A Survey on Factors Affecting the Contractor's Mark-Up Size Decision

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Abstract: - Construction industry is a competitive industry and the only possible way for a contractor to survive is by winning the tenders and making profit. Therefore, a "right" mark-up size is essential for contractor which to maximum possible profit, at the same time keeping its bid at a competitive level. Hence possessing a sound knowledge of the factors affecting the contractors' mark-up size decision is imperative in identifying the "right" mark-up size in bidding. This paper aim to identify the current practices in contractors' mark-up size decision and factors considered important in the mark-up size decision. Questionnaires survey were conducted and distributed to the 200 contractors in Malaysia. It was found that the range of the mark-up size varies from five (5%) to twenty-five (25%) but the most preference mark-up size is 10 % to 15%. Experience, previous record and market survey are commonly practiced by contractors in determining their mark-up size. However, the bidding models were not utilized by contractors since they do not have sufficient information and the complexity of these models. Findings also indicate that the ranking of most influence category of factors were company characteristics, followed by project characteristics, economic situation, project documentation and bidding situation. The finding of this research shows that the top ten influence factors that affect the mark-up size decision are overall economy, size of project, experience in such project, availability of required cash, degree of difficulty, degree of safety, project cash flow, competition, current workload and need for work.

Keywords: - Contractor's Mark-Up, Size Decision

1 Introduction

The construction industry is one of the most important sectors in the Malaysian economy. Though it contribute a small percentage only in Malaysia's GDP, it is very important sector because construction will supplement the development of other sector, such as build factory for industrial sector, provide roads and many more. Winning a tender then maximize profit is the aim of contractor's organization. In order to that, a contractor's organization must always revise their strategy and method in tendering. Competitive tendering situation should give a benefit to the parties involved in construction. It means, a good pricing that maybe awarded a contract by a tenderer should also can produce a best result to execute the works. Due to competitive tendering situation, an analysis of tender sum should make effort from time to time in giving a better result in right choices of contractor to execute a works [1]. In construction industry, there are two ways through which a contractor may be awarded a construction project, competitive bidding or negotiation with an owner. Nowadays, the construction industry becomes more competitive and low profit margin has great influenced by the commonly uses of competitive bidding.

Under the competitive bidding, the client's professional advisers will invite the contractors to submit tenders for the client's proposed development through the advertisement in the local, national and technical press. As a result, stack of the interested contractors will participant in the tender and increase the competitive in getting a job of the contractor [2]. Besides, competitive bidding also influences the contractor's profit margin due to the fierce competitive among the contractors in getting a job. Competitive bidding for construction projects usually awarded to the lowest responsible bidder [3]. During this recession period, the lowest bidding prices are driven down by the competitive pressures [4]. As a result, the contractors are forced to reduce their profit margin in bidding and tried to bid the project as low as possible to getting a job.

However, how to determine the right mark-up size is not an easy task. The complexity of the issue is magnified by many influencing factors and the uncertain potential outcome of decision. This complexity is the source of the difficulty faced by many contractors in determining the right mark-up

sizes which will assure them of winning sufficient projects with reasonable profits [5].

1.1 Aim
The aim of this is to identify factors affecting the contractor's mark-up size decision in Malaysia.

1.2 Objectives
The objectives of the research are:

1. To investigate the current practices in contractors' mark-up size decision.
2. To determine the factors affecting the mark-up size decision by contractors.
3. To analyse the perceived importance of the various factors considered in the mark-up size decision.

1.3 Problem Statement
In bidding process, the contractors are facing the two crucial decisions. The first is the decision of whether to bid or not to bid for a project, when an invitation has been received. If yes, the second decision is associated with the determination of the mark-up size. The mark-up size may vary from 5 to more than 20 percent of the job cost and represents an allowance for profit plus other items such as general overhead and contingency. However, to determine the mark-up size is not an easy task because it is affecting the probability of getting a job and its chances of making a reasonable profit [2]. In determining a mark-up size, the contractor is facing two seemingly incompatible and contradictory objectives. He must bid high enough to make a profit yet low enough to get a job at the same time.

It is difficult for a contractor to balance between both at the same time because a bid low enough to assure getting a job will invariably is too low to guarantee a profit. On the other hand, a bid high enough to assure an adequate profit margin usually has only a remote chance of winning the job. [4]. Right mark-up is the optimum balance between a bid price that is as 'practically low' as possible to win the tender and as 'practically high' as possible to maximize profit [6]. But is it possible for contractor to balance between both at the same time? These unpleasant alternatives place the contractor in an extremely awkward position.

To determine the right mark-up is an essential task of all contractors. However, is it possible to determine the right mark-up that will help the contractor winning the bidding and at the same time maximize his profit? Hence this paper aims to investigate what are the factors affecting the contractor's mark-up size decision in Malaysia

1.4 Scope of Study
Research will investigate into the factors affecting the contractor's mark-up size decision in Malaysia. The scope of this research by is limited to the Contractors Class A or Grade G7 registered with the Construction Industry Development Board Malaysia (CIDB) in Klang Valley, Malaysia.

2 Analysis On Findings
A total 200 sets of questionnaires were distributed via postal within the area. The respondents were instructed to complete the questionnaires and return them immediately. However, only a total of 40 copies were duly answered and returned.

Table 1: Years in construction field

Years operation	Frequency	Percentage
1 to 5 years	2	5%
6 to 10 years	7	17%
11 to 15 years	10	25%
More than 15 years	21	53%
Total	40	100%

Table 1 shows that majority of the respondents had many experiences in this field because their company has been operated more than 15 years and has been taken more than 30 projects. 55% of them usually undertaken public or government project while the remaining undertaken private project.

The contractors were asked on their intention to know detail about preference mark-up size to tender in construction projects, the percentages allocated for each components in mark-up size and how their based to determine the mark-up size decision.

Table 2: Mark-up size taken by contractors

Mark-up Size	Frequency	Percentage
5 to 10 % of overall cost	7	17.5%
10 to 15 % of overall cost	21	52.5%
15 to 20 % of overall cost	10	25.0%
20 to 25 % of overall cost	2	5.0%
TOTAL	40	100%

Table 2 shows that the higher preference mark-up size taken by contractors is among 10% and 15% in overall project cost which consists 52.5%.Mark-up size from 20% to 25% of overall project cost is most rarely taken by contractor which its percentages only reach 5%. It can be concluded that the range of the mark-up size may vary from 5% until 25% and the most preference mark-up size is 10 % to 15%.The mark-up size will be added to the

estimated direct cost of construction at the close of the estimating process.

Generally, the mark-up size contains three major components; overhead cost, contingencies cost, profit. The allocation of percentages of each component in mark-up size is considered important due to their influence in winning a tender.

Table 3: Overhead cost with different mark-up size

Overhead Cost	Mark-up Size	Frequency
3%	5 to 10 %	7
	10 to 15 %	8
4%	10 to 15 %	13
	15 to 20 %	5
5%	15 to 20 %	5
	20 to 25 %	2
TOTAL		40

From Table 3, 15 contractors determined their overhead cost as 3% of overall project cost. Contingencies cost are determined by 2 % until 5 % of overall project cost. The ranges of profit are determined by contractors by 4% until 12%. None of the contractors in this survey had utilized any bidding models in assist their mark-up size decision.

2.1 How your company determines the mark-up size decision?

This question is made according to the likert scale of 1-5 which are 1 for not at all, 2 for rarely, 3 for sometimes, 4 for frequent and 5 for most frequent. The usual practices by contractors in determining the mark-up size decision included the experience, hunches, market survey and previous record.

Table 4: Ranking of practices in determining mark-up size decision

Practices in Determination of Mark-up Size	Weighting Scale 1	2	3	4	5	Average Index
Experience	0	0	10	18	12	4.05
Previous Record	0	0	11	18	11	4.00
Market Survey	0	0	18	12	10	3.80
Hunches	0	14	14	12	0	2.95

Table 4 shows that experience (average index=4.05) is most important in determination of mark-up size decision. Out of 40 respondents, 12 of them strongly agreed, 18 of them agreed and while the remaining 10 of them were neutral. Besides, the previous record (average index=4.00) can be considered frequent used by contractors to determine the mark-up size followed by the hunches.

2.2 What do you think the reason of lack or not utilization of bidding model in assist contractor's mark-up size decision?

Table 5: Ranking for reason of non-utilization of bidding models

Factors of Lack or Not Utilization of Bidding Models	Weighting Scale 1	2	3	4	5	Average Index
Not sufficient information to effectively utilize	0	0	4	18	18	4.35
Not familiar with bidding models	0	0	11	13	16	4.13
Not knowledge about bidding models	0	0	14	11	15	4.03
Complexity of bidding models	2	0	18	14	6	3.55

Table 5 shows that not sufficient information of effectively utilize (average index=4.35) is most influential reason of non-utilization of bidding models followed by not familiar with bidding models, not knowledge about bidding models and complexity of bidding models.

2.3 Factors Affecting the Contractor's Mark-up Size Decision

There are five main categories of factors affecting the contractor's mark-up size namely project characteristics, project documentation, company characteristics, economic situation and bidding situation. Different category of the factor has different influential in mark-up size decision. Thus, each category is analyzed differently in this article. All factors in each category will be ranked according to the score of average index in order to determine the perceived important factor among them. The following section will discuss the analysis of the first category.

The category of project characteristics includes all qualities that describe the project such as size of project, project type, duration of project, project cash flow, type of equipment required, degree of difficulty &safety, identity of owner, location of project, job start time, risk involved nature work, job related contingency and type & number supervisory person required in a project.

Table 6: Ranking for factors affecting mark-up size decision in project characteristics category.

	Factors Affecting Mark-up Size Decision	Weighting Scale 1	2	3	4	5	Average Index	Rank
1. Project Characteristics								
a	Size of project	0	0	5	10	25	4.50	1
b	Degree of difficulty	0	2	5	12	21	4.30	2
c	Degree of hazard or safety	0	2	5	15	18	4.23	3
d	Project cash flow	0	0	7	17	16	4.23	4
e	Location of Project	0	3	9	12	16	4.03	5
f	Identity of owner	0	0	15	15	10	3.88	6
g	Duration of project	0	4	8	18	10	3.85	7
h	Project type	0	4	8	19	9	3.83	8
i	Job related contingency	0	0	19	12	9	3.75	9
j	Type of equipment required	0	3	18	7	12	3.70	10
k	Job start time	0	4	15	10	11	3.70	11
l	Type and number supervisory person required	0	4	12	18	6	3.65	12
m	Risk involved nature work	0	9	16	12	3	3.23	13

The size of a project is found to be the most heavily contemplated factor among the project characteristics. It seems that the larger the size of project is, the more attractive it is to contractors. The attractiveness of a large size project may arise from its big contract price and long construction duration. The large project size will contribute positively and substantially to annual business volume and allows size able monthly cash inflows to a contractor [7]. Project type must be considered because it effect of method of construction. Example is between traditional construction method and uses of IBS components in construction. The long construction duration will allow a contractor to keep his resource in revenue generating state for, at least, a period extending over the project duration, hoping that a more prosperous economy will emanate before the completion of the project [7]. Project cash flow reflects the contractors' need for cash. Monthly cash inflow will help a contractor to pay the monthly wages of the contracted imported work force and other permanent employees. Also, the monthly inflow will increase cash availability to a contractor giving him an economic leverage to compete for other projects [8]. Equipment required by a project and equipment availability also plays a heavy role in determining the mark-up size for the project. A contractor who is deciding on a mark-up size evaluates equipment required by the project against equipment available in his own. In a situation where a contractor's own equipment make up a major portion of the required equipment, he may trade off high mark-up size with setting his available equipment in a revenue generating condition. Therefore, contractors need to raise the required loan to purchase or rent the equipment required by the project [4].

If the complexity of the project requires more technical and managerial input, contractors may consider either employing or hiring consultants to undertake some of the technical and managerial functions. In such situation, contractors will determine the high mark-up size in his bid price [4].

It has been state by [4], the greater the degree of risk and uncertainty involved in the job, the greater the profit margin that will be expected by the management. Thus, contractors have heavier weightage on the mark-up size decision in the highest risk of safety and hazards. The identity of owner or client of project also need considered in the determination of a mark-up size. [4].

A contractor bidding for a project that is located outside his business area is assumed to be in a weak competitive position. He/she has to compete against local contractors who have already established good business relationship with local suppliers. Thus, project location has heavier influence on a contractor's mark-up size decision [7]. This factor referring the time to start the project, it may be affected by season either rainy season or summer.

2.4 Project Documentation

Table 7: Ranking for factors affecting mark-up size decision in project documentation category.

	Factors Affecting Mark-up Size Decision	Weighting Scale 1	2	3	4	5	Average Index	Rank
	2. Project Documentation							
a	Owner special requirement	0	0	9	15	16	4.18	1
b	Type of contract	0	0	12	12	16	4.10	2
c	Completeness of document	0	4	10	14	12	3.85	3
d	Use of nominated subcontractor	0	2	12	16	10	3.85	4
e	Contract condition	0	0	17	17	6	3.73	5
f	Qualification requirement	0	0	20	14	6	3.65	6
g	Anticipated value of liquidate damages	0	0	18	18	4	3.65	7
h	Contractor involved design phase	0	3	18	10	9	3.63	8
i	Design quality	2	3	18	8	9	3.48	9
j	Insurance premium	0	5	19	14	2	3.33	10
k	Designer (architect & engineer)	0	4	24	8	4	3.30	11

It can be seen from Table 7, there are several factors for project documentation category. Owner special requirement received the highest average index with 4.18 followed by type of contract. This type of contract is rigid and inflexible for changes. Changes are very expensive for the owner and they usually bring extra cash to the contractor and both types of contracts transfer the construction risk from an owner to the contractor [8].Completeness of document must be considered due to the contents of document such as specification. The contractor must be considered all owner special requirements before entering to the binding of tender and determined mark-up because it may be need special material, equipment and special method during construction of projects. The contractors need to identify the nominated subcontractors who will be involved for the project to determine the mark-up size in bidding tender. The last factor under project documentation category is insurance premium. For this factor, the finding shows that average of the respondents were neutral with the average index 3.33.

2.5 Company Characteristics

Table 8: Ranking for factors affecting mark-up size decision in company characteristics category.

	Factors Affecting Mark-up Size Decision	Weighting Scale 1	2	3	4	5	Average Index	Rank
	3. Company Characteristics							
a	Experience in such project	0	0	8	9	23	4.38	1
b	Availability of required cash	0	0	6	14	20	4.35	2
c	Current workload	0	0	7	18	15	4.20	3
d	Need for work	0	0	6	21	13	4.18	4
e	Strength in industry	0	0	10	16	14	4.10	5
f	Past profit in similar jobs	0	0	11	16	13	4.05	6
g	Establishing long relationship with client	0	0	9	20	11	4.05	7
h	Uncertainty in cost estimate	0	0	12	16	12	4.00	8
i	General overheads	0	0	13	16	11	3.95	9
j	Availability of qualified staff	0	3	9	19	9	3.85	10
k	Confidence in work force	0	1	18	10	11	3.78	11
l	Reliability of subcontractors	0	0	21	15	4	3.58	12
m	Portion subcontracted to others	0	7	11	19	3	3.45	13
n	Public exposure	2	5	14	15	4	3.35	14

Based on Table 8, it can be seen that there are several factors for company characteristics category. The first factor is the experience in such project followed by the availability of required cash. Current workload also received the third highest percentage with an average index of 4.20 followed by the need of work. Contractor who had many experience and long period in construction industry maybe having more potential to get the projects. The contractor's past experience may provide an ability to foresee the project requirement more clearly which will help the contractor in putting proper estimate, plans and schedule [8]. In such case, the contractor can determine an optimum mark-up size with easily. If the required cash is available to a contractor, he will have the control in setting the interest rate for using the money. But, if the required cash is not readily available, the

contractor will approach a bank for a loan. In this case the interest rate is dictated by the bank. In addition, obtaining a bank loan may freeze a contractor's short and/or long term assets that are held against the loan as collateral [8].

For large and medium contractors may be do not consider this factor when deciding on their mark-up because they have established successful programmes for selecting, orienting, training and motivating their expatriate work force. These programmes may have created a sense of commitment and loyalty in the attitudes of the work force towards the organization [9].

Large contractors may attract qualified staff to join their organizations for the better pay, benefits and recognition they offer. It seems that small contractors cannot compete with large ones in attracting qualified staff to join their firms. Consequently, they may hire less qualified staff and recognize this in the determination of their mark-up [9].By considering past profit rates, the contractor may be able to formulate his desired future profit rate [4]. That means that the contractor can determine the best and optimum mark-up size which maximize the possible profit and at competitive level.

2.6 Economic Situation

Table 9: Ranking for factors affecting mark-up size decision in economic situation category.

Factors Affecting Mark-up Size Decision		Weighting Scale 1	2	3	4	5	Average Index	Rank
4. Economic Situation								
a	Overall economy (availability of work)	0	0	4	10	26	4.55	1
b	Availability of equipment	0	0	11	11	18	4.18	2
c	Risk involved in investment	0	0	11	15	14	4.08	3
d	Availability of labour	0	0	11	15	14	4.08	4
e	Government division requirement	0	0	13	18	9	3.90	5
f	Rate of return	0	2	14	13	11	3.83	6
g	Tax liabilities	0	3	10	20	7	3.78	7
h	Quality of available labour	0	5	13	15	7	3.60	8
i	Policy in economic use of building resources	2	6	14	12	6	3.35	9
j	Policy in production cost savings	2	7	18	9	4	3.15	10

Based on Table 9, it can be seen that there are several factors for economic situation category. After the contractual and construction risks assessed, the contractors are expects to be rewarded for accepting such risks with a reasonable return and mark-up size. Generally, the greater the degree of risk and uncertainty involved in the project, the greater the profit margin that will be expected by the management. A study of the economic indicators will enable the contractor to forecast whether the economy is heading toward a boom or recession. If the indications are that recession is imminent, which may slow down construction activities, and then the contractor would price keenly to win the contract. In such case, determination to win means lower percentage mark-up and hence reduced profit margin [4]

According to [7], the availability of the labour force is low contributed to mark-up size decision. A contractor may obtain the required work force from his own imported labour and or from other contractors' imported labour. It is because contractor who does not win a contract functions as a labour supplier, supplying surplus labour, for other busy contractors. If a project has a high anticipate rate of return, the contractors may minimize their mark-up size to winning the project. In such case, they are considering the long term profit margin incurred on the project in future.

2.7 Bidding Situation

Table 10: Ranking for factors affecting mark-up size decision in bidding situation category.

Factors Affecting Mark-up Size Decision		Weighting Scale 1	2	3	4	5	Average Index	Rank
5. Bidding Situation								
a	Competition	0	0	5	19	16	4.23	1
b	Required bond capacity	0	0	8	17	15	4.18	2
c	Bidding document price	0	2	5	19	14	4.13	3
d	Availability of other project	0	1	12	13	14	4.00	4
e	Time allowed for submitting bids	0	0	13	17	10	3.93	5

f	Prequalification requirements	0	0	17	13	10	3.83	6
g	Number of competitors	0	3	15	10	12	3.78	7
h	Tendering method	0	5	11	16	8	3.68	8
i	Risk in fluctuation in labour prices	0	7	16	11	6	3.40	9
j	Identify of competitors	5	3	15	9	8	3.30	10
k	Reliability of company cost estimate	3	3	16	16	2	3.28	11
l	Risk in fluctuation in material prices	0	9	17	9	5	3.25	12
m	Time of bidding (season)	0	12	13	11	4	3.18	13
n	Tendering duration	0	11	17	9	3	3.10	14

As cited by [4], the lowest bidder prices decreases as the number of competitors on a project increases. In such competitive situation, contractors need to minimize his or her mark-up size so that the chances being lowest bidder are maximized. Latter, he or she just can winning over the competitors and success biding the project [10].The bond is usually in the form of cash or a bank guarantee. In any case the contractor should commit an amount equal to the bond capacity until the expiration of the warranty period.

Therefore, this factor may have heavier influence on a contractor's mark-up size decision when availability of cash in a contractor's account is limited [7].It appears that large numbers of these contractors believe that the period allowed for submitting bids is not enough to prepare an accurate estimate. Therefore, they are aware of the possibility of producing an inaccurate estimate so that they consider this factor when determining their mark-up [9].

Project drawings and specifications are usually sold to the interested contractors for non-refundable consideration. Only the contractor who wins the contract is able to recover the document price given that they incorporate it as a cost item in the bid. As we know that the amount paid for bidding documents for projects undertaken by large and medium contractors is high enough to influence the mark-up size decision. For small contractors, this factor has no influence on the determination of mark-up size [9].

The pre-qualification requirements may provide these contractors valuable information in evaluating the level of competitiveness. If the pre-qualification requirements limit the contractors who can bid for the project to a certain class or grade, contractors may have the ability to reasonably estimate the number of bidders and their identity [9].

2.8 Ranking of Significant Factors That Affecting Mark-up Size Decision

Table 11: Ranking of significant factor of mark-up size according to the category

Factors Affecting Mark-up Size Decision	Average Index	Percentage	Rank
a. Company Characteristics	3.95	79.0%	1
b. Project Characteristics	3.91	78.2%	2
c. Economic Situation	3.85	77.0%	3
d. Project Documentation	3.70	74.0%	4
e. Bidding Situation	3.66	73.2%	5

As mentioned in earlier, there are five main categories of factors affecting the contractor's mark-up size. Every category has varied influential in mark-up size decision. Therefore, the ranking of the category of factors is considered important and will be analysed first. According to the Table 11, the influential categories of factors affecting mark-up size decision are followed by company characteristics, project characteristics, economic situation, project documentation and bidding situation. The average index among them is followed by 3.95 or 79.0%, 3.91 or 78.2%, 3.85 or 77.0%, 3.70 or 74.0% and 3.66 or 73.2%.

2.9 The importance of the various factors considered in the mark-up size decision

Table 12: Ranking of significant factors that affecting mark-up size decision

	Factors Affecting Mark-up Size Decision	Weighting Scale 1	2	3	4	5	Average Index	Rank
a	Overall economy (availability of work)	0	0	4	10	26	4.55	1
b	Size of project	0	0	5	10	25	4.50	2
c	Experience in such project	0	0	8	9	23	4.38	3
d	Availability of required cash	0	0	6	14	20	4.35	4
e	Degree of difficulty	0	2	5	12	21	4.30	5
f	Degree of hazard or safety	0	2	5	15	18	4.23	6
g	Project cash flow	0	0	7	17	16	4.23	7
h	Competition	0	0	5	19	16	4.23	8
i	Current workload	0	0	7	18	15	4.20	9
j	Need for work	0	0	6	21	13	4.18	10

Based on the Table 12, the finding shows that top ten important factors that affecting the mark-up size decision are overall economy, size of project, experience in such project, availability of required cash, degree of difficulty, degree of safety, project cash flow, competition, current workload and need for work.

Overall economy is the most influential factors that affecting the mark-up size decision in this project. That means the contractors will first consider the overall economy in determining their mark-up size especially when recession is imminent. This is because it may slow down construction activities, then the contractor need to price keenly to win a project.

Besides, size of a project also found heavily influence in mark-up size decision. The larger of the size of project is more attract the contractors because it's big contract price and long construction duration. This will contribute positively and substantially to annual business volume of a contractor.

In addition, experience in such or similar project also considered heavily in the mark-up size decision The contractor's past experience may provide an ability to foresee the project requirement more clearly which will help the contractor in putting proper estimate, plans and schedule. Thus, this factor is ranked as third important in affecting the mark-up size decision.

Moreover, availability of required cash also has great influence in determination of mark-up size decision. If the required cash is available to a contractor, he will have the control in setting the interest rate for using the money. But, if the required cash is not readily available, the contractor will approach a bank for a loan. In this case the interest rate is dictated by the bank.

Also, degree of difficulty and safety are ranked in the top ten important factors. These factors have influential because related to the degree of risk and uncertainty involved in the job. Therefore, contractor will consider the high mark-up size in his bid price in the case of higher degree in difficulty and safety.

In addition, project cash flow also considered heavily in the mark-up size decision. This can be explained that project cash inflow can increase cash availability to a contractor and giving him an economic leverage to compete for other projects.

Therefore, this factor is considered by contractor during determining the mark-up size decision.

Meanwhile, competitive nature in bidding also has great influence in determination of mark-up size decision. As naturally, the bidder prices will be reduced when the number of competitors in tender increases. In such competitive situation, contractor will consider to minimize the mark-up size in nature maximize the chances to winning the tender. On the other hand, need for work also taken into account by contractors in determining the mark-up size decision. Contractors are willing to sacrifice their profit margin to winning the tender if they needed for the works.

3 Conclusion And Recommendation

It can be concluded that, in current practices, the range of the mark-up size may vary from 5% until 25% but the most preferred mark-up size is 10 % to 15%. Besides, experience, previous record and market survey were more practiced by contractors in determining their mark-up size. Unfortunately, the bidding models are not utilized by contractors since they are not sufficient information to effectively use it and this is also due to the

complexity of these models. The finding shows that top ten important factors that affecting the mark-up size decision are overall economy, size of project, experience in such project, availability of required cash, degree of difficulty, degree of safety, project cash flow, competition, current workload and need for work.

Therefore, it was recommended that there is a need to encourage proper filing and tracking record system by the contractor in every construction project. Within times accumulative information regarding previous projects will be collected and gathered as purpose of reference in determining their mark-up size for the development of future project. This also will aid the contractor to use of bidding models and the accuracy of such modelling will be increase. It was recommended to the contractor to study the factors that are influencing the mark-up size decision so that it can be well understood and knowledge may be gained regarding the required factors. All of the factors play a big role in determining the mark-up size, a better understanding should be gained and it must also be improved from time to time in order for a decision to be accurately made. Factors influencing the mark-up size must be well studied and awareness regarding the importance must be applied on the contractors and so that the mark-up size decision may be more accurate based on the market condition and the process of making such decision can be conducted efficiently. Contractor must gather as much knowledge as possible in ensuring an accurate decision and a flawless decision making process. Also, more extensive study can be conducted regard to the mark-up size decision in non-traditional procurement method such as Design and Build, Turnkey, and so on. In addition, bidding models are recommended for advanced study in order to persuade and encourage the Malaysian contractors effectively utilized it.

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