

CHALLENGES OF USING PREFABRICATION TECHNOLOGY IN OROMIA REGIONAL STATE

Sisay Girma^{1*}, Jifara Chimdi² and Alemu Mosisa³

¹Department of Construction Technology and Management, College of Engineering and Technology, Bule Hora University, Bule Hora, Ethiopia.

²Department of Construction Technology and Management, Institute of Engineering and Technology, Wollega University, Nekemte, Ethiopia.

³Department of Civil Engineering, Jimma Institute of Technology, Jimma, Ethiopia.

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*Corresponding author's email: sisaygirma01@gmail.com

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Abstract —The prefabricated construction method is the most practical and effective construction in the industry today in the world. It is widely considered a sustainable approach to the construction industry. However, in Ethiopia, particularly in Oromia it is not further growing where the construction method is a conventional method. The main aim of this research was to investigate the challenges of using prefabrication technology in Oromia Regional State. The results of this data show that the challenges of using prefabrication technology in Oromia Regional State mainly depends on factors such as Lack of suitable transportation, Lack of a synergetic information platform, Lack of practice and experience. Generally, the research concluded that lack of suitable transportation, lack of synergetic information platform, lack of practice and experience, and unintegrated industry chain were the major factor challenges of using prefabrication technology.

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Keywords: Challenges, Construction Technology, Prefabrication Technology

1.0 INTRODUCTION

Construction is the demonstration of gathering fragments of a structure in an assembling procedure or another amassing site and moving total assemblages or sub-gathering events to the improvement site where the structure is to be constructed [1]. The term is used to perceive this method from the more conventional improvement routine of moving the fundamental materials to the building site where all get together is finished [6]. Prefabrication construction is a generally late advancement in the development business, which speaks to a move from the conventional on location development to off-site. There are different innovations accessible worldwide for utilizing prefabrication construction strategies, practically all advancements attempt to reduce cost and time, and construction technique gives the likelihood to the designers for gathering their structures in a brief period time. The absence of information and experience has caused decreasing in construction development innovations in many developing countries. Then again, many countries experience quake hazard and it is one of the significant reasons which construction isn't such a proper decision for countries in disaster-prone areas [7]. Be that as it may, several developing countries like Ethiopia start utilizing construction by bringing in their insight and procedures. Yet, the utilization of this innovation was not adequate. The point of this research is to investigate the challenge of Using prefabrication technology in a construction project in Oromia Regional State.

2.0 STATEMENT OF THE PROBLEM

There are different innovations accessible worldwide for utilizing prefabrication technology techniques, practically all advancements attempt to reduce cost and time, and prefabrication gives the likelihood to the designers for amassing their structures in a brief timeframe [1].

Receiving the prefabricated component is perhaps the best technique to limit the nature of the issue which happened by poor workmanship and low-quality material, limit the issues that happened by construction delay and to limit the cost of construction.

There are various studies that focus to the challenges of construction industries in Ethiopia. Notwithstanding its prominent role, the construction industries in Ethiopia, as in other developing countries, faces numerous challenges in its practice. A portion of these challenges is project overruns, low quality, improper procurement frameworks, and a failure to adapt to extend necessities and the failure to embrace best practices [8]. In any case, there is no research that had done explicitly on the challenges of using prefabrication technology in the Oromia regional state. This paper, along these lines; intended to fill the gap of checked on works by investigating the challenges of using prefabrication technology in a construction project in Oromia Regional State.

3.0 OBJECTIVES

3.1 GENERAL OBJECTIVE

The aim of this research is to investigate the challenges of using prefabrication technology in a construction project.

3.2 SPECIFIC OBJECTIVES

- To identify the level of understanding of stakeholders about prefabrication technology in the Oromia regional state.
- To identify the main challenges of using prefabrication technology in the Oromia regional state.
- To identify and propose a solution to technical or institutional links in the adoption of prefabrication technology.

4.0 RESULTS AND DISCUSSION

4.1 STAKEHOLDER'S OPINION ON THE ADVANTAGES OF PREFABRICATION

Of the development speculation project stakeholders, an exceptional job is played by construction process participants. Each performs explicit tasks [2].

After identifying from different literature reviews, the advantages of prefabrication technology were prepared for the questionnaire to rank by the respondents. As needs are, to assess the perspective of experts about the upsides of using prefabrication technology in Oromia Regional State, the accompanying variables were recognized from the writing audit and respondents were asked their opinion.

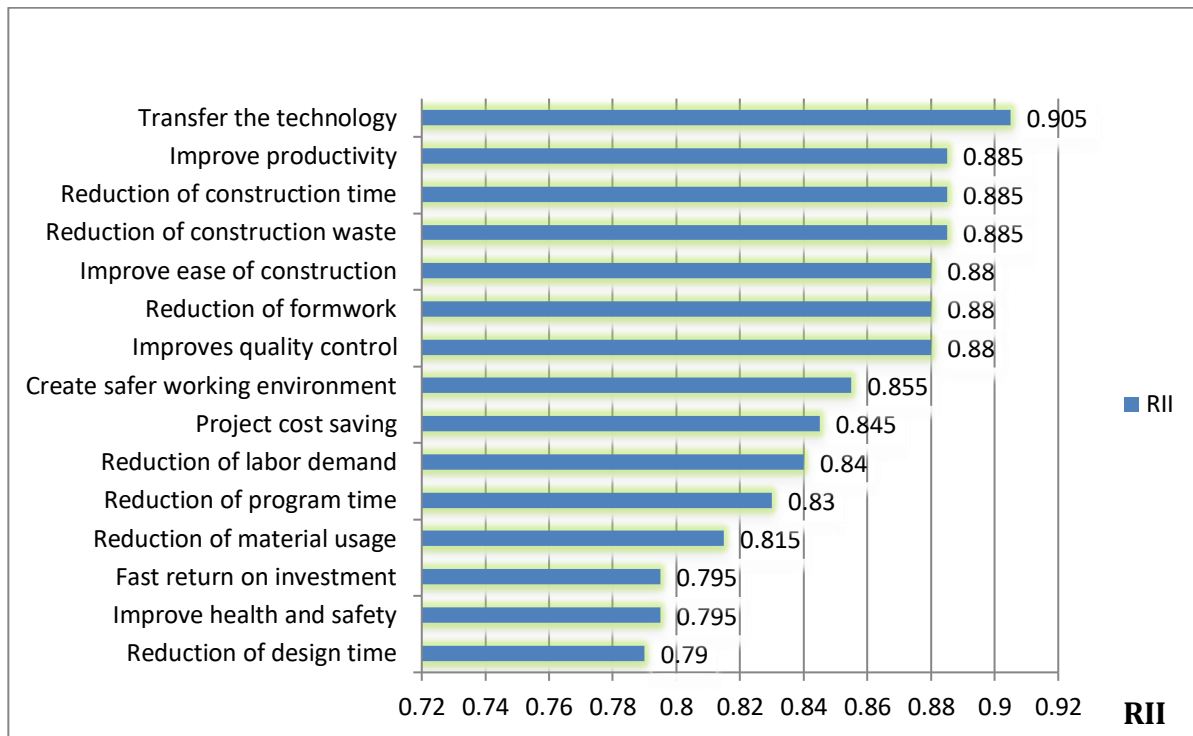


Figure 1. The Weighted Average of All Respondents on the advantages of using prefabrication Technology (based on RII).

The above outcomes agreed with [9] who's expressed that prefabrication technology can be considered as a business system that transforms the conventional construction process into manufacturing and assembly procedure by grasping new and advanced technologies, drawing in individuals, and making an interpretation of customers' needs into building prerequisites.

4.2 PRIMARY CHALLENGES OF USING PREFABRICATION TECHNOLOGY IN OROMIA REGIONAL STATE

Prefabrication Technology has not moved as effectively when compared with different advances since it is a generation innovation or information based and not a utilization innovation or item based. Adapting prefabricated buildings in developing countries is basically impacted by a labour shortage, labour cost, lodging request, building process effectiveness, climate, as well as reduction of waste material and energy consumption [4].

Challenges of Using prefabrication technology were recognized from sorts of writing surveys and asked the respondents to give their suppositions. The assessments of all respondents were positioned by RII as Figure 2.

As appeared from Figure 2 over the Challenges of using prefabrication technology in Oromia Regional state were positioned by RII as indicated by the entirety of respondents' suppositions. The outcomes showed that the lack of suitable transportation was positioned first as the principal challenge of using prefabrication technology in Oromia Regional State with RII 0.82. The outcome concurred with [3] who identified that Component transportation from the factory to the site is also a critical problem affecting the supply chain integration of prefabrication Technology.

Lack of synergetic information platform was the positioned second position with RII 0.81. The outcome concurred with [5] who expressed that; Traditional management strategies don't promptly apply to the plan, manufacture, gathering, or activity of pre-assembled structures and are not bolstered by any lucid or productive information management platform.

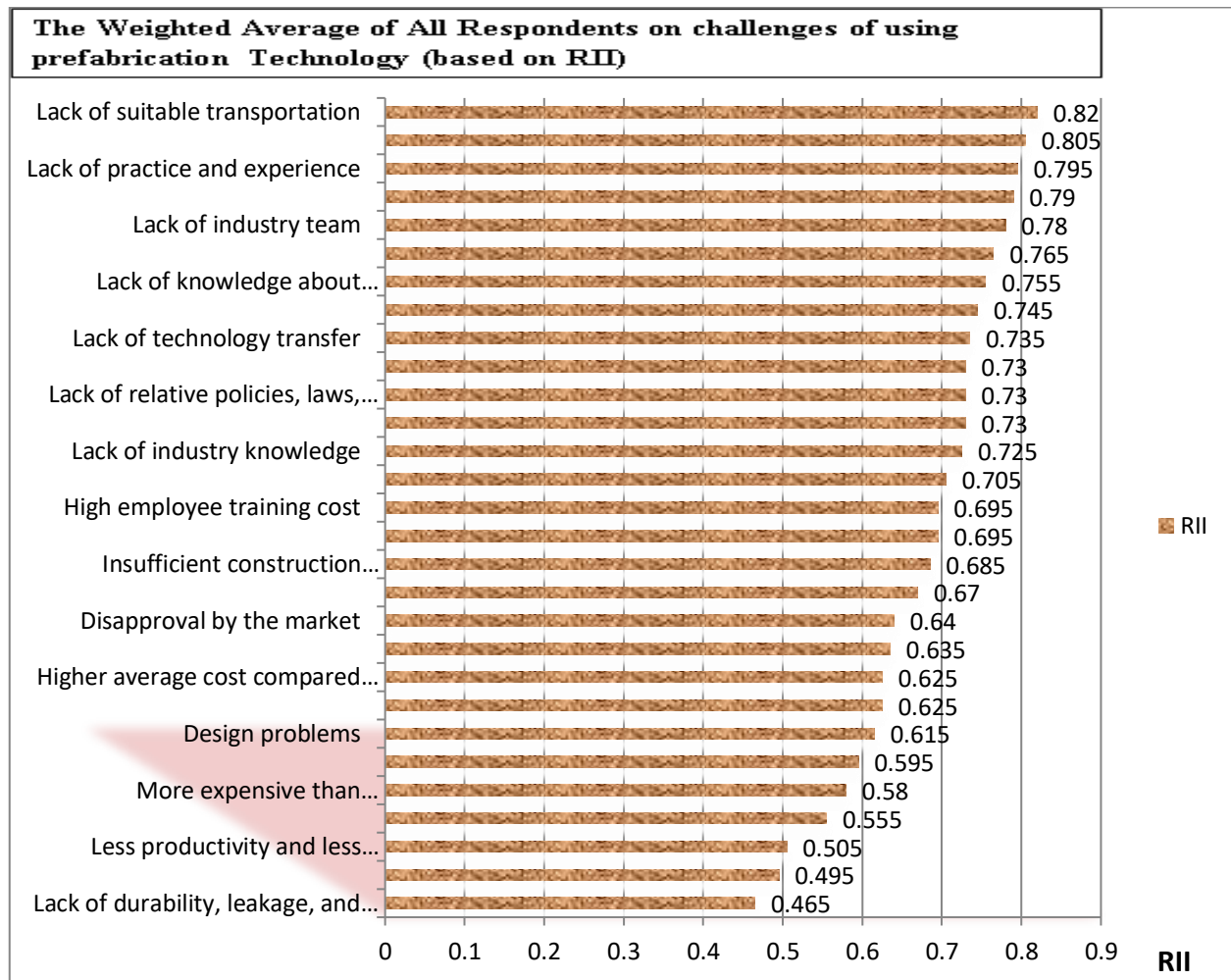


Figure 2. The rank of the general Weighted Average of All Respondents on the challenges of using prefabrication Technology as per every one of the respondents' opinions.

The lack of practice and experience was positioned in the third position with RII 0.795. This outcome concurred with [5] who expressed that; immature innovation and unpracticed workers additionally compromise an assortment of issues, for example, the low quality of materials, precarious joints, and splits in basic positions.

Unintegrated industry chain; RII 0.79, absence of industry group; RII 0.78, absence of well-created specialized framework; RII 0.765, absence of information about construction; RII 0.755, absence of new administration strategy for construction development; RII 0.745, and absence of innovation move with RII 0.735 were positioned from the fourth situation to ninth situation as per all respondents feeling on difficulties of using prefabrication technology in Oromia Regional State.

The other challenges of using prefabrication technology positioned by all respondents were the absence of economy, absence of relative strategies, law, and gauges, inadequate incorporated plan limit, and absence of industry information. As needs are, those elements were positioned the tenth situation with RII 0.73.

The above outcomes additionally upheld by [4] whose expressed that the potential obstructions to utilize pre-assembled components like the absence of research data, higher beginning development cost, constrained site space, monotone in style, absence of experience, no interest for construction, resolute for configuration changes. Industry practices and procedures, supply chain management and logistics, the professionalism of the business, and construction market risks.

4.3 TECHNICAL OR INSTITUTIONAL LINKS IN THE ADOPTION OF PREFABRICATION TECHNOLOGY

A compelling industry chain is critical for the improvement of new development rehearses particularly when another innovation is applied [5]. To assess the connections of Construction organizations in Oromia Regional State the respondents were approached to answer whether their organization has joins with other construction businesses or not. As needs are, the reactions of all respondents appeared in table 1 beneath.

Table 1. Reactions of partners on their company links with other Prefabrication industries

Does your company have links with any other prefabrication Industry?	Frequency	Percentage (%)
Yes	7	17.5%
No	33	82.5%

The analyzed report showed from the table 1 above indicated that 82.5% of the respondents answer No as their company has no links with any other prefabrication industry whereas, 17.5% of the respondents answer yes as their company has links with other prefabrication industries.

5.0 CONCLUSION AND RECOMMENDATION

The results of all participants shows that lack of suitable transportation, Lack of synergetic information platform, Lack of practice and experience, Unintegrated industry chain, lack of industry team, lack of well-developed technical system, lack of knowledge about prefabrication, lack of new management methods for prefabrication construction, and lack of technology transfer were the main challenges of using prefabrication technology in Oromia regional state.

Recommendation for further research is to improve the application of prefabrication technology.

- Assessment of the capacity of construction companies in Ethiopia to establish a modern prefabrication plant.
- Assessment of the application of prefabrication technology in the Ethiopian construction sector.

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