

Cost Overrun in Residential Construction Project in Malaysia: Causes and Improvement Measures

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Abstract

Cost overrun is the major issue in residential construction project industry worldwide, including Malaysia. This paper is therefore aimed to appraise the cost overrun in residential construction project in Malaysia. This paper was done based on findings by reviewing a thorough review of literature and expert focus group interview on the current practice of residential construction projects from local and global context. The previous study reveals that many residential construction projects are facing various types of problems, especially cost overrun that eventually affected most of the construction project completions. It is found that the cost overrun in residential construction project was caused by improper planning and scheduling by contractor, inconsistency in price materials, unanticipated site conditions, incompetent contractor, sudden change in the scope of the project, project financial difficulties, poor management and supervision of construction site, and lack of site workers. Hence, it is important to examine the improvement measures of the cost performance in residential construction project in Malaysia of which include proper planning and scheduling of project, adequate site management and supervision, effective strategic planning and appropriate construction method used in the project. This paper could serve as a guide to the project management team, who involves in Malaysia residential construction project to maximize the cost performance in the project and thus shall support the Construction Industry Transformation Programme (CITP) Malaysia's national agenda.

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1. Introduction

The construction industry in Malaysia plays a vital role in the country's development [1]. It is also creating employment both directly and indirectly and improves citizens' quality of life through provision of essential socioeconomic infrastructure and public facilities. A construction project might require more than one person

during the life cycle of a construction work, obviously

depends on the complexity of construction project as a project management team. It is based on the type of project that shall determine the complexity of managing the cost of the construction project.

Malaysia is in the process of vigorous development. It has been pointed out that, since the 1970s, Malaysia's economy has grown rapidly [2]. It is identified that construction industry plays a crucial role in Malaysia economic growth of 15.2 percent in 1995 and reduces to 11.8 percent in 1996 [2]. As of in 2018, Malaysia's

economic growth has accelerated to 4.7 percent more from the previous year where this growth of demand was not led by construction sector anymore [3]. The construction sector gross development product merely contributes around 4.2 percent from overall economic activity led by civil engineering, specialised in construction activities and non-residential buildings [3].

Similar to other industries that contribute to the nation economic growth, cost in construction project is undeniably a very important factor to consider in a construction project management life cycle. Therefore, cost can be considered to be one of the most significant parameters of a project that drives towards the success of any construction project [1]. Normally, cost estimation will be planned in the preliminary stage, thus the contractor can forecast the budget for a construction project.

Ineffective cost performance is a major issue in construction industry [2], where cost spend exceeds budget, improper estimation, and construction cost under estimation are commonly occurred. Construction cost overrun shall result in investment pressure and thus affects investment decision making and waste of national finances. The corruption is the result or offense if not control wisely. Hence, it is important to classify the factors that affect the cost overruns and mitigate these problems.

Poor site supervision and management amongst all can contribute to problem of poor cost performance in construction project. Poor management, such as non-skillful and inexperience human resource in site management also reflected this weakness as well as the incompetency of contractors [1]. Therefore, this paper emerges with the aim of appraising the cost overrun in residential construction project in Malaysia via the objectives of investigating the causes and examining the improvement measures on cost overruns in residential construction projects in Malaysia.

2. Literature Review

Overview of Residential Construction Project in Malaysia

The Malaysian residential sector has been suffering from failure of residential construction project since the early 1980s. For instance, there were 68 abandoned residential construction projects in peninsular Malaysia (excluding Sabah and Sarawak) in the year of 2014. It is comprising 24,726 residential units and 17,468 buyers [2]. As in 2017, there are 67 cases of abandoned residential project in peninsular Malaysia (excluding Sabah and Sarawak), comprising of 14,973 of residential units and 10,602 buyers [2]. Even though the statistic is slowly reducing, it still needs to be improved to ensure reducing trend in housing project abandonment in Malaysia.

State in Malaysia [2]

State	No. of project	No. of housing units	No. of Buyers
Johor	9	2741	2060
Kedah	2	765	169
Kelantan	10	891	875
Melaka	0	0	0
N. Sembilan	3	658	614
Pahang	5	618	478
Perak	4	298	249
Perlis	0	0	0
P.Pinang	2	1550	1337
Selangor	28	6999	4523
Terengganu	3	319	274
W.P.Kuala Lumpur	1	134	23
Total	67	14,973	10,602

In Malaysia, the phenomena of abandoned residential construction project in the country remained unsolved, thus become national issue discussed by various parties [2]. The developers blamed the contractor for their incompetent project management team and result to the poor cost performance in the residential construction project. On the other hand, the contractor blamed on developer because the payment delay and inconsistency of design have delayed the residential construction project and made it difficult for their project management team to run the residential construction project smoothly, thus leading to the problem of construction cost exceeds the budget [4].

Although the residential industry is one of the main priorities of the government, persistent major problems of cost overrun are being encountered, which resulting in the abandoned residential construction projects [2]. For example, based on [5] on survey of cost overrun, it was notably found that only 11 percent of respondents mentioned that normally their residential construction projects are finished within the budgeted cost, while 89 percent of respondents agreed that mostly the residential construction projects are over budget compared to the budget planning [5].

There have been initiatives to remedy these problems by the government imposed on contractor regarding the increasing number of abandoned residential construction projects due to the poor cost performance, including rehabilitating (reviving) of the current abandoned residential construction project, changing the existing selling plan to build and sell concept and encouraging project delivery success through some approaches such as public-private partnership (PPP) [6]. Although efforts of the research community have drawn attention to various aspects of the problem, however there is a lot to do to identify the causes and effects of the poor cost performance and cost overrun contributed to the

Table 1: Abandoned residential construction project by

abandonment of residential construction projects.

It is apparent that the main factor of this abandoned residential construction projects is due to poor cost performance or cost overrun in the residential construction project. The main concern about abandoned residential construction project is when the residential construction project is still under construction stage and is not completed within stipulated time, thus not ready for occupation [4].

However, it is important to note that the abandonment of residential construction projects is not unique to Malaysia as it is also presented in other countries, such as United States, Dubai, Abu Dhabi, Saudi Arabia, Qatar, Bahrain, Kuwait, and Russia [2]. Therefore, it is important to prevent cost overrun in the residential construction project to ensure lesser abandoned project in the future.

Factors Affecting Cost Performance of Residential Construction Project in Malaysia

The major challenge in construction industry in general is to keep the residential construction projects within estimated costs and schedules. It is requiring good strategies, good practices and careful judgment.

However, many construction projects experience extensive delays and exceed original time and budget, including residential construction projects. This problem is more obvious in the traditional type of contracts, in which the contract of the residential construction project is awarded to the lowest bidder as the strategy in the majority of public construction projects in developing countries [7].

To better managing and controlling the residential construction projects, there are various procurements strategies can be used that shall affect the cost performance of residential construction projects. Most popular strategies include traditional method, integrated services and in-house team [8]. Normally large clients or large developers who have their own construction arm shall directly appoint their own team. However, the client can choose to tender out a partial of contract to outsiders. Many of developers nowadays prefer this method because they can plan the residential construction projects cost effectively from the beginning of the planning stage. They prefer to have control in their construction arm in order for them to get better cost performance and thus can make saving for the residential construction project.

Since it is widely accepted that procurement method is a strategy to well manage the entire construction process, there are various proven strategies which affect the cost performance of residential construction projects. Traditional procurement is normally applied to ordinary residential construction project of moderate size and complexity. Variation, such as design and build, negotiated contract, best value procurement and incentive contract, is widely used for residential construction projects in USA. Open tender contract and negotiated

contract on the other hand are widely used for residential construction projects in the UK and Malaysia. Sometimes, project management consultancy (PMC) shall incorporate with client to assist them in administering the residential construction projects.

In addition, it is important to note that cost estimation is a very important method in the construction planning for any construction project, hence also affects the cost performance of residential construction projects. The cost estimation in the residential construction projects consists of a few methodologies, including a conventional Earned Value Management (EVM) methodology with related Cost Performance Index (CPI), Estimate at Completion (EAC), and Schedule Performance Index (SPI). However, these techniques have some limits in calculating the cost EAC, such as problem to determine the critical path of the project, work and quality, risk impact and presumption estimations. The statistical techniques application and simulation techniques have been identified as an effort to conquer the EAC, EVM, and SPI limitations [9].

To fulfill the effective monitoring of original project cost, managers of construction project utilize the practical index-based methods to forecast the final project cost. However, the choosing and applying index-based metrics shall depend on the residential construction projects type and the development stage. In fact, to determine the accuracy of EAC, the cost reporting and network scheduling are very important for performance monitoring [9].

Nevertheless, many small residential construction projects do not convince either of these collections of timely requirement and actual cost data. Moreover, index-based EAC methods usually tailored to fit the residential construction projects. The component of constant actions cannot be simply broken down into a few work packages and have to consider the impact of the critical path of a schedule. Thus, the index-based approaches can best adapt to complex residential construction projects with longer durations and large budgets compared to smaller residential construction projects and thus it does not achieve cost effectiveness of the residential construction projects. For example, [10] has developed a model to anticipate EAC based on the typical response that affecting project cost performance. The simulation calculates the EAC after setting a few input variables, such as the procurement delays, the change of orders, and the resources, which affect or even eliminate the original budgets and project schedules, thus resulting in a costly rework and additional procurement resources.

In other industries, methods for EAC of ongoing projects was largely explored since there are limited studies for residential construction projects. There are many methods of refined traditional, statistics-aided and simulation-based EAC gauge methods for large and complicated project. Product development and software projects research have been done in context of construction projects [5], including residential

construction projects.

[5] has also revealed that the construction industry is a bit behind other industries and has complexities in sufficiently importing simulation tools and advanced statistical that can help project managers to commence the effective control actions with integrated information related to future unpredictability. Hence, the construction industry including residential construction project needs to adapt the other relevant methods developed by other industries in order to integrate information and contingency into construction project cost performance.

Causes of Cost Overrun in Residential Construction Project Worldwide

Poor cost performance or cost overrun in residential construction project around the globe can occur due to many of reasons as shown in Table 2. Eight different countries were studied, including Vietnam, Pakistan, Ghana, Nigeria, Saudi Arabia, Palestine, Indonesia and Malaysia.

Table 2: Causes of cost overrun in residential construction project. Summarised from ([26], [29], [1], [16], [27], [7], [28], [12])

Causes	[26]	[29]	[1]	[16]	[27]	[7]	[28]	[12]	Frequency of Citation
1		X	X	X	X	X	X	X	7
2	X		X	X	X	X			5
3	X		X		X	X			4
4	X	X		X				X	4
5		X			X	X		X	4
6			X			X	X		3
7		X		X		X		X	4
8	X	X		X					3
9	X	X						X	3
10			X	X		X			3
11		X						X	2
12	X			X		X	X		4
13				X					1
14									0
15		X							1

Indicators:

- 1 – Incorrect planning and scheduling by contractors
 - 2 – Fluctuation in prices of material
 - 3 – Frequent design changes
 - 4 – Unforeseen ground conditions
 - 5 – Inadequate contractor experience
 - 6 – Change in the scope of the project
 - 7 – Cashflow and financial difficulties faced by contractor
 - 8 – Low speed of decision making
 - 9 – Contractor's poor site management
 - 10 – Practice of assigning contract to lowers bidder
 - 11 – Lack of communication among parties
 - 12 – Shortage of site workers
 - 13 – Delay in Material procurement
 - 14 – Under estimate project duration resulting schedule delay
 - 15 – Incompetent project team (designer and contractor)
- [26] – Vietnam
[29] – Vietnam
[1] – Pakistan
[16] – Ghana
[27] – Nigeria
[7] – Palestin
[28] – Indonesia
[12] – Malaysia

cost performance in residential construction project amongst all is due to unproductive construction management and low control system costs [11]. It is undeniable that many residential construction projects are

facing the problem of poor cost performance due to this poor management and system, yet the degree of overrun varies from project to project.

Financial management is a significant criterion for efficient construction of residential building projects. Most of the contractors doing the residential construction project are poor in financial and cashflow due to their ineffective planning in the works that could lead to cost overrun [12]. It is therefore important to observe the financial spending completely throughout the residential construction projects life cycle from the beginning [13].

On client-side, the financial difficulties could also occur in the on-going project. The problem is where the monthly valuations of payments to the contractors are delayed, which affects the contractors' cash flow [14]. This problem may result to slower residential

Based on Table 2, the most important cause of poor

construction project development [7]. Hence, sufficient financial support in the project should be decided at the very early stage of a residential construction project planning so that usual periodic payments may be made to the contractor for the respective work done [15].

In addition, [5] stated that the main factor that contributes to cost overruns in residential construction projects is incorrect estimation of original cost of a residential construction project. It is because of technical problem on how to estimate project costs and also not enough project information in the early stage of residential construction project. On top of that, inaccurate planning and limited management experience were also result in cost overruns in residential construction project as the construction progress becomes slower and takes longer time to complete [16].

Upon getting residential construction project approval, some stakeholders have to consider the preliminary estimating costing for their project. It is the most important conditions that have to be considered on some residential construction projects [12] because the pre-initial cost estimation should be accurate. Accuracy of cost estimation allows clients to gauge and determine the required fund that suffices to execute the residential construction project.

[17] also highlighted that because of other related problem causes from the mismanagement project financial, the residential construction projects are most likely to be abandoned. For instance, poor cost performance in the residential construction project may be due to the failure of the project management team or unstable economic conditions, inaccurate feasibility study to determine the right type of development and wrong marketing strategy that ultimately affects the sales, and thus leads to the cashflow problem [7].

The inflation of project costs would also lead to increasing of cost, fluctuation of equipment, materials and labor costs, and result to the cost overrun in residential construction project. These cases may vary depending on geographically of a country and as well as different contracts between the subcontractor with supplier, which may involve different fluctuation terms agreed with client. Material price fluctuation causes poor cost performance in most cases in residential construction project, where it is hard to gauge the cost accurately [1]. This is proven to be true when a study in Gaza found that the top ten factors causing the poor cost performance include the fluctuation of construction material price [7].

3. Methodology

The research methodology is a description of how the objectives can be realised. The paper is based on findings by reviewing a thorough review of literature. The document review generally provides useful information in order to support or supplement data collection as part of study assessment. Based on understanding of causes of cost overrun in residential construction project in

Malaysia as identified via literature review in the previous section, the current practice of residential construction projects from local and global context are obtained via expert focus group interview on 5 experts of developers, consultants and contractor having vast experience in residential construction projects in Malaysia. The experts examined in this study were well-experienced in handling private and public sector residential construction projects in Malaysia. The data collection through these methods is analysed and the results are presented accordingly.

4. Findings and Discussion

The expert focus group interview suggested that amongst the improvement measures in bettering cost overrun in residential construction projects in Malaysia is to well equip managers who that are expected to execute the residential construction project. Managers should consider the quality of work, cost and limits at all times. The resource inputs at the residential construction project site shall produce outputs in the form of work, including materials, labour, machinery and monetary. To successfully achieve cost performance, a project should control its resources. The clients should avoid cost escalation in the residential construction project that is caused by unnecessary delays.

It is also suggested by the expert via this expert focus group interview that as a part of improving the poor cost performance in residential construction project in Malaysia. It is important that a construction manager seriously considers several critical routine such as performing the material inventory. This is to ensure that there is no lack of improper accounting, pre-work preparation and coordination, negligent of project team, poor storekeeping, and high rate of downturn due to long storage at the place of work, as well as over-issues from the central supplier and failures to return the unused materials to the supplier.

Handling construction cost is one of the most challenge tasks for the successful project completion of the project [14]. Unfortunately, the expert claimed that the residential construction project in Malaysia is suffering difficulties in achieving effective cost management. It is often in a residential construction project experiencing a significant amount of cost overrun. Since poor cost performance is a quite serious problem in Malaysia, the expert suggested that it is important to identify the countermeasure that can be used by contractors to control their construction project cost.

Out of 15 causes of cost overrun factors as discussed in the previous section, the experts had ranked "contractor's poor management of the site and supervision" as the main important cause to cost overrun in residential construction projects, followed with "lack of information amongst parties". Nevertheless, the least important cause of cost overrun in residential construction project in Malaysia is "cashflow and

financial difficulties”.

Apart of these findings on the causes of cost overrun in residential construction project in Malaysia, the experts had proposed 15 improvement measures on the cost overrun in residential construction project in Malaysia as illustrated in Table 3.

They also identified these counter-measures in three execution approaches. Thus, the results of the expert focus group interview on the classification of these improvement measures on poor cost performance in residential construction project in Malaysia are based on three ways of execution strategy, namely as proactive, re-active and organisational approach following the suggestion by [18].

Table 3: Proposed mitigation measures with implementation strategy

No	Improvement Measures in Improving Cost Overrun	Pro	Re	Org
1	Have effective strategic planning	X		
2	Have proper project planning and scheduling	X		
3	Provide effective site management and supervision	X		
4	Conduct frequent progress meeting		X	X
5	Put proper emphasis on contractor past experience			X
6	Use experienced subcontractors and suppliers		X	X
7	Use appropriate construction methods	X		
8	Use up-to-date technology utilisation	X	X	
9	Ensure clear information and communication channels	X		X
10	Conduct frequent coordination between the parties			X
11	Perform a preconstruction planning of project tasks and resources needs	X	X	X
12	Develop human resources in the construction industry			X
13	Provide comprehensive contract administration			X
14	Provide systematic control mechanism	X		
15	Improve contract award procedure by giving less weight to prices and more weight to the capabilities and past performance of contractors		X	X

Indicators:

- 1- Pro: Pro-active measure
- 2- Re: Re-active measure
- 3- Org: Organisational measure

Improvement measures in pro-active (Pro) strategy are the countermeasures that must be implemented from the early stage of the residential construction project to gauge and prevent cost overrun to be occurring. Improvement measures in re-active (Re) strategies are the countermeasures that can be implemented to relieve the effect of restrain factors in project control as a remedy whilst improvement measure in organisational (Org) strategies are the countermeasures which are normally in place because of the orientation, company's belief, management style and philosophy [18].

These improvement measures show that this practice required to improve the current cost control practice in residential construction projects in Malaysia in to achieve a good cost performance in construction project. The owners of organisation are suggested to incorporate all of the mentioned improvement measures to be implemented at an early stage to achieve effective cost control and to avoid the hindrance during the project, thus assuring the completion of the residential construction project is within budgeted cost.

5. Conclusion

There are many factors affecting to cost overrun in residential construction project in Malaysia. The outcomes of a thorough review of this literature would be able to classify the causes of cost overrun and propose improvement measures with implementation strategy on the poor cost performance in residential construction project in Malaysia.

Also, it is found that the most important causes cost overrun in residential construction project in Malaysia based on the findings are inaccurate planning and scheduling by contractor, changes of material prices and cashflow difficulties faced by contractor.

Based on the improvement measures findings, the most important measures are effective strategic planning that have to be implemented via pro-active strategy (preliminary planning stage). However, performing the construction early planning for resources needs and project task is important to be implemented at all stages of pro-active, re-active and organisational strategies to ensure its effectiveness in the residential construction project in Malaysia.

In addition, this paper shall be beneficial to the project management team who involves in the project to maximise the cost performance in the residential construction project in Malaysia. The outcome shall support the initiatives of the Construction Industry Transformation Programme (CITP) Malaysia's national agenda and could possibly reduce the work delay in the residential construction project in Malaysia.

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References

- [1] N. Azhar, R. U. Farooqui, and S. M. Ahmed, "Cost overrun factors in construction industry in Pakistan", First international conference on construction in developing countries (ICCIDC-I, advancing and integrating construction education, research and practice), 2008
- [2] E. Sriprasert, "Assessment of Cost Control System: A Case Study of Thai Construction Organizations", M.S. thesis, Bangkok: Asian Institute of Technology, 2000
- [3] Malaysia Economic Performance Fourth Quarter 2017 (Press Release), 2018. Department of Statistic in Malaysia
- [4] Yap Eng Hoe (2013). Causes of abandoned construction project in Malaysia. Department of surveying, Faculty of engineering and science, Universiti Tunku Abdul Rahman.
- [5] Tien-choon toh, connie ting, kherun nita ali, godwin uche aliagha and omar munir (2012). Critical cost factor of building construction project in Malaysia. The international conference on asia pacific business innovation and technology management.
- [6] Hamzah Abdul-Rahman, Ali M. Alashwal, Abdul Aziz Abdullah, "Abandoned housing project in Malaysia: Risk Management capabilities during Rehabilitation" International Journal of Architectural Research, 2016.
- [7] A. Enshassi, J. Al-Najjar, and M. Kumaraswamy, "Delays and cost overruns in the construction projects in the Gaza Strip", Journal of Financial Management of Property and Construction, 14 (2), p. 126-151, 2009
- [8] G. Ofori, "The Construction Industry; aspects of its economics and management", Singapore University Press, 1990
- [9] Timur Narbaev and Alberto De Marco (2011). 2011 2nd International conference on construction and project management IPEDR Vol.15 (2011) © (2011) LACSIT Press, Singapore.
- [10] A. De Marco, D. Briccarello, and C. Rafele. Cost and Schedule Monitoring of Industrial Building Projects: Case Study. J. Constr. Eng. Manage. 2009, 135 (9): 853-862.
- [11] Dharmasegaran A/L K. Nagamany (2016). A study of the causes and effects of abandoned residential project in Malaysia. Faculty of Technology Management and business Universiti Tun Hussein Onn Malaysia.
- [12] M. Sambasivan, Y.W. Soon, "Cause and effects of delays in Malaysian construction industry", International Journal of Project Management, 25, p. 517-526, 2007
- [13] A. H. Memon, I. A. Rahman, A. A. A. Azis, S. Nagapan, and Q. B. A. I. Latif, "Time and Cost Performance in Construction Projects", IEEE Colloquium on Humanities, Science and Engineering Research (CHUSER 2012), held on 3-4 December 2012, Kota Kinabalu, Malaysia, 2012
- [14] Olawale, Y.A. and M. Sun, 2010. Cost and time control of construction projects: Inhibiting factors and mitigating measures in practice. Construct. ManagEcon., 28(5): 509-526.
- [15] Choudhury, I. and O. Phatak, "Correlates of time overrun in commercial construction", ASC Proceedings of the 40th Annual conference, Brigham Young University – Provo Utah, 2004.
- [16] Y. Frimpong, J. Oluwoye, and L. Crawford, "Causes of delay and cost overruns in construction of groundwater projects in a developing country; Ghana as a case study", International Journal of project management, 21, p.321-326, 2003
- [17] Bavani, M., 2009. Abandoned Jelatek fire station now an eyesore. The Star Online. [Accessed December 20, 2009].
- [18] Ade asmi Abdul azis, Aftab Hameed Memon, Ismail Abdul Rahman and Ahmad Tarmizi Abd Karim (2013). Controlling cost overrun factors in construction project in Malaysia.
- [19] George Otim, Fiona Nakacwa, and Michael Kyakula. Cost control technique used on building construction site in Uganda. Second International conference on advance in engineering and technology.
- [20] A.S Ali, and S.N Kamaruzzaman (2010). Cost performance for building construction project in Klang valley. Journal of building performance, Vol 1 issue 2010
- [21] Azlan Shah Ali, Andrew Smith, Michael Pitt and Chan Hong Choon (2010). Contractor's perception of factors contributing to project delay: case study of commercial projects in Klang valley, Malaysia.
- [22] Nurul Alifah Jatarona, Aminah Md Yusuf, Syuhaida Ismail and Chai Chaang Sar (2015). Public construction project performance in Malaysia. IBIMA publishing, Journal of Southeast Asian research, T.E., "Domain ontology or processes in infrastructure and

- [23] Zou, P.X. and Sunindijo, R.Y., “Skills for managing safety risk, implementing safety task, and developing positive safety climate in construction project”. *Automation in Construction*, 34, pp.92-100 2013.
- [24] Ibrahim, A.R., M.H. Roy, Z. Ahmed and G. Imtiaz, 2010. An investigation of the status of the Malaysian construction industry. *Benchmark. Int. J.*, 17(2): 294-308.
- [25] Azlan Raofuddin Nuruddin, Syed Putra Syed Abu Bakar and Mastura Jaafar (2015). Unveiling the challenges faced by Malaysian Housing developers through government policy changes.
- [26] Le-Hoai, L., Lee, Y.D., and Lee, J.Y., 2008, “Delay and Cost Overruns in Vietnam Large Construction Projects: A comparison with other Selected Countries,” *KSCE Journal of Civil Engineering*, 12(6), 367–377.
- [27] Ameh, O.J., A.A Soyingbe and K.T. Odusami, 2010. Significant factor causing cost overrun in telecommunication project in Nigeria. *J. Construct. Dev. Countries*, 15: 49-67
- [28] Harisaweni, 2007. The framework for minimizing construction time and cost overrun in padding and Pekanbaru, Indonesia. Master thesis, Universiti Teknologi Malaysia.
- [29] Long, N.D., S. Ogunlana, T. Quang and K.C. Lam, 2004. Large construction project in developing countries; A case study from Vietnam. *Int. J. Proj. manage.*, 22: 553-561.