Chapter 5
Conclusions and Recommendations

5.1 Introduction

This study was carried out to identify the construction industry risk factors, their importance and their allocation. Moreover, risk management actions, risk analysis techniques and their effectiveness and usage were settled on. The above topics were examined from contractors and clients' perspectives. These objectives were brought out, some tendencies were concluded and some actions that may improve risk management practices were recommended.

5.2 Conclusions

The construction industry has characteristics that sharply distinguish it from other sectors of the economy. It is fragmented, very sensitive to economic cycles, and highly competitive because of the large number of firms and relative ease of entry. It is basically due to these unique characteristics considered a risky business. In this study, identifying the risk factors faced by construction industry is based on collecting information about construction risks, their consequences and corrective actions that may be done to prevent or mitigate the risk effects. Risk analysis techniques were investigated too. However, determination of severity and allocation of these risk factors was the main result of this research. The focal point of this research is to explore the key risk factors and identify these factors that could be faced in construction industry in Khartoum . Analysis of these risk factors was carried out to measure their effects on building projects and to assign each risk factor on the party who is in the best position to handle such situations. The risk factors that were identified are shown in Table (3.1). These factors were investigated to measure the severity of each. The most ten severe risk factors are appeared in Table (5.1)

Table 5.1. Most ten severe risk factors and allocation according to contractors

Rank	Risk Description	Allocation
1	Financial failure of the contractor	Contractor
2	Social and political pressure by the parties do not have a major interest in the project	Shared
3	War and civil disorders	Shared
4	Defective design (incorrect)	Client
5	Delayed payments on contract	Client
6	Unstable security circumstances	Undecided
7	Bribery and Corruption	Shared
8	Poor communication between involved parties	Shared
9	Unmanaged cash flow	Contractor
10	Awarding the design to unqualified designers	Client

On the other hand, clients had a different opinion about the most ten severe risks, they ranked:

Table 5.2. Most ten sever risk factors and allocation according to clients.

Rank	Risk Description	Allocation
1	Awarding the design to unqualified designers	Client
2	Defective design (incorrect)	Client
3	Occurrence of accidents because of poor safety procedures	Contractor
4	Difficulty to access the site (very far, settlements)	Undecided
5	Inaccurate quantities	Undecided
6	Lack of consistency between bill of quantities, drawings and specifications	Undecided
7	Social and political pressure by the parties do not have a major interest in the project	Shared
8	Financial failure of the contractor	Contractor
9	War and civil disorders	Shared
10	High competition in bids	Undecided

The results showed the difference between contractors and clients evaluation of risks; The results show that

- contractors considered (57%) of the risk factors as highly important risks and (43%) of them as medium risks.
- clients considered only(11%) of the risk factors as highly important risks and (89%) of them as medium risks.

That reflects the high concern of contractors about such issues. More details are in section (4.3.1 and 4.5.1 .)

Contractors were more specific in allocating risks and were more likely to share these risks with clients who were undecided about 45% of risks, but contractors were undecided about 37% of risks .

- Contractors allocated 20% of risks on themselves, 18% on clients and 25% to be shared .
- Clients allocated on themselves 14% of risks, 23% on contractors and allotted 18% of risks as shared. (See sections 4.3.2 and 4.5.2 .)

It was noted that no risk factor has been assigned out of the previous three categories (contractor, client and shared) despite the existence of other two areas; insurance and ignored. Comparison between the two viewpoints is elaborated in Table (4.25)

Contractors and clients still depend on traditional approaches to manage risk factors and their consequences; the use of direct judgment to control risk factors was the most applied method used to control risk events (sections 4.7 and 4.8). These results assure the need to develop the

used methods for managing risk factors. Use of quantitative methods, computer systems or sensitivity analyses were not practiced by respondents, they also depend on direct judgment and comparing analysis to analyze risk consequences (section 4.9).

5 3.Recommendations

5 3.1.Recommendations To Contractors

1. Contracting companies should compute and consider risks by adding a risk premium to quotation and time estimation. This trend has to be supported by organizations like Sudanese Contractors Union, and other organizations concerned about the construction industry.
2. Contractors should struggle to prevent financial failure by practicing a stern cash flow management and minimizing the dependence on bank loans.
3. Contractors should learn how to share and shift different risks by hiring specialized staff or specialized sub-contractors.
4. Contracting firms should utilize computerized approaches used for risk analysis and evaluation such as Risk package which integrates with widely used programs like Microsoft Project and Microsoft Excel. Otherwise, apply manual approach.
5. Moreover, contractors should work on training their personnel to properly apply management principles. It is the duty of institutes to provide such training.
6. Assess impact of identified performance, schedule and costs risks to estimate at completion, and include in the estimate as appropriate. Develop a range of estimates (best case, most likely, worst case).
7. Assign responsibility for risk mitigation activities, and monitor progress through a formal tracking system.

5 3.2.Recommendations To Clients

1. Exchange rate fluctuation should be considered as a risk factor by clients and donors and they should offer a compensation mechanism if there was any damage due to this risk.
2. Clients should conduct continuous training programs to advance managerial and financial practices to explain the internal and external risk factors affecting the construction industry and to initiate the proper ways to deal with such factors.
3. The design process is the most important phase in the construction process. Design products should be at the highest level of quality, because of that it should have more focus by clients.

5 3.3.Shared Recommendations

1. Possible risks should be allocated contractually and clearly on each party. That could be done by defining the potential risk factors and allocate them on the party which is in the best place to manage these risks.
2. Both contractors and clients have to be more aware about safety measures.
3. A satisfactory level of communications between parties should be maintained to convey needed information emphasizing documentation.
4. Specialized construction arbitrators are needed to help in settling conflicts and disputes in a way the amalgamate legal and construction needs.
5. Documentation works should be applied widely in the industry. In addition, contractors and clients are requested to keep computerized historical data of finished projects. This may help in rights reservation and to be an information source for future comparison.
6. There is an essential need for more standardization and effective forms of contract, which address issues of clarity, fairness, roles and responsibilities, allocation of risks, dispute resolution and payment – this could be done by adopting a standard form of contracts e.g. "FIDIC."
7. There should be an addendum or addenda for every standard contract defining the risk factors associated with construction industry in Khartoum and the allocation of every factor.

5.3.4 Proposed Future Studies

1. Contractors should provide the professional staff to manage the project properly, which will considerably reduce the cost and time of execution.
2. Contracting companies should maintain a satisfactory level of communication between the home office and field offices and apply appropriate management practices.
3. It is necessary to repeat this research every 2 years by an authorized institute to survey the new risk factors and their allocation, and publish the results for clients and contractors.