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A dominant factor of human resources performance of construction management in supervising high rise building construction phase

F Suryani¹, I Wideasanti^{2,*}, D Satrio³, A Yuniyanto¹, T Mulyono² and Y Luthfiana²

¹ Faculty of Engineering, Universitas Persada Indonesia Y.A.I, Central Jakarta, Jakarta 10430, Indonesia

² Faculty of Engineering, Universitas Negeri Jakarta, East Jakarta, Jakarta 13220, Indonesia

³ Faculty of Postgraduate, National Institute of Science and Technology, South Jakarta, Jakarta 12630, Indonesia

*irika@unj.ac.id

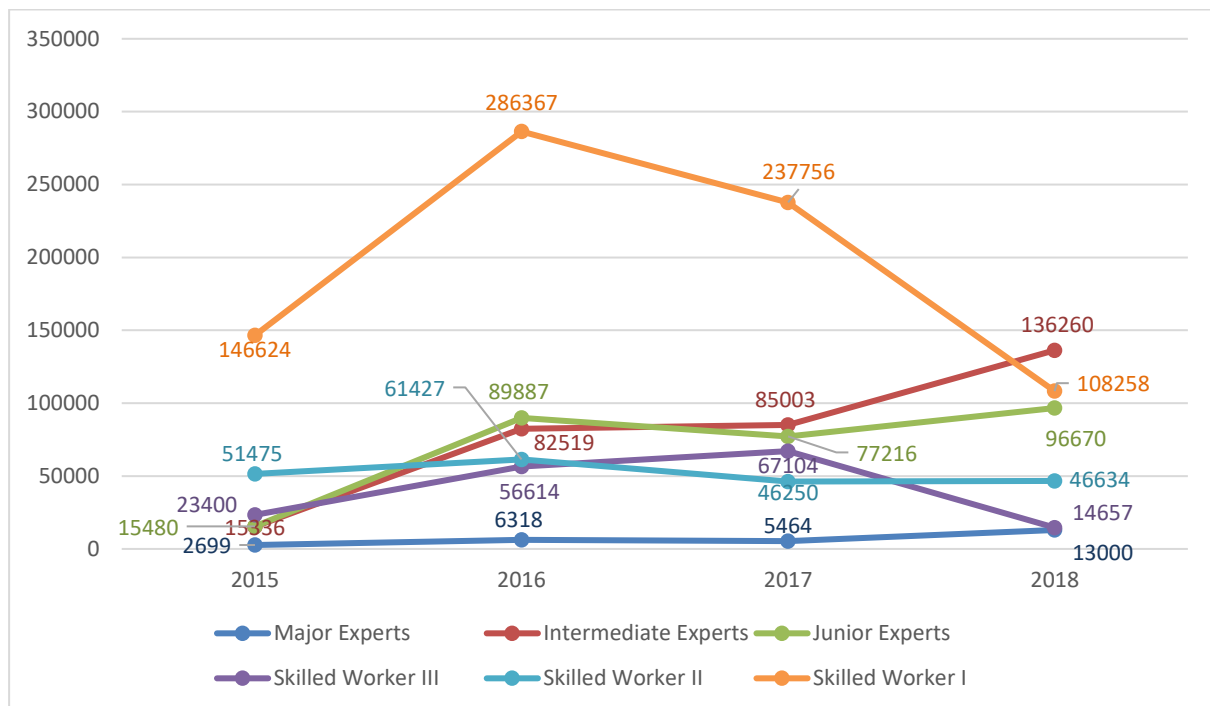
Abstract. The percentage of human resources (HR) in construction that has a certificate of skilled labour is moderately low, which is less than 6% of the total human resources in the construction sector in Indonesia. The certificate can describe the ability, expertise, and competence of the certificate owner. Human resources' quality have an influence on project productivity so that project success can be achieved. Construction Management has an important role as an HR manager who will work on the project including HR who works as a supervisor of construction activities on the project. The purpose of this study is to determine the dominant factors affecting the performance quality of the Management Construction HR on supervising high rise building construction. This study uses quantitative methods with factor analysis. Collected data are primary data from Management Construction HR which collected from questionnaire. The results from this study are five factors that affect the quality of HR performance. Based on the five factors, the most important factor is technical skills factor.

1. Introduction

Human resource is one of critical resource and hold a key role in construction project [1]. Therefore, human resources (HR) in construction projects have an important role in achieving the success of a project [2,3]. Human resources in construction management can also be interpreted as a business model carried out by construction consultants in providing advice and assistance in a construction project [4]. The experience, expertise, and skills of an HR of construction management have a significant effect on the quality of work to achieve project success.

In achieving the success of a project, it is expected that HR have the expertise and skills in accordance with their fields [5]. The certificate which HR has can describe the ability, expertise, and competence. Based on Statistics Indonesia (BPS) data on the year 2015 – 2018, the percentage of HR in construction sector that has a certificate is moderately low, which is 0,42% - 3,03% for experts and 2,09% - 5,18% for skilled workers. This means that less than 6% of all workers in the construction sector in Indonesia are certified.





Source: Statistics Indonesia data (2015 – 2018).

Figure 1. Experts and skilled workers in construction sector in Indonesia.

Table 1. Percentage of construction certified experts and skilled workers in Indonesia.

Year	Total Indonesian Construction HR	Number of Certified Skilled HR	Number of Certified Experts HR	% Certified Skilled HR	% Certified Experts HR
2015	8.010.671	221.499	33.515	2,77 %	0,42 %
2016	7.813.419	404.408	178.724	5,18 %	2,29 %
2017	7.960.569	351.110	167.713	4,41 %	2,11 %
2018	8.123.746	169.549	245.930	2,09 %	3,03 %

Human resources' quality have an influence on project performance as measured through project productivity [6,7]. Lack of productivity during construction activities can cause project failure, such as project delays and rework [8,9]. Lack of worker productivity can be caused by several factors, including lack of employee motivation [8,10,11], culture influence [12,13], stress and fatigue [8,12,14], worker competency and quality [11,12], and poor management [8,10]. The failure in construction project is inseparable from the role of construction management, because one of the important roles of construction management is managing human resources who will work on construction projects and supervising construction project activities [12,15,16], so that can save time and costs that must be incurred that must be incurred due to lack of worker productivity [11,17].

Many factors can affect the quality of the performance of construction management HR in supervising building construction. Some of the factors that influence the quality of construction management HR performance are business ethics, financial management, client relations, and organizational culture [18]. Other factors such as teamwork [19,20], personality and leadership [21], team composition [4], and competence and skills also affecting the quality of construction management HR [4,14]. Along as improving the quality of construction management performance in terms of time, cost, quality, safety, and customer satisfaction [22], then the success rate of a project will increase [17].

Therefore, based on the explanation above, this study conducted to identify the dominant factor that influences the quality of HR performance of construction management in supervising high-rise building construction phase.

2. Methods

This research uses quantitative methods and data obtained by factor analysis. Sources of data collected are primary data from construction management, such as project manager, civil/structure engineer, architect engineer, MEP engineer, civil/structure inspector, architect inspector, MEP inspector, quality surveyor, quality control, and project control. Primary data was obtained by using a questionnaire approach. The questionnaire was made based on a survey of conditions in the field and several journals about HR performance. The number of samples taken in this study are 70 people. The flowchart in this study can be seen in Figure 2.

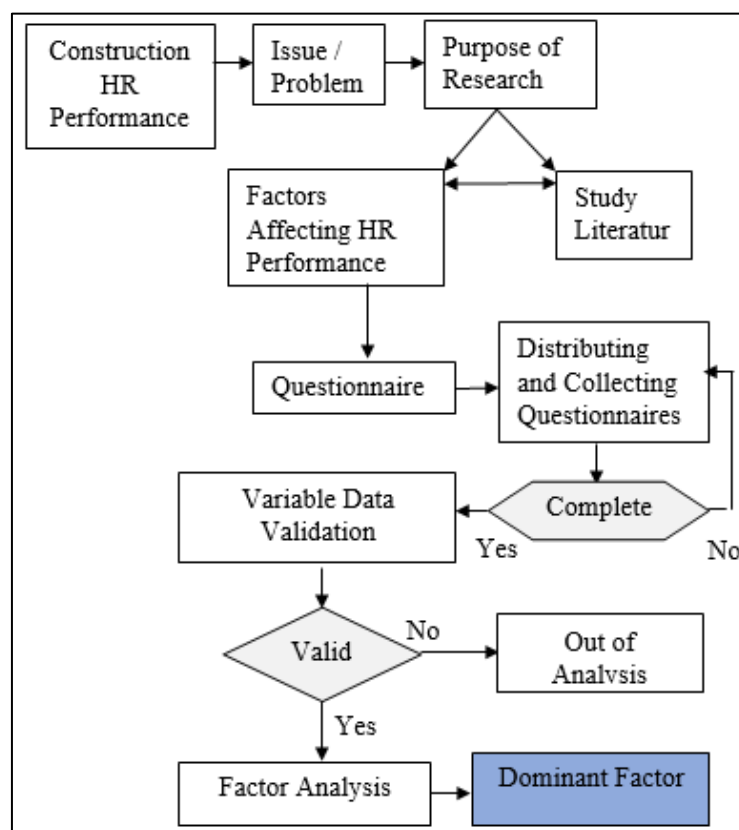


Figure 2. Flowchart research.

3. Results and discussion

3.1. Results

From 70 questionnaires distributed to respondents, only 51 respondents returned the questionnaire (72,85%). Respondent profile data obtained from the questionnaire attended by respondents were the chief director (37,25%), project manager (27,45%), civil engineer (9,80%), architect engineer (11,76%), electro engineer (5,88%), and inspector (7,84%).

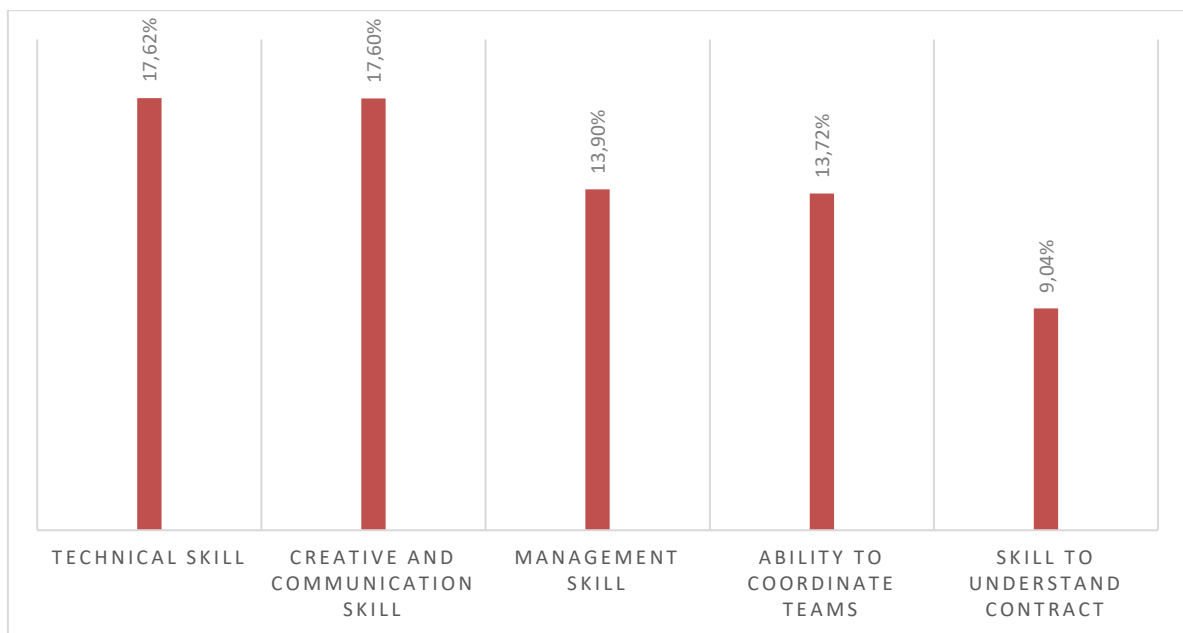
3.2. Dominant factors affecting the quality of HR performance in construction management

In this study, there are 18 valid variables which are then grouped into 5 factors that affect the quality of Construction Management HR in supervising high rise building construction. The variable index of these 18 valid variables are:

Table 2. Index of variable factors that affect the quality of HR performance in construction management.

Variable	Variable Description	Factor Value	Average Value	Variable Index	Factor Number
X14	Skill and ability to calculate volume, budget, and costs	0,794	1,011	0,253	1
X1	Ability to understand shop drawing	0,716	1,108	0,250	1
X19	Skill of conducting field investigations	0,676	0,997	0,213	1
X2	Ability to understand technical specifications	0,653	1,090	0,225	1
X8	Ability to make reports on investigation results	0,653	0,988	0,204	1
X23	Communicating ideas and information	0,894	0,971	0,274	2
X22	Collecting information	0,830	0,949	0,249	2
X25	Working in a team	0,732	1,011	0,233	2
X13	Skill and ability to communicate	0,582	1,042	0,191	2
X27	Problem solving	0,544	1,077	0,185	2
X20	Skill in preparing a project implementation plan	0,789	1,033	0,326	3
X24	Plan and organize activities	0,743	1,011	0,300	3
X10	Ability to prepare attendance lists and minutes of handover	0,534	1,011	0,216	3
X12	Computer literacy skill and design program (AutoCAD)	0,810	0,793	0,260	4
X7	Ability to coordinate the work supervisory team	0,772	1,006	0,314	4
X5	Ability to understand and be able to validate field permits	0,689	1,008	0,281	4
X26	Using mathematical ideas and techniques	0,761	0,780	0,365	5
X18	Skill and ability of applying clauses and provisions in contracts to be applied in the work implementation	0,654	0,993	0,399	5

Respondents' responses to these five factors were analyzed by an index of variables (fi 2) to produce the percentages of these factors as can be seen in Figure 3.



Source: Research results data.

Figure 3. Dominant factors affecting the quality of HR performance in construction management.

Based on the graph above, there are five factors that affect the quality of Construction Management HR Performance. The first factor is the technical skills factor, which consists of the budget plan calculation skills, the ability to understand drawing, the ability to carry out field investigations, the ability to understand technical specifications, and the ability to make reports on inspection results. The second factor is the creativity and communication skills factor [23], which consists of communicating ideas and information, gathering information, team work, communication skills and abilities to solving problems [24]. The third factor is the management skills factor, which consists of skills and ability to arrange, organize, and implement plans [25], the ability to manage activities, and the ability to prepare documents for the handover.

Furthermore, the fourth factor is the ability to coordinate teams factor, which consists of the ability to coordinate teams, computer literacy skills and design programs, and the ability to validate field permits. The fifth factor is the skill and ability to understand contract clauses which consist of the skills and ability to apply clauses and provisions in contracts and use mathematical ideas and techniques. Cumulatively, the contribution of all factors influencing the quality of construction management performance in supervising high rise building construction reached 71,879%.

4. Conclusion

Based on this study's finding, the most dominating factor which affecting HR performance on supervising high-rise building is a technical skill that influenced by 17,62%. Further research based on this research is to further testing for its application in the construction field to improve the quality of construction management HR performance in supervising high rise building construction.

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