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Research Article

Controlling Cost Overrun Factors in Construction Projects in Malaysia

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Abstract: Poor cost performance in construction project is a common problem worldwide resulting in significant amount of cost overrun. This led us to explore the major contributors of cost overrun and propose mitigation measures to control cost overrun factors. Since, there were very few studies on cost issues in construction projects in Malaysia, hence this study was carried out in Malaysia using qualitative research method using semi-structured interview with experienced personnel's involved in handling construction projects. A total of 21 respondents from client, consultant and contractor organizations were interviewed and requested to evaluate the eight (8) categories of cost overrun factors determined from the author's previous work. Out of the eight categories of cost overrun factors, the respondents had ranked "contractor's site management" as most severe contributor of cost overrun and followed by "information and communication" category while the least severe category is financial management. Besides that the respondents are also requested to propose and classify mitigation measures for cost control according to suitable implementation strategies. This resulted in 15 proposals on mitigation measures and these were classified in three implementation strategies. The results indicated that among these 15 mitigation measures, five measures are classified as pro-active strategy and four measures are classified as organizational strategy. While other six measures are classified as fluid measures which can be adopted in more than one strategy.

Keywords: Construction industry, cost performance, implementation strategy, mitigation measure

INTRODUCTION

Construction industry now-a-days is facing severe problem of poor cost management resulting in huge amount of cost overrun. The problem of poor cost management and overrun in project cost is serious issue in both developed and developing countries. This needs serious attention for improving the construction cost performance as rarely projects are completed within budget (Chimwaso, 2001). In order to explore the problem of cost performance in construction projects worldwide, Flyvbjerg *et al*. (2003) studied 258 projects in 20 nations with an approximate worth of US$ 90 billion (size of projects range from US$ 1.5 million to 8.5 billion) and found that cost escalation was a common practice and happens in almost nine out of 10 projects with an average of 28% higher than forecast costs. They concluded that average cost escalation in Europe was 25.7%, North America 23.6% and other geographical areas was 64.6%, while cost performance in construction projects has not improved over time and it is in the same order of magnitude today as it was 70 years ago. World Bank also reported that 63% of the 1778 construction projects financed faced poor performance with overrun in budget at an average of 40% as cited by Ameh *et al*. (2010) and Zujo *et al*. (2010).

By conducting questionnaire survey on cost study in United Kingdom, Olawale and Sun (2010) reported that many construction projects still suffer cost overruns. Only 41% of respondent participating in survey experienced cost overrun less than 10% of their cost projects. This indicates about 59% of respondents experienced cost overrun more than 10%. In Bosnia and Herzegovina, a study of 177 projects of structures indicated that the 41.23% of structures' contracted price was not met and another investigation of 29 building construction structures showed that contracted price overruns were noted at 17 (58.62%) of the structures with maximum contracted price overrun of 29.16% at an average of 6.84% (Zujo *et al*., 2010). In Ghana, 75% of the projects exceeded the original project cost whereas only 25% were completed within the budget (Frimpong *et al*., 2003). Similarly in Malaysia also, the problem of cost overrun is a serious issue. Abdullah *et al*. (2009) mentioned that 90% of large MARA construction project were suffered delay with significant effect of time and cost overrun since 1984.

Cost overrun in construction projects can occur due to many reasons. Sriprasert (2000) pointed out that cost

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overrun is caused by ineffective construction management and poorly established cost control systems. Apart from these, Frimpong *et al*. (2003) studied 26 factors that cause cost overruns in construction of ground water projects in Ghana and found that monthly payments difficulties was the most important cost overruns factor as indicated by contractors and consultants, while owners ranked poor contractor management as the most important factor. Despite of some difference in viewpoints among the three groups surveyed, there was high degree of agreement among them with respect to their ranking of the factors. The overall ranking results indicate that the three groups felt that the major factors that can cause excessive cost overruns in developing countries are poor contractor management, monthly payment difficulties, material procurement, poor technical performances and escalation of material prices. Kaming *et al*. (1997) conducted questionnaire survey in Indonesian high-rise construction projects and found that materials cost increased by inflation, inaccurate quantity take-off and labor cost increased due to environment restriction were the most critical causes of cost overruns. Lee (2008) examined cost overrun problem in Korean social overhead capital projects. In a study of 161 completed projects the causes of cost overruns were found as changes in scope, delays during construction, unreasonable estimation and adjustment of project costs and no practical use of the earned value management system.

Sriprasert (2000) studying cost overrun problems in construction industry of Thailand mentioned that low quality materials cause higher construction cost than expected because of the loss of materials during construction. This is resulted from a lack of standards for materials and management systems. Also, lack of ability of management to prevent cost overruns or to control construction costs caused many Thai construction companies to fail in achieving effective cost performance in projects. In Malaysia, Ali and Kamaruzzaman (2010) through questionnaire survey in different projects at Klang Valley found that main factors that contribute to cost overruns include inaccurate/poor estimation of original cost, construction cost underestimation, improper planning, poor project management, lack of experience, poor contract management, inflation of project costs, high cost of machineries, fluctuation in price of raw materials, unforeseen site conditions, insufficient fund, obsolete/unsuitable construction equipments and methods and Mistake in design, while in study of MARA large projects (Memon *et al*., 2010) found that cash flow and financial difficulties faced by contractors, contractor's poor site management and supervision, inadequate contractor experience, shortage of site workers, incorrect planning and scheduling by contractors were most severe factors while changes in scope of project and frequent design changes are least affecting factors on construction cost. This leads to the need of serious attention to understand the contributors of cost overrun in depth and provide solution to control these factors. Hence, this study focused on assessing major contributors of cost overrun and proposing mitigation measures to control factors of cost overrun which will help in achieving effective cost performance in construction projects of Malaysia.

RESEARCH METHODOLOGY

This study adopted qualitative research method using semi-structured interview session with experienced personnel's involved in handling large construction projects. The respondents were requested to evaluate the 8 categories of cost overrun factors. These categories were determined from the previous study (Memon *et al*., 2011) which had identified 58 factors. Besides that the respondents were also requested to propose and classify mitigation measures for cost control according to suitable implementation strategies.

A total of 30 selected respondents were contacted, however the authors managed to interview 21

Table 1: Demographic information of the respondents

Position	Organization	Education	Years of experience
District engineer	JKR, Johor	BE (civil engineering)	27
Senior assistant director	JKR, Johor	BE (civil engineering)	24
Assistant director	JKR, Kluang	BE (civil engineering)	24
Deputy director	MARA, Melaka	Master (project management)	16
Project director	Concession holder, Kuala Lumpur	BSc	23
Senior project engineer	Private client, Kuala Lumpur	Master (civil engineering)	8
Deputy director	Private client, Johor	Master (project management)	26
Head of planning unit	Project management consultant, Johor	Bachelor in QS	28
Principal	Private consultant, Johor	BE (civil engineering)	20
Managing director	Private consultant, Johor	BE (civil engineering)	23
Project manager	Private consultant, Kuala Lumpur	Master (project management)	12
Managing director	Private consultant, Kuala Lumpur	BE (civil engineering)	21
Project manager	Private contractor, Johor	BE (civil engineering)	10
Managing director	Private contractor, Johor	Master (civil engineering)	15
Managing director	Private contractor, Johor	BE (civil engineering)	30
Senior manager	Private contractor, Kuala Lumpur	BE (civil engineering)	29
Project manager	Private contractor, Kuala Lumpur	BE (civil engineering)	10
Senior project manager	Private contractor, Selangor	BE (civil engineering)	20
Director	Private contractor, Selangor	Diploma (civil engineering)	25
Managing director	Private contractor, Kedah	Diploma (civil engineering)	20
CEO & director	Private contractor, Perak	PhD (civil engineering)	5

Table 2: Ranking of contributing categories to cost overrun

	Frequency of responses in severity's rank								
Group	1	2	3	4	5	6	7	8	Overall rank
Contractor's Site Management (CSM)	19	0	2	0	0	0	0	0	1
Information and Communication (ICT)	0	17	1	1	1	0	1	0	2
Project Management and Contract Administration (PMCA)	0	3	15	1	1	0	1	0	3
Labor related factors (LAB)	1	1	1	16	2	0	0	0	4
Material and Machinery (MMF)	1	0	0	2	15	2	1	0	5
External factors (EXT)	0	0	0	0	1	14	2	4	6
Design and Documentation Factors (DDF)	0	0	0	1	1	3	15	1	7
Financial management (FIN)	0	1	2	0	0	2	1	15	8

respondents. Demographic characteristics of each respondent interviewed are as in Table 1.

From Table 1, the total year's experience of the interviewed respondents is 416 with an average of 19.8. Majority of the respondents are senior employees of their respective companies. All the respondents selected for this interview session are engaged in handling large construction projects and holding managerial and executive posts. The respondents have obtained civil engineering degrees and some have earned master degree in civil engineering and project management. This shows that the interviewees were capable and reliable to explore the underpinning issues related to cost overrun.

Significant contributor groups to cost overrun: The eight categories of 58 factors of cost overrun are:

- Contractor's site management
- Project management and contract administration
- Design and documentation
- Labor related factors
- Material and machinery
- Financial management
- Information and communication
- External factors

The respondents were asked to mark each category according to its severity rank in contributing to cost overrun. The results of interview sessions are shown in Table 2.

Based on Table 2, the most severe category of factors in contributing to cost overrun is contractor's site management and least severe is financial management category of factors. These indicate that contractors play important role in achieving effective cost performance. The elaboration of each category is further discussed in following sections.

Contractor's Site Management (CSM): Site management category is the most significant contributor as agreed by 19 of 21 (90%) respondents by placing it at 1st rank. Only 2 respondents ranked this category at 3rd place. The two respondents that argued site management is highly depending on construction resources hence construction resources are more significant contributors to cost overrun compared to site management. This finding is in line with previous research studies which highlight that improving site management is very critical for reducing cost overrun as it affects on productivity significantly (Ibrahim *et al*., 2010). Site management of contractor affects overall progress of project (Chan and Kumaraswamy, 1997; Fong *et al*., 2006). Koushki *et al*. (2005) also state that contractor related factors are main contributors to cost overrun.

Information and Communication (ICT): Seventeen respondents had ranked ICT related factors category at 2nd place in causing cost overrun in Malaysian construction projects. This representing 81% of the total respondents agreed that ICT category has significant impact on cost overrun. This category is crucial because in implementing construction project, different groups of companies are involved which include civil engineering contractors, subcontractors, M&E contractors and others, in such cases advance information and communication systems are very important as to provide faster data sharing and making practitioners to take decision at earliest in solving any problem occurring during the project execution without delaying the activities. ICT has great impact on economic development (Ameh *et al*., 2010) but unfortunately in construction projects information and communication technology is not properly used and it was found as major reason causing cost overrun. Slow information flow is found as important cause of construction cost overrun (Kaliba *et al*., 2009). Proper implementation of ICT will help in improving coordination and communication among all the personnel involved in construction project which can reduce mistakes and discrepancies. Consequently successful project can be achieving.

Project Management and Contract Administration (PMCA): Project management and contract administration category is at 3rd rank in causing cost

overrun as agreed by majority of respondent with 71.4%. Project management emphasizes on application of knowledge, skills, tools and techniques to project activities to meet project requirements (PMI, 2004) and its role starts from the feasibility study of the project which continues till the commissioning of the project. Project management and contract related issues are also commonly accounted in many countries such as Pakistan (Azhar *et al*., 2008). These issues are avoidable and can be prevented but unfortunately construction industry experiences poor project management which affects significantly to the overall performance (Ali and Kamaruzzaman, 2010; Meeampol and Ogunlana, 2006). Besides this, poor contract administration also contributes to cost overrun (Elinwa and Buba, 1993; Frimpong *et al*., 2003; Omoregie and Radford, 2006).

Labor related factors (LAB): This category is ranked as 4th major contributor of cost overrun as agreed by 76.2% of respondents. Since, construction industry is regarded as labor intensive sector which is highly dependent on labor for execution of the study. Success of any construction project not only depends on the number of labor but also subjected to efficiency of the labor force. Hence, effective labor management is important area which needs serious attention in avoiding cost overrun. Labor related issues are major problems of cost overrun in many countries such as in Kuwait (Koushki *et al*., 2005), Nigeria (Jackson and Steven, 2001) and also Indonesia (Kaming *et al*., 1997).

Material and Machinery (MMF): Material and machineries are very important resources of any projects. This category is ranked at 5th place with agreement of 15 (71.5%) respondents. Materials are considered as the backbone of construction projects, which accounted for nearly 70% of the total value of project (Elinwa and Buba, 1993). Efficient material management is very critical in achieving successful completion of project as any issue related to material will significantly contribute to cost overrun (Koushki *et al*., 2005). Similarly, machinery resources are also important in assisting manpower resources in stepping up the efficiency of the study by saving huge amount of time and cost. Hence, adequate and efficient equipment use is more advantageous for project as compared to the application of obsolete and inadequate equipments (Kaliba *et al*., 2009).

External factors (EXT): External factors are regarded as un-controllable factors which are usually difficult to control and sometimes it is beyond the control (Olawale and Sun, 2010). In this survey, the external factor's category was ranked at 6th place as agreed by 14 (66.7%) of the respondents.

Design and Documentation (DDF): Design is the road map and systematic guide in leading to the objective of any project while documentation plays an important role in tracking and monitoring the progress of the project. This category is ranked at 7th place as agreed by majority of respondents i.e., 15 of 21 with percentage of 71.4%. Poor design and documentation issue could leads to poor project performance (Moura *et al*., 2007). This issue can be resulted from lack of either consultants' or contractors' skill in providing clear working drawings and detailed specification that can be used on site. Documentation focuses on recording all activities during the construction process. These records allow the contractors to identify their performance in the past by looking at the weaknesses and could be used as a guide to improve their future performance (Alwi and Hampson, 2003).

Financial management (FIN): This category seems to have least impact on cost overrun as compared to other categories from the perception of the respondents. Fifteen of the respondents with 71.4% had ranked this category at 8th place. Financial management is also important criteria in achieving successful construction project but if not well management it could lead to serious problem of cost overrun. Chan and Park (2005) states that most of the contractors are lacking in financial management which do not plan well in distributing the cost of the projects that might lead to poor cost performance. Hence, it is advisable to monitor financial spending thoroughly (Enshassi *et al*., 2009; Koushki *et al*., 2005). Financial difficulties could also occur from the owner side where there is a delay payment of monthly valuations to the contractors (Ogunlana and Promkuntong, 1996) which affect the cash flow of contractors. This leads to slower the project progress. Hence, appropriate funding level should be determined at the very inception of a construction project so that regular periodic payments may be made to the contractor for work done (Choudhury and Phatak, 2004).

MITIGATION MEASURES TO CONTROL COST OVERRUN

Managing construction cost is one of the important tasks in achieving successful project completion. Unfortunately it is very seldom achieving effective cost management and often experiencing significant amount of cost overrun. Based on understanding of factors causing cost overrun as identified in previous section, this study proposed a total of 15 mitigation measures to control cost overrun factors for achieving effective cost control through interviews. The respondents classified each measure based on three approaches of implementation strategies as proactive, re-active and organizational strategy (Olawale and Sun, 2010). Measures in Pro-active (Pro) strategy are the measures that must be adopted in the planning stage of project to

Table 3: Frequency of proposed mitigation measures

No	Items	Pro	Re	Org	Pro-Re	Pro-Or	Re-Org	P-R-O
1	Effective strategic planning	17	0	3	0	0	0	1
2	Proper project planning and scheduling	16	0	3	2	0	0	0
3	Effective site management and supervision	12	2	6	0	0	1	0
4	Frequent progress meeting	0	13	6	0	0	0	2
5	Proper emphasis on past experience	3	3	13	0	1	1	0
6	Use of experienced subcontractors and suppliers	2	11	5	1	1	0	1
7	Use of appropriate construction methods	14	2	1	1	1	0	2
8	Use up to date technology utilization	7	11	2	0	1	0	0
9	Clear information and communication channels	11	1	6	0	1	2	0
10	Frequent coordination between the parties	2	4	12	1	0	1	1
11	Perform a preconstruction planning of project tasks and resources needs	10	0	1	1	0	9	0
12	Developing human resources in the construction industry	1	2	17	0	1	0	0
13	Comprehensive contract administration	3	0	18	0	0	0	0
14	Systematic control mechanism	12	1	6	1	1	0	0
15	Improving contract award procedure by giving less weight to prices and more weight to the capabilities and past performance of contractors	3	9	7	0	1	1	0

Pro: Pro-active measure; Re: Re-active measure; Org: Organizational measure; Pro-Re: Fluid measure which could be adopted as proactive as well as reactive measure; Pro-Org: Measure adoptable as reactive as well as organizational strategy; Re-Org: Reactive as well as organizational measure; P-R-R: Measure which can be adopted in all the strategies as proactive, reactive and organizational

predict and prevent from the cost overrun issues. Measures in Re-active (Re) strategy are the measures which can be adopted to mitigate the effect of inhibiting factors in project control as a remedy while measures in Organizational (Org) strategies are the measures which are normally in place because of the company's belief, orientation, management style or philosophy; they have a tendency of not being specific to one project but would normally affect all projects. Also, some of the measures are fluid which can be classified in more than one strategy. The results from interviews were analyzed and presented as in Table 3.

Based on the results obtained from Table 3:

- **Effective strategic planning:** A significant number of respondents i.e., 17 (81%) suggested that this measure should be adopted as pro-active strategy to achieve its benefits in controlling project cost. Three (14%) respondents mentioned that this approach must be as organizational strategy and should be taken as the policy of company while 1 (5%) respondent suggested that it can be used in all three strategies i.e., proactive, reactive and organizational depending on the prevailing situation. Based on this, it is summarized that this measure is appraised as pro-active strategy.
- **Proper project planning and scheduling:** Majority of respondents (i.e., 76%) classified this measure to be adopted in proactive strategy as it helps in devising a workable scheme of operations to accomplish the objectives of project. On the other hand 14% of respondents classified this measure as organizational strategy. While 10% respondents suggested that this measure may be adopted as fluid measure and be implemented as proactive-reactive strategy. This can be summarized that 86% of respondents agreed that this measure is suitable in pro-active strategy.
- **Effective site management:** For this measure a significant number (57%) of respondents classified it as pro-active strategy. While 29 and 10% of respondents classified this measure as organizational and re-active strategy. Five percent of respondents mentioned that this measure be adopted as fluid measure as reactive and organizational strategy. In essence, 67% of respondents agreed that this measure be adopted as pro-active strategy and 34% respondents suggested to adopt it as organizational strategy. Hence, this measure is appraised as reactive-organization strategy.
- **Frequent progress meeting:** This measure is classified as fluid measure which is adoptable as re-active and organizational strategy as suggested by 71 and 38% of respondents respectively. This is because there are always uncertainties in construction projects which can affect project performance. To improve the performance and resolve the uncertainties faced during execution, it is preferred to arrange regular progress to discuss project related matter in depth and re-plan for further works. Also, every organization has the policy to document the progress of work which can be properly assessed by arranging regular meetings.
- **Proper emphasis on past experience:** This measure is appraised as organizational strategy as suggested by majority (75%) of the respondent. However, 19% respondents classified this measure as pro-active and 19% respondents classified it as re-active measure. In fact, this is very important measure for improving project performance from planning to handover of the project. At the planning stage, it will help in proper planning for the similar types of project to work more effectively. In the same way, it helps in solving the

problem occurred during project execution by learning the solutions carried out for problems of same nature occurred in past projects. Hence, if this measure is adopted as organizational policy, it will facilitate in all stages of project.

- **Use of experience subcontractors and suppliers:** This measure plays important role in physical execution of the project. However, there is little disagreement between the respondent for strategy classification of this measure. This measure is classified as pro-active measure by 10% respondents, a significant number of respondents i.e., 52% classified it as reactive measure and 24% of respondents classified it as organizational measure. On the other hand 15% respondents mentioned that this measure be adopted a fluid measure. As we know that construction industry is a resource-driven industry and suppliers are the important role player in assuring the timely availability of resources at required quantities. Similarly, subcontractors are the actual persons who put effort in carrying out physical construction work. Hence, this measure is appraised as fluid measure which may be adopted as reactive-organizational strategy.
- **Use of appropriate construction method:** This measure is classified as pro-active strategy as suggested by majority of respondents i.e., 17 or 21 respondents. While 24% of respondents suggested adopting this measure as reactive strategy and 19% respondents classified it as organizational measure.
- **Use up to date technology:** A significant number of respondents i.e., 52% classified this measure as reactive strategy and 38% respondents classified it as proactive measure. Hence, this measure is appraised as fluid measure and can be adopted as proactive-reactive strategy. This is true because construction works are highly dependent to machinery and suitable technique of work. However because of unique and complex in nature, construction projects are always subjected to risks which require opting advance technologies at the planning stage. Further, construction project being fragmented and uncertain there are the chances to occur numerous problems during construction execution which may require finding more advanced techniques and technology than that being implemented on site as reaction to problems.
- **Clear information and communication channels:** This is a fluid measure to adopt as cost control; it can be implemented as proactive and organizational strategy. As in any construction project, various parties including consultant, contractors, sub-contractors, M&E organization, suppliers etc involved. The work of all parties is inter-related and highly depending with the works of other party. For-example, when the roof construction is carried out, al-together with civil works, the laying of conduits for electrical and HVAC works is also carried out simultaneously. This emphasis that there should be proper coordination between civil engineering firms and M&E personnel so that when civil work starts, M&E personnel also carry out their work on time so that construction work can be carried out smoothly. Hence it is very important that at organization level mode of communication be decided and mutually agreed by all parties to avoid hindrances. This emphasizes that "clear information and communication channels" be adopted organization measure and was agreed by 43% of respondents. A majority of respondents (with 57%) argued that this measure should be integrated with planning of work so that from the beginning of project miscommunication be avoided which many times create disputes on site. This suggests adopting this measure as pro-active action. Hence "clear information and communication channels" is appraised as proactive and organizational strategy.
- **Frequent coordination between the parties:** Majority of respondent suggested that every organization should make sure to use these information channels at every stage adequately to achieve its benefits and classified this measure as organizational strategy. Also, 33% of respondent mentioned that this measure can be proved effective reactive strategy to resolve the conflicts during project execution while only 19% of respondents classified this measure as pro-active strategy. Hence, this measure is appraised as fluid measure which can be adopted as reactive-organizational strategy.
- **Perform a preconstruction planning of project tasks and resources needs:** This is another important step required for successful execution of projects and hence is classified as fluid measure. This measure can be adopted in all three strategies of implementation i.e., pro-active, re-active and organizational as suggested by 52, 48 and 48% respondents respectively.
- **Developing human resources in the construction industry:** Human resources are the fundamental requirement for any projects as construction projects are labor intensive. Hence, majority of respondents i.e., 86% of respondents classified this measure as organization strategy.
- **Comprehensive contract administration:** This measure is classified as organizational strategy as suggested by majority of respondent with percentage of 86% respondent. As we know that any project is carried out by following the contract guidelines and conditions. Hence, contract conditions must be described properly and

Table 4: Mitigation measures with implementation strategy

No	Mitigation measure	Implementation strategy
1	Effective strategic planning	Pro-active
2	Proper project planning and scheduling	Pro-active
3	Effective site management and supervision	Pro-active
4	Frequent progress meeting	Re-active and organizational
5	Proper emphasis on past experience	Organizational
6	Use of experienced subcontractors and suppliers	Re-active and organizational
7	Use of appropriate construction methods	Pro-active
8	Use up to date technology utilization	Pro-active and re-active
9	Clear information and communication channels	Pro-active and organizational
10	Frequent coordination between the parties	Organizational
11	Perform a preconstruction planning of project tasks and resources needs	Pro-active, re-active and organizational
12	Developing human resources in the construction industry	Organizational
13	Comprehensive contract administration	Organizational
14	Systematic control mechanism	Pro-active
15	Improving contract award procedure by giving less weight to prices and more weight to the capabilities and past performance of contractors	Re-active and organizational

explained clearly to execute successfully. Thus at the organization level, steps should be taken to ensure that work is being carried out in accordance with the contract condition of project.

- **Systematic control mechanism:** This measure is a fluid measure and be adopted a proactive-organizational strategy as suggested by 67 and 33% respondents respectively. This is very important measure as in order to compliance the contract requirements and execution of work successfully, a proper system and mechanism is very critical which must be incorporated at planning stage.
- **Improving contract award procedure by giving less weight to prices and more weight to the capabilities and past performance of contractors:** A significant number (i.e., 43%) of respondents classified this measure as reactive strategy, 33% respondents classified it as organizational strategy and 14% of respondents categorized it as proactive strategy. While 10% respondents classified this measure as fluid measure of which 5% mentioned it as proactive-organizational strategy and 5% respondents classified this measure as reactive-organizational strategy. In essence this measure is classified as fluid measure which must be adopted as reactive-organization strategy as agreed by 48 and 43% respondents. This is very important measure and the respondents mentioned that one of the major reasons of failure of construction projects is the policy of awarding contract to lowest price without consideration of past performance of the contractor which many times lead to poor performance of project. Because of this, many of project experience delay, cost overrun as well abandonment of project resulting to re-tender with higher cost and hence this measure must be made policy to avoid this issue and if the contractor is noticed as not performing well, the contract be abandoned and re-awarded to a new contractor with better past record.

Table 4 summarizes the mitigation measures proposing the implementation strategy of the particular mitigation measure.

The mitigating measures shown in Table 4 are extracted from in-depth interviews with very experienced personnel involved in managing construction projects. These measures reflect the practices required to improve the current cost control practice. In order to achieve efficient and effective cost performance in construction project, owners of organizations are suggested to incorporate the mentioned measures as compulsory practices and project managers are suggested to adopt particular measures to implement at planning stage to avoid the hindrances during project execution and achieve effective cost control assuring the completion of project within budgeted cost.

CONCLUSION

This qualitative study adopting semi-structured interviews was to uncover the major contributors to cost overrun for large construction projects. It also identified mitigation measures for controlling the cost overrun. The respondents interviewed in this study were well experienced in handling large construction projects in private and public sector. Out of eight categories of cost overrun factors, the respondents had ranked “contractor's site management” as most severe contributor of cost overrun and followed by “information and communication” category while the least severe category is financial management. Apart of these findings, the respondents had proposed 15 mitigation measures. They also had classified these measures into three implementation strategies. The results of the classification show that five measures are

classified in pro-active strategy and four measures are classified as organizational strategy. Other measures are fluid which has been classified in more than one strategy.

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