

Implementation of Economic Scale for Contractors Grade 5 to Grade 7 During Covid-19 Pandemic

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Abstract: Construction is one of the main sectors that contribute to the economy for Malaysia. Individuals who are directly involved with the construction industry is the contractor where the contractor was classified according to their performance. Therefore, economic scale for each grade of contractor should be managed well. Movement control order (MCO) was implemented nationwide in early 2020 due to Covid-19 pandemic outbreak caused concern among the community as well as the contractors. Hence, the aim of this study is to address the main economic factor among contractors regarding this issue. Which later, analyse the influence of the Covid-19 pandemic on economic scale factors. The contractor from grade5 (G5) to grade7 (G7) in Kuantan, Pahang was selected for this survey respondents. The interviews and responds from contractors were collected by using personal interviews. Both qualitative and quantitative method were used to analyze the data in this study. The analysis shows that 84% of respondents are affected during Covid-19 pandemic and experienced project loss problems. The contractor's effort in avoiding to become a dormant contractor are identified. It can be concluded that, the longer this Covid-19 problem is remained unsolved, the worse the economic problems of the country and society.

Keywords: Construction Industry, Contractor, Economic Scale, Covid-19, Pandemic

1. Introduction

Contractors shall mean any individual, business or company or any employee, agent or subcontractor for the purpose of performing such work or service, undertakes construction, engineering or other work and enters or on the site [1]. The contractors should have a license and registered with Construction Industry Development Board (CIDB) or else their project will be demolished since it is illegal [2]. The contractors in Malaysia have seven different grades, namely contractor G1 to G7 and

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each grade has a different tendering ability in terms of the value tender [3]. A successful contractor knows that the project's success relies on his or her potential to recruit the right independent subcontractors and obey the customer's wishes [4].

In December 2019, the Covid-19 virus was first detected [5]. Since the virus is able to affect the health of individuals and worst, cause death [6], all construction work should be postponed or even cancel due to lack of manpower and restriction to cross states and causing extension of time for projects [7]. For that reason, the losses recorded by the construction industry are high [8] as the cost required to restart a delayed project is large and causes economic scale to be disrupted.

In order to maintain the economic scale and safeguard the welfare of contractors and the people in Malaysia, proactive measures taken is the use of face masks, gloves, social distancing including the reduction in the number of workers, where only 50% of the current required number of workers are allowed to carry out tasks at construction sites [9]. Standard Operating Procedure (SOP) set by National Security Council (NSC) must be complied with by all parties and contractors are no exception in order to curb the spread of Covid-19 pandemic.

The purpose of this study is to identify economic scale factors for contractor G5 to G7 and to analyse the influence of the Covid-19 pandemic on economic scale factors. This is because, G5, G6 and G7 are contractors who have the ability to tender worth from RM5 million to no limit [10] and they may have several plans to avoid further losses. The results of this study can provide some knowledge about the importance of economic scale of contractors nowadays. Hereby, contractors will know that the economic improvement of the contractor will help in improving the economy of the country.

2. Methodology

This research aims to develop knowledge, understanding and theories about economic scale factors for contractor G5 to G7 and solving research problems by explaining the influence of the Covid-19 pandemic on economic scale factors. Data collection is the most important part since the data collected will be analysed to find out its reliability and answer the problems of this study. Project planning and methodology studies conducted are illustrated as in Figure 2. The summary of research methodology is shown in **Table 1**.

Table 1: Summary of research methodology

| Objective | Research | Method | Source | Data | Analysis |
|-----------|--------------|-------------------|---|---------------------|----------------------|
| 1 | Qualitative | Document analysis | Previous researchers | Text | Thematic analysis |
| 2 | Quantitative | Interview | Sampling selected among contractor G5 to G7 | Open-ended question | Descriptive analysis |

i. Qualitative method: This method is the most suitable method to use because all relevant questions are asked directly to the respondents during the interview. Qualitative method uses thematic analysis to analyse the information or data that is obtained through document analysis.

ii. Quantitative method: This method is obtained from the percentage of people who answered the telephone or mean that is the average number obtained. Descriptive analysis is about clarifying a pattern that is how we believe something.

Accordingly, the qualitative method has used the document analysis method where the source is taken through previous researcher. Therefore, one of the previous studies that has been found and appropriate is included in this study. The type of document used is in the form of a journal and titled 'International Interdisciplinary Journal of Scholarly Research (IIJSR)'. The analysis for this document is in thematic analysis. Thematic analysis is a tool for systematically defining, arranging, and providing

insight into a dataset of meaning trend. By reflecting on meanings and experiences and make sense of them. The questions for the interviews were based on the substance of the previous research to ensure that it was valid.

Telephone interview are one of the method of interviews that are carried out. One of the most commonly used forms of interviews is face-to-face interview, where the questions are presented directly to the contractor from the questionnaire that is produced. Face-to-face interview techniques is developed in Pahang. 3 respondents from G5 and 1 respondent from G6 were being asked the question directly. Apart from the 4 respondents, other respondents (37 from G5, 22 from G6, and 37 from G7) were interviewed through telephone interviews. The respondents are selected using purposive sampling from CIDB website.

2.1 Interview instrument

Questionnaire design: There are 5 major themes created to collect the pattern of responses from these interviews more clearly. Questions presented in **Table 2** are some questions that is asked through telephone interview and face-to-face interview. This question relates to the importance of contractor economic scale factors. This set has only open-ended question types that required a response that has various type of answers from interviewee.

Table 2: Interview Questions

| Themes | Interview questions related to the theme |
|-------------------------|---|
| Affected and Unaffected | Did you experience project continued/postponed/cancelled during the Covid-19 pandemic? Why? |
| Difficulties | How many project losses do you experienced in percentage? |
| Demand | Did contractor scale economies different on before, during and after the Covid-19 pandemic? What are the factors? |
| Envisaged Future | What is the importance of economic scale factors among contractors?" |
| Work Process | During Covid-19 pandemic, what are the actions you take as a contractor where everything is online? |

2.2 Study Flowchart

This flowchart describes about the workflow that has been done in this study. The methodology used is also described in this flowchart and the main methodology is questionnaire and the other one is secondary data collection. The selected methodology is also based on previous studies to suit the title of the study as well as the current situation. Questionnaire was conducted because this method is the most suitable to be used to achieve the objectives of this study.

This questionnaire targets three contractor grades, namely G5, G6 and G7 in Kuantan, Pahang. These three grades were selected in order to be able to see the differences and compare the data obtained from the interview sessions that had been conducted. From the data obtained, G7 contractors are not so much affected as these contractors manage large projects resulting in less incurred losses while for G5 contractors it can be seen that the percentage affected is more than G7 contractors.

All these data are collected and analyzed using appropriate methods. The analysis data obtained is divided into two, namely thematic analysis and descriptive analysis. This thematic analysis focuses on the questionnaire only while for descriptive analysis it contains questionnaires and secondary data. A summary of the work flow is shown in **Figure 1**.

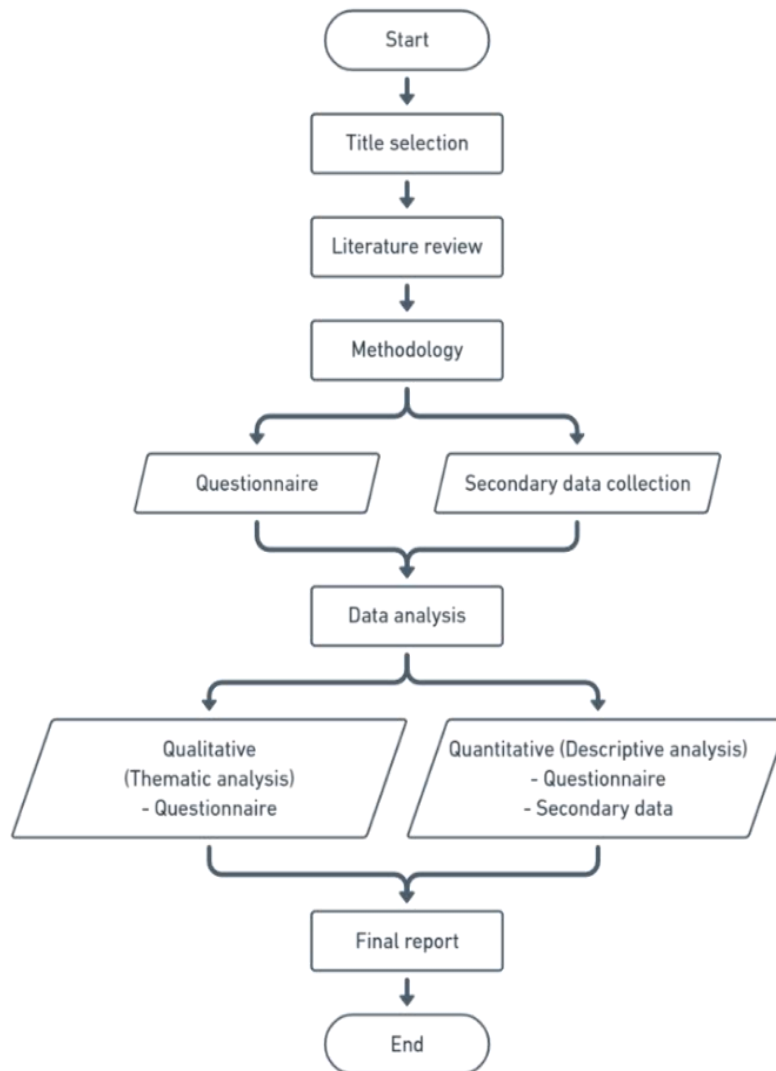


Figure 1: Study Flow Chart

2.3 Data validation

The data obtained from interview with respondents through telephone interview are then determined its reliability. This is because, this study can to some extent help other researchers who also make a research on economic scale factors for contractor G5 to G7 during Covid-19 pandemic. The reliability level test of the interview conducted is determined by using a split-half method where the reliability is of half test, therefore, in order to get complete reliability of the test, Spearman-Brown Prophecy formula is used. The formula used is:

$$r_c = \frac{2r}{1+r} \quad \text{Eq. 1}$$

Here r_c = Reliability coefficient of the whole test
 r = Reliability coefficient of half-test

The drawbacks of this method are the test can be divided into two equal halves and the coefficient of correlation in each case could be different. This method is ineffective for speed tests, power tests and heterogenous tests.

3. Results and Discussion

Following the Covid-19 pandemic outbreak, it is possible that the construction sector suffers from huge financial losses and workforce shortages. The influence of the Covid-19 pandemic on economic scale factors for contractor G5 to G7 is explored. In order to find out its validity, a questionnaire study was conducted. The validity was conducted by takes the split half correlation as input and converts it to an estimate of the equivalent level of reliability for the full-length test. The data obtained as a result of the questionnaire with the respondent which is contractor G5 to G7 will be discussed and summarize.

3.1 Result

Table 3 shows the details of all the respondents who have been selected from three different grades namely G5, G6 and G7 in this interview. The contractors are selected using purposive sampling result in 100 contractors where 40 contractors from G5, 23 contractors from G6 and 37 contractors from G7. The respondents consisted of 86 male and 14 female and 48% of the respondents came from the age class of 30 to 39 years old.

Table 3: Details of the respondents

| Item | No. Of Contractors | Age | | | Gender | |
|------|--------------------|-------|-------|-------|--------|--------|
| | | 20-29 | 30-39 | 40-49 | Male | Female |
| 5 | 40 | 13 | 21 | 5 | 36 | 4 |
| 6 | 23 | 3 | 11 | 9 | 20 | 3 |
| 7 | 37 | 6 | 16 | 15 | 30 | 7 |

According to 2021 statistics by [11], before the Covid-19 pandemic, the number of project completed was high, and the number of projects completed in 2019 was 10,382. However, after the Covid-19 outbreak in December 2019, the number of construction projects has been falling by 63%, which make it only 3,846 projects planned for 2021 as of June 11. The cancellation of the project not only effect the national economy, but it also effect the income of people who worked on the project directly, such as contractors. An overview of the graph of this decrease in the number of projects can be seen in **Figure 2**.

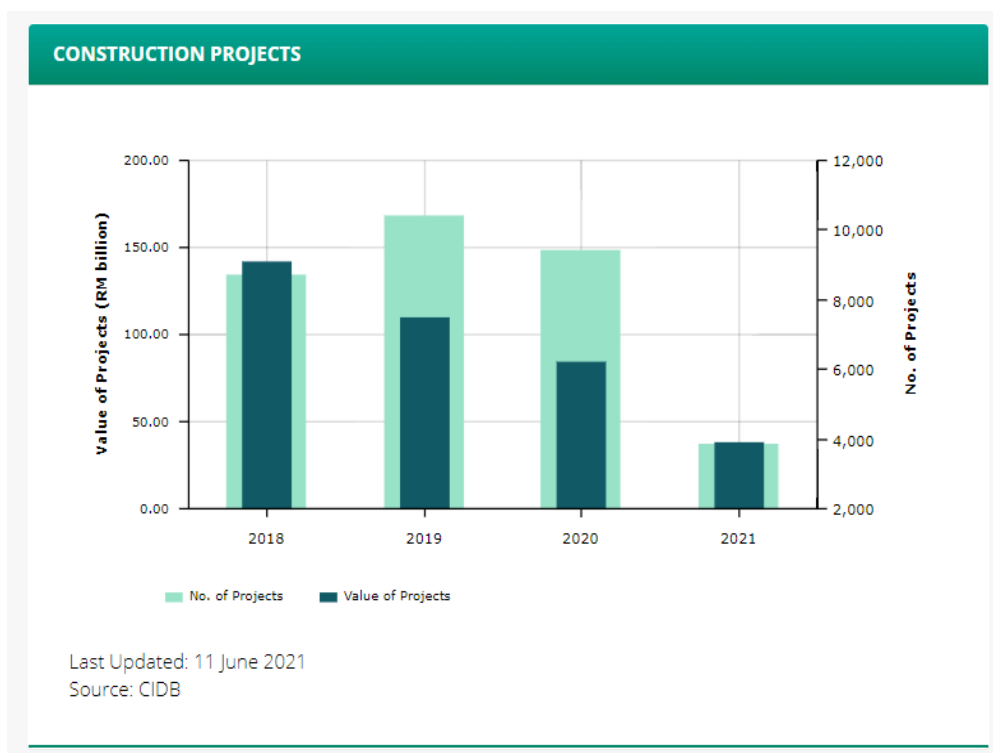


Figure 2: The number of construction projects

3.1.1 Reliability test

One technique to assess a test’s reliability is to repeat it, however this is not always possible. Another strategy that can be used with a questionnaire is to divide the test into those who are impacted by the Covid-19 pandemic and compare the results. After testing the entire set on the respondents, the correlation between the two sets of responses is determined.

Table 4: Division of data and Reliability test statistics

| Grade of contractor | Affected | Unaffected | Correlation coefficient | Spearman-Brown Prophecy |
|---------------------|----------|------------|-------------------------|-------------------------|
| 5 | 38 | 2 | 0.828 | 0.906 |
| 6 | 15 | 8 | | |
| 7 | 31 | 6 | | |

Table 4 shows the results of the interview with contractors G5 through G7, the data is separated and recorded in Microsoft Excel. After that, the correlation coefficient which is the first half test is determined using the formula =CORREL(B4:B6,C4:C6), yielding a result of 0.828. The Spearman-Brown correction value is 0.906, reflect the reliability of data obtained from the interview, using the Equation 1. Result shows that the Spearman-Brown correction result is fairly high, and it is quite close to 1.0. This shows that the research is trustworthy.

3.2 Discussion and Analysis

The main findings of the analysis performed are economies of scale factors for contractors G5 to G7 were found well by using document analysis method that is based on journal and the influence of the Covid-19 pandemic on economic scale factors are also known using interview method.

There are four economic scale factors have been found, namely technical economies of scale, to specialization in job, marketing economies of scales and measures’ investment economy. Technology

economies are lowering the cost of developed growth. This refers to the rules and regulations that regulate production, such as the availability and types of labour resources. Types of technical economies of large analytical ecosystems of markets that are superior than pre-dimensional marketplaces of significant system economies of ongoing inventory economies of power markets.

Specialization in job are fragmenting multi-layered construction systems into fragmented types of work in order to boost productivity. Other than that, marketing economies of scale that is if a large corporation has sufficient market negotiating power, it may spread its advertising and marketing costs across a large output and acquire its inputs in bulk at reduced rates. Lastly, the measures' investment economy is larger firms are typically seen as more 'credit worthy' by the financial markets and have easier access to credit facilities with lower interest rates.

Next objective of this study is the influence of the Covid-19 pandemic on economic scale factors. Some important contents from the interview results that coincide with the objectives have been obtained, which include the following:

- i. The construction sector has been affected by the Covid-19 pandemic and has given some problems to contractors, especially in handling online meeting or discussions. This is because the contractors cannot get used to it at an early stage.
- ii. Most projects have been postponed to prevent widespread of Covid-19 on construction sites as well as to avoid large clusters.
- iii. Each contractor has been affected especially the G5 contractors who is in the construction sector contractor while for the maintenance sector contractor, the work or project is running as usual causing the contractor not to be affected during this pandemic.
- iv. The contractors have also made some preparations such as providing stocks of raw materials from foreign countries that are difficult to find and also a new financial plan to avoid losses and over costs for a project.
- v. The high demand of locals to essential service contractors regarding problems they face such as broken telephone, disconnected cables and problematic internet networks because everyone is at home.

4. Conclusion

In summary, this study on the implementation of economic scale for contractor G5 to G7 during the Covid-19 pandemic found that 84% of respondents from these three grades are affected by the Covid-19 pandemic. The contractors faced a lot of problems such as delays in work processes, difficulties in obtaining raw materials, reduction in the number of contractors at construction sites and lack of projects received. The provision of sufficient raw materials as well as the addition of time to complete the project is an important thing to proceed with a project.

This to some extent has made all the work processes of the contractors more pleasant and also helped the smooth completion of the project. The quality of this study can be enhanced, and the following are some ideas to examine for further study on economic scale factors for contractors. Further study may be required to assess and focus on a number of demographic factors, including educational background, gender, ethnicity, and rank since these indicators may be used to identify individuals who are experiencing difficulties during the Covid-19 pandemic. It might yield a variety of results based on different viewpoints.

In order to acquire reliable and varied research data, the scope of the study have to broaden which include all contractors in Malaysia. The proper sampling techniques have to utilise in order to obtain the accurate and trustworthy results. It is suggested that further study consider employing existing questionnaire that have been adjusted to fit the present scenario. Other than a questionnaire, a number of data gathering procedures might be utilised.

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