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The Significant Impact Of Collaboration Between Foreign And Local Workers In Construction Development: A Case Study Of Three National Strategic Projects In Indonesia

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Abstract:
This study analyzes the impact of collaboration between foreign and local workers on infrastructure development in Indonesia, focusing on the Plaza Premium Lounge at Soekarno-Hatta Airport Terminal 3, the Jakarta-Bandung high-speed rail, and the supervision of the Jabodebek LRT. Using Structural Equation Modeling (SEM), the research found that both foreign and local workers contribute positively to infrastructure development. However, their direct collaboration did not yield significant additional benefits. The study's limitations include its focus on three national strategic projects and millennial respondents in South Jakarta, which may limit the generalizability of the findings. Nevertheless, the research highlights the importance of the Indonesian government formulating effective workforce planning policies. The study recommends that the government implement policies emphasizing knowledge and skill transfer from foreign to local workers through programs like mentoring, on-the-job training, cross-cultural communication training, and the formation of integrated teams. Legal and contractual frameworks should also support clear collaboration objectives and provide incentives for companies that facilitate skill transfer. This research fills a gap in the literature by exploring the impact of collaboration between foreign and local workers in infrastructure development—an area previously less explored compared to the focus on the negative impacts of foreign workers. The value and originality of this study lie in its attempt to measure the significant impact of this collaboration and its use of a conceptual framework for a worker integration model in a developing country like Indonesia.
Keywords: *Foreign Labor Local Labor Infrastructure Development Manpower Planning Project Resource Management*

1. INTRODUCTION

Based on economic perspectives, a country's economic growth is a pivotal factor in decreasing pov-erty. Recently, most developing countries are struggling to enhance their economic growth to overcome the middle-income trap. In accordance with Abdul Rahman investing in infrastructure is the most effective strategy to boost economic growth [1]. Nevertheless, fostering infrastructure development commonly involves other de-veloped countries as investors through the Foreign Direct Investment (FDI) scheme. Foreign Direct In-vestment (FDI) is considered the easiest way for developing countries to develop economic sectors and improve public infrastructure simultaneously [2]. Similarly with other developing countries, the Indonesian government is also implementing this strategy to avoid a debt trap in 2045, particularly by increasing bilateral treaties to develop public infra-structure designated as national strategic projects [3]. However, this strategy has a negative consequence, in which Indonesia has become the leading destination country in Southeast Asia for foreign investment projects over the past few years [4].

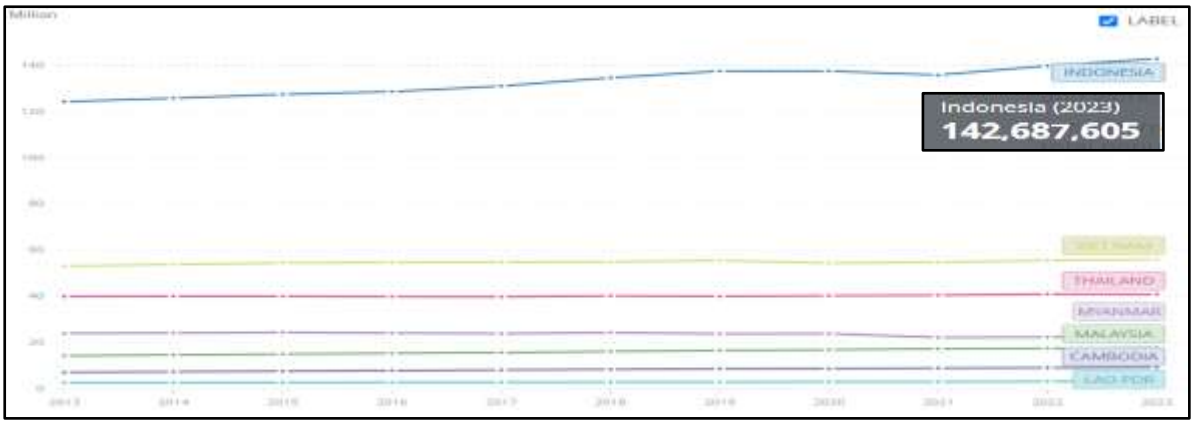

Figure 1. The Trend of Foreign Workers in Indonesia between 2013 and 2023
Source: World Bank Group, 2023

Figure 1 shows that the number of foreign workers working in Indo-nesia has increased steadily, with a total of about 142 million entering the country over the past 10 years. The rising number of foreign workers in Indonesia significantly contrasts with that of other Southeast Asian countries, even though Vietnam, in second place, only recorded 60 million over the same period.

Unfortunately, the large number of foreign workers entering a developing country raises several is-sues, impacting the competitiveness of local workers [5]. The considerable number of foreign workers aggravates the issue of illegal employment, which significantly affects people's trust in the government [6-7]. In line with the previous research, foreign workers are generally deemed a major challenge for the recipient countries because they adversely affect not only people's trust but also the in-tegration process between local and foreign workers [8]. Undeniably, apart from the negative impact on increasing competition for local jobs, foreign workers who enter in large numbers also lead to potential cultural tension [9]. Based on several recent literature reviews about foreign and local workers, all research merely fo-cuses on the negative impact of the presence of foreign workers in recipient countries. However, another impact of the collaboration between foreign and local workers in successfully developing public infra-structure has not yet been adequately explored. Therefore, this research aims to fill a research gap that has been revealed from literature reviews by measuring what the significant impact of the collaboration be-tween foreign and local workers is in improving infrastructure development in Indonesia. Three cases have been chosen as the research location, as they are classified as national strategic projects during the Jokowi era.

2. LITERATURE REVIEW

2.1 How Foreign Direct Investment Affects Host Countries

Several researchers argue that the aid of international institutions can positively affect economic growth in developing countries [10-12]. Furthermore, Almfraji et al. convey that an essential component of boosting economic growth is implementing the foreign direct investment strategy [13]. Foreign direct investment (FDI) is not only aid from international institutions, but rather a package of capital, technology, management, and entrepreneurship that enables a company to operate or provide public services in a recipient country [14]. With inadequate budgets possessed by developing countries, implementing the foreign direct investment strategy is an effective way of either boosting the economic sector or developing the infrastructure sector [15-16].The provision of efficient, reliable, and accessible public infrastructure in a country has a positive and significant impact on boosting economic growth [17]. Yet achieving efficient, reliable, and accessible pub-lic infrastructure requires a significant budget and unfortunately, most developing countries tend to rely on a Foreign Direct Investment (FDI) strategy, which is often deemed a shortcut to achieving significant progress on infrastructure development [18-19]. Alongside its positive impact on boosting economic growth and developing public infrastructure, the FDI strategy also has a negative impact on some aspects [20]. The negative impact of the FDI strategy can be seen in the rapid growth of foreign workers for three decades in developing countries [21]. Similarly, Jude et al. explain that FDI not only serves as a means to overcome the middle-income trap but also contributes

to an increase in the number of foreign workers [11]. Therefore, the rapid influx of foreign workers in developing countries tends to have more negative than positive effects [22].

2.2 The Impact of Foreign Workers and Local Workers in Construction Industry

Unfortunately, the rising number of foreign workers is deemed a negative issue in host countries [23]. Escalating the number of foreign workers affects people's trust in the government. In line with the previous research, foreign workers are generally deemed a major challenge for the recipient countries because they adversely affect not only people's trust but also the integration process between local and foreign workers [8]. Undeniably, apart from the negative impact on increasing competition for local jobs, foreign workers who enter in large numbers also lead to potential cultural tension [9].

Ideally, the entry of foreign workers into developing countries should be linked with the transfer of skills, technology, and managerial expertise, which can further enhance productivity [24]. The large-scale migration of foreign workers who mainly come from developed countries is associated with higher levels of skills and qualifications [25]. Fundamentally, apart from a negative impact on market competitiveness, foreign workers can contribute to enhancing local workers' knowledge and skills, provided that governments must arrange effective policies to facilitate their integration [26]. However, integrating for-eign and local workers is a complex process due to several factors, such as language barriers and cultural differences [27-28]. Language barrier are especially prevalent in countries where the majority of the population are non-native English speakers [29]. Additionally, the significant cultural differences between foreign and local workers influence the adaptation process to workplace norms and professional values [30]. The characteristics of local workers, who generally have a low level of education, hinder integration with for-eign workers [22]. Therefore, due to the significant disparity in skills and qualifications between local and foreign workers, governments must formulate several policies to support local workforce development [31]. By fully controlling the transfer process of skills and knowledge, foreign workers can positively in-fluence local skill development by sharing their expertise to improve local workers' skills and knowledge [32].Most policies that governments have implemented to maintain the integration process between foreign and local workers are manpower policies [27]. Some developed countries have implemented manpower policies to address the rising number of foreign workers [33]. Manpower planning policies have been successfully implemented in Singapore and Australia, which proves that these policies are the most effective strategies not only for ensuring the project's success but also for facilitating the transfer of knowledge and skills to local workers [30]. Supporting the previous sentence, implementing manpower policies leads to the effective utilization of foreign workers in the construction sector [34]. Precise actions must be implemented by the host countries to support local workers in improving their skills through some intensive training and strictly supervising construction companies to ensure compliance with employment regulations [7, 34].

3. RESEARCH METHODOLOGY

The type of this research is quantitative research by using the Structural Equation Model (SEM) ap-proach to understand and fix complex and ill-defined problems in real-world systems. Structural Equation Model (SEM) is commonly used to identify the root causes of problems, design solutions, and evaluate the effectiveness of those solutions [35]. Furthermore, the Structural Equation Model (SEM) functions to analyze latent variables built with factor analysis and indicators of the variables [36]. The use of this ap-proach considers several reasons, such as the alignment with the research aims, the clear criteria for valid-ity and reliability, and the validity model that is more structured. Apart from those reasons, the Structural Equation Model (SEM) is more flexible, particularly in calculating data, and it is suitable for various data types. Furthermore, in collecting primary data, this research used the cross-sectional method by distributing a questionnaire instrument. This questionnaire was distributed using an online method to respondents, for-eign and local workers who work in the selected case study. The format of this questionnaire used a Lik-ert scale as it effectively addresses the research questions [37]. The research was conducted at three loca-tions: 1. Premium Lounge Plaza Project Terminal 3 Soekarno Hatta Airport Tangerang Banten, 2. Jakar-ta-Bandung High Speed Train (KCJB) Development Project and 3. Construction Supervision Project on LRT Work Package (Jabodebek). These infrastructure projects were chosen because they are national strategic projects, which means they are prioritized by the Indonesian

government. Respondents in this study are generation Y employees, millennials, located in South Jakarta. Questionnaire distribution was carried out by distributing forms using Google Forms, consisting of 296 questions for respondents. All respondents are workers on those projects either local and foreign workers. The first-order analysis of the Structural Equation Model (SEM) was used in this research because the main variable was directly measured with its indicators, meaning there are no constructs that are formed from other constructs [38]. However, using Smart PLS as a research tool in quantitative analysis also has limitations, such as only for predictive research. Smart PLS is primarily designed for predictive research, not for confirming well-established theoretical models, although it is really useful to explore a new theory [39]. Based on theories discussed in the literature, the conceptual framework in this research is used to explore a new model of integrating foreign and local workers to develop public infrastructure in a developing country such as Indonesia.

3.1 Outer Model

In Partial Least Squares Structural Equation Modeling (PLS-SEM), the outer model test assesses the validity and reliability of the measurement model. The validity construct test assesses the appropriateness of the measurement instrument for evaluating the intended construct. The construct validity assessment is categorized into convergent validity and discriminant validity. Convergent validity is evidenced by the loading factor value utilized to assess the validity of a construct, which is deemed valid if it possesses a loading factor value exceeding 0.7. Furthermore, convergent validity is evidenced by an Average Vari-ance Extracted (AVE) value exceeding 0.5 [40-41]. Moreover, discriminant validity is evidenced by the cross-loading values of the dimension statement items, which must exceed the correlation values of those items with other dimensions. The statement item fails the discriminant validity test if these conditions are unmet. The results of the data processing for the discriminant validity test are initially presented in the table detailing the Fornell and Larcker Criterion value calculations. The construct reliability test was performed to demonstrate the internal consistency of the measurement instrument. Construct reliability testing encompasses composite reliability, with the anticipated criterion for composite reliability set at a value of ≥ 0.7 [36].

3.2 Hypotheses Test

The analysis of the research data was conducted utilizing the Smart PLS application, employing a second-order embedded two-stage approach. The second-order embedded two-stage approach is imple-mented due to the presence of dimensions for each variable, with each dimension corresponding to a spe-cific indicator. Data analysis is conducted in two stages: dimensional-level and variable-level analysis. This includes inner model tests, which assess validity and reliability, as well as outer model evaluations, such as R-Square, F-Square, Q-Square, VIF, and model fit/goodness tests, alongside hypothesis testing [37, 42].

4. RESULTS AND DISCUSSIONS

The assessment of the outer model using Smart PLS involves three criteria: convergent validity, discriminant validity, and composite reliability. The convergent validity of the measurement model utilizing reflective indicators is evaluated through the correlation between item scores and component scores estimated by PLS software. Individual reflective measures are considered high if they exhibit a correlation exceeding 0.70 with the construct being assessed. Nonetheless, prior researchers in the preliminary phase of scale development deemed a loading value of 0.5 to 0.6 as adequate. The comprehensive processing results utilizing Smart PLS are presented in the appendix, indicating that the outer value or correlation between constructs and variables initially failed to meet convergent validity due to several indicators possessing loading factor values below 0.50. Model adjustments were implemented by eliminating indicators with loading factor values below 0.50, necessitating a subsequent re-estimation of the model. The model was subsequently adjusted to ensure that all loading factors exceeded 0.50, thereby preventing the elimination of constructs for any variables from the model.

Table 1. The Result of the Composite Reliability Test

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)	Conclusion

Infrastructure Development	0.766	0.854	0.598	Reliable
Foreign Workers	0.938	0.947	0.620	Reliable
Local Workers	0.971	0.974	0.724	Reliable

According to Table 1, the composite reliability test results indicate that the Infrastructure Develop-ment variable (Y) possesses a Cronbach's alpha value of 0.766, a composite reliability value of 0.854, and an Average Variance Extracted (AVE) value of 0.598. The Foreign Workers variable (X1) exhibits a Cronbach's alpha of 0.938, a composite reliability of 0.947, and an Average Variance Extracted (AVE) of 0.620. The Local Workers variable (X2) exhibits a Cronbach's alpha of 0.971, a composite reliability of 0.974, and an Average Variance Extracted (AVE) of 0.724. Consequently, all variables are deemed reliable as they meet the requisite criteria for Cronbach's alpha, composite reliability, and AVE values.

Table 2. The Result of the Discriminant Validity Test

Indicators	Infrastructure Development	Foreign Workers	Local Workers
PI1	0.577	0.290	0.759
PI2	0.849	0.652	0.324
PI3	0.789	0.664	0.276
PI4	0.847	0.701	0.341
TKA1	0.718	0.714	0.302
TKA2	0.624	0.766	0.339
TKA3	0.589	0.838	0.312
TKA4	0.580	0.815	0.232
TKA5	0.583	0.825	0.245
TKA6	0.621	0.824	0.278
TKA7	0.577	0.741	0.243
TKA8	0.576	0.820	0.267
TKA9	0.567	0.820	0.229
TKA10	0.517	0.755	0.180
TKA11	0.612	0.729	0.270
TKL1	0.423	0.266	0.864
TKL2	0.445	0.281	0.869
TKL3	0.441	0.303	0.862
TKL4	0.419	0.268	0.882
TKL5	0.434	0.294	0.863
TKL6	0.452	0.318	0.864
TKL7	0.427	0.314	0.884
TKL8	0.429	0.256	0.868
TKL9	0.371	0.224	0.848
TKL10	0.389	0.290	0.848
TKL11	0.378	0.245	0.837
TKL12	0.441	0.281	0.815
TKL13	0.478	0.320	0.821
TKL14	0.591	0.327	0.785

According to Table 2, several cross-loading values for each indicator of each latent variable exhibit the highest values relative to other latent variables, indicating that each latent variable possesses strong discriminant validity, as all latent variables demonstrate high correlations with other constructs.

In the context of social research and statistical analysis, testing the inner model or structural model is an important step in structural equation modeling (SEM). It is used to evaluate the relationship between constructs (latent variables), statistical significance values, and R-square of the research model [33]. Furthermore, the process of testing the inner model or structural model in SEM involves calculating the R-square for the dependent variable, the p-value for each structural path parameter coefficient, and interpreting these results. The results of this test can provide important information about how well the model fits the data, whether the relationships between constructs are statistically significant, and the extent to which the model explains variation in the dependent variable. The results of this inner model test are used to evaluate the theory proposed in the study, identify significant relationships, and determine whether the model requires further modification or refinement [43].

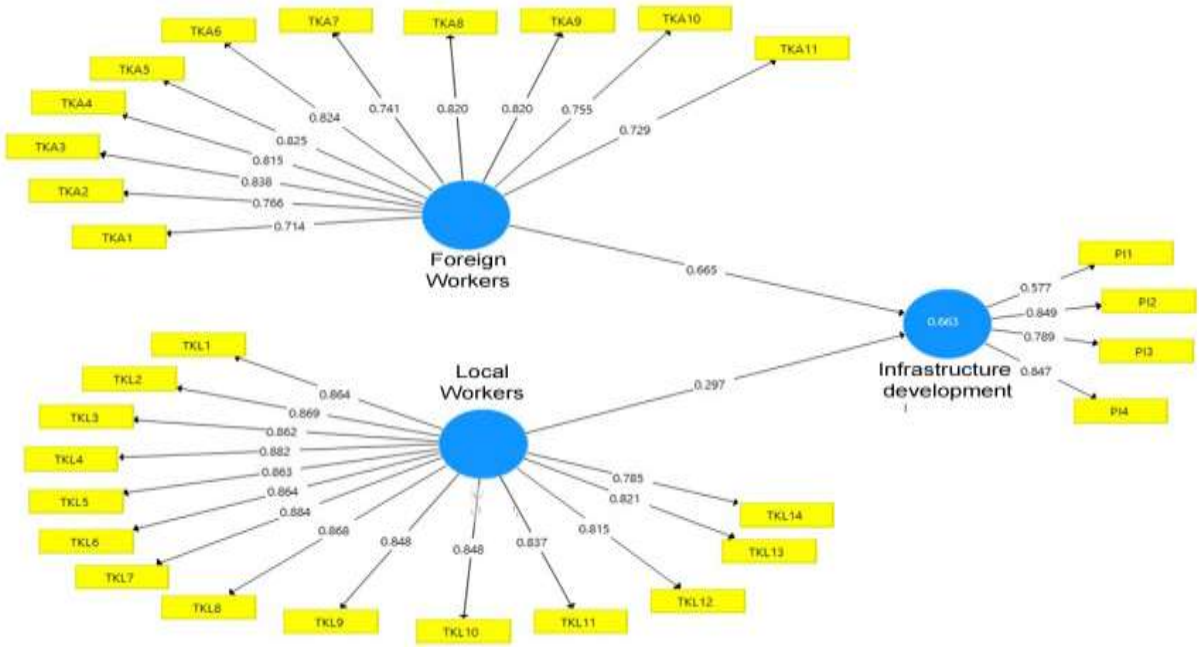

Figure 2. Model Fit Path Diagram

Figure 2 above illustrates the R-Square value. The evaluation of the model using PLS begins with the examination of the R-square for each dependent latent variable. Table 3 presents the outcomes of R-square estimation utilizing Smart PLS.

Table 3. The Result of R-Square

Construct	R Square	R Square Adjusted
Infrastructure Development	0.663	0.661

According to Table 3, the R-square value for the Infrastructure Development variable is 0.663, while the Adjusted R-square is 0.661. The R square value indicates that the Foreign Workers and Local Workers variables account for 66.3% of the influence.

This stage of hypothesis testing will analyze the significant influence between the independent and dependent variables. The proposed hypothesis is evaluated by examining path coefficients that indicate parameter coefficients and their corresponding statistical significance t values. The significance of the estimated parameters can provide information about the relationship between research variables. The threshold for rejecting or accepting the proposed hypothesis is a probability of less than 0.05. The table below displays estimation results for structural model evaluation.

Table 4. The Result of Path Coefficients

Path Coefficients	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
Foreign Workers → Infrastructure Development	0.665	0.665	0.031	21.448	0.000
Local Workers → Infrastructure Development	0.297	0.298	0.037	7.970	0.000

Table 4 presents the results of hypothesis testing conducted using Smart PLS, focusing on the evaluation of the structural model and the relationships between constructs (inner model). This stage yields path coefficients and significance levels that are valuable for decision-making. The significant measure of hypothesis support can be assessed by comparing the T table and T statistic values. If the T Statistic value exceeds the T-Table value or the P Value is below 0.05, the hypothesis is supported. Conversely, if the T Statistic value is less than the T-Table value or the P Value is above 0.05, the hypothesis is not supported. Prior to identifying the T-table value in the study, it is essential to calculate the Degrees of Freedom (df) by subtracting the number of independent variable samples from the total sample size: df = sample - independent variables (296 - 5 = 291), or 1.96, with a significance level of 0.05. The foundation for testing the hypothesis is the value found in the Path Coefficients output.

Table 5. Research Hypothesis Testing

Research Hypothesis	T Statistics	P Values	Decision
Partial Testing			
Foreign Workers → Infrastructure Development	21.448	0.000	Accepted
Local Workers → Infrastructure Development	7.970	0.000	Accepted
Simultaneous Testing (F-statistic Test)			
Foreign Workers & Local Workers Working Simultaneously → Infrastructure Development	$F = \frac{R^2/(n-1)}{(1-R^2)/(n-k)}$ $F = \frac{0.663 / (296-1)}{(1 - 0.663) / 296 - 2)}$ $F = \frac{0.0022}{0.337 / 294}$ $F = \frac{0.0022}{\cdots}$	F-count = 2 < 3.04 (F table)	Rejected

	0.0011 F = 2		

Based on the results of data processing and statistical data analysis in Table 5, the following discus-sion can be carried out:

4.1 Foreign Workers Have a Positive and Significant Impact on Infrastructure Development

Based on the calculation results using Smart PLS 3.0 software, the t-statistic test results are 21.448 > 1.96 (t-table) or with a significant p-value = 0.000 < 0.05. Thus, it can be concluded that the first hypoth-esis is proven and accepted. Undeniably, the construction industry is the main sector that the government relies on to drive National Economic Recovery (PEN) amid the COVID-19 pandemic. In accordance with the direction of the President of the Republic of Indonesia, the government will continue to develop infrastructure and human resources that have been carried out in the second period of the President's inauguration. In the midst of these efforts, concerns have arisen in the community regarding the large number of Foreign Workers (TKA) working in the construction sector in Indonesia [44].

The construction sector in Indonesia still relies on foreign workers due to the need for specialized skills, particularly in operating complex technologies. It must be acknowledged that there is a shortage of Indonesian workers with the expertise required for such tasks. A notable example is the implementation of advanced infrastructure projects, such as the Integrated Mass Rapid Transit (MRT) system. Additionally, the employment of foreign workers is generally limited to projects funded by foreign investment, such as the Jakarta–Bandung high-speed rail project, which is financed by Chinese investors. These projects de-mand that construction resources-including technology, materials, and skilled labor-meet investor standards. Therefore, the government requires investors to provide training and facilitate technology transfer to Indonesian workers.

4.2 Local Workers Have a Positive and Significant Impact on Infrastructure Development

Based on the calculation results using Smart PLS 3.0 software, the t-statistic test results are 7.970 > 1.96 (t-table) or with a significant p-value = 0.000 < 0.05. Thus, it can be concluded that the second hy-pothesis is proven and accepted. Apart from the positive impact of the local workers on infrastructure development, a massive infrastructure development significantly lowers labor wages to reduce production costs [45]. The large number of labor-intensive infrastructure projects and the development of economic corridors require a large workforce, causing the prevalence of cheap labor markets in Indonesia to increase [46]. According to a study by Khondoker & Kalirajan, infrastructure development in Africa has created increased employment opportunities for the population, but has also resulted in the emergence of a cheap labor market [47]. This situation also occurs in Indonesia. Moreover, with the support of low-quality local labor, it is likely that cheap labor practices will occur.

The low level of education possessed by Indonesian workers significantly impacts the quality of their workforce. Educated and skilled workers demonstrate higher level of efficiency than untrained or uneducated workers [22]. It is easy to understand that the findings of the analysis conducted in this study indicate a correlation between foreign workers and local workers in infrastructure development. It is also undeniable that local workers have weaknesses, but this can be overcome by the presence of foreign workers that enhance the knowledge and skills of local employees, contingent upon the government's implementation of appropriate policies for the integration of local and foreign workers [25]. Although, the right policy must be formulated by the Indonesian government to integrate successfully foreign and local workers. Developed countries have implemented effective policies in managing the increase of foreign workers caused by foreign direct investment policy [48]. The Indonesian government can learn from a manpower planning policy successfully conducted in Singapore and Australia. By implementing a manpower policy that is possibly applied in Indonesia, the effectiveness of the use of foreign workers in the construction sector while still maintaining the interests of local workers will be successfully achieved. The practical ac-tion must be taken by the government to impose local workers improving their skills development through various intensive trainings and implement a strict supervision for construction companies in complying with employment regulations [30].

4.2 Foreign Workers and Local Workers Together (Simultaneously) Influence Infrastructure Development

Different with the result of other hypotheses, based on the results of the F-statistic test calculation, a value of 2 < 3.04 (F-table) was found. This result can be concluded that the third hypothesis is not proven or not accepted. Following the swift increase in foreign workers in Southeast Asia, it is undeniable caus-ing various challenges, including heightened competition in the labor market, the integration issue, and a rise in the unemployment rate [22]. The integration of foreign and local workers is a multifaceted process hindered by various factors, including linguistic barriers and cultural disparities [26-27]. The significant different of the culture had by foreign workers impact the adaption process of work ethos [30].

5. CONCLUSIONS

Based on the findings and discussion above, this study can conclude that two hypotheses are posi-tive and significant: foreign workers to infrastructure development and local workers to infrastructure development. Based on the findings and discussion above, this study concludes that two hypotheses are supported with positive and significant results: (1) the influence of foreign workers on infrastructure development, and (2) the influence of local workers on infrastructure development. In contrast, the third hypothesis which posits that the simultaneous involvement of both foreign and local workers contributes positively to infrastructure development is rejected. Specifically, the influence of foreign workers is found to be positive and significant, as indicated by a t-statistic of 21.448 (> 1.96) and a p-value of 0.000 (< 0.05). Similarly, local workers have a positive and significant effect, with a t-statistic of 7.970 (> 1.96) and a p-value of 0.000. However, the joint contribution of foreign and local workers shows a negative and insignificant effect, with a t-statistic of 2.000 (< 3.04, the critical value).

Based on these findings, it is recommended that the Indonesian government adopt and implement manpower planning policies that emphasize the transfer of knowledge and skills from foreign workers to local workers. This transfer is essential to strengthen the capacity of the domestic workforce and ensure the long-term sustainability of infrastructure development. The successful implementation of manpower planning policies plays a pivotal role in achieving national infrastructure goals. Apart from that strategy, to enhance collaboration between foreign and local workers, several strategic approaches can be adopted. One effective method is implementing structured knowledge transfer programs, such as mentorship pairings, on-the-job training, and work shadowing, which ensure that local workers acquire the technical expertise brought by foreign professionals. Additionally, cross-cultural communication training, including language courses and cultural orientation workshops, can foster mutual understanding and reduce workplace misunderstandings. Establishing integrated team structures with mixed teams and rotating leadership roles encourages shared responsibility and strengthens team cohesion. Legal and contractual frameworks should also emphasize clear collaboration goals and incentivize companies that actively support skill transfer. Furthermore, partnerships between government, industry, and academia can develop vocational training and internship pipelines aligned with infrastructure needs. The use of bilingual digital tools and shared knowledge platforms can further support daily coordination. Lastly, promoting social integration through community-building activities can create a more inclusive work environment, helping both foreign and local workers build trust and collaborate more effectively.

Furthermore, the current mechanism for determining positions that can be filled by foreign workers (Tenaga Kerja Asing, or TKA) should shift from a positive list (designating permitted roles) to a negative list (specifying restricted roles). This approach is more adaptive to the dynamic nature of the labor market, especially in the context of Industry 4.0, where many emerging roles were previously unanticipated. By identifying positions that should not be filled by foreign workers, the government can better protect strategic employment opportunities for Indonesian nationals while allowing flexibility for innovation and investment.

Author Statements:

Ethical approval: This study did not have any specific permission because it did not use human and animal as experimental subjects.

Conflict of interest: The authors declare no known conflicts of interest.

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