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Intellectual intelligence and emotional intelligence of project manager

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Abstract. Intellectual and emotional intelligences are two important competences of project managers for the success or failure of a construction project. This study aims to investigate how often project managers utilize these two intelligences in running their project. It will also take a look the intelligence that construction personnel expect more from their project manager. The research was conducted by distributing questionnaires to construction personnel that were working on ongoing projects. The results show that the project managers use both intellectual and emotional intelligences, with mean values of 4.20 and 4.12 respectively. Meanwhile, results from analytical hierarchy process analyses portray that the project team members expect the project managers to exhibit emotional intelligence more than intellectual intelligence with weight of 66.40% and 33.60% respectively. The study also conducts several analyses by using respondents' and project managers' general information.

1. Introduction

A project manager is someone who has an important role in a project because he/she is the person who is responsible for the success of a project. In the current era, project managers are required to be able to make decisions in terms of the right strategy so that they can compete in a complex and competitive construction environment.

The competence of the project manager is a key factor to support the success of the project being implemented. Yulianto [1] emphasizes that the competence of the project manager is critical for the success or failure of a project. Particularly Muller & Turner [2] stress that project manager's intellectual and emotional competencies are essential. Sunindijo et al. [3] also found relationship between leadership styles with emotional intelligence competencies of project managers. Based on research conducted by Muller & Turner [3], the competency factors required are divided into intellectual intelligence, emotional intelligence, and managerial ability.

Intellectual intelligence is an intelligence that is used in measuring analytical skills and cognitive abilities. The measurement of intellectual intelligence is called intelligence quotient (IQ). Meanwhile emotional intelligence, or sometimes called emotional quotient (EQ) is an intelligence used in dealing with other people. For the rest of this paper intellectual and emotional intelligences will be abbreviated as IQ and EQ respectively. According to Goleman [4] emotional intelligence (EQ) is more important than intellectual intelligence (IQ) in determining good work performance, however Carusso [5] argues that IQ is also important in working success.

Research on intellectual intelligence and emotional intelligence is often carried out in the fields of management and psychology in determining employee performance and leadership styles, but very



limited in the field of construction (e.g. [2,3]), especially in the case of Indonesia. Therefore, this study will investigate the competence of project managers, which focuses on intellectual intelligence (IQ) and emotional intelligence (EQ). This research will look at how project managers use these two intelligence abilities in carrying out their project. In addition, this study will examine which intelligence abilities the project team expects more from their project manager.

2. Theoretical basis

2.1. Intellectual intelligence

According to Robbins & Judge [6] IQ is the ability needed to perform various mental activities. The higher a person's IQ, the higher his ability to deal with problems related to spatial, numerical, and linguistic abilities.

There are three indicators of intellectual intelligence. The first is figure abilities which is used to identify similarities and differences and to imagine a form with speed of perception, spatial visualization, and memory. Second, the verbal abilities used to conclude and receive information conveyed include verbal understanding, inductive reasoning, and deductive reasoning. The last one is numeric abilities which is a person's ability to process numbers [6]. The indicators and sub indicators of intellectual intelligence can be seen in Table 1.

Table 1. Indicators and sub indicators of intellectual intelligence.

Figure Abilities	Verbal Abilities	Numeric Abilities
Speed of perception.	Verbal understanding	
Spatial Visualization	Inductive reasoning	
Memory	Deductive reasoning	

2.2. Emotional intelligence

Emotional intelligence is intelligence that is used to be able to relate to other people well. Goleman [7] explains that emotional intelligence is divided into several indicators, as shown in Table 2. First is self-awareness. Self-awareness is knowledge of what we feel at one time. It is used to guide self-decision making and to have realistic benchmarks for self-efficacy and strong self-confidence. Second is self-regulation. Self-regulation is the handling of our emotions in such a way that they have a positive impact on the performance of tasks, sensitive to conscience, able to delay enjoyment before achieving a goal, and able to recover from emotional stress. The third EQ indicator is motivation. Motivation is the use of our deepest desires to move and guide us towards our goals, it helps us to take initiative and act most effectively, and to endure failure and frustration. The fourth indicator is empathy. Empathy is the desire to feel others, understand their perspectives, foster trusting relationships and to be in harmony with various people. The final EQ indicator is social skill. Social skill is good emotional handling when dealing with other people and carefully reading social situations and networks, interacting fluently, influence and lead, deliberate and resolve disputes, and to cooperate and work in teams.

3. Research method

This study used a questionnaire survey to obtain data. The target respondents are contractor staff who are subordinate to project managers, such as supervisors, site engineers, site managers, procurement managers, administrators, and others who work on ongoing projects at the time of the research. The questionnaire was distributed in two ways, namely offline and online. Offline questionnaire distribution was carried out by providing questionnaire sheets directly to staff working on the project, whilst online questionnaire was distributed via URL address of the Google questionnaire.

The questionnaire consists of three parts. The part one contains the general information of the respondents and the project manager. The second part contains indicators and sub-indicators of the intellectual intelligence and emotional intelligence as shown in Tables 1 and 2. The respondents were

asked to rate how often their project manager used the two intelligences using a scale of 1 (very low) to 5 (very high).

Table 2. Indicators and sub indicators of emotional intelligence.

Self-Awareness	Motivation	Social Skill	Empathy	Self-Regulation
Emotional awareness	Achievement drive	Influence	Understanding others	Self-control
Self-awareness	Commitment	Communication	Developing others	Trustworthy
Self confidence	Initiative	Conflict management	Service orientation	Vigilance
	Optimism	Leadership	Leveraging diversity	Adaptability
		Change catalyst	Political awareness	Innovation
		Building bond		
		Collaboration and cooperation		
		Team capabilities		

The last part of the questionnaire is aimed at assessing the expectations of the project team about intellectual and emotional intelligence that the project manager should have. Respondents would be asked to compare intellectual and emotional intelligence and their respective indicators (in Tables 1 and 2) using scales - 9 to 9 (17 scales). Through analytical hierarchy process (AHP) analysis, this study will obtain the comparison of the expected weight between IQ and EQ, along with their indicators.

4. Discussion

4.1. Respondent data and validity and reliability test

The number of respondents participated the survey were 55 staff, who were working at seven ongoing construction projects located in Surabaya, Malang, Bali, Jakarta, and Tarakan. General information of the respondents and project managers can be seen in Tables 3 and 4.

Before conducting further analyses, the questionnaire was tested for its validity and reliability. The value of the r – table is 0.266 for the validity test. The complete results of the two tests can be seen in Ong & Reinaldo [8]. The validity test shown that most of the sub-indicator was found valid, where r count $>$ 0.266. There was one sub-indicator of intelligence that was found invalid, namely service orientation. Then for reliability test, all indicators met the requirements where Cronbach's alpha $>$ 0.5. Because of that, all of the indicators were reliable [9].

Table 3. General information of respondents.

Age	Percentage	Educational Background	Percentage	Position	Percentage
21 – 25	33%	SMA/equal	5%	Procurement Manager	5%
26 – 30	35%	D3	15%	Quantity Surveyor	7%
31- 35	14%	S1	78%	Quality Control	7%
>35	18%	S2	2%	Supervisor	9%
				Drafter	13%
				Site manager	15%
				Site engineering	22%
				Administrasi	15%
				Staf K3	7%

4.2. Actual intellectual intelligence and emotional intelligence in project manager

According to the respondents, the mean values of actual utilization of intellectual and emotional intelligence by their project managers are 4.20 and 4.12. It shows that in general the project managers

use both intelligences in a balanced way, with a slight more use of intellectual intelligence. The result of the mean analysis can be seen at Table 5.

Respondents' answers were then tested using a paired sample t-test to see if there were significant differences between the intelligences used by the project manager. The result of the paired sample t – test analyses can be seen at Table 6, which indicates a significant difference of the use of the two intelligences by the project managers. The project managers use intellectual intelligence more frequently than emotional intelligence in running their project.

Further analysis was also carried out to see whether there was a difference between the use of IQ and EQ based on age, length of work, and level of education of the project manager. The results of the analyses can be seen in Tables 7, 8 and 9, which indicate that in general there is no significant difference (at $\alpha = 0.05$).

Table 4. General information of project managers.

Age	Percentage	Educational Background	Percentage	Length of work	Percentage
31 -35	33%	S1	93%	10 - 15	87%
>35	67%	S2	7%	16 - 20	6%
				21 - 25	-
				26 - 30	2%
				>30	5%

Table 5. Actual IQ & EQ mean value.

Intellectual Intelligence	Mean Values	Emotional Intelligence	Mean Values
Figure abilities	4.21	Self-awareness	4.00
Verbal abilities	4.22	Self-regulation	4.15
Numeric abilities	4.18	Motivation	4.21
		Empathy	3.98
		Social skill	4.17
Intellectual intelligence	4.20	Emotional Intelligence	4.12

Table 6. IQ & EQ difference test.

Paired sample t - test	Mean	t	sig - 2(tailed)
Pair IQ - EQ	0.08	2.14	0.04

Table 7. Average IQ and EQ based on project manager's age.

Intelligence	31 - 35	> 35	Sig (2-tailed)
Intellectual Intelligence	4.16	4.21	0.47
Field of Form Capability	4.15	4.24	0.44
Field of Language Capability	4.13	4.26	0.35
Field of Numeric Capability	4.20	4.14	0.76
Emotional Intelligence	4.06	4.15	0.51
Self-awareness	3.98	4.03	0.75
Self-control	4.11	4.18	0.54
Motivation	4.10	4.30	0.08
Empathy	3.89	4.06	0.23
Social skill	4.19	4.15	0.76

Table 8. Average IQ and EQ based on project manager's length of work.

Intelligence	10 - 15 year	16 - 20 year	26 – 30 year	> 30 year	Sig
Intellectual Intelligence	4.17	4.30	4.89	4.26	0.35
Field of Form Capability	4.19	4.11	4.67	4.44	0.46
Field of Language Capability	4.17	4.44	5.00	4.33	0.26
Field of Numeric Capability	4.15	4.33	5.00	4.00	0.58
Emotional Intelligence	4.10	3.99	4.44	4.29	0.80
Self-awareness	4.00	3.78	4.33	4.33	0.51
Self-control	4.13	4.13	4.60	4.47	0.40
Motivation	4.21	3.92	4.75	4.58	0.13
Empathy	3.98	4.08	4.25	4.17	0.88
Social skill	4.19	4.04	4.25	3.88	0.66

Table 9. Average IQ and EQ based on project manager's educational background.

Intelligence	S1	S2	Sig (2-tailed)
Intellectual Intelligence	4.21	4.14	0.39
Field of Form Capability	4.22	4.08	0.53
Field of Language Capability	4.25	3.83	0.09
Field of Numeric Capability	4.16	4.50	0.29
Emotional Intelligence	4.11	3.94	0.23
Self-awareness	4.00	3.92	0.24
Self-control	4.15	4.10	0.78
Motivation	4.21	4.25	0.91
Empathy	4.00	3.75	0.32
Social skill	4.21	3.69	0.03

Table 10. Expected IQ & EQ weight value.

Intellectual Intelligence	Weight Values	Emotional Intelligence	Weight Values
Figure abilities	25.71	Self-awareness	12.90
Verbal abilities	43.13	Self-regulation	16.32
Numeric abilities	31.17	Motivation	16.60
		Empathy	19.66
		Social skill	34.53
Intellectual intelligence	33.60	Emotional Intelligence	66.40

4.3. Expected intellectual intelligence and emotional intelligence

The results of AHP pairwise comparison calculations in Table 10 show that the EQ weight (66,4%) is far greater than the IQ weight (33,6%). It indicates that project staffs (team member) expect project managers to use more EQ than IQ. Under the EQ, social skill has the highest weight (34.53%). Meanwhile verbal ability has the highest weight (43,13%) among the IQ indicators.

Sunindijo, et al [2] stated that project manager with high emotional intelligence will tend to use open communication and proactive leadership styles, where the open communication is the key factor in team success. Goleman [7] stated that self-awareness is the key factor for realizing one's own strength and weakness, people with good self-awareness are conscious of their abilities and limitations, seek feedback, and know when to work with others who have complementary strengths. Therefore, emotional intelligence is very important to project manager for considering delegate work and bring out the best of the others subordinate.

These statements are strengthened by one respondent during interview that teamwork is a must in a project. Project manager cannot work alone. He has to deal with many people in a project team.

Therefore, emotional intelligence is more needed at work. In this regard, good coordination and communication skills are essential for the project manager to possess.

Further analysis was carried out to determine differences in the IQ and EQ weighting scores of project managers based on the position, age, and educational history of the respondents. The results of the analysis can be seen in Tables 11, 12, and 13 respectively.

Table 11. Weight of intelligence based on respondent's position.

Position	IQ's weight	EQ's weight	IQ:EQ
Procurement manager	41.67	58.33	<
Quality Surveyor	26.07	73.93	<
Quality Control	36.04	63.96	<
Supervisor	15.55	84.45	<
Drafter	32.62	67.38	<
Site Manager	20.28	79.73	<
Site Engineering	57.58	42.42	>
Administrator	20.46	79.54	<
K3	37.95	62.05	<

Table 12. Weight of intelligence based on respondent's age.

Age	IQ's Weight	EQ's weight	IQ:EQ
20 – 25	28.59	71.41	<
26 – 30	29.84	70.16	<
31 – 35	41.88	58.13	<
> 35	44.63	55.37	<

Table 13. Weight of intelligence based on respondent's educational background.

Educational Background	IQ's weight	EQ's weight	IQ:EQ
High School/equal – Diploma 3	26.84	73.16	<
Undergraduate (S1)	36.04	63.96	<
Master (S2)	19.64	80.36	<

The results of the analyses show that in general respondents expect the project manager to use more EQ than IQ. Interestingly, only respondents in the position of site engineer that expect the project managers to use IQ more than EQ (Table 11). One possible answer for this situation maybe because site engineering staffs often work with data, either in image data or calculation data, which needs more utilization of IQ.

Whilst both IQ and EQ are essential, this research confirms the argument by Goleman [4] that EQ is more important/expected from the project manager. The project team wants their project manager to exhibit EQ more in a project, especially the social skills, such as communication and leadership. Currently the surveyed project managers tend to possess and use the two intelligences in balance. The research findings thus suggest that project managers should develop their emotional intelligence more than the intellectual intelligence for more successful project outcomes. Among other things, social skills are the most important. This may be acquired thru training and informal education. The construction companies should help and support their project managers towards this goal

5. Conclusion

It can be concluded that project managers in Indonesia use both intellectual intelligence and emotional intelligence in carrying out a project. The project managers slightly use intellectual intelligence more than emotional intelligence.

Interestingly, the project team members expect the project managers to possess and use more emotional intelligence abilities in leading their team. Social skills, such as coordination, communication and leaderships are found in this study to be the most essential for working in a project environment. This research also finds that the position held by the staffs will also influence the expectation of the intelligence to be more used by the project managers. More researches are needed to investigate the effectiveness of the use of these intelligences on project performances.

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