigates how the JIT philosophy could benefit the carrying and the planning of construction projects.

2 RESEARCH AIM AND METHODOLOGY

The research aims to show how JIT can help to better deal with costs, waste, unmet deadlines, and quality problems encountered in construction. To do so, a scientific methodology called systematic literature review (SLR) is applied. The goal of a SLR is to “improve the quality of the review process by synthesizing research in a systematic and reproducible manner” (Tranfield et al. 2003). The SLR is conducted through three stages: planning, conducting, and reporting as presented in figure 1.

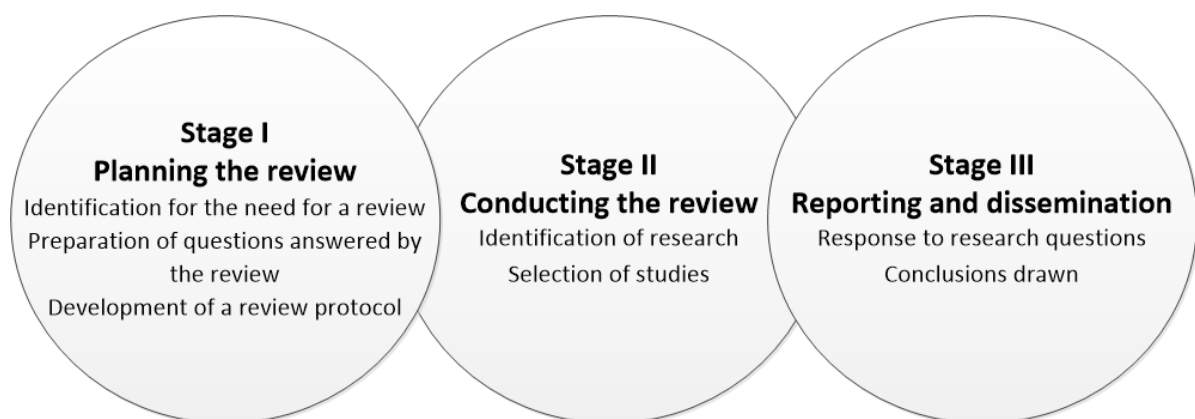


Figure 1: Stages of the systematic literature review

3 RESEARCH FINDINGS

The first research question concerned the presence of JIT in construction in scientific literature. The second question dealt with the form JIT typically takes in construction. The case studies of Tommelein and Weissenberger (1999) and Pheng and Chuan (2001) maintain that in practice a buffer is necessary and its size should be determined strategically. Furthermore, the implementation of JIT principles in construction seems to require prefabrication (Cossio and Cossio 2012), Lean techniques, and other elements presented in figure 2a and in the paper.

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Question three was about the indicators used to measure performance when JIT is implemented in construction. Figure 2b illustrates the findings which are discussed in the paper.

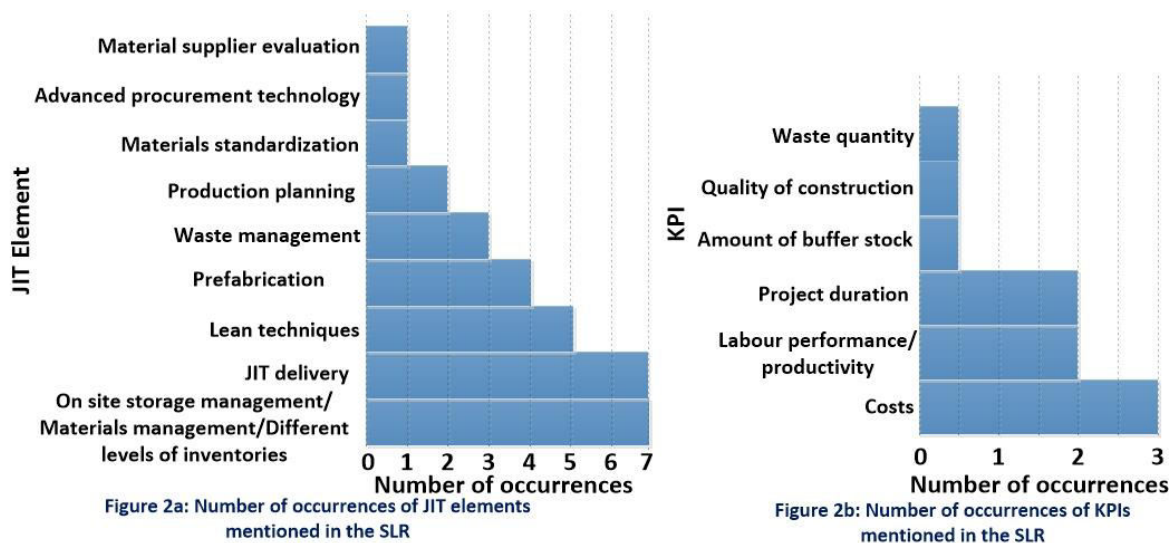


Figure 2: Number of occurrences of JIT elements and KPI mentioned in the SLR

According to the literature, JIT benefits on a construction project’s value chain depend on the prefabrication plant, the construction site, and the flows between them. Figure 3 illustrates four scenarios of JIT in construction. Scenario I, which presents the less beneficial case, shows that low information sharing between the plant and the site and low supply chain coordination are respectively less favourable to (-) prefabrication of components and (-) JIT deliveries while low construction site management suggests (-) low presence of Lean principles on the site. Scenarios II, III, and IV are discussed in the paper.

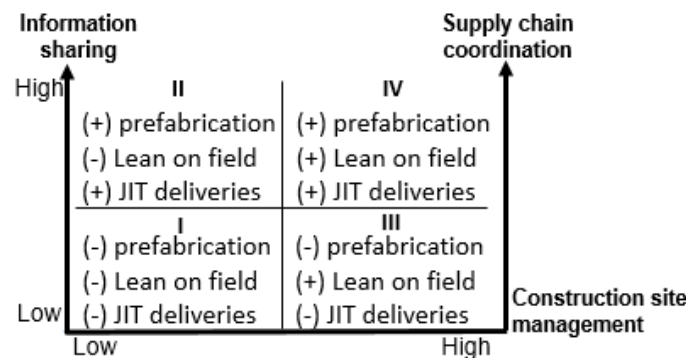


Figure 3: Scenarios of implementation of JIT in construction

Pheng (2001) states that prefabrication has come with “the hope of reaping the benefits of factory-styled operations” since it entails benefits such as improved quality, waste reduction, and faster erection of buildings. However, even if an efficient plant makes JIT deliveries, if there are no resources or no space available to unload them on site, the truck and its driver will remain monopolized. Which conclusions can be drawn from these findings?

4 SUMMARY

The research showed through the SLR that JIT exists in construction, and helped identify the JIT elements applied as well as the KPIs used to measure the impact of their implementation. Moreover, the research proposed four scenarios to illustrate the influence of three JIT elements (prefabrication, JIT deliveries, and presence of Lean principles) on the successful implementation of JIT in construction. Future work will use discrete-events software to simulate different



scenarios presenting various levels of prefabrication, on-site buffer stock, and Lean on-site activities in order to obtain quantitative KPI measurements.