

# Construction Contractor Performance Improvement Strategy Based on the Quality of the Construction Manpower Using Indonesia Standards

Hotma Sitohang<sup>\*</sup>, Zainai Mohamed, Syuhaida Ismail

Razak Faculty of Technology and Informatics, University of Technology Malaysia, Kuala Lumpur, Malaysia

## Email address:

sitohanghotma@yahoo.co.id (Hotma Sitohang)

\*Corresponding author

## To cite this article:

Hotma Sitohang, Zainai Mohamed, Syuhaida Ismail. Construction Contractor Performance Improvement Strategy Based on the Quality of the Construction Manpower Using Indonesia Standards. *Journal of Human Resource Management*. Vol. 10, No. 4, 2022, pp. 106-122.

doi: 10.11648/j.jhrm.20221004.11

**Received:** September 9, 2022; **Accepted:** October 12, 2022; **Published:** October 24, 2022

---

**Abstract:** The manpower in organizations is a complex resource to control and manage, particularly in the construction sector. The sector generally often experiences difficulty meeting project schedules and impacts financial performance due to a lack of skilled manpower to carry out the planned work. To overcome this problem, the study was conducted to formulate strategies to improve the performance of construction contractor companies through manpower management based on the Indonesian National Work Competency Standard (SKKNI), which is expected to improve the capacity of the manpower. The study was conducted through two stages: First by interviewing 10 stakeholders in manpower quality management and found that the manpower management problems faced are undisciplined and less creative manpower and there are still areas that still do not have manpower training centers for development sector. The second stage study was conducted through the distribution of questionnaires to 352 workers among contractor companies in Jakarta. The analysis was conducted using multivariate statistical analysis of the Structural Equation Model (SEM), in which there were 3 latent variables and 1 dependent variable. In this regard, the performance of construction contractor companies can be improved by paying attention to the strategy of merging between the three main influences namely: Construction SKKNI, Manpower Training and Internal Strength. The approach of this study is expected to contribute in improving the competencies of the manpower in construction based on the Indonesian National Work Competency Standard (SKKNI).

**Keywords:** Construction, Manpower, Training, Workers

---

## 1. Introduction

When discussing the construction sector, some important terminology will be discussed, including the quality of the manpower. In the perspective of this study, the term manpower means workers who directly contribute to the performance of the construction sector. The Indonesian National Work Competency Standard (SKKNI) is referred to as a standard document as set by the Indonesian Government for each manpower for all employment sectors in Indonesia, including construction sector companies.

The construction sector is a complex economic sector, and involves various stakeholders and has close relations with other areas of activity, such as the manufacture and use of

materials, energy, finance, equipment (machinery) and labor [11, 4]. Statistical data show that in developing countries, the construction sector makes a significant contribution to national development [43]. Renata and Marek [28] through the statement of Lopes [16] and Ofori [25] said that the role of the construction sector in national economic growth is seen in the number of labor force use, the number of building materials used, and the number of construction projects. The output of the construction sector is the physical basis that functions to maintain the country's economic growth and support the development of various aspects of community life [38].

However, it cannot be denied that the influence of the

construction sector in Indonesia can be seen from economic indicators, such as the contribution to the Gross Domestic Product (GDP) and the use of a significant construction manpower. Thus, the effectiveness of the use of SKKNI for the manpower in the construction sector is important and must be regulated through recognized competency training institutions. The Construction Services Development Agency (LPJK) is an institution responsible for managing the development of the construction sector in Indonesia which gives accreditation to the Professional Certification Institute (LSP) and then issues competency certificates to construction workers [9]. In this upgrade, the LSP establishes a certification scheme to meet customer and/or stakeholder requests, which are then submitted to the National Professional Certification Body (BNSP) for the purpose of obtaining authorization. This certification scheme was then compiled based on SKKNI [32].

Manpower training also improves company performance if employees realize that their future is determined by the existence of the company [31, 13]. Seeing the role of construction workers is very strategic so that it is necessary to consider the need to improve their efficiency, the Indonesian government through the Ministry of Public Works and Housing (PUPR) has implemented a special training and certification test program for construction workers [9]. This program is also followed and supported by non-governmental organizations among construction service stakeholders, such as professional associations, construction service business entities, universities, vocational schools, polytechnics, local governments and others [7].

The aim of this study is to develop a performance improvement framework for construction contractor companies (also known as construction contractors) based on manpower management according to the Indonesian National Work Competency Standard (SKKNI). This goal is achieved through the following objectives:

- (a) Identify manpower management problems faced by construction contractor companies in Indonesia.
- (b) Investigate factors to improve the performance of construction contractor companies in relation to the quality of the manpower set by SKKNI.
- (c) Assessing the relationship between the quality of manpower management and the performance improvement of construction contractor companies in Indonesia.
- (d) Propose an implementation framework based on manpower quality factors that affect the performance of construction contractor companies in Indonesia.

## 2. Study Literature

Manpower is the most valuable asset for every organization, and this is especially so for sectors that involve a large number of workers such as the construction sector. However, research found that the manpower in the organization is also the most complex resource to manage compared to other resources required for construction

projects because it can affect the cost, time and quality of the construction project [33].

The construction sector in general often experiences problems in meeting project completion schedules in addition to financial problems that lead to a lack of skilled manpower and sufficient staff to carry out the planned construction works. Such problems can be handled effectively if effective manpower management techniques are practiced to avoid manpower shortages [19].

Although manpower management in the construction sector is often given due attention through various literature studies, the construction sector is generally criticized for the lack of a proper approach to manpower management policies, where the manpower management structure in the construction sector is still reported to be unsatisfactory [6, 15]. Raiden and Dainty [27] state that references remain vague in terms of explaining how manpower management actually works in the construction sector. This further leads to the emergence of studies and research that suggest formal methods regarding manpower management in the construction sector [19].

### 2.1. The Role of the Construction Sector in Indonesia

The construction sector is a sector that includes all parties related to the construction process including professionals, construction contractors (contractors), and also suppliers who together meet the needs of participants in the industry [11]. Statistical data show that in developing countries, the construction sector contributes and has a significant influence on national development [43].

As a basis for economic growth, the construction sector has several roles, among which is providing physical infrastructure, as a support for business and job opportunities, promoting the growth of other sectors, contributing to the gross domestic product, supporting increased savings through foreign exchange and increasing the acceptance of foreign exchange, as media through the transfer of technological knowledge, fostering high morale, discipline, awareness of responsibility, efficiency, order, support to increase national resilience, as well as serving as a media for the formation of a sense of national pride [40].

### 2.2. Factors Contributing to the Improvement of Construction Contractor Performance

Performance measurement is an important matter in the evaluation and management process of the company [12]. According to Mulyadi [22], performance is the optimal work performance performed by a person, group, or company. Traditional performance measurement is usually oriented towards financial areas and the ability to make a profit. Therefore, a company can be said to have a good performance if its financial statements achieve profit according to the target that has been set. Nevertheless, the main purpose of performance evaluation itself is to help in setting standards and targets and provide facilities for performance improvement; motivate employees; conveying and channeling the

organization's strategy; and influence behavioral change. According to Hansen and Mowen [10], performance measurement aims to avoid non-value-added activities and optimize value-added activities.

Based on the research on the performance of construction companies conducted by Sudarto [37], it is known that the company's performance indicators on the construction sector can be seen from four indicators, namely profit performance indicators (profitability), growth performance (growth), sustainability performance (sustainability), and competitive performance indicator.

### **2.3. Effective Manpower Management Practices Among Construction Contractors**

Labor is an important asset in the construction sector. Manpower management has the potential to be a complex problem because manpower can affect aspects of cost, time and quality of construction projects [33].

Manpower management is a daily operational activity carried out in every company. Typically, company management is responsible for managing the manpower [8]. The person responsible for the implementation of these activities is called the manpower manager [30].

Othman et al. [26] stated that in construction projects, one of the main problems is inadequate manpower management. Therefore, the quality of the manpower needs to be improved from time to time for the effectiveness of the growth of the construction sector.

Management factors in managing the manpower that are practiced every day in the construction sector according to Malia Muis [18] and several other sources are: fair wages, giving incentives, manpower relations with the company, occupational safety and health, giving bonuses, facilities for the manpower, training for new manpower, encouragement to improve knowledge, transfer of technology from experienced manpower, employee roles and responsibilities, effective communication, manpower satisfaction, continuous motivation to employees, transparent appraisal, and team collaboration.

### **2.4. Factors Affecting Construction Company Performance**

In general, the company's performance is affected by factors consisting of internal factors, external factors, and market strength factors. According to Teng [39] and Venegas and Alarcon [42], these three factors consist of several things, namely: internal factors of the company consisting of manpower, management, organization, customers, and manpower management; the company's external factors consist of the socio-political environment, the legal environment, the competitive environment, the technological environment, and the macroeconomic environment; and the company's market strength factors which are influenced by internal and external factors.

According to Kaplan [14], internal processes in companies aim to produce value for customers, improve performance and reduce costs for productivity components. Internal processes in

companies can be grouped into operational management processes, customer management processes, innovation processes, and regulatory and social processes. According to Venegas and Alarcon [42] and Teng [39], internal factors that affect company performance, especially construction companies can be grouped into several factors, namely management, organization, manpower, finance, corporate culture and other resources.

Company manpower management is basically the company's activity in managing its manpower or often referred to as HR. Manpower management starts from manpower recruitment which includes manpower planning, job analysis that determines suitable jobs and positions, selection, training and development, performance evaluation, compensation, and renewal related to retirement and termination of employment. In managing the manpower to improve the quality of the company, that can be done by improving the performance of the manpower itself in addition to the need to know more about improving the quality of the manpower [2].

Improving the quality of the manpower is done on resources that have competence from physical and intellectual aspects. Improving the quality of the manpower can be done in several ways, including [35] improving the physical quality can be achieved through health and nutrition programs and improving the quality of non-physical abilities that can be done through training, seminars and workshops.

The improvement of the quality of the manpower must always be done in an effort to find, develop and maintain the manpower in accordance with the needs. There are three strategies in manpower planning based on Lumempouw et al. [17], namely manpower and strategic planning; level of tactical manpower planning; and manpower operational planning.

In Indonesia, the Indonesian National Work Efficiency Standard (SKKNI) for construction has been formed to train the construction manpower as previously explained, which consists of 7 measures as indicators of the success of the training implementation that will be used in the project, and 11 steps as indicators of the implementation of the training being carried out well. The success of manpower training will affect project performance with 15 indicators. Overall, these indicators will affect the performance of the contractor company, and directly also have 7 indicators related to the manpower. Overall indicators indirectly affect the company's performance, but through 4 interrelated latent variables, where analysis that can answer the influence of each other must be carried out using Multivariate Analysis such as Structural Equation Model (SEM).

## **3. Research Method**

In achieving the goals of this study, a suitable research methodology design is a prerequisite [24]. In short, the research methodology used in this study includes a

preliminary study formed by structured interviews with a group of experts to confirm the questions in the questionnaire. Next, the determination of significant variables was identified through a literature review which was then used in an empirical study of questionnaires as well as a detailed analysis of the project data collected through Structural Equation Modeling (SEM) statistics.

Therefore, before the analysis method is discussed in more detail, the type of data in this study is initially explained. The research method of this study is divided into two main stages of literature review, identifying manpower management problems faced by construction contractor companies in Indonesia; investigate the factors for improving the performance of construction contractor companies based on the quality of the manpower outlined by SKKNI, evaluating the relationship between the quality of manpower management and the improvement of the performance of construction contractor companies in Indonesia; and propose an implementation framework involving manpower quality factors that affect the performance of construction contractor companies in Indonesia.

### 3.1. Labor Quality Indicators in the Construction Sector in Indonesia

In order to reach the focus group more effectively and save time, the questionnaire was delivered to the members of the focus group via e-mail and followed by a telephone interview so that the research objective through the dissemination of the questionnaire could be achieved. Focus group discussions were conducted openly, which allowed members to tell the researcher any information they felt was relevant. Interviews are conducted separately where it depends on the date and time determined by the focus group members. This method can help focus group members to manage their time and work schedule so as not to interfere with the interview process. On the other hand, topics identified from the literature review are introduced by researchers easily [44]. In order to provide any opinion that is considered valid for variability identified with the questionnaire itself.

Through past studies, 15 manpower quality problems in the construction sector in Indonesia have been identified as shown in Table 1 below:

*Table 1. Labor Quality Problems in the Construction Sector in Indonesia.*

No.	Quality problems
1	Low level of education for construction contractor union workers
2	The ratio of higher and lower education among construction contractor workers is not balanced
3	SKA and SKT do not guarantee good work quality among construction contractor workers
4	Construction contractor workers who are freelancers from schools and universities cannot do the job well
5	Independent construction contractor union workers from schools and universities are not disciplined
6	Construction contractor workers who are freelancers from schools and universities are less creative
7	The training given to construction contractor workers by the SKKNI training center is not uniform
8	Various types of skill training for construction contractor workers are still not provided through SKKNI
9	There are regions in Indonesia that still do not have the competence of the guidance sector for construction contractor workers' unions
10	Construction contractor workers' union workers work on farms that do not match their SKKNI certificates
11	Lack of appreciation by employers to construction contractor workers
12	Lack of employer protection for construction contractor workers
13	Lack of SKKNI training devices for workers in training centers
14	Lack of SKKNI training facilities for workers at training centers
15	There is no supervision of construction contractors whether they have workers with SKA and SKT

### 3.2. Formation of Contractor Company Performance Indicators

From the theoretical framework that has been discussed before, 4 latent variables that influence each other are obtained, namely; Training for employees who have a relationship with Construction SKKNI; Training for employees is expected to increase the company's internal strength and further improve the company's performance; Construction SKKNI is expected to contribute to the company's internal strength and also improve

the company's performance.

Each latent variable has an indicator that is compiled based on the theoretical framework and formulated in Table 2, which is grouped into sections and groups of questions. The number of total indicator items for each group or cluster that is detailed for each latent variable (Table 2) and given a code for each of its fractions, which is code X, X1 to X3 for latent variables, X1 expanded to X11 to X111; X2 is expanded to X21 to X215; X3 expanded to X31 to X37. While the Y code is a dependent variable that is expanded into Y1 to Y6.

*Table 2. Distribution of Questions in the Survey.*

Section	Group of questions	Number of Items
A	Training for employees of contractor companies in Indonesia about SKKNI	11
B	Internal strength of construction contractor companies in Indonesia	15
C	SKKNI for construction for construction companies in Indonesia	7
D	Construction company performance by employees with SKKNI certificate	6

**Table 3. A-** Number of Variables Related to Training for Contractor Company Employees in Indonesia about SKKNI.

No.	Variables	Coding
1	The benefits of obtaining an SKKNI certificate create a desire to follow the training	X11
2	Appropriateness of Training material	X12
3	Balanced theoretical and practical material	X13
4	Time in training felt enough	X14
5	Train the ability of teaching staff	X15
6	Training tools and equipment	X16
7	Good training ground	X17
8	Information for Training	X18
9	Training Fee	X19
10	Field of work according to certificate	X110
11	Proud to have a certificate	X111

**Table 4. B-** Number of Variables Related to the Internal Strength of Construction Contractor Companies in Indonesia.

No.	Variables	Coding
1	Decent salary	X21
2	Incentives	X22
3	Labor relations with the company	X23
4	Occupational Safety and Health	X24
5	Give bonuses	X25
6	Facilities for the manpower	X26
7	Training for new employees	X27
8	Encouragement to increase knowledge	X28
9	Technology transfer from experienced manpower	X29
10	Employee roles and responsibilities	X210
11	Effective communication	X211
12	Manpower satisfaction	X212
13	Continuous motivation for employees	X213
14	Transparent evaluation	X214
15	Teamwork	X215

**Table 5. C-** Number of Variables Related to Indonesian National Work Competency Standards for Construction Companies in Indonesia.

No.	Variables	Coding
1	Collect, analyze and organize information	X31
2	Communicating information and ideas	X32
3	Planning and organizing activities	X33
4	Collaborate with others and in teams	X34
5	Using technical and mathematical ideas	X35
6	Ability to solve problems	X36
7	Ability to use technology	X37

**Table 6. D-** Number of Variables Related to Construction Company Performance by Employees with SKKNI Certificate.

No.	Variables	Coding
1	Manpower management skills	Y1
2	Select the manpower qualitatively	Y2
3	The manpower must be innovative and creative	Y3
4	Create a work environment that supports profitability	Y4
5	No disruption in organizational structure and daily activities	Y5
6	More efficient use of resources, better communication, and prioritizing occupational health and safety.	Y6

### 3.3. Analysis Model

The SEM theoretical model is suitable for use as an analytical technique to test complex variable relationships. SEM is the second generation of multivariate analysis techniques for testing complex variable relationships. SEM can test structural models and measurement models, able to test measurement errors and factor analysis together with hypothesis testing. Other SEM programs such as; AMOS (Arbuckle), LISREL (Joreskog and Sorbom), EQS (Bentler), ROMANO (Brown, Mels and Coward), LISCOMP (Muthen) [32].

Basically, SEM is a "confirmatory technique" that is different from exploratory factor analysis. This technique is used to test a theory or an improvement to a theory that has been developed for a long time. The fact is that SEM is a suitable method (technique) to be used in confirming research findings. empirically.

#### 3.3.1. Path Analysis

Regression analysis, precision factor analysis and band analysis are the basis of structural equation. Path analysis is an approach to detect direct (direct effect) and indirect (indirect effect) relationships among variables, thus this

path analysis is not a method to determine the causal relationship of one variable to another variable, but to test the theoretical relationship between variables. All variables in path analysis, whether dependent or independent, are directly measurable (observable). Whereas when the variable in the path analysis is a variable that cannot be measured directly (unobservable) then it is called a structural equation model (Structure Equation Modeling = SEM) [1].

Figure 1 shows the relationship between the variables:

training of construction workers, SKKNI for building the internal strength of the project, and the performance of the construction company described using straight arrows and curved arrows. A straight arrow shows how one variable affects another variable. Curved arrows where arrows in a bidirectional form indicate the correlation of one variable with another. The influence of one variable on another variable was analyzed using regression analysis. While the correlation between independent variables is calculated using the correlation by Karl Pearson [1].

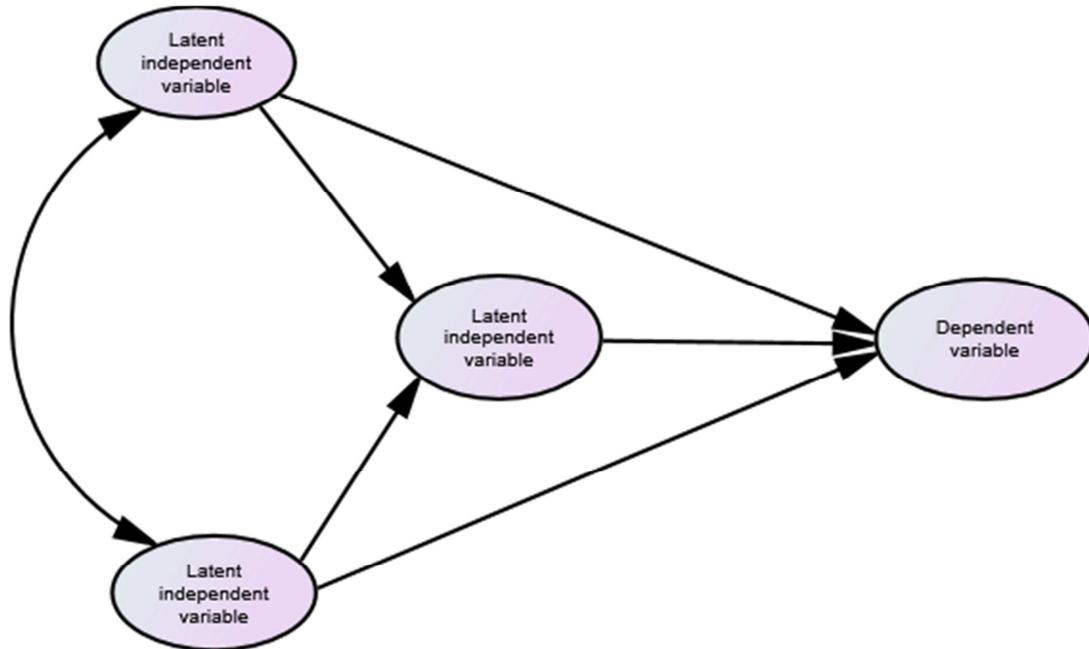


Figure 1. Band Analysis.

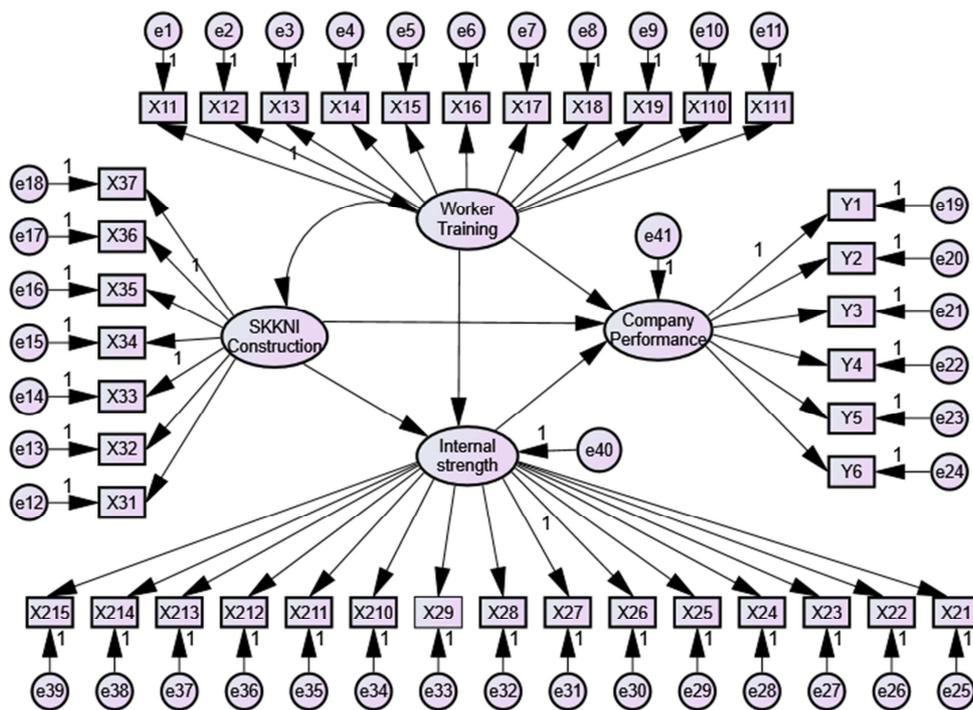


Figure 2. Formation of SEM with AMOS Graphics.

The relationship between the variables in Figure 2 states the research hypothesis that;

- 1) Interlocking training for workers with Construction SKKNI.
- 2) Company performance is affected by training for employees.
- 3) The company's performance is affected by the internal strength of the project.
- 4) The company's performance is affected by the Construction SKKNI.
- 5) The internal strength of the project is influenced by training for employees.
- 6) The internal strength of the project is influenced by the Construction SKKNI.

### 3.3.2. Forming a Structural Equation Model (SEM)

A complete SEM model basically consists of a Measurement Model or a Measurement Model and a Structural Model or a Structural Model. Measurement models are intended to validate dimensions or factors based on empirical evidence. Structural Model is a model about the relationship structure that forms or explains the causes between factors [21]. The structural equation model or SEM is a model that explains the relationship between latent variables so this SEM model is often referred to as latent variable analysis (latent/construct analysis) or linear structural relationship [1]. Agus [1] explained that the relationship between variables in SEM is the same as the relationship in path analysis, which is the basis for forming the relationship between variables in the structural equation model. However, in explaining the relationship between latent variables, this SEM differs from the path analysis model where path analysis uses variables that are measured while SEM uses variables that cannot be measured directly.

There are five steps to analyze the SEM model [5]:

- 1) Model specifications.
- 2) Identification.
- 3) Approximate model.
- 4) Test model fit and significance.
- 5) Modification model specifications.

Model specification in the first stage is related to the formation of relationships between variables in SEM. Because SEM is not a method to build a theory, the specification of this model should be based on the existing theory. The second step in SEM is the identification question to determine whether the model is correct or there are still model specification errors (misspecified model). If the model is accurate then we can get the estimated parameters from the relationship between the variables in the SEM. The third step is to estimate. There are several estimation methods that can be used such as ordinary least squares (OLS) and maximum likelihood (ML). After estimating, the fourth step is to test the validity of the model. If the model is qualified then we can test the significance of the relationship between the variables in SEM. The last step, if the model is not qualified

then we need to respecify the model in order to get a qualified model.

In more detail, SEM is actually a combination of a path analysis model, structural validation model (CFA), second order CFA, regression model, covariance structure model and correlation structure model.

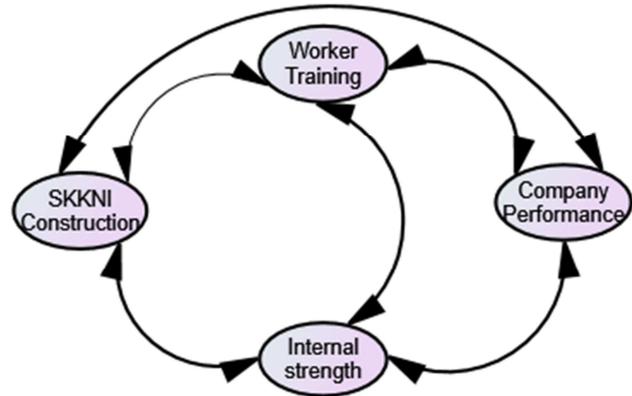


Figure 3. Intercorrelation of Latent Variables.

## 4. Research Results and Analysis

As discussed earlier that this research is done with two stages; first conducting research to identify the quality of the manpower in construction contractor companies in Indonesia, that is by conducting interviews with stakeholders in manpower management in construction; secondly by conducting research on the use of labor in construction projects to investigate the improvement of the performance of construction contractor companies based on the quality of the manpower through SKKNI and evaluate the relationship between the quality of labor management and the improvement of the performance of construction contractor companies in Indonesia.

### 4.1. Labor Quality Data Analysis

Of the 15 labor quality problems in the construction sector as described in Chapter 3, an interview was conducted via Google form, a list of questions asked for answers based on a Likert scale of 1 to 5 (lowest and highest). By asking the opinion of stakeholders who are considered as experts who have deep knowledge and voice experience about the manpower for construction projects, that is; Representatives of professional bodies, contractor engineers, contractors, academics and engineers of the Ministry of Public Works and Housing. Each body is represented by 2 people and the results are as in Table 7.

According to the results of the analysis, there are three (3) factor points that are very influential on the quality of the manpower in the construction sector in Indonesia as explained in Table 7.

Table 7. Interpretation of the Manpower Quality Problem Scale.

No.	Quality problems	Average score according to Likert scale	Scale interpretation
1	Construction contractor company employees who are school and university graduates are not disciplined	4.2	Very affecting
2	Construction contractor workers who are school and university graduates are less creative	4.2	Very affecting
3	There are regions in Indonesia that still do not have the competence of the construction sector for employees of construction contractor companies	4.2	Very affecting
4	The low level of education of construction contractor company employees	3.9	Affecting
5	Construction contractor workers who are school and university graduates are not able to do the job well	3.8	Affecting
6	Construction contractor company employees work in fields that are not compatible with the SKKNI certificate they have	3.8	Affecting
7	Lack of protection by employers to construction contractor workers	3.8	Affecting
8	Lack of appreciation by employers to construction contractor workers	3.7	Affecting
9	There is no supervision over construction contractors whether they have workers with SKA and SKT	3.4	Affecting
10	SKA and SKT do not guarantee good work quality among construction contractor workers	3.4	Affecting
11	The ratio of higher and lower education among construction contractor workers is not balanced	3.3	Affecting
12	The training given to construction contractor workers by the SKKNI training center is not uniform	3.3	Affecting
13	Various types of skill training for construction contractor workers have not yet been provided through SKKNI	3.3	Affecting
14	Lack of facilities for SKKNI training aids for workers at the training center	3.2	Affecting
15	Lack of SKKNI training infrastructure facilities for workers at the training center	3.2	Affecting

Based on the Likert scale used for 15 quality problems where the lowest scale value of 1 is not very influential and the scale value of 5 is very influential, while the average of the measurement results shows the level of influence of the quality of the workforce.

4.2. Statistical Analysis

In this section, several analyzes are described that explain the accuracy of using the model to evaluate the company's

performance. Among those detailed are: the type of input matrix model and the proposed estimate, the evaluation of goodness of fit criteria, the results of accuracy analysis for factor loading (factor loading), and the analysis of the research hypothesis.

4.2.1. Types of Input Matrix Models and Proposed Estimates

The dimensional measurement model that forms the latent variable in this model is as shown in Figure 4.

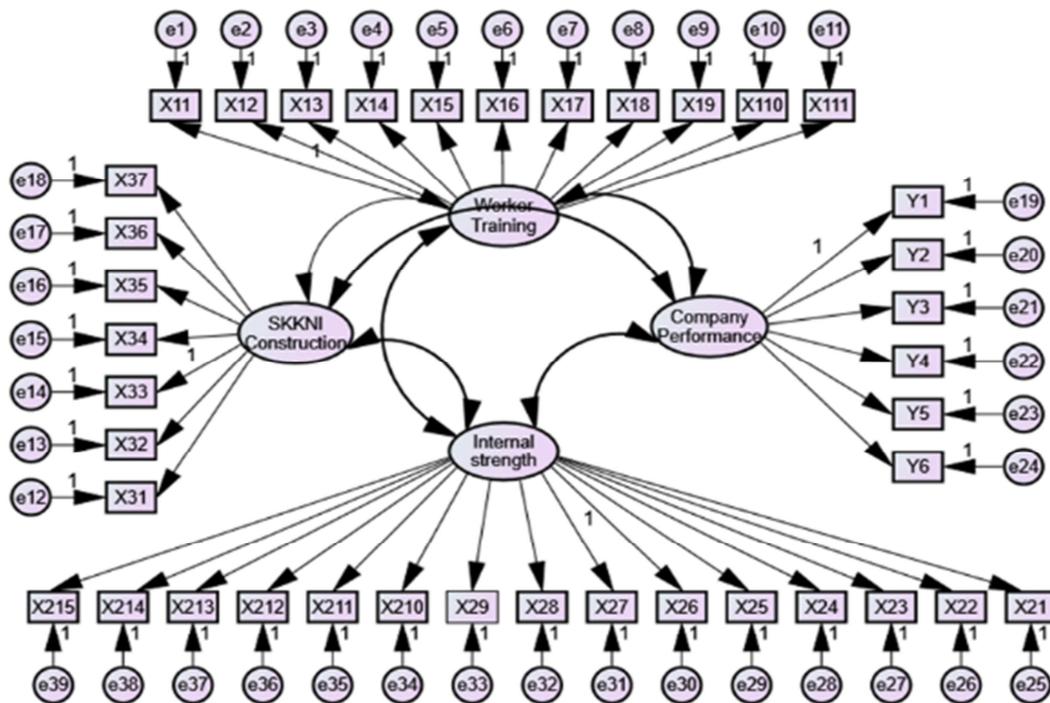


Figure 4. Input Parameters for the Confirmatory Factor Analysis (CFA) Model.

**4.2.2. Evaluation of Goodness of Fit Criteria**

The results of the testing using the parameters of the Confirmation Factor Analysis (CFA) model at the initial stage as shown in Table 8.

**Table 8.** Evaluation of Initial Level Model Goodness of Fit Criteria.

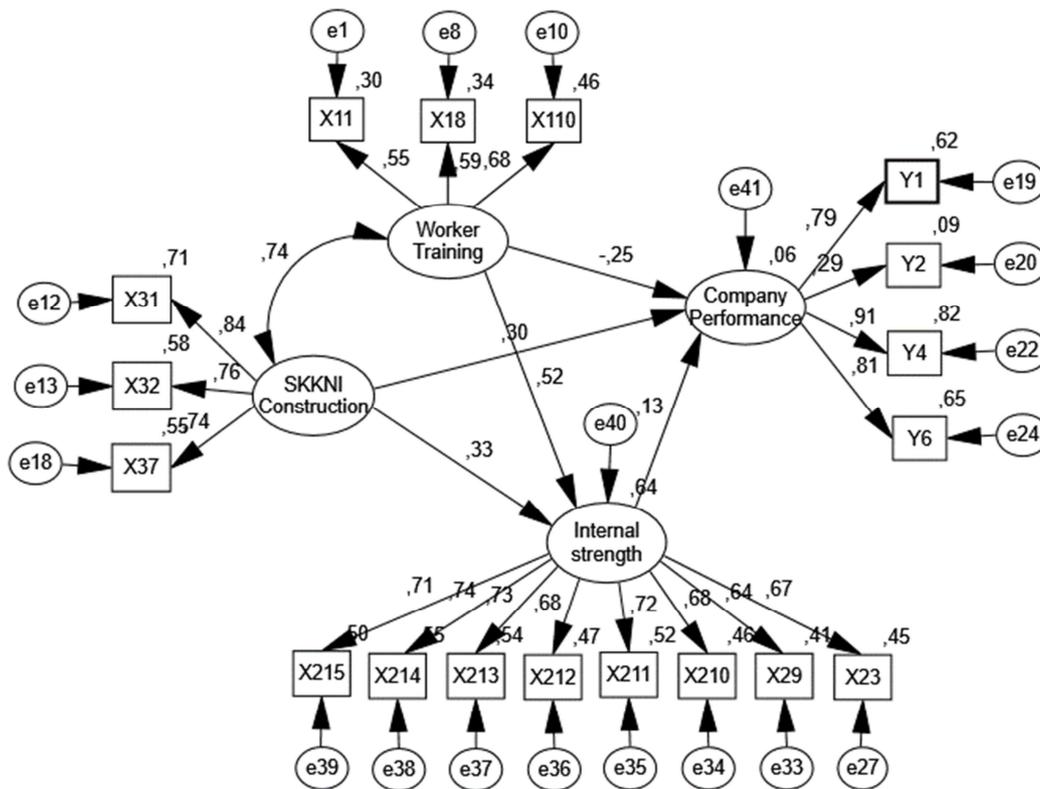
Goodness of fit	Calculation results	Cut-off	Explanation
Chi-square	2979.497	Small	Not Fit
P	0.000	> 0.05	Not Fit
CMIN/DF	4.281	≤ 2	Not Fit
RMSEA	0.097	≤ 0.08	Not Fit
GFI	0.605	≥ 0.90	Not Fit
AGFI	0.557	≥ 0.90	Not Fit
TLI	0.710	≥ 0.95	Not Fit
CFI	0.728	≥ 0.95	Not Fit

Source: SPSS Amos Release 23.

The CFA Confirmatory Factor Analysis measurement model in Figure 4 has not produced a good model, especially  $\chi^2$  which has a value of 2979.497 and the P value is  $0.000 < 0.05$  and based on data from the assessment of model goodness criteria (model fit) shown in the table all values are not suitable.

Further, model specifications and/or index modifications are carried out until good model measurements are produced. The process done is by looking at the MI (modification index) value from the output, a large value indicates a strong intercorrelation. Next, indicators that have a large value and the most intercorrelation will be removed from the analysis. The process is done continuously, until obtaining  $p > 0.05$  with  $CMIN/DF < 2$ .

From the final stage data processing done to get the good is shown in Figure 5.



**Figure 5.** Final Level Model Goodness of Fit Criterion Evaluation.

**Table 9.** Final Stage Model Goodness of Fit Criterion Evaluation.

Goodness of fit	Calculation results	Cut-off	Explanation
Chi-square	155.255	Small	Fit
P	0.058	> 0.05	Fit
CMIN/DF	1.204	≤ 2	Fit
RMSEA	0.024	≤ 0.08	Fit
GFI	0.955	≥ 0.90	Fit
AGFI	0.940	≥ 0.90	Fit
TLI	0.988	≥ 0.95	Fit
CFI	0.990	≥ 0.95	Fit

Source: SPSS Amos Release 23.

The result of the SEM analysis is shown in Figure 5, while the output result in the form of a strip diagram can be seen in Table 9 which shows that the test  $\chi^2 = 155.255$  with a small criterion and  $p = 0.058$  is greater than  $\alpha = 0.05$ . Therefore, the model is said to be good and can be used to prove the research hypothesis.

**4.2.3. Accuracy Analysis Results for Loading Factors**

The results of the accuracy factor analysis are shown in the final SEM analysis results section. Table 10 shows the results of the final factor loading analysis for the research variables to the company's performance.

*Table 10. Results of Factor Analysis of Research Variable Loading to Company Performance.*

Indicator	Loading Factor						
X11	0.550	X23	0.672	X31	0.843	Y1	0.788
X18	0.585	X29	0.409	X32	0.759	Y2	0.298
X110	0.681	X210	0.680	X37	0.744	Y4	0.905
		X211	0.723			Y6	0.806
		X212	0.684				
		X213	0.732				
		X214	0.740				
		X215	0.706				

Source: SPSS Amos Release 23.

The results of the squared multiple correlation analysis ( $R^2$ ) are shown in the final result section of the SEM analysis. Table 11 shows the results of the final correlation analysis of research variables to company performance.

*Table 11. Results of Squared Multiple Correlation Analysis ( $R^2$ ) of Research Variables to Company Performance.*

Indicator	$R^2$	Indicator	$R^2$	Indicator	$R^2$	Indicator	$R^2$
X11	0.303	X23	0.452	X31	0.710	Y1	0.620
X18	0.343	X29	0.409	X32	0.577	Y2	0.087
X110	0.463	X210	0.463	X37	0.553	Y4	0.819
		X211	0.522			Y6	0.649
		X212	0.468				
		X213	0.536				
		X214	0.548				
		X215	0.498				

Source: SPSS Amos Release 23.

Based on the table, there are two indicators with a loading factor value smaller than 0.5 so that it is not included for analysis and the others are all above 0.5. Therefore, there is a close relationship between each variable. There are no guidelines for standard values to correlate variables but a value of 0.7 or 0.5 above is used as a reference to correlate two variables in general [34].

**4.2.4. Research Hypothesis Analysis**

Once all the assumptions can be met, the hypothesis testing will be done as suggested in Chapter 3. The results of the analysis based on the output of SPSS Amos 22 are as given in Table 12.

*Table 12. Hypothesis Test Results.*

Independent variable	Calculation results	CR	P-value	Explanation
Inner Strength	Construction SKKNI	3.278	0.001	Significant
Inner Strength	Train Workers	4.307	0.000	Significant
Company Performance	Inner Strength	1.040	0.298	Not Significant
Company Performance	Construction SKKNI	2.409	0.016	Significant
Company Performance	Train Workers	-1.520	0.129	Not Significant
Construction SKKNI	Train Workers	6.965	0.000	Significant

Source: SPSS Amos Release 23.

**(i). The Influence of Construction SKKNI on the Internal Strength of Construction Projects**

There is a significant influence between Construction SKKNI on the Internal Strength of Construction Projects. Values that show that Construction SKKNI has a significant influence on Internal Strength are CR values = 3.278 > 1.96 and P-Value values (0.001) < 0.05. All indicators on the Construction SKKNI variable are declared eligible as measurement indicators because they have a value of Standardized Regression Weights (SRW) > than 0.5 as in Table 12.

**(ii). The Influence of Employee Training on the Internal Strength of Construction Projects**

There is a significant influence between Employee Training on the Internal Strength of construction projects. The value that shows that Employee Training has a significant effect on Internal Strength is the value of CR. = 4.307 > 1.96 and the value of P-Value (0.000) < 0.05. All indicators on the Employee Training variable are declared eligible as measurement indicators because they have a value of Standardized Regression Weights (SRW) > than 0.5 as shown in Table 12.

**(iii). The Influence of Internal Strengths on Company Performance**

There is no significant influence between the Internal Strength of Construction Projects on Company Performance. The value that shows that Internal Strength does not have a significant effect on Company Performance is the CR value. =  $1.040 < 1.96$  and  $P\text{-Value} = 0.298 > 0.05$ .

**(iv). The Influence of Construction SKKNI on Company Performance**

There is a significant influence between Construction SKKNI on the company's performance. The value that shows that Construction SKKNI has a significant effect on internal strength is the CR value. =  $2.409 > 1.96$  and  $P\text{-Value} = 0.016 < 0.05$ . All the indicators on the Employee Training variable are stated to qualify as measurement indicators because they have a Standardized Regression Weights (SRW) value  $>$  than 0.5 as in Table 12.

**(v). The Influence of Employee Training on Company Performance**

There is no significant influence between Employee Training on Company Performance. The value that shows that Internal Strength does not have a significant effect on Company Performance is the CR value. =  $1.520 < 1.96$  and  $P\text{-Value} = 0.129 > 0.05$ .

**4.3. Research Analysis Results**

**4.3.1. Identifying Manpower Management Problems Faced by Construction Contractor Companies in Indonesia**

Referring to the average value according to the Likert scale in Table 7, a clear picture of the importance of manpower quality in the construction sector. Based on those values, below are important observations about the data obtained:

Construction contractor workers who are undisciplined school and university graduates greatly influence the low quality of labor in the construction sector in Indonesia. Work discipline is a person's attitude and behavior that shows obedience, obedience, loyalty, order and order to the rules of the company or organization and the prevailing social norms. According to Rivai [29], work discipline is a tool used by managers to communicate with employees until they are ready to change their behavior as well as efforts to increase a person's awareness and willingness to comply with all company rules. Enforcing work discipline is very important for the company. The existence of work discipline will ensure the maintenance of order and the smooth implementation of the company's work, so that it can obtain optimal results. For employees, work discipline has an impact on a pleasant work atmosphere that will increase the enthusiasm to carry out their work.

Construction contractor workers who are less creative school and university graduates greatly influence the low quality of labor in the construction sector in Indonesia.

According to data from the Ministry of Manpower, there are 171 institutions that have Vocational Training Centers

(BLK) throughout Indonesia, only 76 BLKs provide training in the construction sector, so not all regions and training centers provide human resource training for construction. With these weaknesses, it is necessary to add training centers for the construction sector to increase the manpower to achieve the expected competence.

Therefore, the problem of managing human resources faced by construction contractor companies in Indonesia is due to lack of discipline, lack of creativity, and lack of training facilities. Lack of discipline and lack of creativity is a key part of education, and training facilities that should be supported by stakeholders to improve human resource capabilities in the construction sector.

**4.3.2. Investigating Factors for Improving the Performance of Construction Contractor Companies Based on Manpower Quality Through SKKNI**

Factors to improve the performance of construction contractor companies based on the quality of the manpower through SKKNI will be explained through the results of the study that has been presented in the analysis results beforehand. All indicators on the Construction SKKNI variable are stated to qualify as measurement indicators because they have a value of Standardized Regression Weights (SRW)  $>$  than 0.5. In general it can be said that a loading factor above 0.7 indicates that the indicator is part of the construct, but some literature sets the limit as 0.5.

**(i). Guidance as the Strongest Factor in Employee Training**

The strongest indicator of Employee Training for the Internal Strength of the project is only one, namely: Occupational field according to certification (X110). The better the adaptation of the place and how the practice is used to work, the more successful the training (Clark and Voegel, 1985).

**(ii). Guidance as the Strongest Factor in Construction SKKNI**

Construction SKKNI strongest indicators for Construction SKKNI consecutively as follows; (1) Collecting, analyzing and organizing information (X31) is important for the manpower, if the information received by the manpower is not well understood it can give different perceptions so that the work results are not as expected, therefore the results of the work team are not optimal. (2) Communicating information and ideas (X32) is necessary to ensure that the information received by an employee can be done reliably by acting innovatively. (3) Being able to use technology (X37) is a demand that must be met by construction workers in accordance with very dynamic developments..

**(iii). Indicators as the Strongest Factor for the Internal Strength of the Project**

The four (4) strongest indicators from Construction SKKNI for Internal Strength of the project are as follows; (1) Transparent evaluation (X214) is the strongest indicator, where an employee needs a leader's evaluation of the results performed and compared with work achievements openly. (2)

Continuous motivation for employees (X213) is to encourage employees by explaining their mutual interest in doing good work, so that they will have high work morale. (3) Effective communication (X211) is essential to provide a good understanding by the leadership of the work that will or is being done. (4) Teamwork (X215) is something that is very necessary, because the nature of work in construction is generally teamwork, so that each individual should work together to achieve optimal work results.

**(iv). Indicators as the Strongest Factor for Construction Contractor Company Performance**

There are three (3) strongest indicators from Construction SKKNI for the performance of construction contractors are as follows; (1) Create a financially supportive work environment (Y4). The financial relationship with employees is very close, if every payment benefit related to employees is carried out smoothly, then the spirit of work will be maintained, so that it will benefit the company. (2) More efficient use of resources, better communication, and prioritizing occupational health and safety (Y6). The relationship of construction workers to the use of healthy materials, tools and work systems is a value that will give enthusiasm to improve work performance, so that it will indirectly improve the company's performance. (3) Manpower management skills (Y1). A company that has good manpower management will have the right size and management of the manpower as needed to complete the work, so that they can work effectively and efficiently which will benefit the company itself.

**4.3.3. Evaluating the Relationship of Manpower Management Quality with the Performance Improvement of Construction Contractor Companies**

**(i). Manpower Training Relationship with Construction SKKNI**

SKKNI-based manpower training is conducted through Employment Training Centers (BLK) facilitated by the government. In researching the relationship between Construction SKKNI and employee training from SPSS Amos 22 data processing results with a CR value = 6.965 > 1.96 and a P-value of 0.00 explains a very strong relationship. The results that can be taken from this research that Construction SKKNI is quite well used as a curriculum in training, so that Construction SKKNI has met the criteria to improve the work ability of construction workers.

**(ii). Project Internal Strength Relationship with Construction SKKNI**

The relationship between the internal strength of the project based on Construction SKKNI is tested based on the use of trained manpower according to SKKNI. The results obtained show that there is a significant influence between Construction SKKNI on the internal strength of the construction project. The value that shows that Construction SKKNI has a significant effect on internal strength is the CR value. = 3.278 > 1.96 and P-Value (0.001) < 0.05. All

indicators on the Construction SKKNI variable are stated to qualify as measurement indicators because they have a value of Standardized Regression Weights (SRW) > than 0.5.

**(iii). Relationship of Internal Project Strength with Employee Training**

The relationship between the internal strength of the project based on employee training obtained a significant influence with the value of CR. = 4.307 > 1.96 and P-value = 0.000 < 0.05. All indicators on the variable of employee training are declared eligible as measurement indicators because they have a value of Standardized Regression Weights (SRW) > of 0.5.

The main factor in the relationship between employee training and internal strength to improve company performance in the construction sector is the field of work that is suitable for training that is closely related to honest evaluation, continuous motivation to employees, and effective communication.

**(iv). Relationship of Company Performance with Employee Training**

Company Performance Relationship based on Employee Training obtained CR value. = 1.520 < 1.96 and P-Value = 0.129 > 0.05. Values that show that Employee Training does not have a significant effect on Company Performance. There is no direct and significant relationship between the measured variables contributing to the company's performance.

**1) Company Performance Relationship with Construction SKKNI**

C. R. value. = 2.409 > 1.96 and P-Value = 0.016 < 0.05. All indicators on the variable of employee training are declared eligible as measurement indicators because they have a value of Standardized Regression Weights (SRW) > of 0.5. This value shows that Construction SKKNI has a significant effect on the company's performance.

There are 3 things as performance variables of companies that have a relationship with SKKNI in the construction sector, among them: creating a financially supportive working environment, more efficient use of resources, better communication, and prioritizing occupational health and safety. These three cases are closely related to the achievement of competency standards that have the ability to collect, analyze and organize information, convey information and ideas and have the ability to use technology.

**2) Relationship of Company Performance with Internal Project Strengths**

The relationship between the company's performance and the internal strength of the project is indicated by the CR value. = 1.040 < 1.96 and P-value = 0.298 > 0.05. This value means that there is no significant effect between Company Performance and Internal Strength of the project.

**4.3.4. Proposing the Implementation Framework and Factors Affecting the Performance of Construction Contractor Companies**

According to the results of the study conducted for the use of SKKNI as a basis in improving the work ability of the

construction sector, it can be proposed the implementation framework and factors that affect the performance of construction contractor companies in Indonesia.

**(i). Manpower Management Problems to Improve Company Performance**

Manpower management problems faced by construction contractor companies in Indonesia have weaknesses due to lack of discipline, lack of creativity, and lack of training facilities. These three factors need to be worked on to improve the company's performance as follows:

- a) Employees of construction contractor companies who are school and university graduates are not disciplined, as presented in Table 7. Disciplinary problems are part of education, so efforts should be made to cooperate with the education department, so that school and university graduates already have good discipline.
- b) Construction contractor workers who are school and university graduates are less creative as presented in Table 7. Lack of creativity is also a big part of education, where it can be applied early in the education process at the lower level, so that it becomes a culture rather than a manpower.
- c) There are regions in Indonesia that still do not have construction sector competencies for construction contractor company employees as presented in Table 7. The lack of training facilities should be supported by stakeholders to increase the capacity of the manpower in the coaching sector. This can be done by working with governments and companies.

**(ii). Construction SKKNI to Improve Company Performance**

In testing the hypothesis, it was found that SKKNI in the construction sector affects Company Performance. There are 3 indicators that are very influential namely; evaluate the quality of information in work; choose models of various types and styles of communication; and use technology for development. The three indicators are explained as follows;

- a) Assessing the quality of information in the workplace, identifying communication is very important because it is the main cause of events and processes in the organization. There are two forms of communication which are communication characteristics and individual characteristics - such as feedback, information processing, accuracy, choice of modality, direction, influence, mobility aspirations, and satisfaction with communication, trust and interaction, security knowledge management and real-time communication is the flow of risk information. security.
- b) Choose a model of various types and styles of communication, where more open communication at all levels can lead to innovation and better technical solutions. The application of the use of visual tools to make the flow of communication easier, better, and

understandable is analyzed in construction projects.

- c) By using technology for development, the practice undermines the ability to absorb and use new technology. Various studies show that workers are affected because the use of technology requires retraining procedures and can shape and improve the skills of the existing manpower. The technology transfer strategy will be more effective if all parties are aware of the importance of the technology transfer environment.

## 5. Discussion

### 5.1. Identifying Manpower Management Problems Faced by Construction Contractor Companies in Indonesia

There are 15 problems about the quality of the manpower in the construction sector that have been described in a theoretical framework. Based on the analysis carried out with reference to the opinions of stakeholders who are considered experts, this study summarizes three (3) factors that are very influential on the problem of manpower quality in the construction sector in Indonesia, namely:

- 1) The manpower of construction contractors who are school and university graduates are not disciplined. This greatly affects the low quality of the manpower in the construction sector. Therefore, the enforcement of work discipline is very important for the company. The existence of work discipline will ensure the maintenance of order and the smooth implementation of the company's work in order to obtain optimal work results. Discipline of the manpower has an impact on a pleasant working atmosphere which in turn can increase the enthusiasm to carry out their work.
- 2) The manpower of construction contractors who are school and university graduates who are less creative greatly influences the low quality of manpower in the construction sector. Creativity is the ability to be creative in creating something innovative, and is one of the basic human needs, which is the need for self-awareness that is important for humans. Creativity can be identified and nurtured through proper education because basically, everyone has creative potential.
- 3) The existence of regions that still do not have competency training in the construction sector greatly affects the low quality of the manpower in this sector. According to data from the Ministry of Manpower [20] only 45 percent of accredited Vocational Training Centers (BLK) throughout Indonesia provide training in the construction sector, where not all regions have training centers that provide manpower training for the construction sector.

The above factors can be linked to the presence of a manpower in the construction sector whose majority is poorly educated, where they will experience obstacles in the process of transferring knowledge and skills. This is in line with data showing that the construction sector manpower is

still dominated by those with low education.

In improving education and skills, the Indonesian Government has established the Indonesian National Work Competency Standard (SKKNI) to be used as a general training guide for the manpower based on Law No. 13 of 2004. However, the new construction sector was given a mandate in case 71 of Law No. 2 of 2017 [41] on Construction Services that regulates the implementation of training by the Professional Certification Institute (LSP). LSP is a professional certification implementing agency that has been approved by the National Professional Certification Body (BNSP). Through this new mechanism, it is hoped that training for construction workers will be better.

However, there is still a situation where training places are insufficient and not yet equipped with the standards used nationally due to the limitations of the Government as the manager of SKKNI in providing training facilities. This is a problem that needs to be optimally fixed.

Manpower management faced by construction contractor companies in Indonesia based on the above description still needs serious attention even though the regulation of the repair process made by the Government has started to be implemented.

Bahr and Leif [3] conducted a study in Germany that the construction manpower also experienced problems in increasing productivity for example in terms of management quality and lack of manpower or skills mismatch, so from the problems they got they launched new training programs and expanded the existing ones. They adopt new technologies and new techniques to increase productivity.

### ***5.2. Investigating Factors to Improve the Performance of Construction Contractor Companies Related to the Quality of Manpower Set by SKKNI***

Factors to improve the performance of construction contractor companies based on the quality of the manpower through the Indonesian National Work Competency Standard (SKKNI) are explained through the results of the study. A total of eight (8) indicators related to the variables found in the Construction SKKNI that are stated to qualify as measurement indicators consist of eight indicators. The eight main indicators as factors to improve company performance through project performance for this manpower are: areas of work related to certificates, evaluating the quality of information in the workplace, choosing models of various types and styles of communication, using technology for development, transparent evaluation for energy work, ensuring the manpower is always motivated, communication built, and working together as a team.

The achievement of the above factors is expected to be obtained based on training using SKKNI conducted at the Job Training Center (BLK) facilitated by the Government. In general, the cost of training is free, where participants register for the purpose of obtaining a certificate solely to be able to apply for a job, therefore the training that has gone through does not necessarily correspond to the job that will be obtained. This shows that what is gained from training

does not necessarily follow the field of work in the project. Therefore, the training system carried out still needs adjustment to the actual job.

The next factor is the selection of a communication model and information system which is an inseparable part of the request, and this is part of the effort in supporting the successful implementation of the work. Good communication and clear information will unite everyone's understanding of the purpose of the work so that it can be done well.

Another factor is using technology for development, where everyone needs to improve their ability to work, especially involving the development of technology, because technology generally makes it easier for workers to complete tasks. Therefore, the hope of obtaining technological development is very important. Furthermore, transparent evaluation for the manpower is very important to be carried out transparently so that the manpower feels comfortable with the superior's decision which can certainly be perceived as a correction that needs to be improved so that it becomes a motivation to improve performance. In addition, the fostered communication factor, and working together as a team is a unity in achieving work performance.

Therefore, this study suggests that the manpower be developed through an effective and planned training program so that construction projects do not suffer losses due to low manpower performance. These factors are expected to help in the effective completion of construction projects.

Thus, this study sees that it is very important for every manpower to have a comprehensive understanding of construction work and work productivity because this will save costs and reduce rework. This is because the construction project is unique and requires a large investment. Thus, there are many factors that affect the project construction process as well as affect the productivity of the manpower.

In order to improve SKKNI, efforts are made to develop job availability information maps, so that training can be tailored to the type of job for employees or job seekers. This can provide information about career paths in a particular industry and can also be used as a basis for developing SKKNI, developing learning programs, curricula or training packages, and as a basis for developing certification schemes, as well as as a reference. to develop apprenticeships [23].

The improvement in the performance of construction contractor companies related to the quality of the manpower determined by SKKNI is clearly seen by the main factor so that the training carried out according to the needs of the actual type of work and needs to be adapted to the development of technology.

### ***5.3. Evaluating the Relationship of Manpower Management Quality with the Performance Improvement of Construction Contractor Companies***

The relationship between the quality of manpower management and the improvement of company performance can be explained through the research hypothesis, where there are three variables that are measured for company

performance, namely: training for the manpower, Construction SKKNI, and the internal strength of the project.

Manpower training is needed to improve the quality of the manpower, where this study found three main factors that need to be achieved to improve company performance: the benefits of obtaining the Indonesian National Work Competency Standard certificate (SKKNI) to realize the desire to participate in training, information for training, and field of work after recognition. These three points are important in explaining the relationship between manpower training and improved company performance.

The SKKNI curriculum that has been set as a training guide has three main factors that the manpower needs to achieve as a result of the training: collecting, analyzing and organizing information, communicating information and ideas, and being able to use technology. The ability of the manpower to possess these three factors is important in explaining the relationship of manpower training to improved company performance.

The internal strength of the project is affected by the measurement and management of the manpower with eight (8) main influencing factors: manpower relationship with the company, technology transfer from experienced manpower, manpower roles and responsibilities, effective communication, manpower satisfaction, continuous motivation to the manpower work, transparent evaluation, and teamwork. These eight (8) factors are important in explaining the relationship between manpower training and improved company performance.

Indonesia's competitiveness in the construction sector cannot be separated from the quality of the manpower. To ensure high competitiveness in global competition, training and certification is one of the efforts undertaken by the Ministry of Public Works and Public Housing (PUPR) through the Directorate General of Construction Development. By ensuring the construction manpower has the necessary competencies through training and certification, this study argues that competitiveness will increase globally. This can develop an improvement in the performance of construction companies in Indonesia.

The relationship between the quality of manpower management and the improvement of the performance of construction contractor companies in Indonesia as mentioned above was measured with three variables. Each variable has a major influence, namely: three items for manpower training, three items for SKKNI guidance, and eight items for project internal strength.

Manpower is the main factor in the success of a company. Availability of manpower with the right skills and in the right quantity enables orders to be completed on time. Slawomir et al, [36] proposed a conceptual method to support the planning of manpower requirements for construction contractors by simulating the flow of prospective orders. This can help assess labor utilization rates and the impact of job size on the timeliness of project execution as construction businesses experience a shortage of skilled labor.

#### **5.4. Proposing an Implementation Framework Based on Manpower Quality Factors Affecting the Performance of Construction Contractor Companies**

Based on the results of the study conducted, the implementation framework and manpower quality factors that affect the performance of construction contractor companies in Indonesia have been proposed as follows;

- 1) There needs to be cooperation between the stake holders of increasing the manpower by the Directorate General of Construction Development and the stake holders of education (University and vocational schools of the Department of Education) to think about increasing the discipline and creativity of students to enable the output of the education system to have discipline and creativity which is good for work.
- 2) Additional training centers are very necessary from the aspect of quantity as well as quality so that training can be done better and more widely. This is necessary because the territory of Indonesia is very vast with thousands of islands and this allows the distribution of the same training to be carried out and coordinated in each Province and District.
- 3) Based on the main factors that affect the company's performance from the results of the study, the quality of the construction manpower still needs to be improved. This comprehensive improvement is; training venues, facilities and training content including technology, trainers, and collaboration with companies and collaboration with companies that use the manpower.
- 4) Increasing internal strength ie: through effective manpower management by construction contractor companies should be given priority, especially in terms of manpower selection, providing training as needed, providing salaries according to competency level certification, and building a smart partnership between the company and employees.

In accordance with the mandate of Law No. 2 of 2017 on Construction Services that every construction manpower working in the field of Construction Services is required to have a work competency certificate, this competency certificate must be obtained through a competency test conducted by the Professional Certification Institute (LSP) in the construction sector and no longer by the Service Development Agency Construction (LPJK) as stipulated in the previous law. With this change, better and faster manpower training results can be achieved because the results of the study show that training based on the SKKNI curriculum can improve the performance of contractor companies.

In the construction services sector, COVID-19 is quite influential, especially in relation to the very small target of employee training. The situation is worsening amid a large gap between the demand and availability of construction labor. Strategic efforts to nurture construction workers in the midst of the pandemic are underway such as the application and use of digital technology. Online training and SKKNI-based competency tests are a strategic effort

because they reduce activities involving the public. This was done following the Circular of the Directorate General of Construction Development No. 107/SE/Dk/2020 regarding the Guidelines for the Development of Construction Worker Competencies for the New Normal Period. With the application of training methods and online competency tests, periodic evaluations can be implemented to obtain maximum results, both in terms of quantity and quality, so that the preparation of construction workers can be accelerated [23].

The proposed implementation framework is based on manpower quality factors that affect the performance of construction contractor companies in Indonesia, including the role of stakeholders to improve the discipline and creativity of the construction manpower, the same place and quality of training in each region, making efforts to improve the quality of the manpower construction, and adequate manpower management by construction contractor companies. In addition, this study found that it is important for all parties to be consistent in complying with the mandate of Law No. 2 of 2017 on Construction Services.

## 6. Conclusion

There are 3 (three) main problems in workforce management faced by construction contractor companies in Indonesia, among them: (1) construction contractor workers who have finished school and university but are not disciplined; (2) construction contractor workers are less creative; and (3) the distribution of competency training for construction sector workers in each region has not been distributed evenly. This becomes input to interested parties to solve the three (3) problems.

The relationship between the quality of workforce management and the improvement of the performance of construction contractor companies in Indonesia is explained through the results of analysis from three parties, namely: from the perspective of Training, from the perspective of SKKNI, and in terms of the Internal Strength of the Project. The SKKNI Construction curriculum is suitable for improving company performance, but the workforce training output based on the curriculum does not significantly improve company performance. Workforce training and the SKKNI curriculum have a strong correlation. However, both have an influence on the internal strength of the project. The internal strength of the project was found to not directly affect the company's performance.

## References

- [1] Agus Widardjono (2010), *Applied Multivariate Statistical Analysis*. UPP STIM YKPN. Yogyakarta, 2010.
- [2] Artini, Y. D. (2019) 'Competency-Based Human Resource Management (MSDM) as a Strategy for Building Competitive Organizations', *Efficiency - Administrative Science Study*. doi: 10.21831/efisiensi.v1i12.3989.
- [3] Bahr Laszig and Leif (2021), *Productivity Development In The Construction Industry And Human Capital*, *Civil Engineering and Urban Planning: An International Journal (CiVEJ)* Vol. 8, No. 1, March 2021.
- [4] Betlejewska, R. S. and Potkány, M. (2015). *Construction Costs Analysis and Its Importance to The Economy*. *Procedia Economics and Finance by Elsevier B. V*, 34: 35-42, doi: 10.1016/S2212-5671(15)01598-1. Available at: [https://doi.org/10.1016/S2212-5671\(15\)01598-1](https://doi.org/10.1016/S2212-5671(15)01598-1).
- [5] Bollen, K. A. (1989). *Structural Equations with Latent Variables*. Amerika: John Wiley & Sons, Inc.
- [6] Dainty, A. R. J., Bagilhole, B. M. and Neale, R. H. (2000), "A grounded theory of women's career under-achievement in large UK construction companies", *Construction Management and Economics*, Vol. 18 No. 2.
- [7] Darti Tresnawati (2018) "Achievement of Training and Certification Test for Construction Workforce in 2018", *Director General of Construction Development, Ministry of PUPR Construction 2018*, (6) 20-22.
- [8] Delaney, J. T., & Huselid, M. A. (1996). *The Impact of Human Resource Management Practices on Perceptions of Organizational Performance*. *Academy of Management Journal*, 39, 949-969. <http://dx.doi.org/10.2307/256718>
- [9] GNPK (2010) *The National Movement for Construction Training*, PUPR Indonesia, 2010.
- [10] Hansen, Don R. and Mowen, Marryanne M. (1995). *Cost Management: Accounting and Control*. Ohio, South- Western College Pub.
- [11] Hillebrandt, P. M. (1985). *Economic Theory and the Construction Industry*. 2nd Ed. London: Palgrave Macmillan UK.
- [12] Hrebieniak, Lawrence G. and Ioyce, W. (1984), *Implementing Strategy*. New York, Macmillan.
- [13] Jehanzeb, K. and Bashir, N. A. (2013). *Training and Development Program and its Benefits to Employee and Organization: A Conceptual Study*. *European Journal of Business and Management*. 5 (2): 243-252.
- [14] Kaplan, R. S. and D. Norton (2004). *Strategy Maps: Converting Intangible Assets into Tangible Outcomes*, Harvard Bussiness School Press.
- [15] Loosemore, M, Dainty, A and Lingard, H (2003) *Human resource management in construction projects: strategic and operational approaches*. London: Spon Press.
- [16] Lopes, J (1997), *Interdependence between the Construction Sector and the National Economy in Developing Countries: A Special focus on Angola and Mozambique*, Unpublished Ph.D. Thesis, University of Salford, UK.
- [17] Lumempouw, Jan, Waney, Estrellita V. Y. (2014) *Analisis Pengaruh Penerapan Teknologi Dan Kinerja Perusahaan Jasa Konstruksi Terhadap Sasaran Proyek*, Sam Ratulangi University, 2015.
- [18] Malia Muis, (2013). *Human Resource Management on Industrial Performance*. PT. Penerbit IPB Press. Januari 2013. ISBN: 978-797-493-468-5.
- [19] Malkani Z. A. K. and Kambekar A. R. (2013) *Management of Human Resource in Construction Industry* "International Journal of Engineering Research and Technology". Volume 6, Number 3 (2013), pp. 353-362.

- [20] Ministry of Manpower, (2017), Performance Report of the Indonesian Ministry of Manpower 2017.
- [21] Minto Waluyo, (2011), Structural Equation Modeling Guide and Applications, Jakarta: Indeks, 2011.
- [22] Mulyadi (2001), Accounting System. Jakarta: Salemba Empat, third edition.
- [23] Nanang Handono Prasetyo, Riky Aditya Nazi, Heru Dian Pransiska, (2020). Fostering a Construction Workforce with Quality Standards, Construction Bulletin no. 5 2020 (PUPR).
- [24] Naoum, S. G. (2007). Dissertation Research and Writing for Construction Students (2nd. Edition). New York: Butterworth-Heinemann.
- [25] Ofori, G. (1990). "The Construction Industry — Aspects of Its Economics and Management " Singapore University Press - NUS, Singapore.
- [26] Othman, Suaini (2012) Corporate social responsibility reporting and corporate reputation: an institutional and resource-based perspective / Suaini Othman. In: The Doctoral Research Abstracts. IPSis Biannual Publication, 1 (1). Institute of Graduate Studies, UiTM, Shah Alam.
- [27] Raiden, Ani B.; Dainty, Andrew R. J. (2016) Human Resource Development in Construction Organisations: An Example of a "Chaordic" Learning Organisation, v 13 n1 p63-79 2006.
- [28] Renata Stasiak-Betlejewska, Marek Potkány (2015), Construction Costs Analysis and its Importance to the Economy, Procedia Economics and Finance 34: 35-42. DOI: 10.1016/S2212-5671(15)01598-1.
- [29] Rivai, Veithzal. (2011) Human Resource Management for Companies: from Theory to Practice, Jakarta: Raja Grafindo Persada.
- [30] Robbins, S. (1993). Organizational Behavior. Englewood: Prentice Hall, Cliffs.
- [31] Rosenwald, M. (2000). Working class: More companies are creating corporate universities to help employees sharpen skills and learn new ones. Boston Globe, H1.
- [32] Samsul Bakeri, Siti Afrida, (2019) "Formation of LPPK and LSP in the Construction Sector" Director General of Construction Development, Ministry of PUPR Construction 2019, (1) 8-9.
- [33] Sharmila S & Nirmalkumar K., (2015), 'A review paper on the impact of human resource Management among labors in construction Projects', International Journal of Modern Trends in Engineering and Research, Vol. 2, No. 9.
- [34] Singgih Santoso. (2015). AMOS 22 Untuk Struktural Equation Modelling. PT Elex Media Komputindo, Gramedia, Jakarta.
- [35] Sintya Rani, N. M., Dharmayanti, G. C. and Adnyana, I. B. R. (2017) 'Strategy for Improving Human Resources Performance at the PT Construction Company. Jaya Kusuma Sarana Bali Through an Organizational Culture Approach', Jurnal Spektran. doi: 10.24843/spektran.2016.v04.i02.p06.
- [36] Sławomir Biruk & Piotr Jaśkowski & Magdalena Maciaszczyk, (2022), "Conceptual Framework of a Simulation-Based Manpower Planning Method for Construction Enterprises," Sustainability, MDPI, vol. 14 (9), pages 1-13, April.
- [37] Sudarto, (2007), Law and Criminal Law, Bandung: Alumni. 2017.
- [38] Sudarto, (2011). Improving the Performance of Construction Service Unions in Indonesia: Aplikasi Knowledge Based Management System [Improving Performance of Construction Services Companies in Indonesia: Knowledge Based Management System Applications]. Jakarta: Center for Construction and Infrastructure Studies.
- [39] Teng, M. (2002), Corporate Turnaround. Prentice-Hall, Inc, Alexandra Road, Singapore.
- [40] Trisnowardono, N., Drs. B. E (2002). Menuju Usaha Jasa Konstruksi yang Handal, Abdi TANDUR. Jakarta.
- [41] Law No. 2 years 2017. Republic of Indonesia Regarding Construction Services.
- [42] Venegas, P. and Alarcon, L. F. (1997). Selecting long-term strategies for construction firms, Construction management and economics journal.
- [43] World Bank. (2017). The Future of Organization Development: Enabling Sustainable Business Performance Through People. World Development Indicators. Washington, DC: World Bank.
- [44] Yeung, J. F. Y., Chan, A. P. C. and Chan, D. W. M. (2008). Establishing Quantitative Indicators for Measuring the Partnering Performance of Construction Projects in Hong Kong. Construction Management and Economics, 26 (3), 277–301. 10. ID: 25098732 Review.