

Investigation on the Impact of Uncertified Contractors on Project Performance in the Northern Region of Malaysia

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Abstract: The performance of construction depends significantly on the capability of contractors. However, the prevailing construction industry faces a shortage of scarce and compatible contractors accompanying construction's critical skills, causing construction failure, delay, and cost overrun. Thus, the objective of this study is to identify the importance of a certificate, analyse the characteristic of uncertified contractors and determine their effect on the project performance. A questionnaire survey was conducted and then analysed using SPSS software. The mean value method and Relative Important Index (RII) method was used. Targeted respondents include managing directors, project managers, engineers, quantity surveyors, architects, and site supervisors working in the Northern Region of Peninsular Malaysia. The obtained result had employed both descriptive analysis and reliability analysis to achieve the study objective. The interpreted data shows that uncertified contractors do not understand fundamental theories applicable to construction sites. The lack of technological skills such as Artificial intelligence and the Internet of Things (RII = 0.758) for uncertified contractors also impact construction's performance. Besides, delays in construction projects (RII = 0.452) were mainly the reason for the poor project performance by uncertified contractors. Consequently, this study could garner more attention towards contractors' qualifications to ensure that all parties involved in construction are competent and professional.

Keywords: Uncertified Contractors, Project Performance, Certification

1. Introduction

The construction section in Malaysia has contributed to a large part of the country's advancement over the decades. Over the years, approximately 80,000 registered contractors' growth proves that more professionals are needed for construction work done [1]. A general contractor holds a significant part in influencing the overall project outcome. However, issues related to contractors, delays, and project

performance have simultaneously increased. Construction Industry Development Board CIDB stated in situational analysis 2012 that the construction industry faced a shortage of scarce and critical skills required by the construction and engineering industry [2]. The lack of an entry-level requirement and no skills capacity in the construction industry for contractors has caused the thorny issue of contractor downgrading. It has caused the degrading of the performance of Malaysian construction.

The word "certification" means a procedure by which the Lembaga or any person authorized by it gives written assurance that a process, practice, or service conforms with specified requirements [3]. Contractors pursuing larger construction projects must obtain a higher-level certificate for qualification as a registered local contractor. The competency and qualification of a contractor measured by individuals are different, but the certificate issued is still a stamp of assurance that that individual had received proper training. Certifications offer a level of accomplishment that translates into more opportunities and more pay [4]. Nevertheless, uncertified contractors involving Grade 1 to Grade 3 construction work are not compulsory to attain recognition certificates. Among the four states focused on this study are active personals working in the northern region of Peninsular Malaysia. It is due to the smaller project size undergoing in the four states.

This study aims to identify the importance of a certificate and analyse the characteristic of uncertified contractors of Grade 1 to Grade 3 general contractors. Furthermore, this study also targets to determine the effect of uncertified contractors on project performance. Therefore, more attention will be brought towards the importance of certified contractors for Grade 1 to Grade 3 contractors to ensure the construction industry is filled with skilled and professional personals.

2. Literature Review

In this study, an uncertified contractor is Grade 1 to Grade 3 general contractors that are not compulsory to possess any technical qualification in specific courses listed in the contractor registration requirements and procedures handbook. The local contractor registration criteria do not mandatory Grade 1 to Grade 3 technical personnel specialized in category B (Building), CE (Civil Engineering), and ME (Mechanical), also both technical personnel FM (Facility Management) or vice versa in category F (Facility) to obtain any technical certificates. Other certificates including diploma or bachelor's degree certificate that is not stated in the list related to the construction field accredited by Malaysia Government or CIDB can also be taken into account to meet the technical personnel criteria.

Table 1: Criteria of Grade 1, Grade 2 and Grade 3 contractors [5]

Grade	Tender capacity (RM)	Paid-up Capital (RM)
1	Not exceeding 200,000	5,000 or 10,000 with Sijil Perolehan Kerja Kerajaan (SPKK)
2	Not exceeding 500,000	25,000
3	Not exceeding 1,000,000	50,000

Contractors must be skilled and knowledgeable about conquering any emerging difficulties in construction. Positive characteristics such as handling unpredictable situations and overseeing smoother workflow during the construction process greatly improve projects' overall performances. A good project implies the iron triangle that considers the time, cost, and quality to measure the success criteria in projects [6]. It can also be defined as meeting the requirements of all designers, contractors, regulatory agencies, and the owner (meeting the client's expectation) [7]. Thus, the characteristic of contractors and the construction performance are interrelated.

2.1 Characteristic of uncertified contractors

The growing complexity of construction projects creates the need for certified professionals trained to control the inception to the end of the project. Contractors have arrays of obligation and responsibility to ensure project completion by considering cost and quality. The most prominent are obtaining basic skills. Basic skills of contractors like reading communication skills, decision-making, and resourcefulness are especially a primary driver for construction performance.

In recent years, construction development further focuses on technological knowledge such as Artificial knowledge and Internet of Things expanding in construction work to improve project productivity and progresses. The application of modern technology indeed brings an apparent effect on every project performance. A previous study mentioned that the lack of surveillance and consistent supervision carried out by contractors had damaged the performance of a project [8]. Contractors oversee the entire process from project preparation to completion of project handover, thus emphasizing work coordination. With superior site management comes with adequate safety measures of in-site crews, contractors need to pay attention to safety measures on-site.

2.2 Effect on the project performance

Delays are among the challenges faced during the operation of construction. A previous study related to the causes and effects of delays in the construction industry founded that contractor-related factors ranked the highest in the cause of uncertainty in a project [9]. Changes in construction are among the reasons for the uncertainties and are common during construction. Effective communication between a contractor and other parties is handy to agree on a final decision to form a healthy collaboration in every project. Without a clear decision, it then leads to arising financial management issues. Good cash flow management and proper budgeting enable the construction to be complete regardless of late payment from clients or any materials deficiency. Contractors' low financial awareness will lead to cost overrun of projects and degrade the quality of projects.

Malaysia's construction industry had approximately ten times higher fatality rate of the workforce than in the United Kingdom [10]. Multiple failures in building in Malaysia for the past years have also garnered attention toward contractors' competency. Many have undergone unauthorized work and illegal construction that disobey the initial approval of work approved by authorities. It endangers neighborhoods, occupant, and public surroundings when the contractor ignores or disregards the significant of following approved plans and regulations. Lastly, Statistics show that out of the 76 percent of solid waste collected in Malaysia, only 5% is recycled, while 95% of waste was dumped at landfills [11]. When contractors are not aware of having a sustainable environment, the waste produced by construction materials will flood in dump areas and not handle properly, causing environmental pollution. Protecting our deteriorating environment has become an obligation to every individual and society. Contractors should be aware of the current environmental situation and make an effort to implement actions to minimize waste by adopting good waste management.

Thus, it is clear that construction's performance depends significantly on the capability of contractors. Delay of projects, abandoned projects, and disputes between parties are often the result of incompetent contractors with negative characteristics.

3. Materials and Methods

This study was conducted through a quantitative approach, which is by using a questionnaire. Quantitative research methods are where issues or phenomena are explained through gathered data in numerical form and aided by mathematical methods, particularly using statistics for analysis [12]. The targeted respondents are all construction stakeholders, including engineers, site supervisors, and quantity surveyors working in the northern region of Peninsular Malaysia. Likert scale was used for

each question ranging from 1 to 5 (strongly disagree to strongly agree) throughout every section. The questionnaires were distributed to the stated respondents through an online google form.

Collected data were then analyzed using descriptive analysis with the aid of Statistical Package for the Social Sciences (SPSS). The central tendency was used as a medium to identify the average mean score and average spread out from the collected. Relative Importance Index (RII) method was also adopted to rank and determine uncertified contractors' main effect on project performance.

Table 2: Central tendency level measurement [13]

Mean range	Central tendency level
High	3.68-5.00
Moderate	2.34-3.67
Low	1.00-2.33

Relative Important Index (RII) equation:

$$RII = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{A * N} \quad \text{Eq. 1}$$

n_x = weight given to each cause by respondents ($x = 1,2,3,4,5$)

A = Highest weight (A=5)

N = Total number of respondents

4. Results and Discussion

This section discusses the findings of the 100 received questionnaires out of 157 sent questionnaires regarding the impact of uncertified contractors on project performance in the northern region of peninsular Malaysia. Among the respondents that had contributed to this study were 1 managing director, 7 project managers, 69 engineers, 3 quantity surveyors, 3 architects, and 7 site supervisors that is still actively working in the construction industry. The focal point of this study are younger respondents because certification is crucial for the entry-level of the construction industry. Concerning that more experienced contractor focuses more on reputation and relationship with other parties, the responses inclined towards younger individuals and have moderate experience for around 5 years. The respondents' certification is also taken account in this study to spot individual opinions from different education levels including 83% of respondents who have obtained Bachelor's degree and 9% with Master's degree.

To determine the degree of significance for each statement, the mean value and central tendency is shown and ranked except for the certificate importance for contractor. The importance of certificate was considerate to obtain insight into the perspective of construction stakeholder regarding the normality for any individual obtaining a certificate.

4.1 Certificate importance for contractors

The finding shows that more respondent disagrees that the certificate of contractors is not necessary. Results shows the lowest mean value reading of 1.81 among the statements with respondents disagreeing formal education learned through well-organized resources not required in the construction industry. In line with previous research of Abazi and Hajrizi(2018), whose research indicates that fundamental theories learnt throughout courses and training is crucial in people's progression in their careers despite having no prior experience [14]. Certificate act as an assurance that trainings and proper

education were carried out to produce professionals. Thus, certificate proves to play crucial role in identifying the competency of an individual.

Table 3: Mean value and central tendency level for certificate importance for contractors

Elements	Mean Value	Central Tendency Level
A certificate is not important for job application in the construction industry.	2.04	Low
Fundamental theories learned throughout courses and training are not required in the construction industry.	1.81	Low
A certificate is not important compared to experiences in the construction industry.	2.50	Moderate
The incompetence of a contractor is due to the lack of formal education.	3.33	Moderate
Low tender price is more important than the certificate of a contractor during the selection of a contractor.	2.12	Low
Uncertified contractors have an equal opportunity for employment as certified contractors do.	2.36	Moderate
Uncertified contractors with experience have fewer chances of employment than certified contractors.	3.33	Moderate
A certificate can define the ability of contractors	3.60	Moderate
The value of certificates had depreciated.	3.19	Moderate
Uncertified contractors are not valued by employers.	2.98	Moderate
Total Average Mean Score	2.72	Moderate

4.2 Characteristic of uncertified contractors

According to Table 4, the result established that uncertified contractors' lack of technology skills (RII = 0.758) ranked the first with a mean value of 3.79. The inadequate basic skills or lack of exposure in utilizing modern construction technique such as implementing Industrialized Building System (IBS), Artificial intelligence (AI) or Internet of Things (IoT) had caused projects to fall behind of modern construction advancement. This finding is in accordance with research by Hussain et al. (2016) which stated that unskilled personnel lack knowledge expertise, and shoddy workmanship effects the quality of construction projects [15]. These results impart the claim that technology knowledge is an important asset for contractors to execute more cost and time effective projects.

Table 4: Mean value, Relative Importance Index (RII) and rank for characteristic of uncertified contractors

Characteristic	Mean Value	RII	Ranking
Uncertified contractors lack technology skills (Artificial Intelligence, Internet of Things)	3.79	0.758	1
Uncertified contractors do not adapt to modern methods of construction	3.71	0.742	2
Uncertified contractors do not understand fundamental theories applicable to construction sites	3.44	0.688	3
Uncertified contractors have poor coordination, management, and supervision skills	3.38	0.676	4
Uncertified contractors are less innovative and creative	3.32	0.664	5
Uncertified contractors have a poor selection of subcontractors	3.15	0.63	6
Uncertified contractors are not confident in making decisions	3.04	0.608	7
Uncertified contractors have poor financial management and poor cash flow	3.01	0.602	8
Uncertified contractors are not resourceful	2.96	0.592	9
Uncertified contractors are unable to read and understand site plans	2.85	0.57	10
Total Average Mean Score	3.26		

4.3 Effect of uncertified contractors' performance in construction

Table 5 exhibits the delay in projects (RII=0.425) had ranked first with mean value of 2.26 among the negative impacts of previous projects caused by contractors. The result shows incompetent uncertified contractors causes projects delays which adverse project to be completed on time. This result is consistent with Ahmad Hisham & Yahya (2016) and Aziz et al. (2016), who identified that unskilled uncertified contractors experience higher degree of project delays, posing a challenge to on-time project completion. Earlier study by Dai et al. (2009) stated that the qualification of workforce presents a vital factor in project performance improvement [16]. Sufficient qualification, training and knowledge is assessed as a critical step towards achieving a projects' success.

Table 5: Mean value, Relative Importance Index (RII) and rank for the effect of uncertified contractors' performance in construction

Effect	Mean Value	RII	Ranking
Uncertified contractors do not cause delays in projects.	2.26	0.452	1
Uncertified contractors do not increase the accident rate on construction sites.	2.27	0.454	2
Uncertified contractors know how to handle construction waste properly.	2.28	0.456	3
Uncertified contractors do not cause cost overrun in projects.	2.29	0.458	4
Fewer disputes occur between uncertified contractors and other parties (Client, Consultant, and Supplier).	2.37	0.474	5
Uncertified contractors do not increase the rate of abandoned projects.	2.43	0.486	6
Uncertified contractors do not carry out unapproved construction works.	2.45	0.49	7
Uncertified contractors make little mistakes and defects in construction's performance.	2.62	0.524	8
Uncertified contractors will reach the client's or owner's expectations.	2.74	0.548	9
Uncertified contractors can carry out quality construction projects.	2.79	0.558	10
Total Average Mean Score	2.45		

5. Conclusion

From the overall study, the undesirable characteristic of uncertified contractors brings negative impact on project performances in terms of time, cost and quality. The increasing demand of skilled contractors in future construction development urge the improvement of more quality contractors. These findings provide insight towards impact of uncertified contractors on project performances and suggested that the importance of certification must be viewed more distinctively. The reason is because certification ensures fundamental knowledge to be channeled through formal education and nurture good characteristic of contractors to deliver quality projects. Stakeholders in the construction industry must act by upgrading the basic requirement of contractors, decrease the involvement of uncertified contractors, therefore project performance can be enhanced.

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