Application of lean and agile (LeAgile) for modular and offsite Construction

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PROBLEM STATEMEN

Despite the amount of published research for utilizing lean tools for modular and offsite construction and the few studies investigating the application of agile principles in this industry, Most of these studies consider theoretical aspects of utilizing lean or agile without focusing on their real practical application in the industry. Lean and agile principles are translated into different tools and techniques which results in reduction in waste and increase in value and quality. Few studies in literature considered the integration between lean and agile tools "LeAgile" as a practical framework for the supply chain of modular and offsite construction. This integration can be accomplished using a decoupling point (DP) which separates lean in the upstream supply chain (manufacturing) and agile in the downstream supply chain (onsite construction). Some studies focused also on the theoretical aspects of this integration without considering the real practice in the market. Hence, this research is bridging the gap between theoretical ideas in literature and real practice in the market to benefit from "LeAgile" principles and tools in enhancing productivity and reducing waste.

BACKGROUND

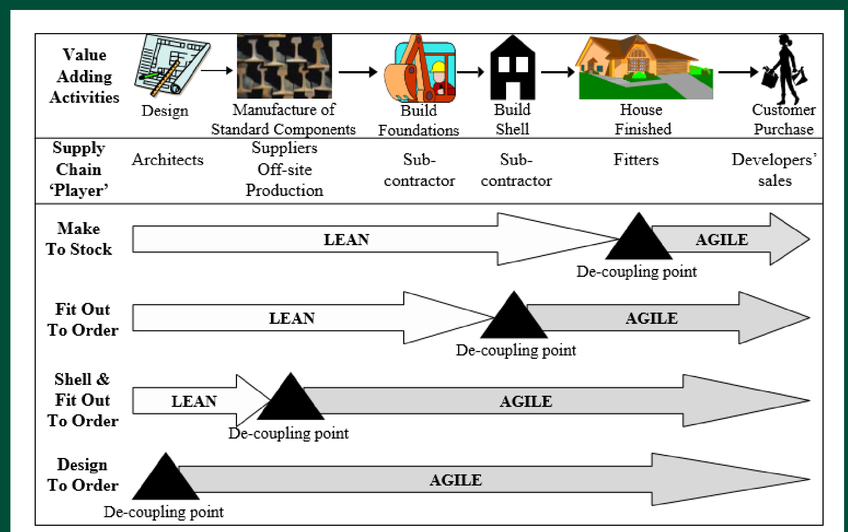
Modular and offsite construction are prefabricated buildings or houses that consist of repeated sections named modules. "Modular" is a construction technique that constructs building sections in manufacturing facilities, then install them onsite.
Several academic studies focused on the application of lean tools for modular and offsite construction, however, few studies considered agile tools or the application of "LeAgile" as a practical framework for supply chain of offsite construction.

Figure 1: Onsite Installation for Modular construction .

SUMMARY OF WORK

- **Conducting structured questionnaire to gather data from practitioners of modular and offsite construction regarding the degree of implementation for lean and agile principles and tools.**
- **Comparing the findings of the questionnaire to the theoretical studies that focus on the "LeAgile" application for modular and offsite construction.**
- **Investigating the location of the decoupling point (DP) to get a better understanding for the supply chain characteristics in the industry.**
- **Suggesting recommendations based on the findings of the questionnaire to enhance the productivity of this industry.**

Figure 2: Leagile strategies for supply chain of offsite construction.



IMPACT ON COMMUNITY

The intended, long-term impact of this work includes:

- **A better understanding for the real application of lean and agile principles and tools in practice.**
- **Investigating the applicability of different "LeAgile" strategies in this industry.**
- **Highlighting the need to encourage modular and offsite construction builders to utilize specific lean and agile tools to enhance their operations.**
- **Enhancing builder's operations would increase productivity , reduce waste, time and cost.**
- **Encouraging the development of prefabricated housing, increase the ability to solve the current shortage of housing in California.**