Factors and Results of Cost & Duration Overrun on The Construction Projects

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INTRODUCTION

The primary objective of this study is to attempt to identify the major cost overrun factors and different main potential causes for cost overrun have been identified construction Projects and reviews the literature concerning cost & Duration overrun.

The identification of these factors should improve the performance of construction projects and increase the probability of successful project completion which can serve as the way forward for future projects in dealing with these cost overruns and a critical literature review methodology is used to achieve this goal.

Construction industries have a poor reputation in terms of finishing projects on budget. Most projects normally experience cost overrun. Several causes of cost overrun have been found in different contexts with the main potential causes being: frequent design change, investors ,contractors, financing, payment delay for completed work, lack of contractor experience, poor cost estimation, poor tendering documentation, and poor material management.

Besides being unique, expensive and usually carried out within a limited time frame, construction projects have been described as complicated and uncertain in nature, as no two construction projects are ever exactly the same. Even if two construction projects are similar, the opportunity for exactly repeating the process of execution is very low, as most of the projects elements are site-specific. Although the level of investment represented by construction projects has increased over the years from starting the investment projects in this region, construction projects have a consistently poor record in finishing within budget. It is considered that the cost overrun is a “regular feature” for public projects and can be defined cost overrun as the degree to which the final cost of the project exceeds the base estimate.

Construction projects experiencing cost overrun have the potential to become defaulted projects, with a resultant significant impact on all the projects parties.

For example: clients will be unable to use the facility, as the projects have not finished yet, and consultation and designing fees might increase. For contractors the impact could include loss of reputation and being “trapped” in only one project for long time.

Design/methodology/approach

The study is based on a literature review investigating factors which have a significant influence on cost overruns and also a survey, was conducted among professionals of the construction industry.

The survey investigated factors that have significant influence in construction cost overruns of public sector projects. This includes misinterpretation of the client's brief, incomplete design at tender stage, procurement strategies and contractual claims such as contract instructions. The results were analyzed and compared against the literature review.

Findings

Results indicated that the factors that have an influence in cost overruns of construction projects can be grouped into three categories i.e. very critical factors, moderately critical factors and less critical factors. It is important to note that major attention still need to be given to all these factors collectively as they all contribute to cost overruns of construction projects.

Value

This paper recommends that there is a significant need to identify factors that may influence construction cost & Duration overruns and to address these factors as early as the inception of the project.

The results thereof will bring about a significant decrease in the occurrence of overruns and improve the cost performance on Investment sector projects in Kurdistan region.

Which Projects get Build?

Flyvbjerg , (2005: 1) found it isn't necessarily the best ones, but those projects for which components best succeed in conjuring a fantasy world of underestimated costs, overestimated revenues, undervalued environmental impacts and overvalued regional development effects. Flyvbjerg survey, the first and largest of its kind, looked at several hundred projects in more than 20 countries. Marchiavelli seems to have been Chief Adviser on these projects with his observation that "prices who have achieved great things have been those … who have known how to trick men with their cunning, and who, in the end, have overcome those abiding by honest principles". In fact there seemed to be a formula at work:

(Underestimated costs)

+ (Overestimated revenues)

+ (undervalued environmental impacts)

+ (overvalued economic development effects)

= (project approval

Many project proponents don't hesitate to use this Machiavellian formula for project approval, even if it means misleading parliaments, the public and the media about the costs and benefits of projects. The result is an unhealthy "survival of the unfit test for large public works and other construction projects Flyvbjerg, (2005:1).

Do Projects Grow Larger over Time?

Project size matters to cost escalation, as found above for bridges and tunnels. But even for projects where increased size correlates with neither bigger percentage cost escalations nor larger risks of escalation, as found for rail and road projects, it should be pointed out that there may be good practical reasons to pay more attention to – and use more resources to prevent – cost escalation in larger projects than in smaller ones.

For instance, a cost escalation of, say, 50% in a US$5 billion project would typically cause more problems in terms of budgetary, fiscal administrative and political dilemmas than would the same percentage escalation in a project costing, say, US$5 million. If project promoters and owners wish to avoid such problems, special attention must be paid to cost escalation for larger projects.

Project Risk

Projects are inherently risky due to their long planning horizons and complex interfaces. The project scope or level of ambition will often change significantly during project development and implementation.

The Influence of Design on Cost

The relationship between costs of buildings and procurement, where procurement is the method by which buildings are delivered to the client. We can consider cost planning as a system that relates the design of a building to its cost, taking full account of quality, utility and appearance, the cost is planned to be within the economic limit of expenditure. Cost planning procedures are applied in an attempt to reduce the amount of recourses (and therefore cost) incurred during each stage of the development process, including design, construction, operation and maintenance, and subsequent replacement.

Kirkham (2007:3) referred back to biblical times in order to trace the origins of cost planning, and the reading they quoted from St Luke (Ch.14) gives a fascinating insight:

"Would anyone think of building a tower without first sitting down and calculating the cost, to see whether he/she could afford to finish it? Otherwise, once the foundations have been laid and he/she cannot complete it, all the onlookers will. "There is the man" they will say "who started to build and could not finish".

Whilst there are clearly metaphorical connotations within this reading, the point is pretty clear. To build well you must first plan. Interestingly, the final part of the reading is a harrowing reminder to many clients and builders in today's society who have not taken heed of good budgetary management (Kirkham, 2007:3).

Kurdistan region in particular has seen a rapid increase in construction output since the year 2006, but allied to this has been an increasing focus on project budgets, and moreover the ability to deliver these projects at the projected cost.

Causes of overruns

High profile infrastructure projects that experience cost and time problems or contractual disputes attract media attention as the community contributes to funding their delivery. There are several notable projects in recent which were over many years late and experienced more than the planned cost overrun.

In Kurdistan region, several large scale social infrastructure projects have experienced considerable delays due to poor project governance and design errors.

There are two rudimentary reasons why projects experience cost overruns. Firstly, strategic misrepresentation, which is an Orwellian euphemism for describing deceptive actions used by politicians and planners to ensure that projects proceed. Secondly, optimum bias, which encapsulates the systematic tendency for decision makers to be over-optimistic about the outcome of, planned actions. This includes over-estimating the likelihood of positive events and under-estimating risk and loss. Optimism bias is a problem in the planning and budgeting infrastructure projects and developed measures for dealing this with problem.

Many pathogen errors in engineering firms are based on practices (i.e. those pathogens from people's deliberate practices) that attempted to solve a particular problem. Further individuals may repeat inappropriate practices, such as taking short cuts and not following due processes. When a practice provides an individual with a satisfactory outcome then this practice is used again on future projects irrespective of its suitability.

Causes of error

The relationship between strategic misrepresentation and optimum bias with cost overruns implicitly assumes causality in terms of counterfactual dependence of the effect on the cause: the cause is rendered counterfactually necessary for the effect. For instance, to say that strategic misrepresentation caused a cost overrun is to say if the misrepresentation had not occurred, then the cost overrun would not have ensued. To be more precise, causality can be defined by reference to a causal chain of counterfactually dependent events, where a sequence of events (C, E, F….) is a chain of counterfactual dependence if E counterfactually depends on C, E counterfactually depends on F and so on. Basically one event is a cause of another if and only if there exists a causal chain leading from the first to the second.

The error of underestimating costs is significantly much more common and much larger than the error of overestimating costs. If underestimation were unintentional and related to lack of experience or faulty methods in estimating and forecasting costs, then we would expect underestimation to decrease over time. Better methods have been developed and more experience gained through the planning and implementation of more relevant complex projects. It is therefore concluded that cost underestimation has not decreased over time.

OBJECTIVE OF THE STUDY

The objective of the study was to identify the factors influencing cost & Duration overrun.

Overruns and rank them in order of significance to raise the level of awareness. The objective was achieved through a questionnaire survey. From the existing research finding, it was possible to identify the factors that influence cost overruns.

RESEARCH: SURVEY ON FACTORS CAUSING COST OVERRUNS

The purpose of the survey was to establish the factors causing cost overruns and to evaluate the influence these factors have on cost overruns. The survey was sent to 17 professionals in the construction industry, comprising architects, engineers, quantity surveyors, project managers and contractors.

These professionals comprised consultants in the private sector and professionals in public service, with some experience of the Free State situation. Responses to the questionnaire were received from twenty one (74%) of these professionals. The identification of the factors as well as evaluation of their impact is seen as important for future management of projects. This knowledge will enable project managers and project facilitators to concentrate on the most critical influences in respect of the control of costs on property development projects.

RESULTS AND FINDINGS

The first question was directed towards the establishment of whether construction cost overrun is seen as a problem. All the respondents considered cost overruns as a problem that needs to be addressed. Respondents did not consider all the factors listed to have a significant or equally important influence. According to respondents, the importance of factors on cost overruns may be divided into three categories i.e. very critical factors, moderately critical factors and less critical factors. However, all these factors should not be ignored in any given project. Five factors were considered to be very critical, (valued at between 70% and 80%) contributing to cost overruns (Figure 1).

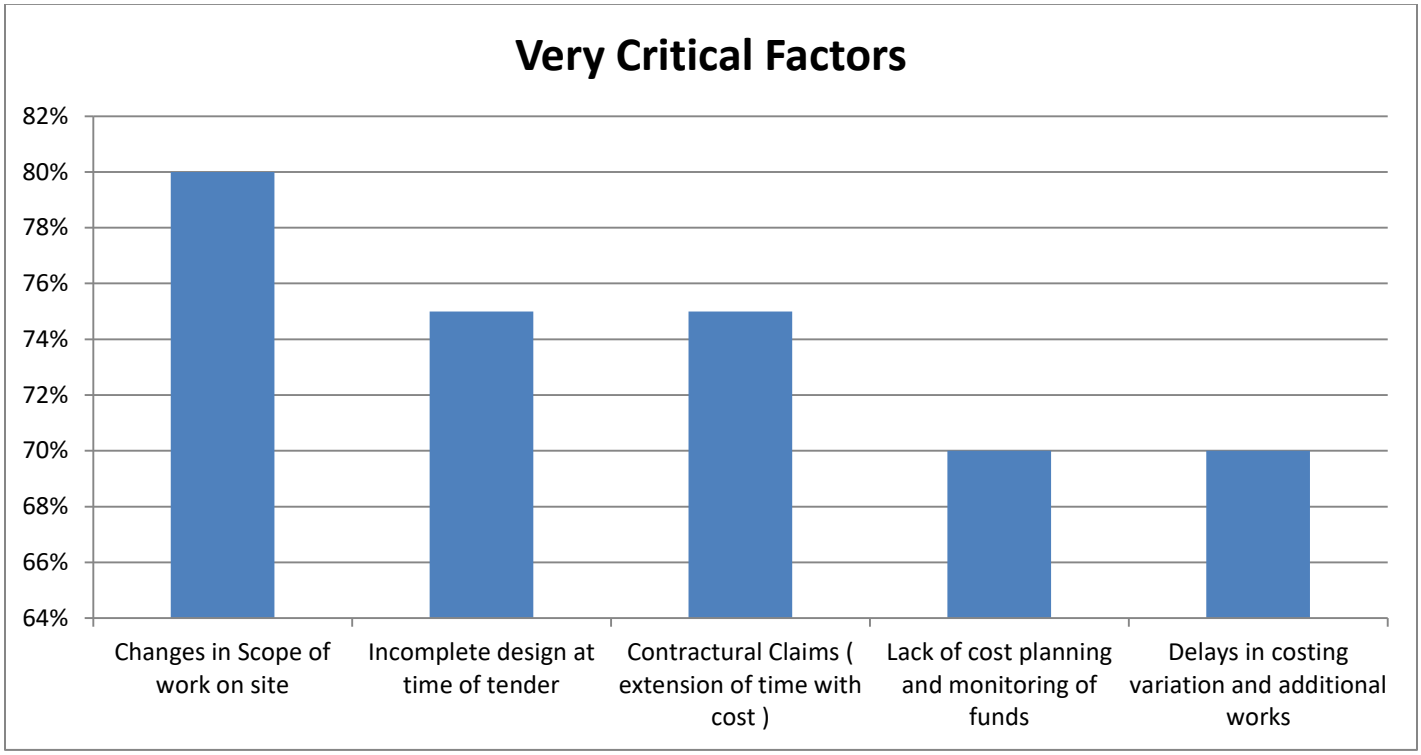

Figure 1: Five very Critical Factors of cost overruns

The five critical factors considered by the respondents and indicated by them as very critical, is shown in Figure 1 with importance of between 65% and 85%. Changes in scope of work on site by the client seemed to be the one with the most influence according to the respondents, but cannot be seen as controllable by the design team and is thus not seen as cost overrun related to budget items and must be equated for through an approval process driven by the client body.

One of the perennial causes of claims for additional payment is defects in the design or documentation issued for a project at the outset. Just as design may change for technical reasons there will be instances where the client's requirements may change, often for unpredicted or unanticipated reasons. Figure 1 clearly shows the important influence of design, claims, lack of cost planning and delays in costing of extras. The factor, "delays in costing of variations and additional works" is not seen itself as a factor causing cost overruns, but influences planning related to budgets because of the lack of timeous information. Figure 3a & 3b shows the moderately critical factors of cost overruns as considered by the respondents. (50% to 64% importance).

Figure2 shows factors directly influencing cost.

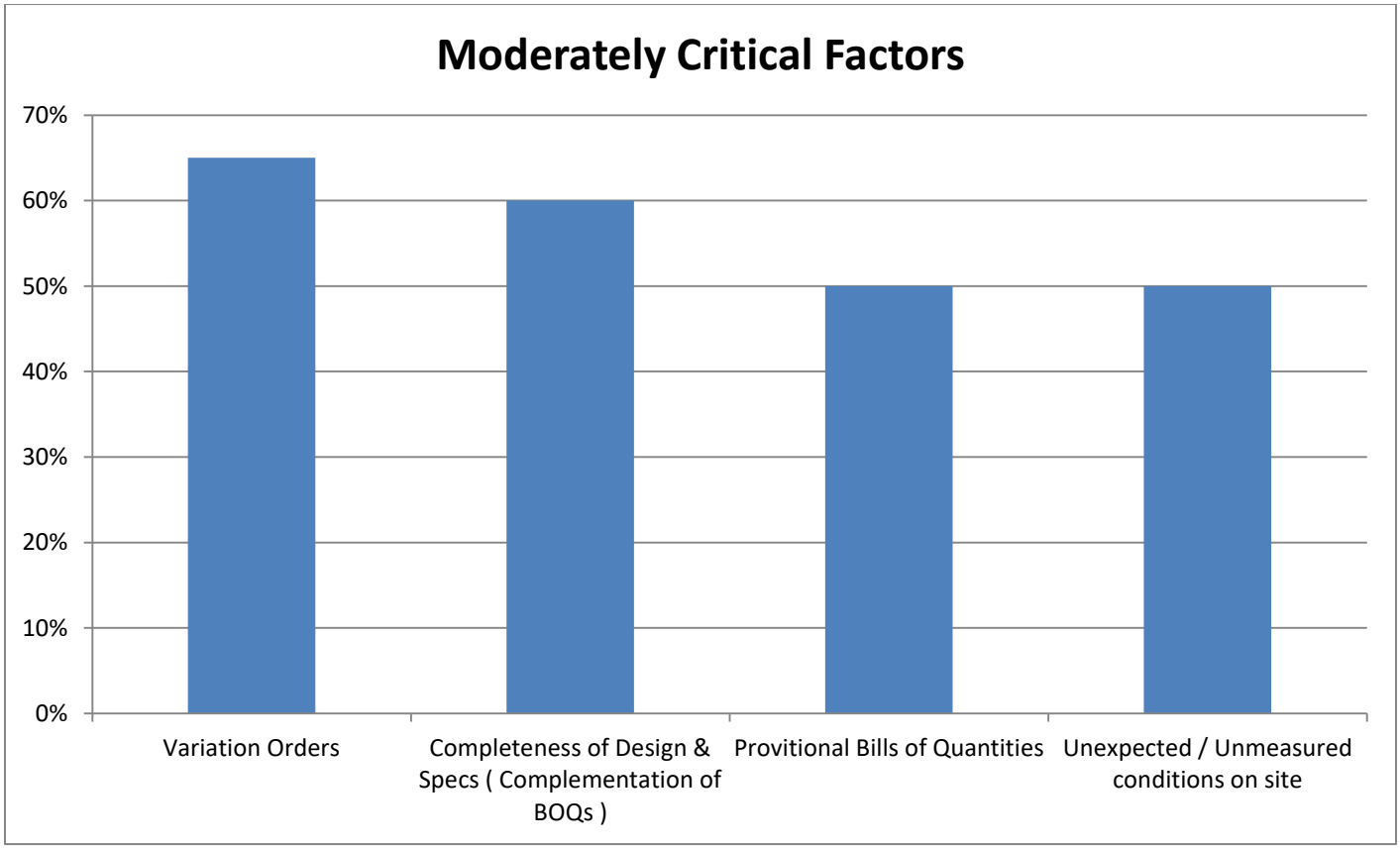

Figure2: Moderately Critical Factors of cost overruns (factors directly influencing cost)

Figure3: shows factors influencing cost information

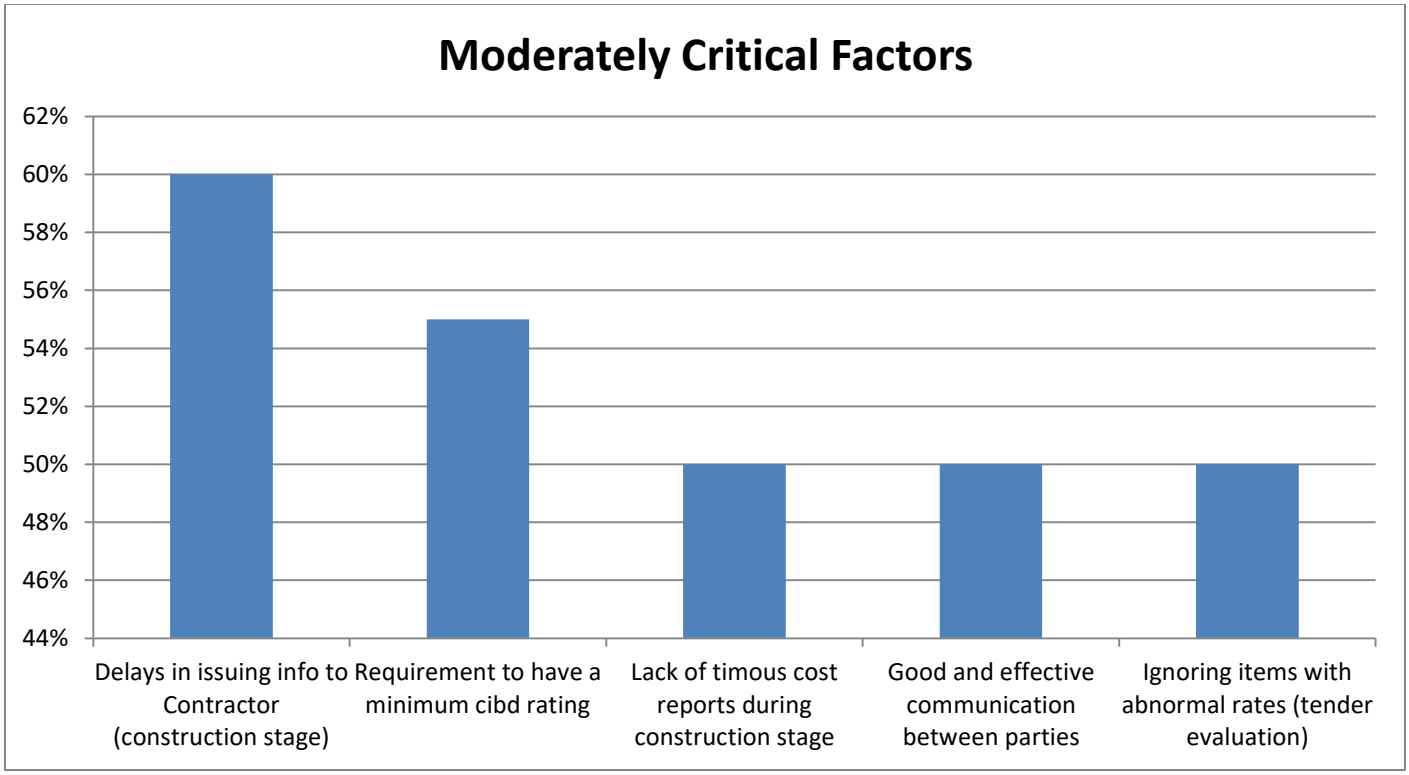

Figure3: Moderately Critical Factors of cost overruns (factors influencing cost information)

Classifying the various influencing factors under the above categories, narrows the problem and helps to deal with it more effectively. In these categories the responses were grouped between 50% and 64%, and were regarded as moderately critical with the variation orders scoring 65% in this category. It is not realistic however to believe that all the factors that influence cost overruns can be brought under control. Figure 3 must be considered carefully because it may be divided into two categories; Figure 3a contains the factors that directly influence costs, and Figure 3b the factors that influence cost information. In respect of factors influencing costs and therefore cost overruns the following factors are seen as fundamentally important:

• Variation orders: If variation is caused by change of scope or clients' changes then it becomes a budget change decision and cannot be seen as a cost overrun item in the "unexpected" category.

• Provisional Bills of Quantities: The effect of provision of quantities may cause cost overruns where to original quantities were under evaluated.

• Unexpected conditions caused by lack of prior investigation or natural influences.

• Completeness of design and specification is most important especially when Figure 1, results are considered.

Important factors influencing the availability of information are:

• Delays in issuing information to the contractor

• Cost reporting

• Communication

• Ignorance of abnormal rates: However if rates that are too high are ignored and items so priced are increased in number or volume cost overruns will occur.

Figure 4: shows the less critical factors of cost overruns.

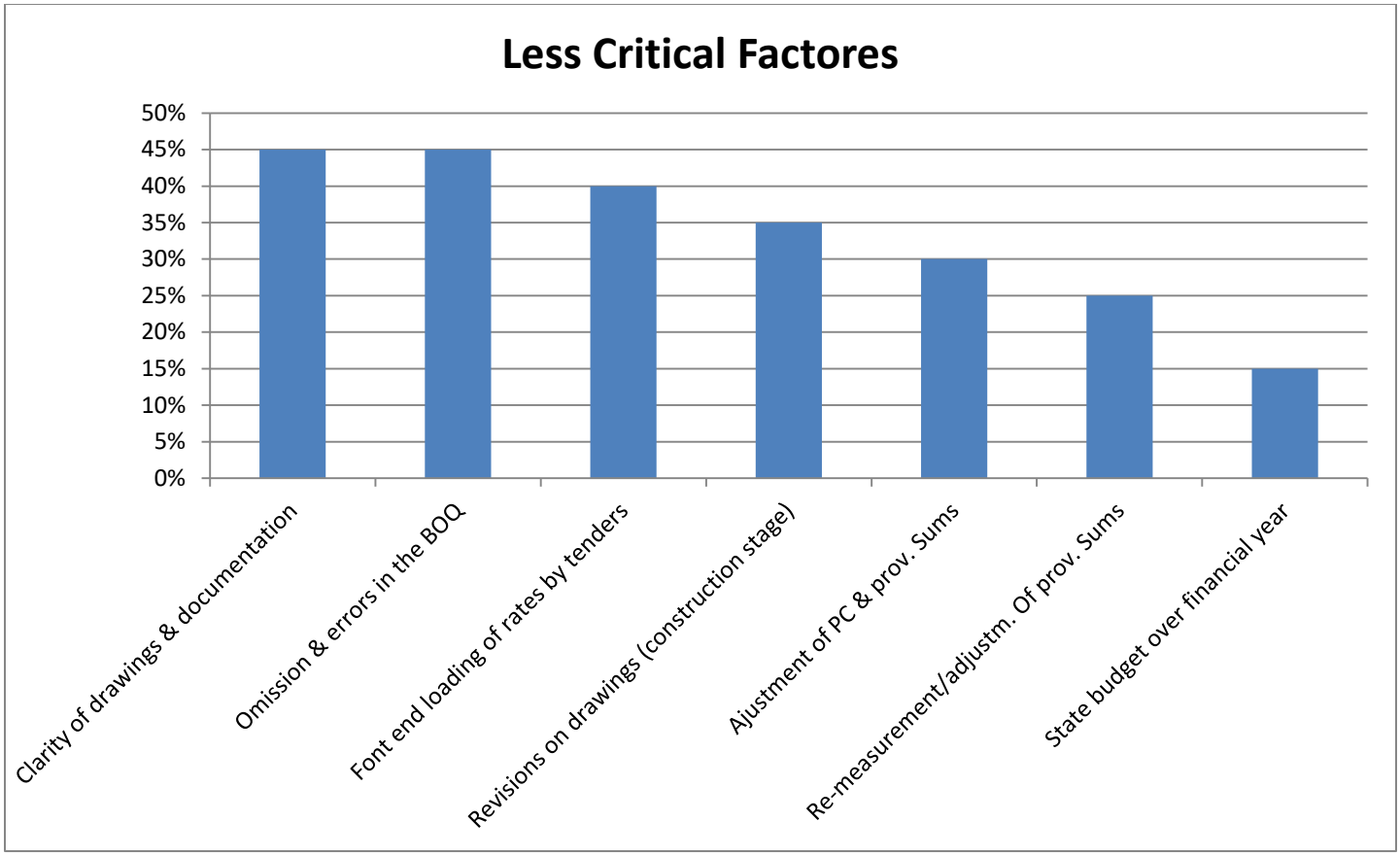

Figure 4: Less Critical Factors of cost overruns

In the less critical categories, the respondent's responses were grouped between 0% and 50%. These less critical factors indicated clarity of drawings and documentation as scoring 45%. On any given project, the factors under this category should be considered before dismissing them as insignificant. All these factors do contribute to cost overruns although the impact is minimal. It is however important to note that the adjustment to preliminaries and increases in respect of provisional sums due to under estimation may become critical if not planned and controlled well and are dependent on time and value rated pricing of the preliminaries bill.

CONCLUSION

It may be seen that most of the above factors, emanate from actions and omissions by both the client and the professional team. In this regard the first step towards minimizing cost overruns may be to deal with the human factors first. The factors that were studied make it difficult to control cost overruns during the construction stage alone. Instead, there should be sufficient planning of the project at the inception stage. Drawings and other tender documents should be well detailed.

If imperfect techniques, inadequate data, and lack of experience were main explanations of the underestimations, we would expect an improvement in forecasting accuracy over time. Underestimating the costs of a given project leads to a falsely high benefit-cost ratio for that project, which in turn leads to two problems. First, the project may be started despite the fact that it is not economically viable. Or, secondly, it may be started instead of another project that would have yielded higher returns had the actual costs of both projects been known. Cost underestimation cannot be explained by error and seems to be best explained by strategic misrepresentation, i.e. lying, which is defined in the conventional fashion as making a statement intended to deceive others.

In conclusion, the factors that influence cost overruns have been identified and ranked in order of significance. These factors have further been classified into categories, to help deal with them effectively. The three categories are: very critical factors, moderately critical factors and less critical factors. However it is important to note that some factors cause cost overruns and others cause only the lack of information to enable parties to act upon timeously.

From the results of the questionnaire, it can be deduced that public sector projects in the Free State Province of South Africa, like in any other developing countries, are not free from cost overruns. It is still evident that:

- Cost overruns appear to be a global phenomenon
- Cost overrun appears to be more pronounced in developing nations
- Cost overrun has not decreased over the past years. No learning seems to take place.
- Cost underestimation and overrun cannot be explained by error and seem to be best explained by strategic misrepresentation, namely, lying with a view to getting projects started.

RECOMMENDATIONS

From the above findings the following recommendations are seen as applicable:

1. Client involvement is critical and client (employers) must recognize the importance of their influence on the effectiveness of cost planning and cost control. The design team cannot budget for items that are still in the clients' mind that are added to the project during the construction phase.

2. The budget must be updated when external influences like additions and variations are implemented by the employer and should not be seen by them then as cost overruns, unfortunately this perception is still present.

3. There is a need to identify the factors that may influence cost overruns and deal with them from the inception stage of each project. This will decrease the occurrence of cost overruns.

4. Since design changes may be a result of insufficient planning, a careful study should be done to determine the appropriate time scale in which to produce designs and other tender documents. This will help improve the quality of tender documents and lessen changes during the construction stage.

The implementation of a discipline involving a formal budget control, cost planning and cost control regime is seen as an important process to limit cost overruns of construction projects.

Unfortunately formalization of such a regime is currently not seen as an important priority in relation to a government project as it is not implemented well by design teams.

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