



# Decision-Making Method Employed at Construction Planning Phase of Housing Development

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**Abstract:** A correct decision made by decision-makers, at the planning phase, determines the success of a housing development project. Detailed decision supporting data is needed to provide specific guidance to private housing developers. The purpose of this paper is to define a decision-making method to be employed at the construction planning phase of a housing development project in Malaysia. Survey method is implemented using a questionnaire that was distributed to 67 private housing developers. The collected data was then analysed via Statistical Package for Social Sciences (SPSS) software. The outcomes of the analysis show that for Malaysian private housing developers, discussion and market/economic report are the most important methods that are applied while making a decision for a housing development project. Thus, this paper is supposed to guide private housing developers as well as governments in making decisions at the construction planning phase of housing development projects in Malaysia.

**Keywords:** Decision-making method, planning phase, housing development, private housing developer

## 1. Introduction

Numerous studies define decision-making as the study of identifying and selecting choices based on the principles and preferences of the decision-maker (Ireland & Miller, 2004; Zainal, 2015; Robbins et al., 2017). Decision-making not only involves decision-makers' consideration of different choices, but their selection of a decision that suits best with the needs (goals, objectives, desires, values etc.) so that the success of a project can be ensured. Inaccurate and poor decision-making will affect the whole housing development project and the decision-maker as well. So, the cooperation from all levels in the organisation, especially those involved in decision-making, is compulsory to gain a mutual understanding, so that the issue of project failure is wiped out.

Referring to Acevedo & Mejia (2006) and Alvarez (2007), the methods offered for planning are not intended to handle uncertainty or to react to unexpected incidents. Once an unexpected incident occurs, during the planning of a project, decision-makers try to fix it manually which is often ineffective and sometimes needs to go through costly re-planning. Preparation for unpredicted events, such as the shortage of material, urgent orders, production time variation, quality problems and machine damage is important in assuring business stability. A detailed planning model and a decision support system are required to provide specific guidance to private housing developers (Johnson, 2006). This paper highlights few methods to assist a decision-maker in making decisions at the construction planning phase of a housing development project.

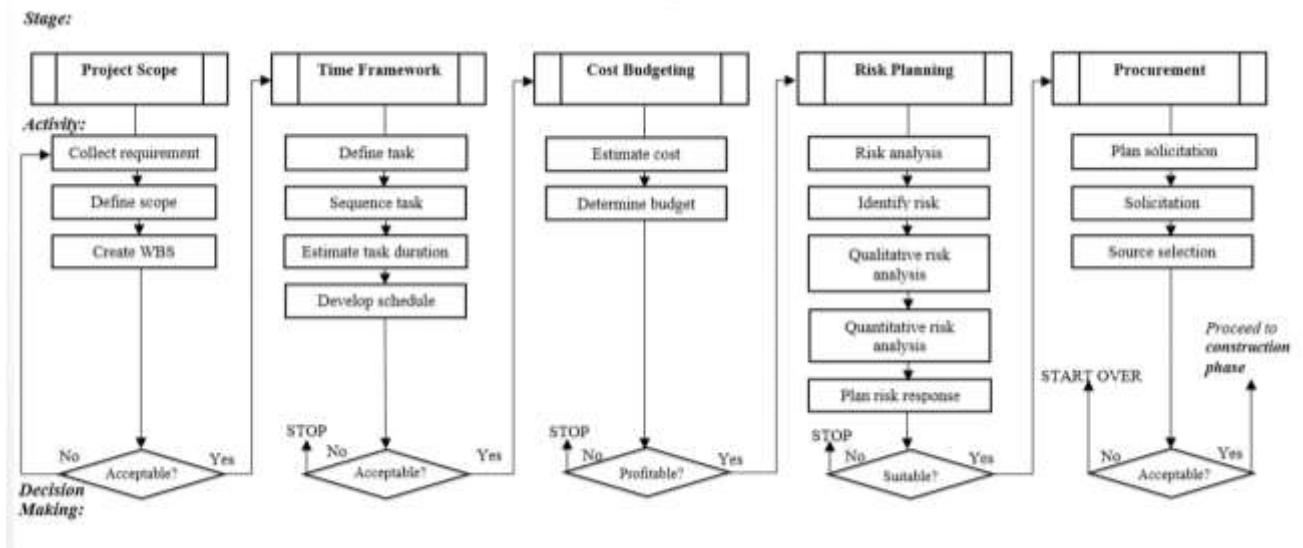
## 2. Literature Review

This paper provides a decision-making method practised by the private housing developers employed at the construction planning phase. Consequently, following the aim of this research, a process of decision-making at the

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construction planning phase of the housing development project was established based on the theoretical framework. The planning phase is important to a project’s success. This fact can be seen in the studies by Agus (2002), Mohd et al. (2009), Abdullah et al. (2011), Mohd & Alias (2011) and Zainal (2015). Marzuki (2015) states that apart from the huge diversity of planning fields, planning, usually is the act of organising activities within a framework to reach the desired goal.

According to Chitkara (2014), the planning outlines how the project would be set up to reach specified goals based on discussions and decisions based on the current knowledge and estimation of future developments. Each process in the construction planning phase is divided into some stages with one group of activities per stage. Afterwards, each activity is subdivided into more adaptable steps or components until the products delivered is defined in detail to allow better management control (Angus et al., 2003). The activities in each stage of the construction planning phase are then performed using decision-making methods to produce outputs. Angus et al. (2001), RIBA (2013), Chitkara (2014), Turner (2014) and PMI (2013) agreed that the project scope, time framework, cost budgeting, risk analysis and procurement are important stages in the construction planning phase. Fig. 1 shows the process of decision-making at the construction planning phase of a housing development project.



**Fig. 1 - Decision-making process at the construction planning phase of a housing development project**

Decision-making method is needed to complete the decision-making process at each stage in the construction planning phase. Referring to Baker et al. (2001), the analysis of decision-making methods is a rational process/systematic procedure used to apply critical thinking to the information, data, and experience to make a secure decision when the choice between alternatives is blurred. The purpose of each method is to provide comprehensive information and ways to make better decisions. Additionally, decision have to be made empirically using the scientific method (Zainal, 2015) to achieve the correct decision before proceeding to the construction phase of the housing development project. Previous researchers devised different kinds of decision-making methods in their studies that can guide the private housing developers in predicting the circumstances of their housing development project. Table 1 shows the lists of decision-making methods by Abdul Rahman et al. (2015), Zainal (2015), Adagha et al. (2017) & Robbins et al. (2017).

**Table 1 - Summary of the decision-making method**

Author	Year	Decision-making Method
Abdul Rahman et al.	2015	<ul style="list-style-type: none"> <li>• Intuition</li> <li>• Past experience</li> <li>• critical path method (CPM) –tool</li> <li>• S-curve –tool</li> <li>• SWOT analysis –tool</li> <li>• Risk control/mitigation –technique</li> <li>• Checklist and guidelines certified by ISO 9000</li> <li>• Discussion –technique</li> <li>• Workshop approach</li> </ul>

Zainal	2015	<ul style="list-style-type: none"> <li>• Discussion</li> <li>• Decision tree</li> <li>• Mathematic simulation (model)</li> <li>• Computer simulation (model)</li> <li>• Intuition</li> <li>• Experience judgement</li> <li>• Comparison with historical data</li> <li>• SWOT analysis</li> <li>• Operation management method (location)</li> <li>• Voting/Consensus</li> <li>• Delphi method</li> <li>• Market/Economic report</li> <li>• Analysis of Pros and cons</li> <li>• Analysis of Financial</li> </ul>
Adagio et al.	2017	<ul style="list-style-type: none"> <li>• Focus group/group discussion or survey</li> </ul>
Robbins et al.	2017	<ul style="list-style-type: none"> <li>• Payoff matrices</li> <li>• Decision tree</li> <li>• Break-even analysis</li> <li>• Ratio analysis</li> <li>• Linear programming</li> <li>• Queuing theory</li> <li>• Economic order quantity</li> <li>• Lists of alternatives</li> <li>• Personal judgments</li> <li>• Intuition</li> </ul>

### 3. Methodology

This study used a quantitative method - a survey method employing a questionnaire that has been used to collect data from selected respondents (private housing developers). Questions provided in the questionnaire, are related to the decision-making methods practised by Malaysian private housing developers. Data from 67 respondents were collected. Before conducting the survey, a literature review was conducted to collect data related to the research. An extensive review of the literature regarding previous research on standard development, theoretical frameworks and models suitable to this study was conducted. This review set the need for this research and supported the preliminary conceptual model. Also, the issues pointed out in this literature review are related to the decision-making process at the construction planning phase of a housing development project.

The scope of this research is confined to private housing developers in Peninsular Malaysia. The private housing developers were selected from the registered list of developers in the Real Estate and Housing Developers Association (REHDA, 2017). The list is available only for the developers in Peninsular Malaysia. Private housing developers were selected because they are involved in their work with a high prospect and it is important to determine whether they are involved in ethical or unethical decision-making for housing development projects at the construction planning phase process (Zainal, 2015). Next, the data gathered was analysed with the aid of Statistical Package for Social Sciences (SPSS) software. Descriptive analysis is conducted and the mean value from the examined data is used to identify the aims of this paper. Finally, the analysed data was validated through checklist surveys with the help of experts from private housing developer companies which have an experience more than 10 years in the field of housing development.

### 4. Result

Table 2 shows the finding of the survey conducted on 67 (*n*) respondents. The finding is based on the mean analysis performed to determine the importance level. The level depends on the basic agreement regarding the importance of decision-making methods in each stage of the construction planning phase of the housing development project.

**Table 2 - Finding for decision-making method in the construction planning phase**

Stage / Decision-Making Method	Mean (n=67)	Important Level
<b>Project Scope</b>		
[1] Comparison with historical data	4.3582	Very Important
[2] Decision tree	4.2388	Very Important
[3] Discussion	4.8806	Very Important
[4] Economic order quantity	4.4925	Very Important
[5] Experience judgment	4.7015	Very Important
[6] Financial analysis	4.6716	Very Important
[7] Market/economic report	4.3134	Very Important
[8] Pros and cons analysis	4.4627	Very Important
<b>Time Framework</b>		
[1] Decision tree	4.2537	Very Important
[2] Discussion	4.5672	Very Important
[3] Experience judgment	4.5075	Very Important
[4] Financial analysis	4.3134	Very Important
[5] Pros and cons analysis	4.2687	Very Important
<b>Cost Budgeting</b>		
[1] Break-even analysis	4.2687	Very Important
[2] Comparison with historical data	4.3284	Very Important
[3] Discussion	4.5522	Very Important
[4] Economic order quantity	4.4478	Very Important
[5] Experience judgment	4.2388	Very Important
[6] Financial analysis	4.5373	Very Important
[7] Market/economic report	4.5522	Very Important
[8] Pros and cons analysis	4.2090	Very Important
<b>Risk Planning</b>		
[1] Comparison with historical data	4.3731	Very Important
[2] Decision tree	4.4925	Very Important
[3] Discussion	4.5224	Very Important
[4] Financial analysis	4.2537	Very Important
[5] Market/economic report	4.3284	Very Important
[6] Pros and cons analysis	4.4328	Very Important
<b>Procurement</b>		
[1] Discussion	4.4627	Very Important
[2] Experience judgment	4.3433	Very Important

Table 3 shows the standard values for the agreement level regarding the importance of decision-making methods. Basically, the decision of accepting or rejecting the variables in the questionnaire survey is based on the mean value of the five points of the Likert scale, as in Table 2.

**Table 3 - Value of agreement level**

Agreement Level	Mean Value
<b>Not Important at All</b>	$1 < X \leq 1.8$
<b>Unimportant</b>	$1.8 < X < 2.6$
<b>Undecided</b>	$2.6 < X \leq 3.4$
<b>Important</b>	$3.4 < X < 4.2$
<b>Most Important</b>	$X \geq 4.2$

## 5. Discussion and Conclusion

Almost all the decision-making methods used by the private housing developers at each stage of the planning phase are the same. This paper discusses the main method contributing to decision-making at the project scope stage of the planning phase. Discussion, experience judgment and financial analysis are the three main successful methods that help private housing developers in making decisions at the first and the second stage of the planning phase. The private housing developers are aware of the fact that the most appropriate way to get the knowledge is discussion among group members. Through discussions with experienced team members, selection for the best alternative and ideas for minimising the duration of a housing project can be made more effective. Then, the information needed to formulate a decision is perfectly produced and possible alternatives for the action are well recognised. Financial analysis is also

specified as very important since the major goal of every construction practitioner is to complete the project within expected time and budget, along with predicted quality targets.

Afterwards, the private housing developers declared discussion, market/economic report and financial analysis as the main decision-making methods, at the third stage (cost budgeting) of a construction planning phase of the housing development project. A discussion with supported data from the market/economic report and financial analysis helps decision-makers predict the right value for the housing development project. Projects can be delivered within allocated budget but that needs a good starting estimate and an awareness of factors that can increase the cost of the project. An accurate cost estimation for every item in a housing development project during the construction planning phase helps private housing developers overcome the project failure which may occur due to poor financing.

For the next stage (risk planning), respondents (private housing developer) agreed that discussion, decision tree and pros and cons analysis are the best ways to reach at the right decision before moving on to the next stage. The practice of decision tree along with pros and cons analysis assists the decision-maker in running a better discussion which then guides them to produce initial predictions of possible risks as well as the solutions to potential problems. For the final stage of construction planning phase (procurement), discussion and experience judgment are indicated as main methods used in decision-making. The decision-makers need to make a precise decision based on their knowledge to identify the most qualified stakeholders. Progress must be made to solve any issue related to the interactions between the stakeholders such as clients, contractors and consultants. The early forecast would lead to time and cost savings.

In practice, a decision-maker can select an appropriate method to design a successful housing development project. The provided decision-making methods, support private housing developers in identifying the best and the most crucial input data, get better information and knowledge on the activities, and identify risks and their effects as well as the solutions. Finally, this paper has formulated a decision-making method practised at the construction planning phase of a housing development project for Malaysian private housing developers. Appendix A shows the overall findings regarding the decision-making method employed at the planning phase of the housing development project.

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### Appendix A

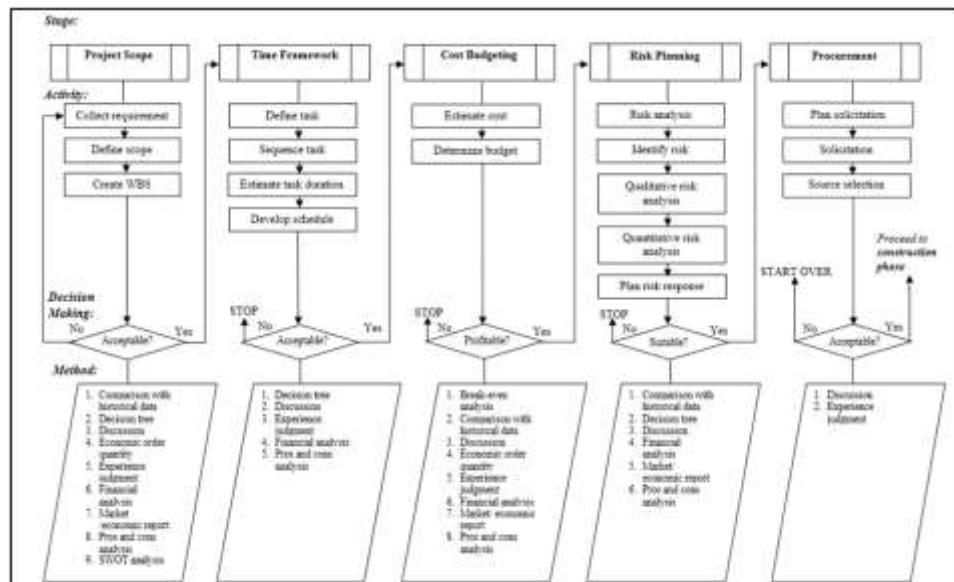


Fig. 2 - Overall finding of the decision-making method in the construction planning phase

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