Information Management and Business Review (ISSN 2220-3796)
Vol. 15, No. 2, pp. 116-127, June 2023 (SI)

The Effects of Foreign Labor towards Labor Productivity in Construction Industries

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Abstract: The focus of this study is the demand for foreign labor in the construction industry. While labor productivity contributes significantly to the economic growth of the country but the trend has decreased over recent years. Hence, this paper aims to identify whether the increase in the labor force or other factor inputs contributes significantly to the labor capacity of construction projects in Malaysia. Results show the relationship between labor and other factors related to employment productivity in the construction industry of Malaysia from the year of 1986 to 2020. Factor inputs consist of variables such as capital, local labor, and foreign labor. The research objective is to identify the effects of labor force and other factor inputs on labor productivity. This study employs the Cobb-Douglas production function. The findings show that there is a significant relationship whereby the financial assets have a significant relationship, whilst the local and foreign workforce has a negative relationship in terms of their impact on labor productivity. These findings provide some scientific evidence for improving the project performance of the construction industry in Malaysia. It will be useful in identifying which factor inputs have a huge impact on construction labor productivity.

Keywords: *Foreign labor, local labor, capital, labor productivity, construction industries.*

1. Introduction and Background

The construction industry plays a significant part in enhancing recruitment which will basically provide opportunities for unskilled, semi-skill, and skilled workmen (Abdul Aziz & Sing Wong, 2010; Khan, 2008). Simultaneously, unemployment will be reduced and in the long run, poverty can be minimized (Khan et al., 2014). It also holds a crucial function in boosting the economy to produce resources and financial values, job openings, building construction, and infrastructures enhancement which support GDP advancement and socio-economic development in Malaysia, as well as promoting the utilization of domestic product materials which could enhance job opportunities in the downstream industry.

The construction subdivision contributes a significant contribution to job recruitment. For instance, in 2021, 1.1 million workers were recruited in the construction sector, which represents 7.69% of the overall working force. Table 1 illustrates the increasing trend of contributions from the recruitment division in the construction sector. The results indicate that the construction industry represents an exceptional part of socio-economic advancement by boosting sources of income and job opportunities whilst at the same time, reducing unemployment. Additionally, the engagement of foreign employees in the construction industry was experiencing an increasing trend from 1985 to 2021 (Department of Statistics Malaysia, 2022).

Table 1: Recruitment in Construction Sector and Foreign Workers in Construction Sector, 1986-2021 ('000)

YEAR	EMPLOYMENT	FOREIGN WORKERS
1986	339.7	29.7
1996	585.2	131.2
2006	776.2	132.8
2016	971.5	280.2
2020	959.9	213.5
2021	965.6	194.0

Source: Department of Statistics Malaysia, 2022

Advancement of productivity, modernity and quality in Malaysia is essential in constructing a feasible environment for the construction industry, in which it was successfully implemented in domestic intricate

construction projects, and is capable to take part in major international projects. However, several arising issues needed to be identified and overcome (Aziz & Hafez, 2013) as this industry was affected by time overrun, disintegration, overpricing, overspending and hazards (Ikuma et al., 2011).

The efficacy of the construction industry should be expedited to compete domestically and internationally. It also must be productive and capable of meeting the demand of its customers (Ibrahim et al., 2010). Nevertheless, quite a few scholars concluded that the construction industry is having some issues and disputes could decrease its capacity (Olanrewaju & Abdul-Aziz, 2015; Khan et al., 2014; Shehu et al., 2014). Thus, it is important to ensure that a comprehensive measure could be taken to analyze the challenges in promoting the efficacy and productivity of this industry. The construction field is known to be the least fruitful sector in comparison with other subdivisions with the amount of RM36,669, based on value added per enrolment in 2021. Table 2 showed the labor productivity in the construction, production, agriculture, and services sectors in Malaysia. The productivity of workers in all sectors declined tremendously from 2019 to 2021 (Department of Statistics Malaysia, 2022).

Table 2: Sector Labor Productivity, 2019-2021('000)

Year	2019	2020	2021
Construction	45,421	38,322	36,669
Agriculture	54,225	53,114	52,786
Manufacturing	123,881	120,645	128,807
Services	89,568	84,336	84,716

Source: Department of Statistics Malaysia, 2022

Therefore, the primary objective of this research is to analyze the connection between the productivity of local and foreign workers, along with the labor resources in the construction industry of Malaysia and find out whether labor or capital significantly influences labor productivity in the construction industry of Malaysia. Correspondingly, this is the extension of a previous study that proposes a significant connection between foreign labor and the employment capacity of the construction industry in Malaysia.

2. Literature Review

The construction industry had been recognized as one of the major and impactful sectors in Malaysia. It also contributes to economic growth as it adds up to the GDP (Kamal et al., 2012). Nonetheless, it is still in the modest share in comparison with other fields such as services, agriculture, and manufacturing sectors. In the year 2020, Malaysian has the vision which has been introduced in 1990 with the aspiration of uplifting Malaysia from a developing country to a competitive, robust, dynamic, resilient, and prosperous nation. It has acknowledged the fundamental roles of the construction industry in expanding the economy of this nation as this dynamic industry encompassed the onward and reverse relationships with other fields (Chia et al., 2014; Khan et al., 2014; Berawi et al., 2019). In addition, the construction sector utilized the economic infrastructures for industrial advancement and essential amenities such as residential and commercial sections, dams, expressways, stadiums and playing fields, ports, railways, airports, health maintenance units, power generators and supplying stations, as well as communication facilities. These are the foundation for other fundamental infrastructures in developing countries towards promoting the living standards of the communities (Ibrahim et al., 2010; Al-Shayea et al., 2019).

The advancement of the Malaysian economy is greatly influenced by the productivity of major industries such as construction (Naoum, 2016). There were several issues faced by this industry, and the most critical issue is the low productivity (Jarkas & Bitar, 2012) which has been a concern for most nations around the globe (Lim & Alum, 1995; Egan, 1998; Thomas & Sudhakumar, 2013; Ayele & Fayek, 2019). In terms of the economy, the decrease in productivity level could lead to social conflict, inflationary pressure, and disagreement (Drucker, 2012; Dixit et al., 2019; Shoar & Banaitis, 2019). By recognizing the aspects that contributed to the low productivity of construction labor, the arising issues could be addressed at the initial stage by project managers, in which it could reduce the time and cost overruns (Kaming et al., 1997; Kaming et al., 1998; Abdul Kadir et al., 2005; Palikhe et al., 2019; Seddeeq et al., 2019). Construction labor productivity (CLP) essentially affected the expediency of the construction corporations, and thus becomes a primary source of

project risks as it demonstrated the highest variability among other project capitals (Tsehayae, 2015). The impacts of labor productivity were also the most complicated components to be defined, managed, and quantified. Considering this, it is essential to recognize the components that influenced labor productivity towards managing labor forces efficiently (Kazaz & Acikara, 2015).

Understanding the crucial aspects influencing construction labor productivity (CLP) could aid in developing strategies to minimize incompetency and increase efficiency in managing construction's labor force as it will not only enhance the efficiency of construction companies but also increase their competitiveness, as well as their survival chances in this eminently competitive field (Wilcox et al., 2000; Ailabouni et al., 2007; Robles et al., 2014). Factors associated with CLP could be utilized to develop CLP models used for estimating and predicting CLP from several aspects (Tsehayae & Fayek, 2018). CLP forecasting models could be adopted in scheduling and structuring the phases of construction, as well as in improving CLP. In addition, the models are frequently applied since they served as effective tools in estimating and monitoring the equipment and labor capital (Parthasarathy et al., 2018).

Lindsay (2004) defined productivity as an assessment of the capability to develop products and services from a certain expense of resources, labor, supplies, the plot, time, education, or any combination of those. Nonetheless, Jarkas & Bitar (2012) referred to productivity as the connection between production and the method used to generate production. Another definition that is considered more relevant and commonly acknowledged among the players in the construction industry is by expressing productivity in the view of measuring performance such as determining how well the capitals are leveraged towards achieving goals or demanded outcomes (Durdyev & Mbachu, 2018).

Moreover, labor productivity and human resources are the most challenging issues in the construction field as those factors play crucial roles in determining the targets achieved and meeting the stakeholders' suggestions. Alaghbari et al. (2007) state that lack of experience and ability, combined with low labor productivity, are the fundamental causes that lead to the interruption within the construction industry in Malaysia. For that reason, productivity itself depicts the capability of the workforce to build the product. For instance, higher production generated by workers symbolizes a high level of workers' productivity. Most of the available definitions for productivity refer to a comparison between input against output. The administrative input in the production process albeit frequently unseen, has an undeniably significant impact on productivity levels. The distinct principal aspects of productivity comprised the ability to generate, which is the effort supporting the construction itself; the efficacy of constructive forces as an evaluation to what extent the assets were utilized and finally, the production per unit of effort (or rate) to assess the production output over a certain extent of time (Bamfo-Agyei et al., 2020).

Apart from making an exceptional contribution to the overall economic performance of this country, the construction sector also contributes as a source of job recruitment (Giang & Pheng, 2011). In terms of productivity level, labor serves as a relevant input to any construction project towards achieving the highest level of production (Hwang & Soh, 2013, Gerek et al., 2015). It is distinct compared to other resources as it has distinct traits (Kaming et al., 1998). Labour comprises the biggest allocation of overall project expenses. Studies show that it constitutes 20-50% of the overall project expenses (Kaming et al., 1998), hence the overall costs of the project can be significantly reduced by enhancing employment capacity (Kazaz et al, 2008). The significance of construction labor productivity (CLP) in ensuring the accomplishment of construction projects has been described previously in several studies (Sweis et al., 2009; Fayek & Tsehayae, 2012; Hamza et al., 2022). CLP has been identified as a fundamental and effective indicator of efficacy in the construction industry which directly affected the competency of Small and Medium Enterprises (SMEs). Thus, labor will persist as the essential element for successful development projects in the future (Tsehayae & Fayek, 2016). Accordingly, the advancement of CLP has been a primary concern at present, and in the future (Attar et al., 2012).

Heizer and Render (1996) have categorized productivity factors as labor characteristics. Those traits consist of experience, skills, motivation, and satisfaction in the workforce. Hence, this research intends to identify the characteristics of local and non-native workers in construction industries toward labor productivity. The construction industry of Malaysia is encountering a serious shortage of construction workers because of

openings left by the native workers that were more interested in joining the well-paid and conducive working surroundings in other sectors such as manufacturing and services (Fateh et al., 2020). Moreover, local workers are not interested in joining the construction industry since this industry has low demands for local workers, who were not paid well, have the long period of employment, abandoned labor policies and jobs dominated by foreign workers, the factors of 3Ds (Dirty, Difficult, and Dangerous,), incompatibility between the job and higher education level, the substandard image of this industry, companies preferred foreign workers over locals, the inexpert perception of the jobs, low repayment, and the status of the job (Najib et al., 2019).

Abdul-Rahman et. Al. (2012) proposed that local workers are more likely to migrate to other countries as they can offer higher salaries compared to Malaysia. Moreover, employers commonly offered a lower rate wage to foreign workers which could lead to the deterioration of the average salary rate of this sector and the increment is also much slower than in other sectors (Thomas & Sudhakumar, 2013). This situation eventually failed to attract local workers to be in this industry. 93% of the registered foreign labor under CIDB in the construction industry were untrained workers (Hisyam 2015). Apart from that, the introduction of foreign workers which increased the portion of a specific group of the population would put descending pressure on the recruitment rate for employees in that group, hence lowering the demand compared to the inflow of foreign labor (Mohd Fateh, et al., 2022). Abdul-Rahman et al. (2012) further commented that one of the factors that attracted immigrant workers to work in the construction sector in Malaysia is long-term employment whilst the local workers do not prefer furthering their career in this sector. It was concurred by Carpio et al. (2015) who found that the career movement for workers in the construction field is very limited.

On the other hand, the huge opening for immigrants and monopoly has become the factors hindering the locals and fresh graduates from entering the construction industry (Fateh, et al., 2022). According to CIDB (2017), a survey conducted by the Construction Industry Transformation Programme (CITP) showed that native workers commonly viewed the construction industry in a negative sense such as a challenging area to work in, which contributed to their unwillingness to accept job offers, making this sector to rely heavily on the foreign labor, thus resulting in 60% - 90% monopoly of the foreign workers (Lingard, 2013). In addition, the positions in the construction industry were commonly temporary or on project-base (Construction Industry Development Board, 2017). As the project is completed, the workers' contract will also end. This situation becomes one of the reasons why the locals did not want to find a job in the construction sector as most of them are seeking permanent jobs which offered stable and secure incomes. Workers will get the advantage of stability as it permits them to structure their funds and pay back their loans (Abdul-Rahman et al., 2012).

Furthermore, most of the researchers had the aim to examine the impact of local and foreign labor on labor productivity and the relationship between them, whether they are substituting or complementing one another. One of the research projects is from Bachtiar et. al (2015) who studied the preferences for the foreign workforce in the manufacturing sector of Malaysia. The authors found out that technical supervisors and experienced workers gave a significant contribution towards production growth and salary rates, which is equivalent to the local workforce in production stages. It was approved by Dickson (1975), as the introduction of foreign laborers will increase the productivity of local employees, leading to production enhancement. Concisely, the researcher considered that economic growth could be stimulated as the integral association between both workforces. However, several findings showed that native and external labor could not be replaced as they did not complement each other (Noor et al., 2011) in which the decline in the foreign workforce did not affect the efficiency of local labor.

Additionally, Pholphirul (2012) argued bringing more external workers into the country will contribute to adverse effects on productivity, including the lack of balance issues which could be more serious when the salary depression occurred because of salary allocation, which is less than the limit set by the government. Furthermore, the demands for property accommodation will increase with the overrunning of foreign workers which also will directly lead to the increment in prices of local properties, specifically in limited land areas of this nation. On the other hand, most countries are experiencing growing numbers of immigrants, succeeding in the uncontrolled intake of foreign labor. From the survey, about 56% of the respondents in Singapore felt that foreign workers have seized their job opportunities. Most countries believed that the

introduction of external workforces has jeopardized their positions, encouraging them to seek stable job opportunities abroad (Hui & Hashmi, 2007).

Palel et al (2016) discovered that local and foreign workers did not contribute significantly to the increase in productivity for the short term but both parties possessed a significant relationship to the enhancement of productivity in the long run. The study also revealed that foreign workers have less contribution towards labor productivity in comparison with locals. Another study conducted by Thangavelu (2012) showed that skills, human capital, and foreign workers' productivity contributed to their long-term growth hence giving direct impacts on the innovation and capacity to adopt new technology of the local companies. However, in short-term periods, periodic fluctuations and temporary deficits in the market the workforce can be tackled through the influx of foreign labor, which retained the competencies of the workforce market.

Things will go in an adverse direction as the situation becomes extreme. An uncontrolled influx of foreign workers, specifically the untrained or semi-skilled workers will bring adverse impacts to the nation's economy, political stability, and national threats. Growingly, the issues of illegal immigrants had contributed negative impacts on the salary structure which become the main concern of the stakeholders. Most foreign workers accepted lower salaries and working hours than the local workers, thus employers are more interested in employing foreigners to minimize the cost (Carpio & Wagner, 2015; Mahmood et al 2021). In addition, the poverty rate will increase if the inflow of foreign labor to Malaysia is not controlled, thus affecting the overall incomes of the workers, as they did not exceed the poverty line or equal to that, which could pull down the living quality of Malaysians.

Another factor of production productivity in construction industries is financial assets. Oftentimes, it was linked to the proportion of fixed capital to workforce input that further characterized the efficiency of a company in occupying its assets to produce goods or offer services (Chang & Singh, 1999; Sen & Farzin, 2000). In the construction sector, tools and supplies were frequently characterized as the capital of their production. Tools and automation used in production could affect the process of advancing the construction industry to be fully automated, likewise, influencing productivity and project performance. The impacts of automation technology, along with innovation in enhancing construction productivity was examined to identify and evaluate the effects of administration appliances in enhancing productivity in the construction sector (Loosemore, 2014; Dixit et al., 2019).

Additionally, Ameh & Osegbo (2011) investigated the relationship between time overruns and the productivity of workforces in development projects. Meanwhile, the industry of construction around the world is experiencing a huge number of delayed projects and projects that experienced cost overruns. The researchers were trying to identify the connection between time overruns and the productivity of the workforce in development projects in Lagos, Nigeria whilst finding a way to tackle the issue. The study suggested that the major causes of time overrun are insufficient cash reserve, poor planning, insufficient equipment, and shortages of stocks on site, whilst crucial aspects leading to low productivity of labor on the construction sites are the adoption of bad construction approaches, correction of drawings, and lacking construction materials respectively. The researchers suggested that hiring a project manager at the initial phase of the project could assure good management of assets and human resources which in turn, improved productivity, thus preventing time overruns.

Rivas et al (2011) conducted a study on the determinants that affect the productivity of the development business in Chile. The construction firms in that country compete with the global actors to remain significant in this industry. Thus, the productivity of construction firms in Chile must be improved so that they could remain relevant in the market, thus creating a competitive environment for the other non-native companies that seek to penetrate the construction market in that country. The authors also mentioned the leading aspects affecting construction productivity are insufficient materials, reworks, equipment and gears, the availability of heavy vehicles and employees' motivation.

Regarding that, it is likely to acknowledge the aspects influencing productivity such as capital, investment, or labor were significantly related, with the consideration of whether the output is regarded as capital investment or labor factor. This indicated that productivity can be represented by the capacity of the

characteristic factors of production. This condition can be regarded as the outcome of the process, in the form of products or services, whilst the determinant inputs consist of any physical and human assets used during production. To conclude, the effects of employment and other factor evidence towards productivity can be significant, insignificant, or not connected all, but generally, the relationship has negative effects, especially in the labor factor. Hence, it can be confirmed that the effects of labor factors specifically in foreign workers on the productivity of workers in the development field are more on negative relationships.

This study aims to create awareness for the teams of project management in construction industries from the perspective of employment and expenditure which causes the low productivity at work. This will assist the team members to acknowledge early indications of problems resulting from inadequate productivity levels, allowing them to take appropriate actions to put the construction work back on course.

3. Methodology and the Analysis Approach

The Solow growth model was used in this research. It was conducted by running the primary Cobb-Douglas production function in the Solow framework model (Noor, 2011). Here is the basic equation of the function:

$$Y_t = AK_t^{\alpha} L_t^{\beta} Mat_t^{\theta} \quad (1),$$

According to the Cobb-Douglas production function, each variable in the comparison was split by the overall number of workers to convert it into a labor productivity equation (Noor, 2011). In this equation, labor was categorized into two groups, namely local and foreign labor. The complete variables were then converted into a logarithm. The estimated equation can be viewed below:

$$\ln y_t = A + \beta_1 \ln capital_t \ \beta_2 \ln llocal_t + \beta_3 \ln lforeign_t + \in_t \quad (2)$$

As referred to in the equation above, where t =1, …, T, refers to the time.
Meanwhile,
1n y = logarithm of labor productivity (value added /total number of workers),
ln capital = logarithm of capital (fixed assets / the total number of workers),
ln local = logarithm of local workforce (the number of local workers / the total number of employees),
ln foreign = logarithm of the foreign workforce (the number of foreign workers / the total number of employees),

Equation (2) will be tested using Ordinary Least Square (OLS) method. Before commencing further analysis, data should be analyzed to determine the presence of time series problems by adopting the Unit Root Tests which consist of Augmented Dickey-Fuller unit root. Then, the Granger causality test was conducted to identify the causal connection between local and foreign workforces. The data were obtained through the survey executed by the Department of Statistics of Malaysia in the construction industry and collected each year before converting them into logarithms. The duration time for evaluation is between 1986 and 2020, utilizing the Ordinary Least Squares (OLS) method for data evaluation.

4. Results and Discussion

Descriptive statistics analysis was carried out in this study to calculate the fundamental conduct of the data. Table 3 below showed that the mean labor productivity in Malaysia is ($\bar{x}$ = 3.0688, s = 0.6214), in which capital ($\bar{x}$ = 2.2248, s = 0.5616) has the topmost values among other sets of independent variables, succeeded by local labor ($\bar{x}$ = -0.1765, s = 0.0716), and foreign labor ($\bar{x}$ = -1.9121, s = 0.4183). Jarque-Bera's analysis pointed out that the whole variables were distributed normally. Thus, Ordinary Least Square (OLS) can be adopted for this research.

Table 3: Descriptive Statistics

Analysis	Labor Productivity	Capital	Foreign	Local
Mean	3.0688	2.2248	-1.9121	-0.1765
Standard Deviation	0.6214	0.5616	0.4183	0.0716
Minimum	1.9082	1.1638	-2.8268	-0.3221
Maximum	4.2999	3.3299	-1.2895	-0.0610

Jarque-Bera	0.3952	0.2290	2.3995	1.6809
Probability	0.8206	0.8917	0.3012	0.4315

Table 4 showed that the Augmented Dickey-Fuller (ADF) Unit Root test for all variables was used to classify the variables whether they were stationary or not. The results showed that all variables for ADF at the first difference in the unit root test were stationary, I (1). Furthermore, with the trend and drift in the ADF unit root test, all variables were found to be stationary at the first difference.

Table 4: The Result of the ADF Unit Root Test

Variables	**Augmented Dickey-Fuller (ADF) Unit Root test**			
	Intercept		Trend & Intercept	
	Level	1st Difference	Level	1st Difference
Ln Output	0.1096	-4.1126***	-1.0552	-4.0325***
	(0.9619)	(0.0030)	(0.9220)	(0.0172)
Ln capital	-0.4355	-5.3860***	-1.8176	-5.3073***
	(0.8917)	(0.0001)	(0.6740)	(0.0007)
Ln local	-1.6761	-3.6214***	-2.9552	-3.6490**
	(0.4330)	(0.0110)	(0.1598)	(0.0417)
Ln foreign	-1.5834	-3.7699***	-4.6025	-3.9500***
	(0.4799)	(0.0077)	(0.0058)	(0.0216)

Succeeding the results, Ordinary Least Square (OLS) method was used to degenerate the equations in (2). The results are indicated in Table 5 below. It summarizes that all variables are significantly related. The results demonstrate that capital has a significant relationship at 1% to the labor productivity of the construction sector. It shows that the increment in the capital employment proportion by 1% will advance the capacity of workers by 1.07%. This conforms to the study from Durdyev & Mbachu (2017) and Gerges et. al (2016) that advocated overcoming the tools and equipment insufficiency will lead to the enhancement of labor productivity.

Table 5: Result of the Ordinary Least Square Regression

Variables	**Coefficient**	**p-value**	
C	-0.7213	0.2397	
Ln capital	1.0711***	0.0000	
Ln local	-2.9556***	0.0096	
Ln foreign	-0.4630**	0.0251	
R-squared			0.9749
Adjusted R-squared			0.9724
F-statistic			401.6405
Durbin-Watson statistics			1.6676

Nonetheless, local, and foreign labor have an insignificant connection with employment capacity in the construction business. It can be seen by an increase of 1% in local and foreign labor will decrease labor productivity by 2.95% and 0.46% respectively. This is consistent with the study conducted by Ismail (2015) and also Nor et al. (2023), which found that semi-skilled and inexperienced non-native workers contributed adversely to workforce productivity. Native workers possess lower productivity compared to non-native workers as the construction industry in Malaysia is facing serious insufficiencies of construction workers at present, resulting from the openings left by the local workers. Most of the native workers had more interest in entering the manufacturing and service sectors as those sectors offered conducive working environments with higher pay (Fateh et al., 2020). The findings were also similar to research done by Dickson (1975), that proposed to introduce a non-native workforce in construction projects, so that the productivity of local workers could be increased, leading to the enhancement of production.

Hence, it could be concluded that the Malaysian construction industry is facing lower workforce productivity.

The results showed the increment in labor used did not expand labor capacity, as the local workers were having lower labor productivity than the foreign workers.

Furthermore, the findings indicate that the Malaysian construction sector is moving towards boosting capital in nature as any increases in capital utilization will raise the ratio of labor, leading to the increment of labor productivity. R^2 explained the construction productivity representing 97.4% of the fixed variables in the model. Table 5 summarized the analysis result of the ordinary least square regression:

$$\ln y_t = -0.7213 + 1.0711 \ln capital_t - 2.9556 \ln llocal_t - 0.4630 \ln lforeign_t + \in_t \quad (3)$$

The original connection between local and foreign workers in (3) is calculated using the Granger causality test. The relationship is summarized in Table 6:

Table 6: Result of Granger Causality Test

Null hypothesis	Observation	F-statistic
Foreign labor does not Granger cause Local labor	25	10.4405 (0.0185)
Local labor does not Granger cause Foreign labor	25	18.2549 (0.0065)

The results indicate there was causality between local and foreign labor. The null hypotheses stated that non-native workers did not Granger cause local workers and vice versa were rejected. This shows that local and non-native workers have a positive relationship with each other. Therefore, it can be concluded that the non-native workers will complement the local workers by filling up the gaps due to the shortage of construction workers. Salleh et al. (2014) state that the insufficiency of the workforce in construction projects in Malaysia had led to the introduction of non-native workers, mainly from Bangladesh and Indonesia, to fill in the gaps and tackle the issues of labor insufficiency in the fastest way possible, without jeopardizing the cost. The statement complements the ILO & Australia Aid Report (2019) which concludes that non-native labour comprised 30% of the workforce (along with undocumented non-native workers) in Malaysia. As of the mid of 2019, the total of operating non-native workers in construction projects in Malaysia is approximately 435 000 people, summing up to 21.7% of the overall registered non-native workers (MOHR, 2019). The over-dependency on non-native workers had impacted the sustainability of human resources in the development industry of Malaysia (Rahim et al., 2016). The inflow of inexperienced non-native workers in construction projects had aggravated the insufficiency of experienced workers in Malaysia (Marhani et al., 2012; Hamid et al., 2013).

5. Conclusion and Recommendations

Essentially, the research objective is to recognize the determinants that influenced the productivity of workers in the construction industry of Malaysia. Variable factors used for this research are capital, foreign and local labor. This study used a series of data samples from 1986 to 2020 which have been collected annually. The theory used to analyze the relationships among those variable factors and employment productivity is the Cob-Douglass theory whilst the Augmented Dickey-Fuller test was adopted to test a unit root.

The estimation results show that capital has a positive impact on labor productivity. Nonetheless, local and non-native workers tend to show a negative relationship towards labor productivity in Malaysian construction industries. The findings demonstrate the factors of local and foreign workers have a significant connection with labor productivity in the construction field whilst other determinants possessed positive relationships. The adverse relationship of the labor factor could be the result of insufficient investments made in human capital which resulted in the low productivity of labour.

Furthermore, Ibrahim et al. (2010) proposed some suggestions to overcome the issues of management shortages, unskilled employees, and other technical issues, the construction industry of Malaysia should expand the training to the employees and experts towards promoting their abilities, competencies, and functional achievements in local and international levels.

Accordingly, the authors also proposed the government enhance the competency of native and non-native workers by expanding industrial-based skill training by collaborating with experts from industry players and training academies (Varaprasad, 2022). On another note, companies could motivate their workers to be more productive by giving out incentives such as allowances and bonuses based on their performances and achievements in their workplace (Nikiforakis et al., 2019; Mohd Fateh et al., 2022).

Employers were also encouraged to provide safe and conducive working environments to captivate more native workers to join this sector (Verghese, Viswanathan, & Ramalingam, 2018). By doing this, local workers will be more interested to work in development projects, leading to an increase in motivation and productivity as this industry is known to be dominated by foreign workers. Fateh et al. (2020) concur that the accommodation for workers should comply with national legislation and global good practice. For instance, minimum space allocation for every worker, sanitary supplies, laundry and cooking facilities, and portable water supply should be improved to meet the standard set by local governments and international agencies.
Additionally, future studies should consider other elements that influence the increase of labor productivity in development projects which could enhance the understanding of other factor inputs in the perspective of labor productivity.

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