

Cost Overrun Causes in Road Construction Projects: ‘‘Consultants’ Perspective’’

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Abstract. This study is conducted to identify the cost overrun causes in road construction projects in the West Bank in Palestine from consultants’ view. A questionnaire survey of 40 consultants from was performed. The survey included 51 suggested factors through literature review. The factors are ranked according to the degree of importance as assessed by the respondents. The findings reveal that the top five affecting factors are: materials price fluctuation, insufficient time for estimate, experience in contracts, size of contract, and incomplete drawings.

Keywords: cost overrun, road construction, estimating accuracy.

1. Introduction

Risk in construction has been the object of attention because of time and cost overruns associated with construction projects. A construction project is considered to be success, when it applies the iron triangle’s constrains: time, cost, and quality. However, the construction industry is full with projects which completed with excessive time and cost [2]. This study is conducted to identify the main cost overrun causes in road construction projects from consultants’ perspective. To achieve this aim, a survey of 40 consultants from the West Bank in Palestine was performed. For the purpose of this research cost overrun is defined as the difference between the final actual cost of a construction project at completion and the contract amount, agreed by and between the client (the project owner) and the contractor during signing of the contract.

2. Literature review

Researches on construction projects in some developing countries indicate that by the time a project is completed, the actual cost exceeds the original contract price by about 30 % [8]. Mahamid et al. [6] investigated the statistical relationship between actual and estimated cost of road construction projects using data from road construction projects implemented in the West Bank in Palestine over the years 2004–2008. The study was based on a sample of 169 road construction projects. They found that 100% of projects suffering from cost diverge, it is found that 76.33% of projects have cost over estimation while 23.67% have cost underestimation. They also concluded that the discrepancy between estimated and actual cost has average of 14.56%, ranging from -39.27% to 98.04%.

Koleola et al. [3] concluded six important factors affecting the accuracy of a pre tender cost estimate. The six factors are: expertise of consultants, quality of information and information flow requirements, the project team's experience of the construction type, the tender period and market condition, extent of completion of pre- contract design, and the complexity of design and construction. Okpala et al. [4] studied the causes of high costs of construction in Nigeria, the results indicated that: (1) High costs can be minimized

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by minimizing lapses in the management of human and material resources; (2) Despite some slight differences, the professionals agreed that shortage of materials, method of financing and payments for completed works, and poor contract management, are the three major reasons for high construction costs; and (3) Price fluctuation was identified as the most important factor responsible for the escalation of project costs. Al-Khaldi [1] concluded that the top five ranked factor affecting construction cost in Saudi Arabia from contractors' view are previous experience of contract, payments, availability of financial management and plans, type and size of contract and its content, and project location. On the other hand, the top five rank factors from consultants view are previous experience of contract, type and size of contract and its content, payments, project location, and contract period. Iyer and Jha [7] concluded that the factors most adversely affecting the cost performances of construction projects in India are: conflict among project participants, ignorance and lack of knowledge, presence of poor project specific attributes and non-existence of cooperation, hostile socio-economic and climatic conditions, reluctance in timely decision, aggressive competition at tender stage; and short bid preparation time.

3. Research methodology

51 causes of cost overrun were identified through literature review and discussion with some parties involved in construction industry. The factors were tabulated in a questionnaire form. The questionnaire is divided into two main parts. Part I is related to general information for both the company and respondent. Part II includes the list of the identified causes of cost overruns in road construction projects. These causes are classified into 5 groups according to the sources of cost overrun: financial factors, factors related to construction parties, factors related to construction items, environmental factors, and political factors. The questionnaire is developed to identify the impact level of the identified causes from consultants' view. The impact level was categorized on a five-point scale. It is categorized as follow: very high, high, moderate, little and very little (on 5 to 1 point scale). The collected data were analyzed through calculation of factors importance index by using formula (1), the formula is used to rank causes of cost overrun based on impact level as identified by the consultants.

$$Importance\ Index\ (\%) = \sum a (n/N) * 100/5 \quad (1)$$

Where; a is the constant expressing weighting given to each response (ranges from 1 for very little up to 5 for very high), n is the frequency of the responses, and N is total number of responses.

The importance index for all factors was calculated. The group index was calculated by taking the average of factors under each group. The questionnaire was sent out to a total of 52 consultants, asking their contribution in ranking the identified 51 factors in terms of severity using an ordinal scale. A total of 40 consultants filled the questionnaire.

4. Results and discussion

The factors under each group are ranked by the measurement of importance index according to Equation (1).

4.1. Financial factors group

Table 1 shows the importance index and ranking of each factor under financial group. The Table shows that the most severe factors: market conditions, fluctuation in money exchange rate, and inflation.

Table 1: Ranking of factors under financial group

Factors	Importance index	Rank
market conditions	69,50	1
fluctuation in money exchange rate	61,50	2
inflation	61,50	3
payments delay	53,50	5
availability of finance management and plans	58,50	4
estimating method used	47,00	8

high interest rate charged by bankers on loans	49,00	7
taxes increase	53,00	6
insurance cost	39,50	9

4.2. Factors related to construction parties

11 factors are listed under this group as shown in Table 2. The consultants view indicates that the most severe cost overrun causes under this group are: experience in contracts, lack of information and coordination between construction parties, and experience in the line of work.

Table 2: Ranking of factors under construction parties group

Factors	Importance index	Rank
experience in contracts	74,50	1
experience in the line of work	67,00	3
poor financial control	63,50	6
lack of information and coordination between parties	69,00	2
lack of qualified project manager	62,50	7
poor quality of project management	66,00	4
lack of application of risk management process	61,50	8
knowledge of clients and consultants	66,00	5
lack of coordination between designers	60,50	9
financial status of owner	55,50	10
government requirements	54,50	11

4.3. Factors related to construction items

Table 3 illustrates importance index and ranking of factors affecting cost estimation under construction items group. The consultants input shows that the most severe factors are: insufficient time for estimate, size of contract, and incomplete drawings.

Table 3: Ranking of factors under construction items group

Factors	Importance index	Rank
insufficient time for estimate	76,50	1
incomplete drawings	71,00	3
size of contract	71,50	2
period of contract	69,00	4
inadequate labor productivity	63,00	7
frequent design changes	69,00	5
lack of raw material sources	61,00	10
relationship between labor and management team	63,00	8
type and content of contract	68,00	6
inadequate specifications	61,50	9
lack of skilled labor	58,50	12
labor and equipment required	60,50	11
unclear arbitration process	56,50	13

4.4. Environmental factors group

13 factors are listed under this group as shown in Table 4. The results show that the top three factors under this group are: materials price fluctuation, lack of historical data, and number of competitors.

Table 4: Ranking of factors under environmental group

Factors	Importance index	Rank
materials price fluctuation	77,50	1
lack of historical cost data	70,50	2
level of competition	61,00	5
number of competitors	65,50	3
location	61,50	4
supplier manipulation	60,50	6
laws and regulations	57,50	8
rock and soil suitability	53,50	9
terrain conditions	58,00	7
weather	49,00	12
ground conditions	50,00	11
public exposure of the project	53,00	10
social and cultural impacts	46,50	13

4.5. Political factors group

Table 5 shows the importance index and ranking of factors under political group. 5 factors are listed under this group. The most severe cost overrun causes from combined view are: political situation, difficulties on importing equipments and materials, and segmentation of the West Bank and limitation of movements between areas.

Table 5: Ranking of factors under political group

Factors	Importance index	Rank
political situation	71,00	1
segmentation of the West Bank and limitation of movements between areas	68,00	3
difficulties on importing equipments and materials	70,50	2
dealing with suppliers and traders	57,00	4
monopoly of material suppliers	54,00	5

4.6. Top Five factors

Table 6 shows the top five factors and related groups from consultants' perspective. The results show that three of them are related to the construction items group, one to construction parties and one to environmental group.

Table 6: Top five affecting factors

Factors	Related group	Importance index	Rank
materials price fluctuation	environmental	77.50	1
insufficient time for estimate	construction items	76.50	2
experience in contracts	construction parties	74.50	3
size of contract	construction items	71.50	4
incomplete drawings	construction items	71.00	5

4.7. Groups Ranking

Consultants indicate that sources of cost overrun in road construction projects are construction items, political, construction parties, environmental, and financial as shown in Table 7.

Table7: Main groups ranking

Group	Importance index	Rank
Construction items	65.31	1
Political	64.75	2
Construction parties	63.68	3
Environment	58.77	4
Financial	54.78	5

5. Conclusion

The cost overrun in road construction projects in the West Bank in Palestine is discussed in a field survey. It studied importance of the causes affecting cost estimating accuracy. The importance index of each cause is calculated. 51 causes of cost overrun were identified through research. The identified causes are combined into five groups. The field survey included 40 consultants. The findings reveal that the top five affecting factors from consultants' view are: materials price fluctuation, insufficient time for estimate, experience in contracts, size of contract, and incomplete drawings.

6. References

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