

LEAN CONSTRUCTION IN SMALL-MEDIUM SIZED ENTERPRISES (SMES): AN EXPLORATION OF THE HIGHWAYS SUPPLY CHAIN

Algan Tezel¹, Lauri Koskela² and Zeeshan Aziz³

1 BACKGROUND

Lean Construction (LC), the reflection of the Lean Production System and Lean Management on the construction industry, has been under the spotlight for an improved performance in civil projects in England since the late 2000s.

In the highways sector specifically, LC has actively been championed by Highways England (HE), the main public client responsible for the delivery and operation of England's strategic highways network, through engagement and contractual configurations with some large-sized main contractors (Tier 1s) and some specialised sub-contractors operating in key delivery areas like soil works, paving/surfacing or traffic management (large Tier 2s) that are almost on par with the Tier 1s in terms of their annual turnovers and employee numbers.

Despite constituting the largest group in the supply chain, the engagement with small and medium sized enterprises (SMEs) for LC has been limited to date. In this equation, SMEs are chosen by Tier 1s often for short terms on the minimum price basis with fixed-priced contracts. Also, SMEs have been rarely in direct contact with HE for their LC or other process improvement efforts, which are mostly shaped and directed by their Tier 1 clients. Given this context, one of the strategic targets of HE is to effectively disseminate LC across the whole highways supply chain, primarily including SMEs.

2 RESEARCH AIM AND METHODOLOGY

In the paper, the authors present a summary of the initial findings of a research project aimed at understanding the current condition of and future directions for LC in the SMEs in England's highways supply chain. A mixed-research approach involving interviews and a comprehensive survey was used. Following a literature review, 20 senior managers (4 from HE, 5 from the Tier 1s, 4 from the large Tier 2s, 7 from the SMEs) were interviewed face-to-face for circa 45 minutes between December 2015-May 2016.

After the literature review and analysis of the interviews, 31 points for the current LC condition in the SMEs and 40 actions for the way-forward were identified and are discussed in the paper. To validate and rank the importance of the findings, the identified points and actions were turned into Likert-scale questions on a survey of 98 questions and distributed among managers across the supply chain. HE's database was used to pinpoint the relevant managers, who are experienced in both the SMEs' business context and the current LC efforts in the supply chain. Of the outgoing 289 surveys, 110 responses were collected between June – October 2016 with 38% response ratio. The analysis and write-up of the survey findings are currently underway.

A summary of the interview findings outlining the current condition of and future directions for LC in the highways SMEs is presented in the paper from the process, project delivery, training and project governance perspectives.

¹ Research Fellow, School of Art, Design and Architecture, University of Huddersfield, UK, A.Tezel@hud.ac.uk

² Professor, School of Art, Design and Architecture, University of Huddersfield, UK, L.Koskela@hud.ac.uk

³ Senior Lecturer, School of the Built Environment, University of Salford, UK, Z.Aziz@salford.ac.uk



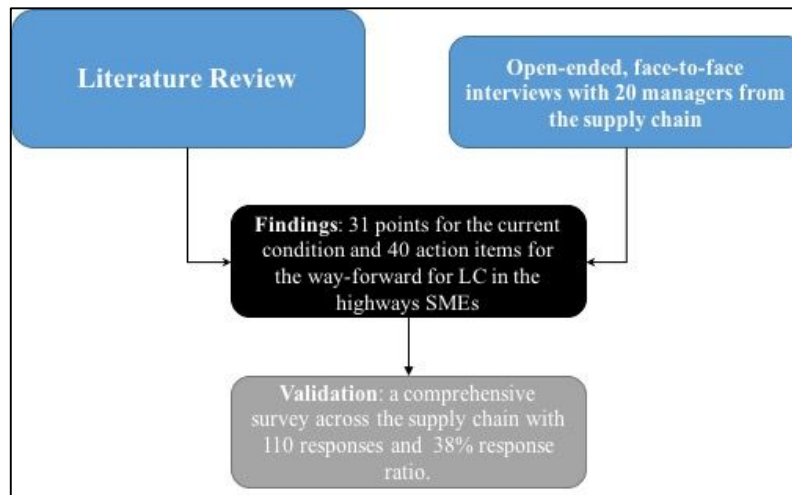


Figure 1: Research process

3 RESEARCH FINDINGS

The initial findings as to the current condition of LC mostly validated the literature; lack of resources for LC deployments in the SMEs, conventional project delivery systems not incentivising LC or innovation, need for creating the business case for LC in the SMEs, fragmentation and short-term contractual relations, lack of support for and focus on the SMEs. However, there are also more sector specific parameters like short on-site working windows in the highways sector, and fragmented and unstandardized LC techniques (i.e. the Last Planner, Visual Management). Also, although not labelled as LC, the interviews highlighted that the SMEs do ad-hoc process improvement and innovation in their operations. It was identified that in the highways sector, where the deployment of LC is relatively new, the same concerns that were identified 20 years ago still exist.

For the future action points, there are responsibility items for all the supply chain actors (e.g. HE, the SMEs and large companies). The gist of the findings for the future is to engage with the SMEs directly, to support them with necessary resources and incentivising project delivery mechanisms, and to devise a continuous training plan going beyond the basics and specifically targeting the SMEs. Also, demonstrating the business case for LC through pilot LC projects, and effectively capturing and disseminating the LC knowledge seem necessary. Training and project governance related findings come to the fore.

4 CONCLUSION

SMEs often constitute the largest group in construction supply chains. However, LC deployment discussions have rarely focused on SMEs to date with sector-level analyses being even scarcer. For an extended dissemination and deployment of LC across construction supply chains in different sectors, it is essential to gain a better understanding of the issue from the SMEs' point of view.

The paper summarises the initial findings of a research effort supported by HE and aimed at understanding the current condition of and future directions for LC at the SMEs in England's highways supply chain. After the analysis of the findings from the survey, which was prepared based on the interview findings outlined in this paper, a more complete understanding of LC in the SMEs will be achieved. Alongside validating the interview findings, the statistical analysis of the survey study will help rank the relevance of each current condition point (the first research question) and the importance of each future directions (the second research question) from different supply chain actors' perspectives (e.g. the SMEs, Tier 1s and large Tier 2s) for prioritisation.

