FACTORS AFFECTING CONSTRUCTION PRODUCTIVITY: COMPARATIVE STUDY BETWEEN WORKER'S NATIONALITY

K. Balakrishnan, N.F. Buang, M.A. Adman

Abstract

There are many factors that affect construction productivity based on the worker's background. This study assesses the five factors affecting construction productivity at a construction site in Kuala Lumpur within the worker's nationalities. In 2019, a survey was distributed to a sample of 60 construction workers with various backgrounds. Descriptive analysis shows that respondents are perceived as moderately, that manpower factors (Mean score = 2.88, S.D. = 0.54), external factors (Mean score = 3.32, S.D. = 0.59), communication factors (Mean score = 3.23, S.D. = 0.63), resources factors (Mean score = 3.31, S.D. = 0.58) and miscellaneous factors (Mean score = 3.29, S.D. = 0.70) affect construction productivity. Moreover, perception of the four factors (manpower, external, communication and resources) affecting construction productivity had a significant difference between Malaysian and non-Malaysian workers ($P<0.05$). Therefore, advancement should focus on those four factors to nurture better delivery of construction work; thus, increasing the productivity among workers from different nationalities.

Keywords: Construction, Productivity, Workers, Nationality

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Introduction

In the construction industry, productivity loss is one of the most significant and most serious problems. The productivity of the construction industry in Malaysia has declined (Department of Standard Malaysia, 2019), which is still the industry with the lowest percentage of productivity compared with other industries such as manufacturing and services (Malaysia Productivity Corporation, 2017). Most people agree that the construction industry suffers from delays and cost overruns due to reduced productivity (Durdyev & Mbachu, 2011; Soham & Rajiv, 2013; Thomas & Sudhakumar, 2014; Naoum, 2016).

Some studies indicate that using the correct language as a medium of communication and effective communications plays an essential role in productivity in the construction sector, especially among workers from various backgrounds (Ne'Matullah et al., 2021; Gamil, Y. & Rahman, I.A., 2017).

Many researchers worldwide found various factors affecting construction productivity. Factors affecting construction productivity were commonly identified as non-availability of materials, inadequate supervision, skill shortage, lack of proper tools and equipment, incomplete drawing and specifications, poor communication, rework, poor site layout, adverse weather conditions, and change orders (Hasan, A. et al., 2018). Most developing countries, especially Malaysia, depend heavily on foreign workers for construction projects. Thus, the local and foreign workers' perceptions on the factors affecting construction productivity at Malaysia's construction site should be further investigated.

Therefore, this study was conducted to specifically assess the factors, concerning the workers, affecting the construction productivity to the extent of the worker's nationality differences in Malaysia. With all the expectations for the project, maintaining construction productivity is the key and necessary condition to ensure the perfect success of the project.

Methodology

Study period, location, and respondents

A cross-sectional study was conducted between January to March 2019. One construction site of a national project initiated by the Government in Kuala Lumpur, Malaysia, was selected as a case study. A total of 60 construction workers, consisting of a diversity of workers' backgrounds in nationality, were selected as the respondents. Only construction workers on the project site who agreed to participate joined this study.

Questionnaire

Self-administered questionnaires were selected as the primary technique for collecting the necessary data to assess workers' perceptions of construction projects' factors. The items included in the questionnaire were adapted from a similar study by Gundecha (2013) in the United States. The survey was adapted as the construction projects' factors cover the common issues within the Malaysian context. The study divided construction activities and problems that may arise during the completion of construction projects into five factors, namely manpower factors, external factors, communication factors, resources factors and miscellaneous factors. The questionnaire is divided into two main parts: Part A, General information, and Part B, Factors affecting construction productivity. The reliability coefficient, Cronbach's alpha of the tool used in the questionnaire is between 0.768 and 0.852. Therefore, the questionnaire is considered reliable and can be used to obtain the data required for this study. In this case, the internal consistency of the Cronbach's alpha for the items in a test is good enough, as it is measured within an acceptable range of $\alpha \geq 0.7$ (Salkind, N., 2015).

Data Analysis

Descriptive and bivariate analyses were used to explain the respondents' nationality distribution and the difference of mean

score between the factors affecting construction productivity and respondent's nationality.

Result and Discussion

Distribution of Respondents According to Their Nationality

This study shows that the background of the existing workers on the construction site is diverse, making their views on the factors affecting construction productivity different. Table 1 shows the distribution of respondents by nationality.

Table 1: Distribution of respondents according to nationality (n=60).

Nationality	Frequency (n)	Percentages (%)
Malaysian	31	51.7
Non-Malaysian	29	48.3
Bangladesh	14	23.3
China	2	3.3
Indonesia	9	15.0
Myanmar	4	6.7

Mean Scores of the Five Factors Affecting Construction Productivity

Five factors (manpower, external, communication, resources and miscellaneous) that affect construction productivity are analysed. All of the five factors that have been mentioned are involve human-like characteristics that may affect the project site's productivity.

This study found that the average scores of all factors are at a moderate level, which means that the respondents of this study generally believe that all factors are complex and affect construction productivity in some way (Table 2).

Table 2: Factors affecting construction productivity by mean scores ranking.

Rank	Factors	Mean Score	S.D.	Level of Perception (Mean Score)
1	External Factor	3.32	0.59	Moderate (2.34 – 3.67)
2	Resources Factor	3.31	0.58	Moderate (2.34 – 3.67)
3	Miscellaneous Factor	3.29	0.70	Moderate (2.34 – 3.67)
4	Communication Factor	3.23	0.63	Moderate (2.34 – 3.67)
5	Manpower Factor	2.88	0.54	Moderate (2.34 – 3.67)

The moderate level of perception may correspond to a construction process in which the respondents diverge in selecting the most familiar factors related to their work functions.

Arashpour and Arashpour (2015) showed that even moderately perceived factor variability can significantly affect workflow, leading to long completion times, long queues of unfinished jobs and excessive delays, leading to reduced productivity. Therefore, although they are regarded as factors that affect construction productivity, project managers must pay attention to these factors to further improve on-site construction productivity.

Difference of Mean Rank in Factors Affecting Construction Productivity according to Worker's Nationality

Table 3 shows the non-parametric test to identify the mean rank of factors affecting construction productivity according to nationality. A non-parametric test is used to test for differences between two independent groups on an ordinal measure and the data are considered not normally distributed. Our study revealed that four factors (manpower, external, communication and resources) were perceived with a higher mean rank and significant

difference in the mean rank among Malaysian compared to non-Malaysian workers ($p<0.05$).

Table 3: Non-parametric test of the mean rank difference between Malaysian and Non-Malaysian for the factors affecting construction productivity.

Factors	Mean Rank		Z	P-value
	Malaysian	Non-Malaysian		
Manpower	36.76	23.81	-3.12	0.002*
External	36.15	24.47	-2.84	0.004*
Communication	37.55	22.97	-3.61	<0.001*
Resources	34.97	25.72	-2.22	0.027*
Miscellaneous	31.42	29.52	-0.47	0.640

*p < 0.05

The significant difference in mean rank among these factors between Malaysian and non-Malaysian workers showed that local construction site workers had very different perceptions of how these factors could affect construction productivity based on their nationality.

Differently, while Malaysian respondents had a higher mean rank of perception of the extent of miscellaneous factors affecting construction productivity than non-Malaysian, no significant difference was found ($p=0.640$). This finding indicates that the respondents in this study had similar perceptions of the extent of miscellaneous factors affecting construction productivity regardless of nationality.

In this study, respondents included workers of different nationalities, cultural origins and those responsible for different construction activities. Therefore, due to significant differences in language, tradition, culture and working methods, as discussed in several previous studies, it is not surprising that respondents of different nationalities have different views on the effectiveness of communication and delivery at the construction site (Dai et al., 2007; Jarkas et al., 2012; Mahamid, 2013).

For example, Dai and Goodrum (2011) emphasised in their research that language and cultural barriers may not lead to effective communication on the construction site, hamper productivity and increase safety risks. In this case, the transfer of the information regarding technical details and site management instructions can often be misinterpreted, which can cause other problems on the construction site, such as delays in decision-making (Choudhry, 2015).

The difference in the mean rank of perceived factors between local and foreign workers is likely due to their sociodemographic characteristics. Traditionally, most foreign workers tend to have a lower perception of construction productivity factors than the local workers in Malaysia. The lower perception could be mainly because of less working experience in Malaysia, different levels of awareness and standard of education.

Conclusion

Overall, the result shows a moderate difference in respondents' perceptions of the extent of the four factors that affect construction productivity. Manpower standards, external conditions, communication process and resource management need to be maintained with good practices to promote better execution of construction work; thus, increasing the productivity of workers of different nationalities.

The employer has to focus on a practical measure to educate foreign workers with continuous training on the technical work to increase productivity at the construction site. It is also equally crucial that foreign workers should understand the Malaysians working culture.

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