

## THE APPLICATION OF THE VALUE ENGINEERING TECHNIQUE IN THE MANAGEMENT OF CONSTRUCTION PROJECTS IN SUDAN

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### ABSTRACT

The research focused on the relationship between theoretical approaches and the performance of construction companies in an attempt to find a link between the knowledge and application of value engineering principles that lead to achieving project objectives while reducing cost and improving quality. Where a questionnaire form was designed to collect the necessary information for the study and was distributed to selected samples of

project managers and professors specialized in the field of construction and those interested in the field in order to determine the impact of cost management and planning on construction projects in Sudan through the application of valuable engineering technique.

**KEYWORDS:** Research, Value Engineering, Questionnaire.

### INTRODUCTION

Value engineering (VE) is one of the methods used to reduce the cost of executing engineering projects while maintaining on the required quality, which is used before the contract is concluded so that each item in the contract is used in accordance with the requirements the job assigned to him without any increase or waste in the financial value allocated to him.

Value engineering is also considered an analytical study applied to new projects that are intended to select the most appropriate alternatives, as well as projects or products that are implemented, finished and currently in use. This is intended to take a look at the possibility of improving them to raise performance rates and reduce its cost.

Occur Kelly and Graham in<sup>[1]</sup> about value engineering and value management, where value management I defined as is a team-based activity that is concerned with making explicit the package of whole-life benefits a client is seeking from a project or projects at the appropriate cost, as mentioned the value planning and value analysis.

And he mentioned Ashworth and Hogg in<sup>[2]</sup> about value analysis is an organised approach to the identification and elimination of unnecessary cost. Value analysis shall be carried out on the completion of the project.

Confirmed Luke in<sup>[3]</sup> presently, there is no published evidence that value engineering in the middle east is being effectively implement. ‘Market trends show that there is rising competition in the construction industry as a result of the recent economic downturn in 2009’.

### ***RESEARCH PROBLEM***

The research problem is summarized in the lack of an approved methodology for cost management and planning in construction projects, where cost management is not applied in a thoughtful way and the absence of a clear concept of cost management and planning and its application in construction projects. Where there is no correct evaluation of them, which results in problems that lead to cost deviation in the project, and the need to improve the cost management process for construction projects in Sudan by controlling the cost of construction projects in Sudan and the importance of planning and controlling costs, and the methods used to manage project resources and how to study the feasibility of them.

### ***RESEARCH AIMS***

1. Emphasizing the importance of proper management and tight cost planning from the beginning of the project.
2. Identify the main constraints that affect the cost management and planning process.
3. Identify the right foundations in cost management and planning in the implementation of

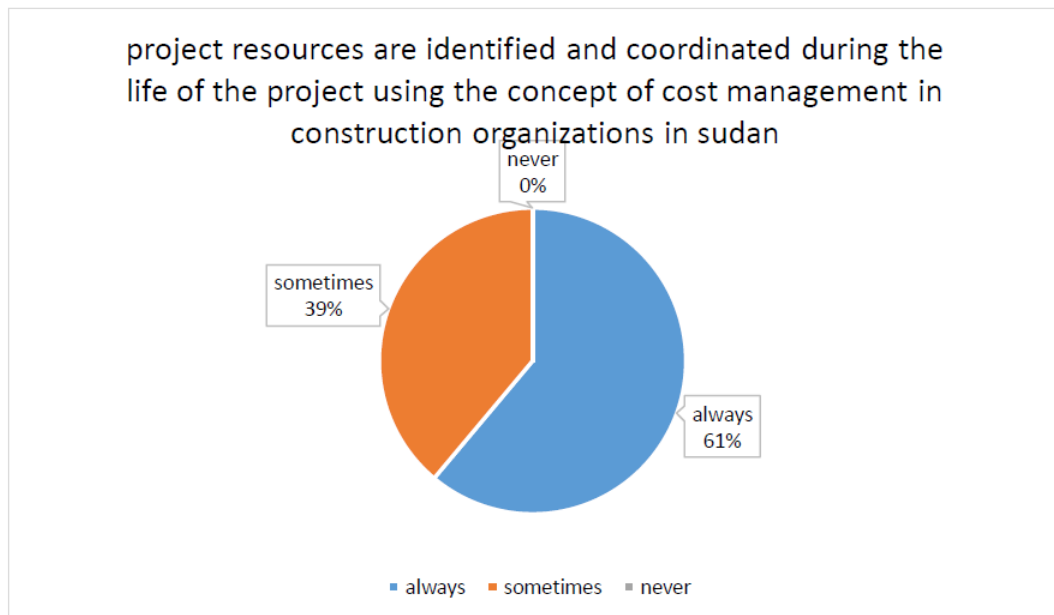
projects.

4. Spreading the culture of cost management and planning and making appropriate decisions according to modern methods.

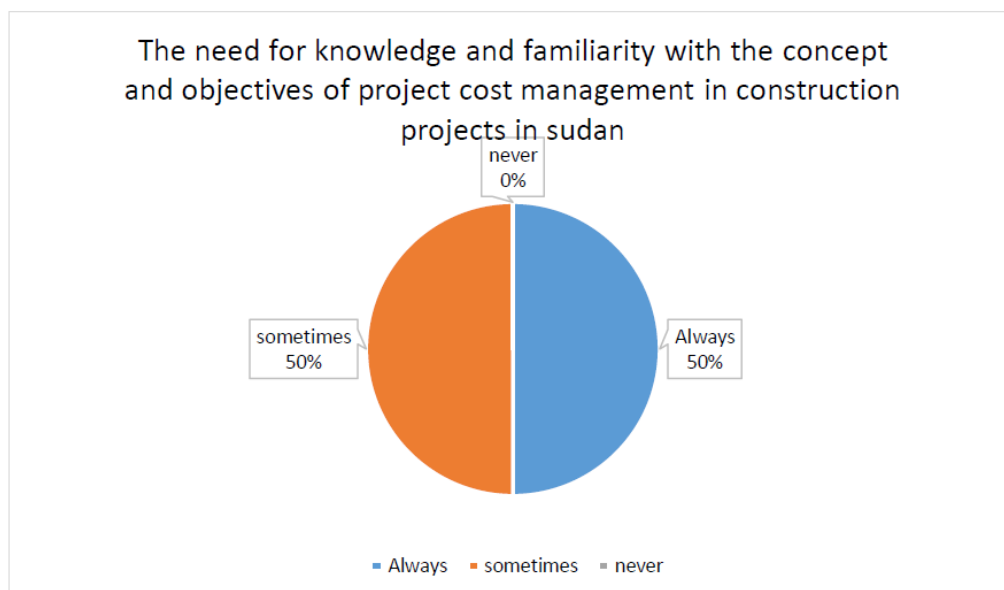
### ***DISCUSS THE RESULTS***

The questionnaire, which was distributed to the sample group, consisted of several sections

#### 1- Fundamentals of cost management



**Figure 1-1**



**Figure 1-2**

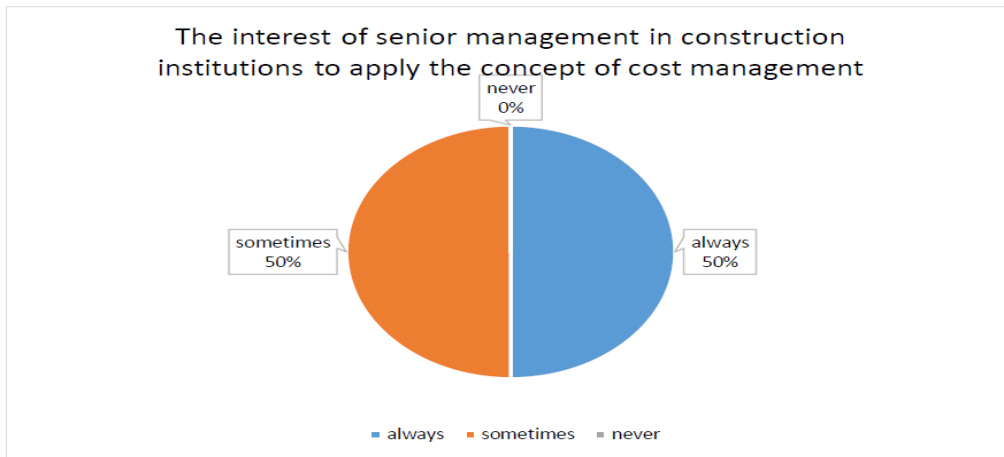


Figure 1-3

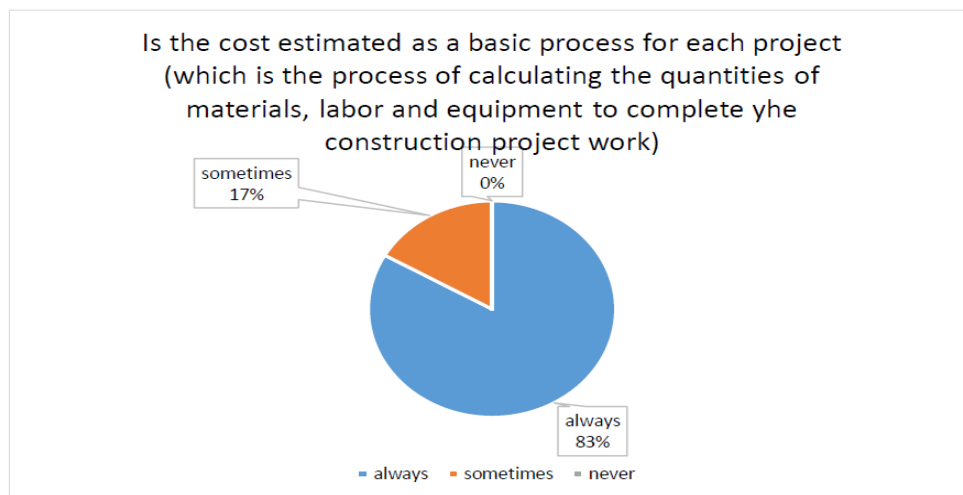


Figure 1-4

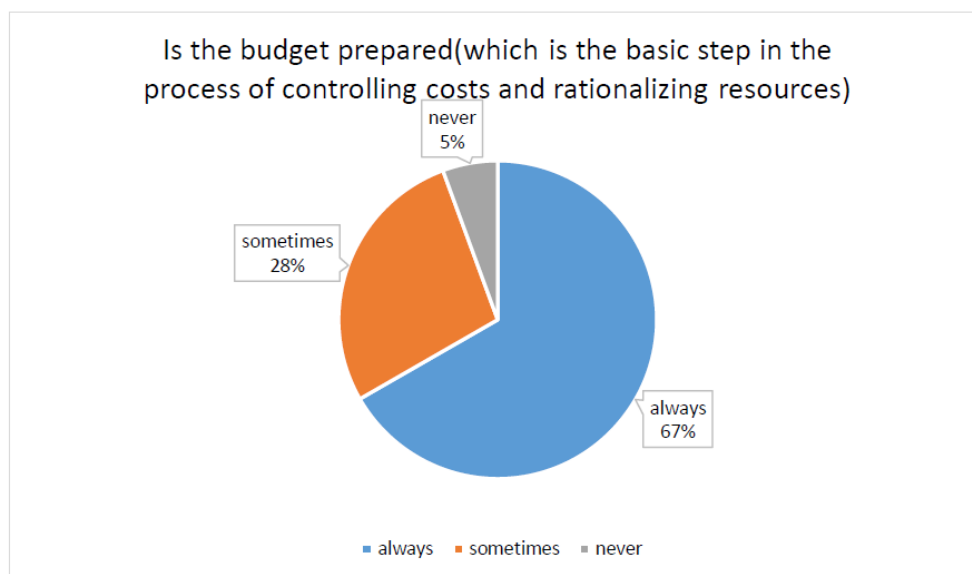


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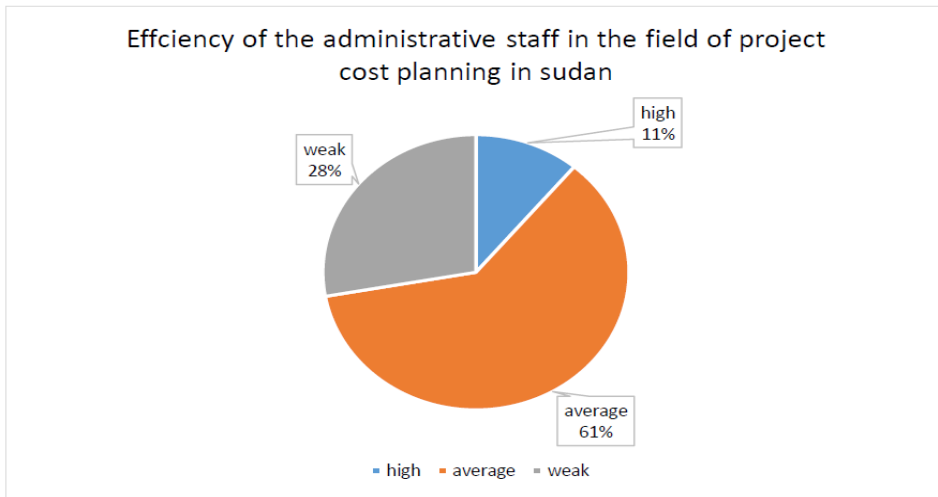


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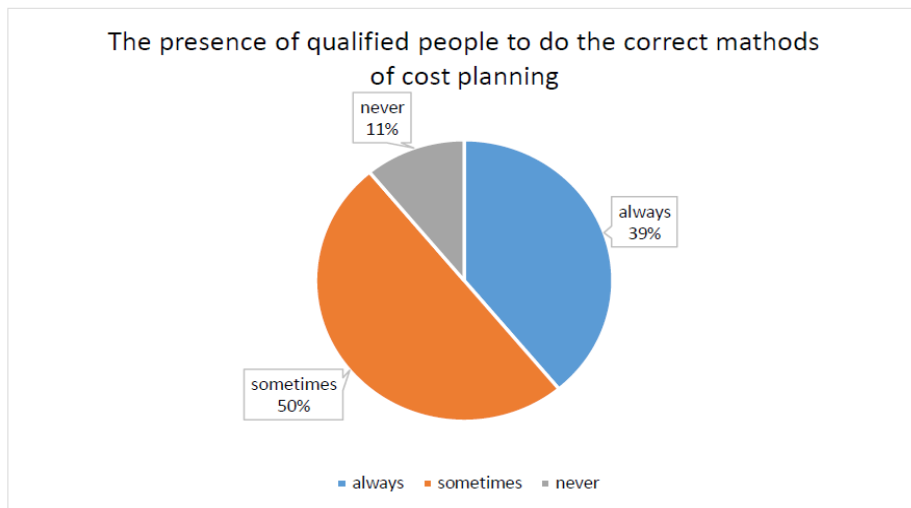


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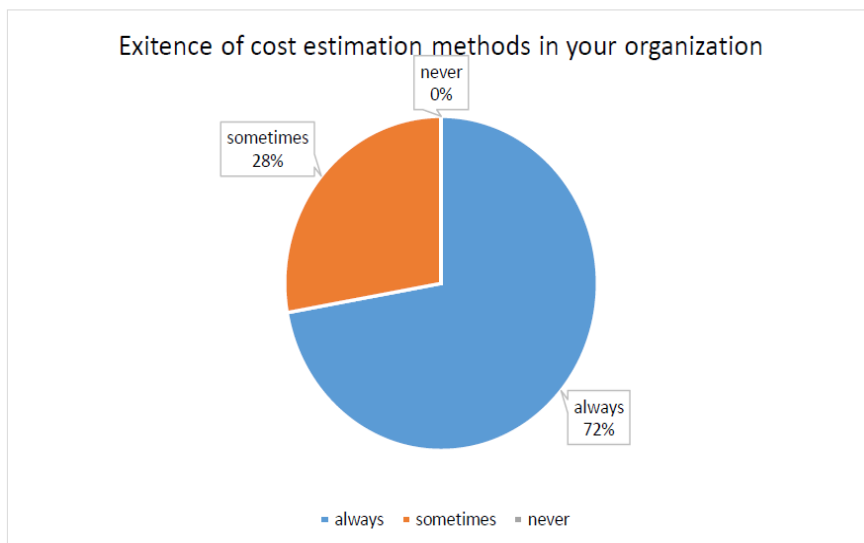


Figure 1-8

2- Value engineering technology in cost management and planning

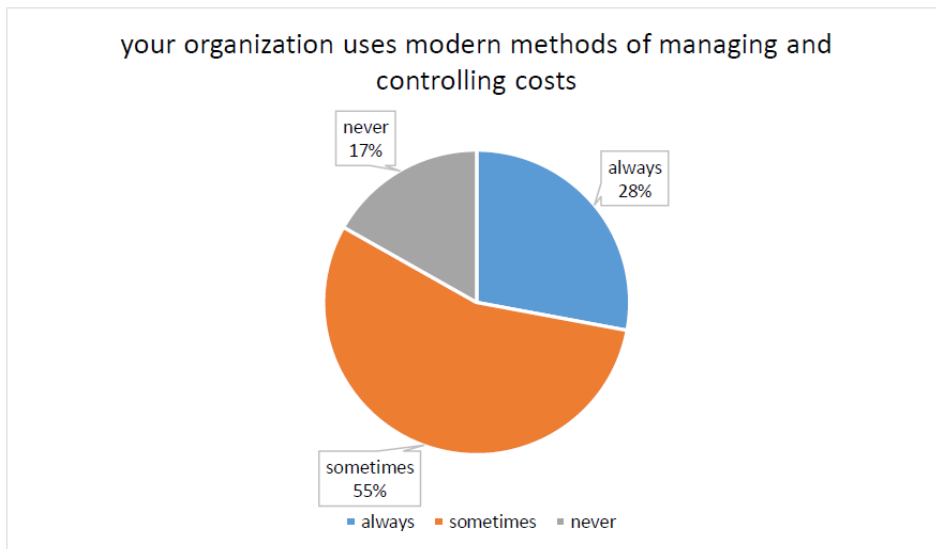


Figure 2-1

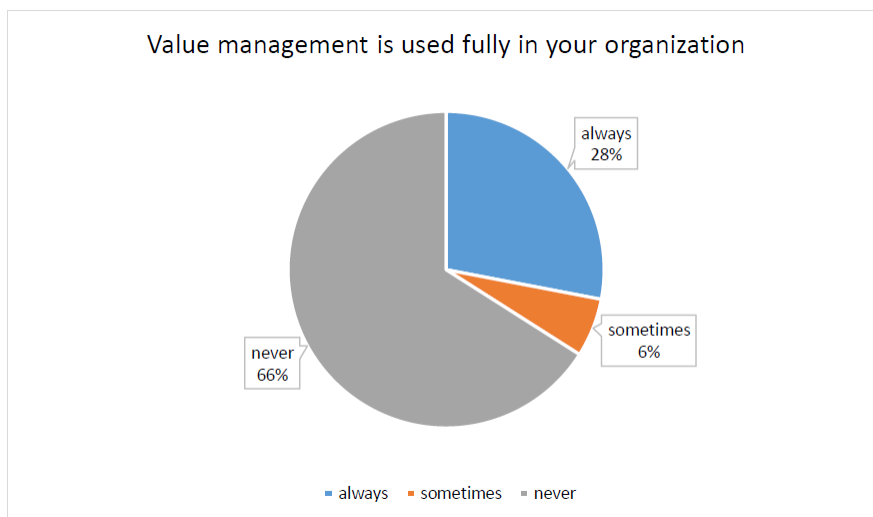


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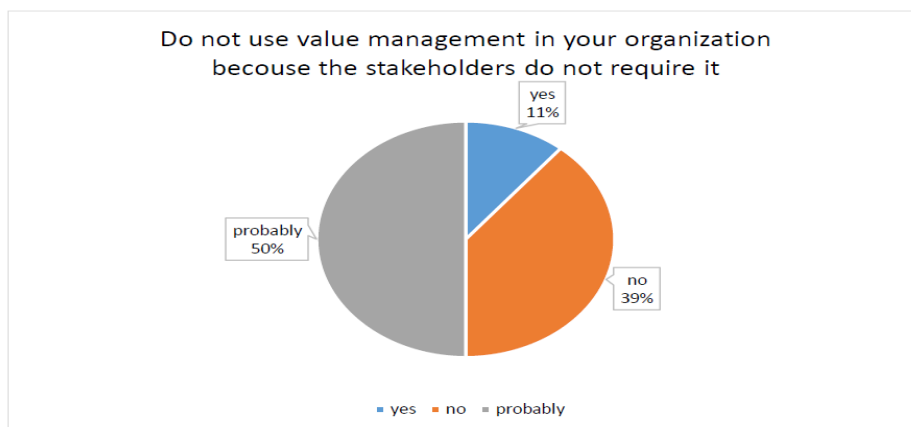


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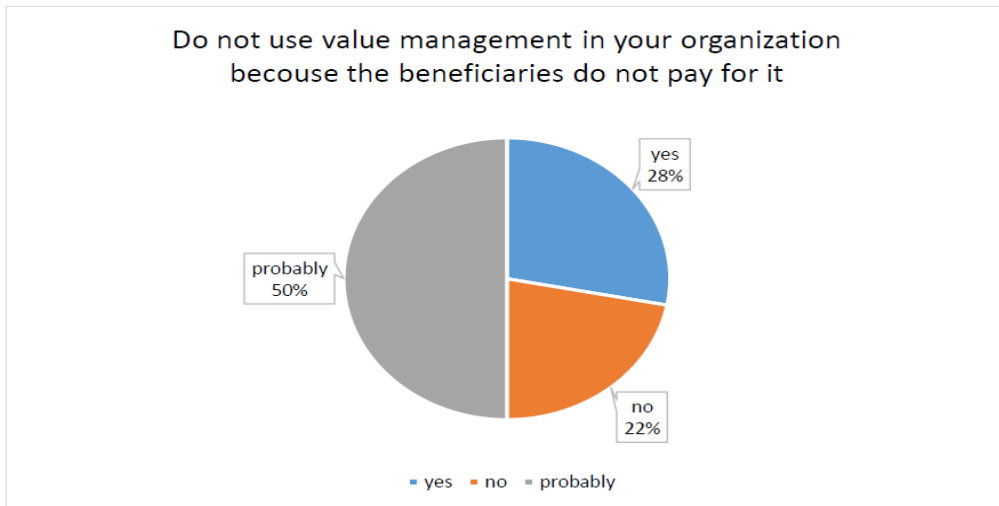


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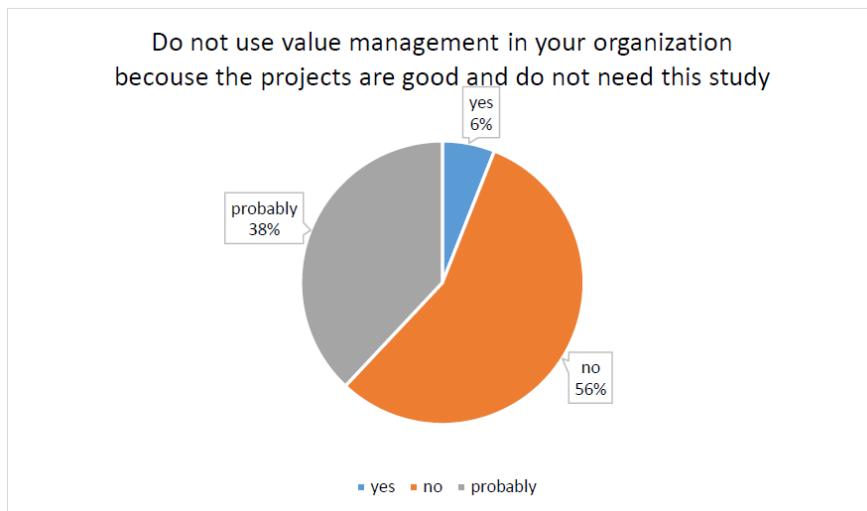


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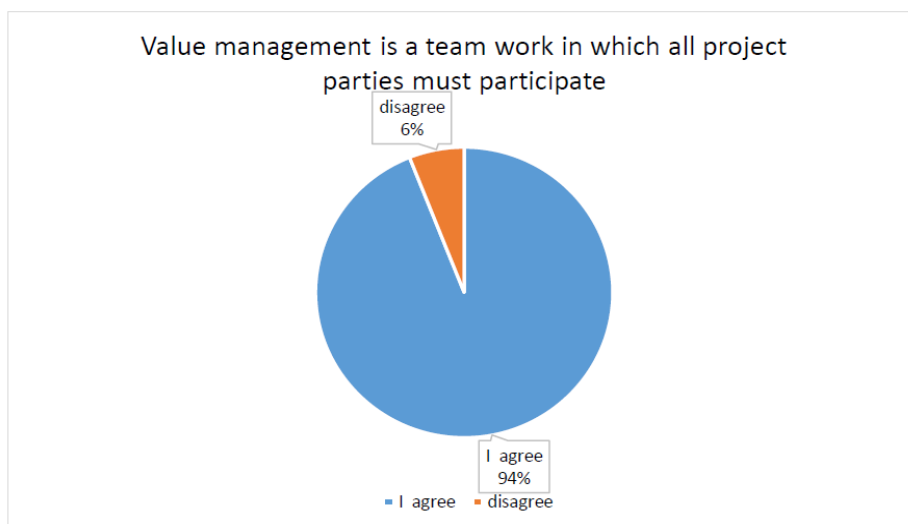
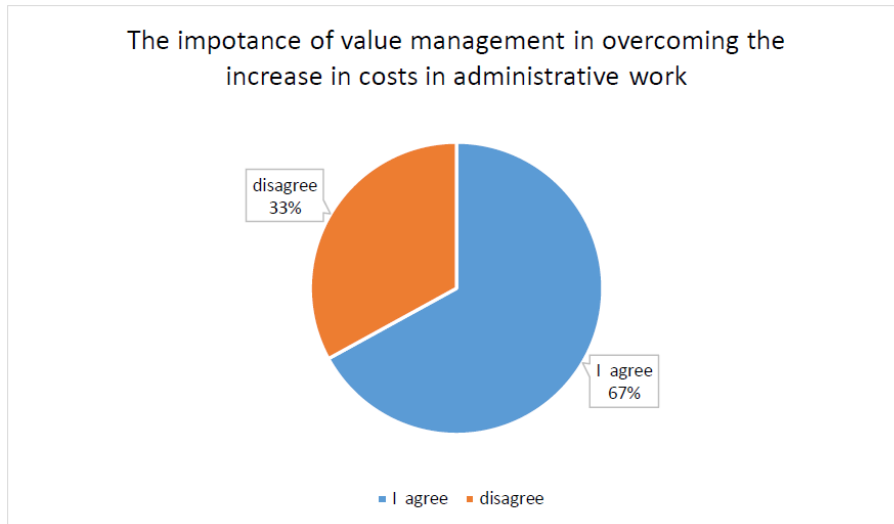
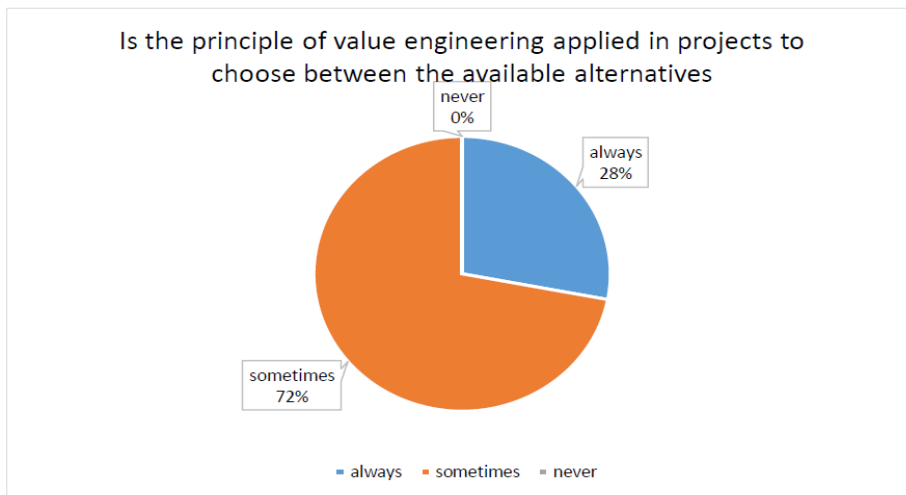


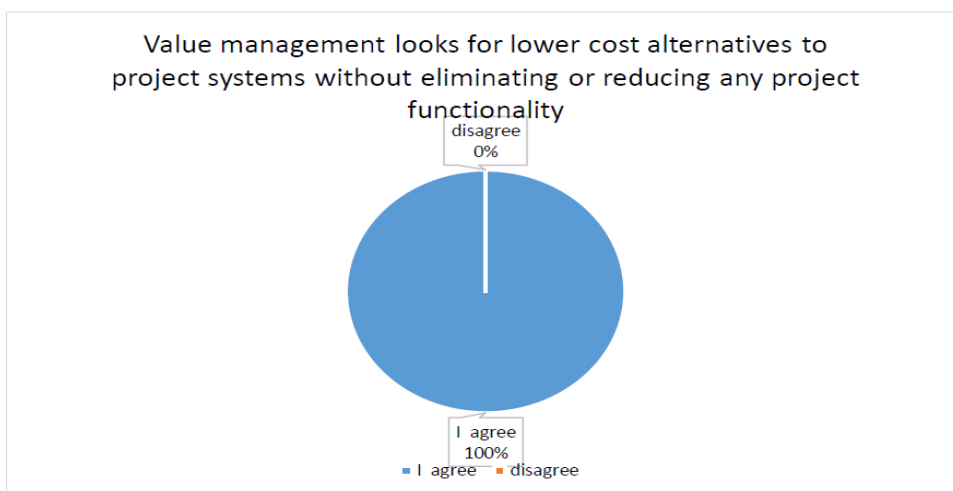
Figure 2-6



**Figure 2-7**



**Figure 2-8**



**Figure 2-9**



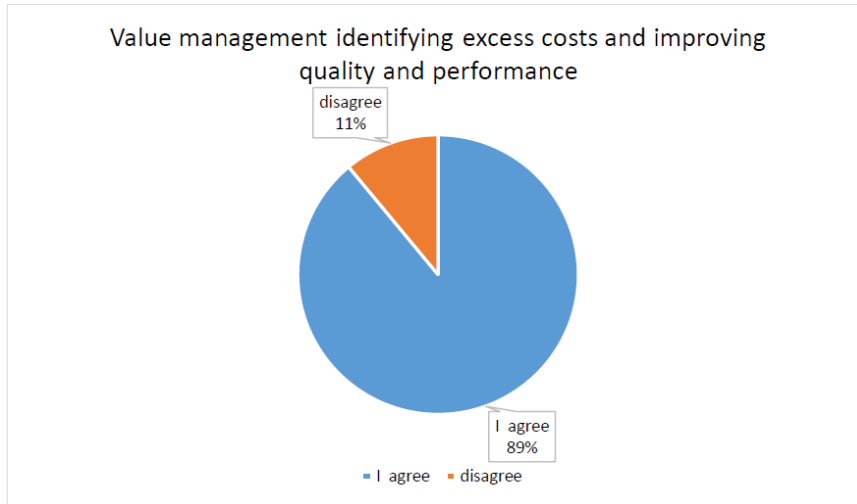


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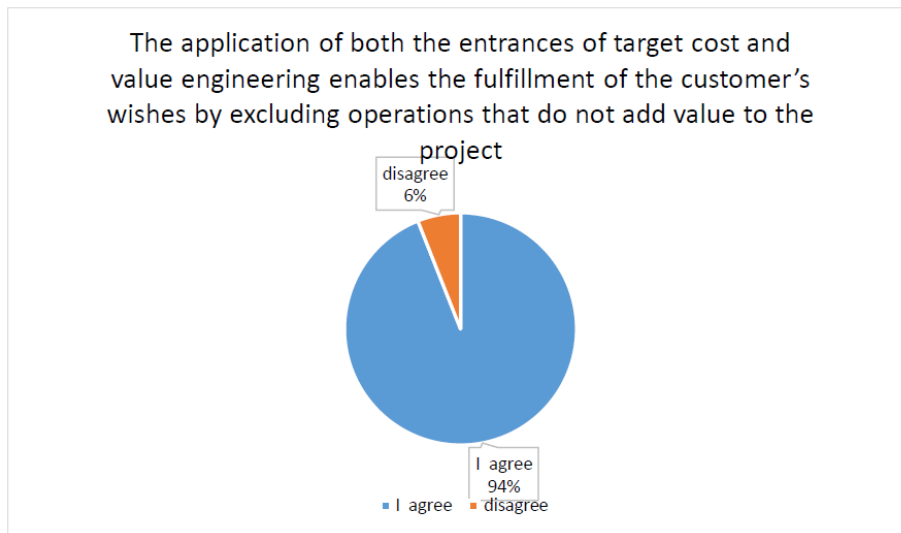


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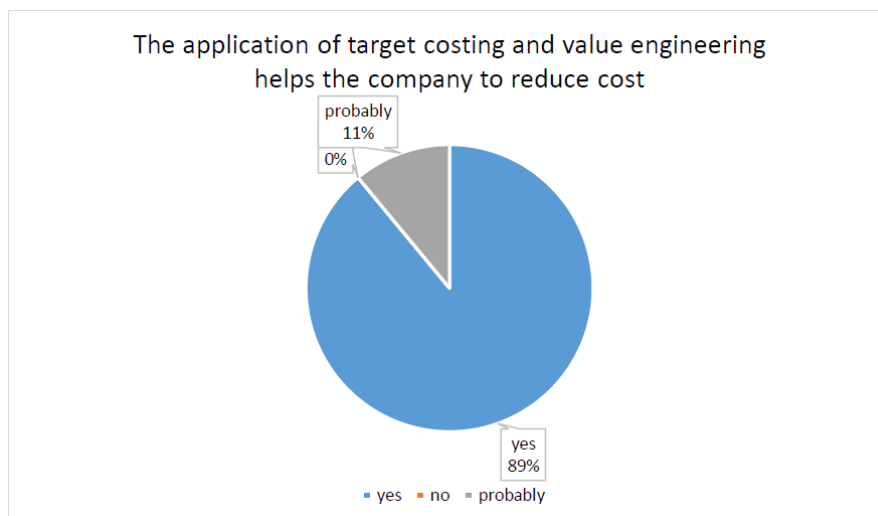
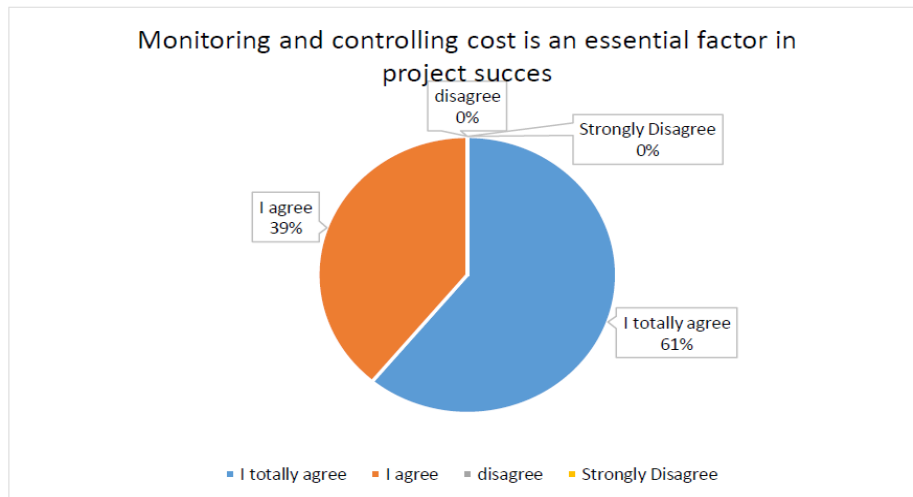
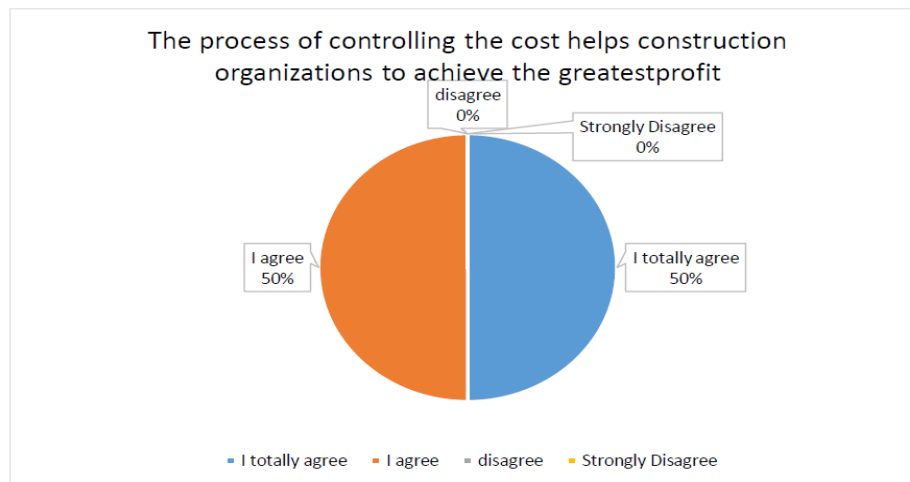


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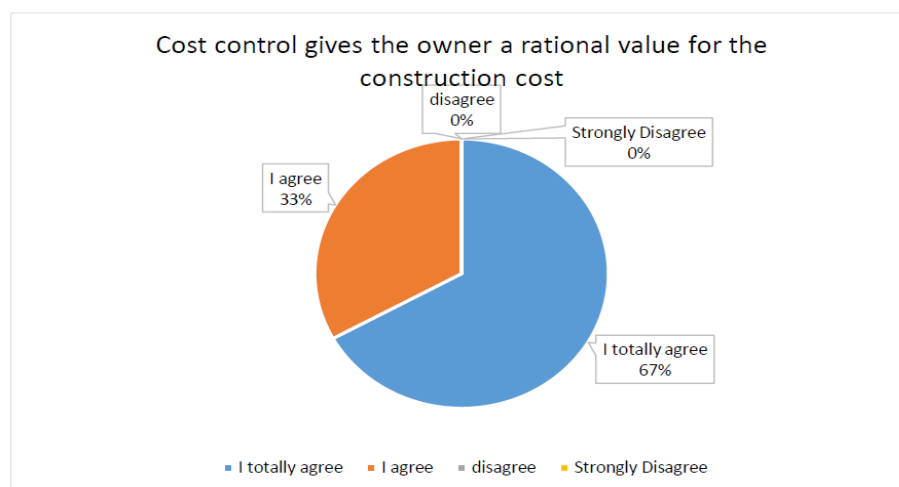
**3- Follow-up operations (monitoring) on the construction cost**



**Figure 3-1**



**Figure 3-2**



**Figure 3-3**

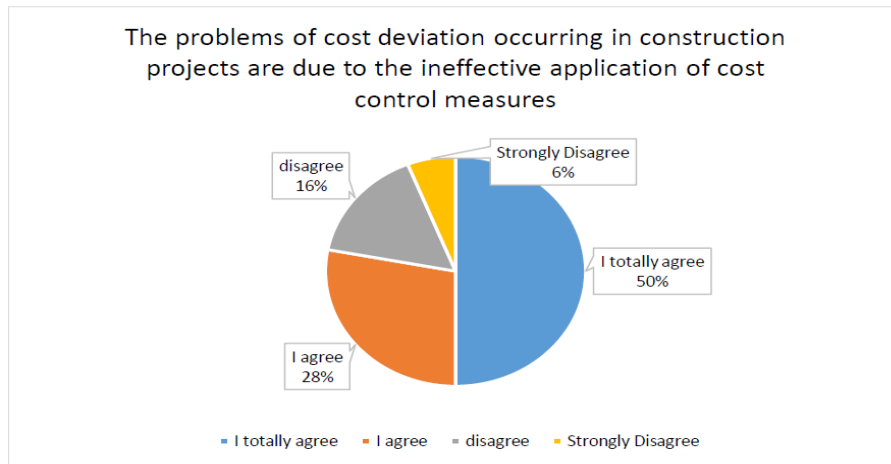


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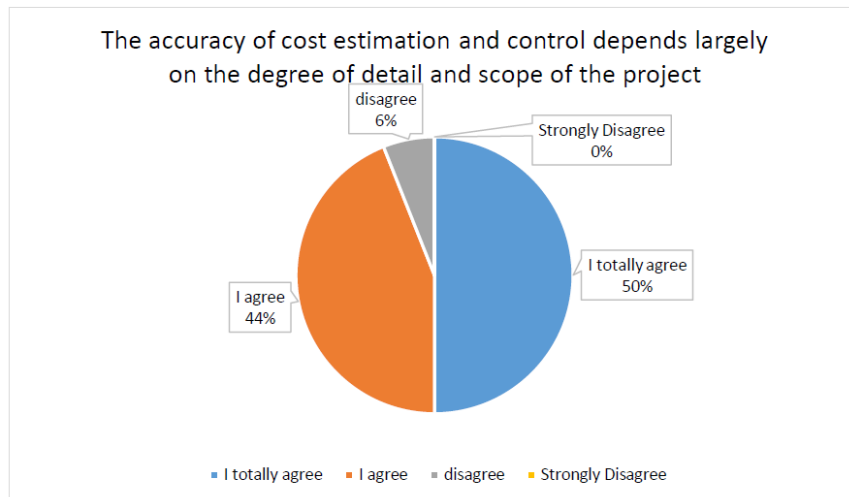


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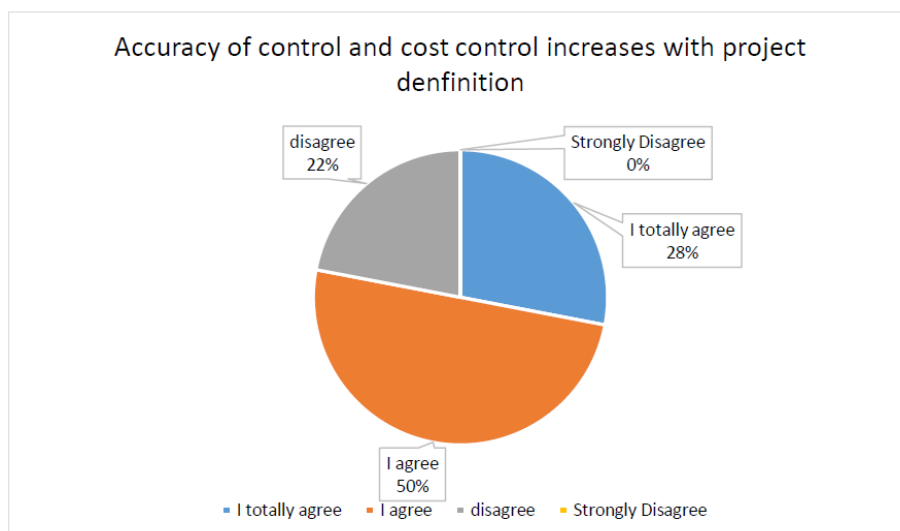


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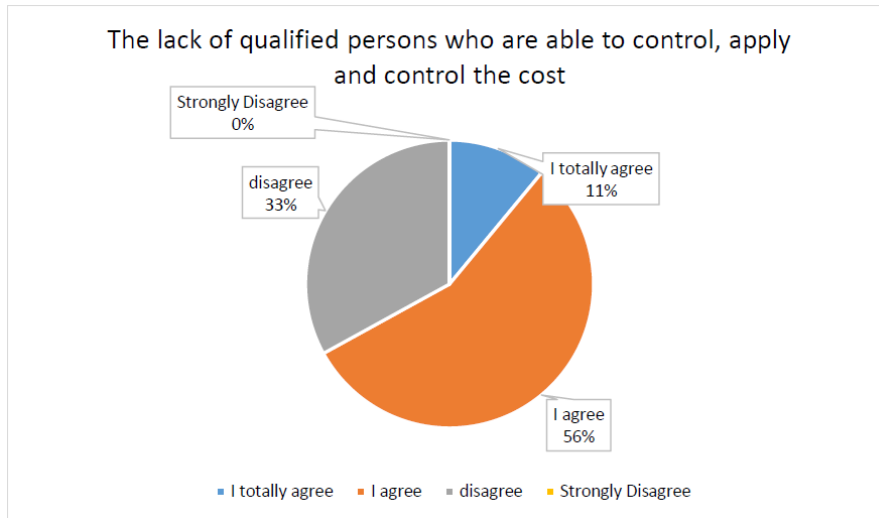


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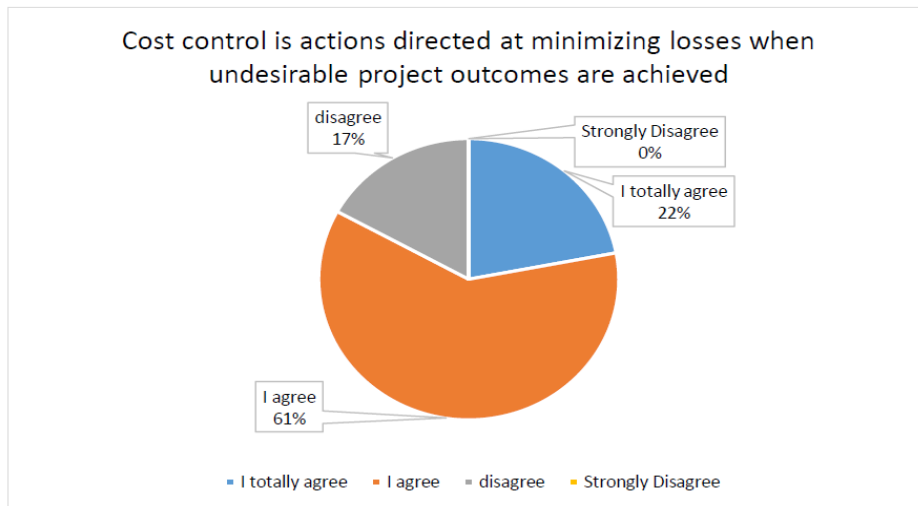


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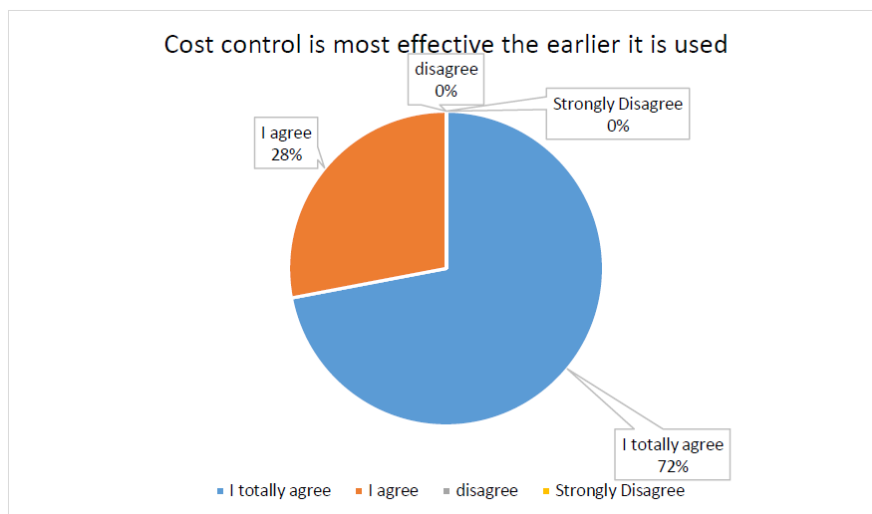


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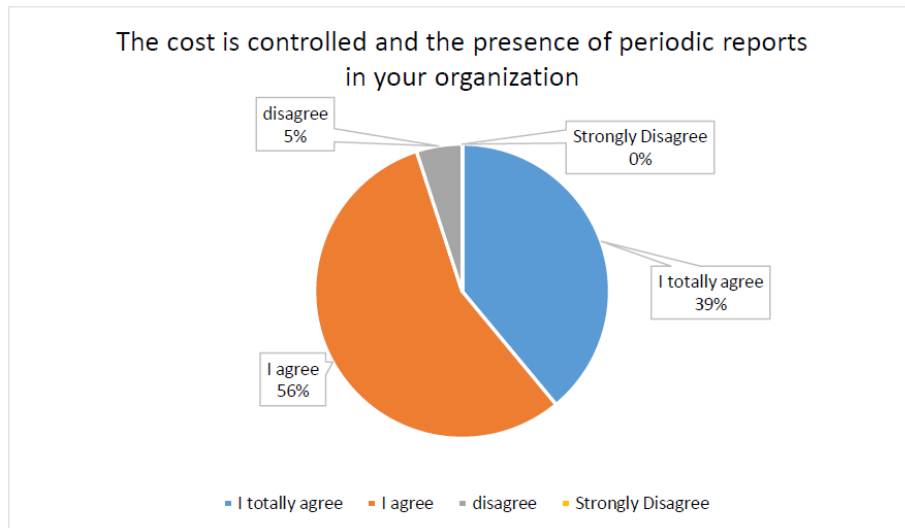


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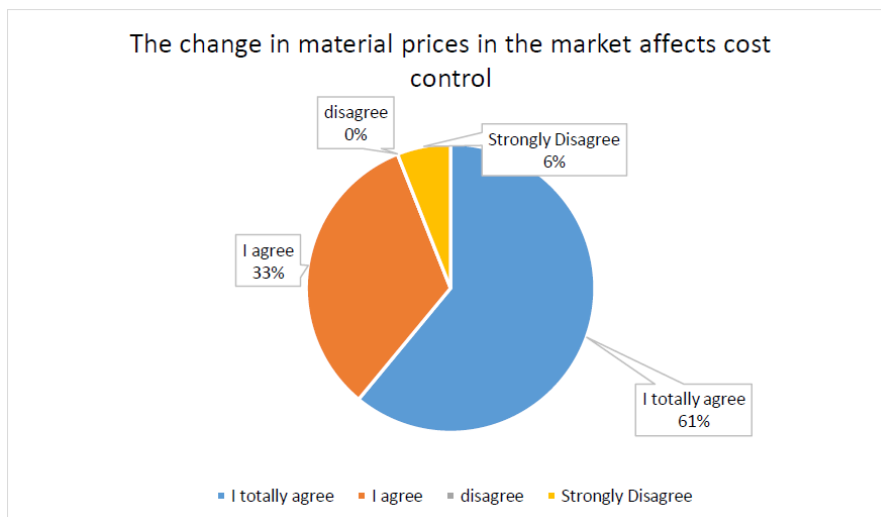


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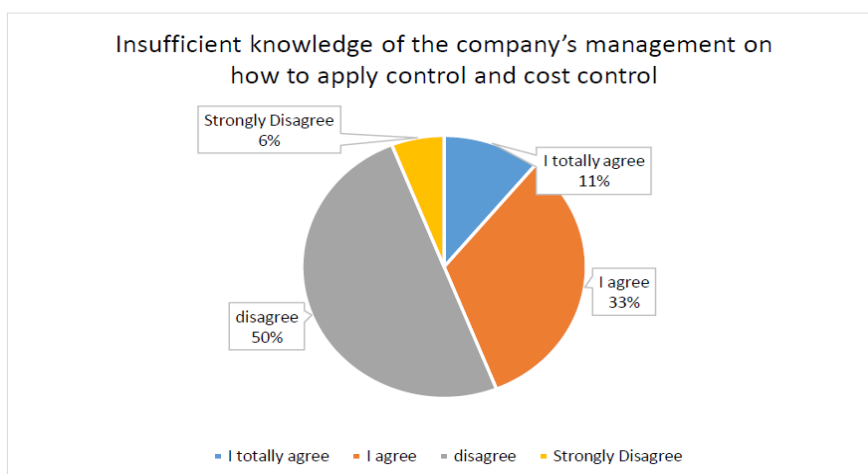
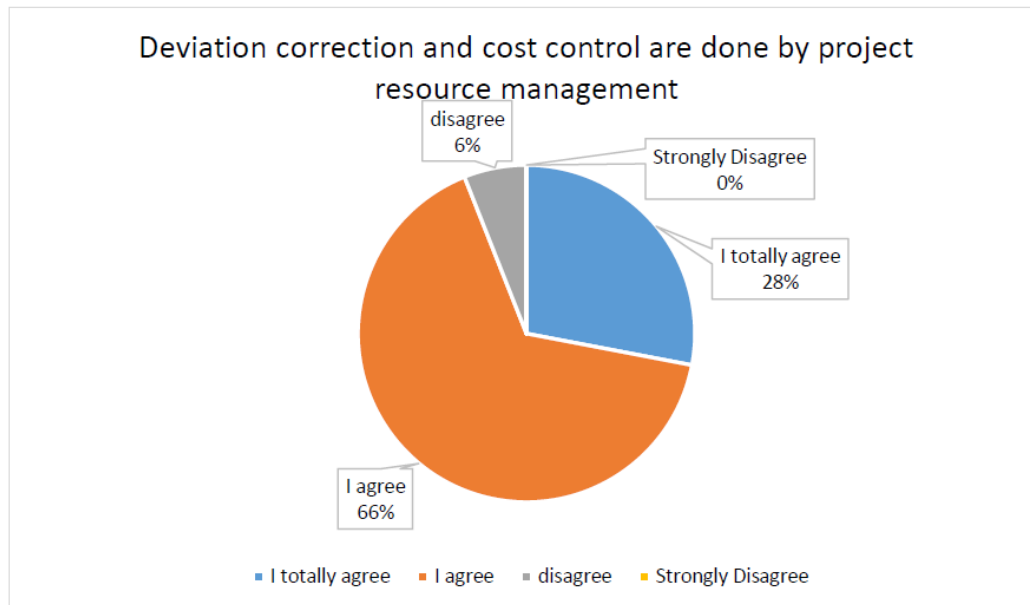
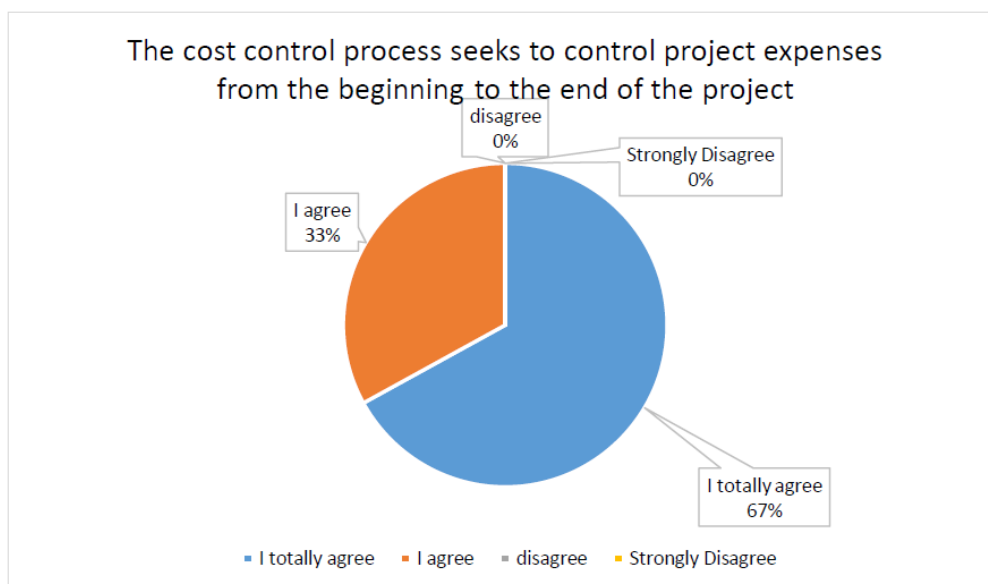


Figure 3-12

**Figure 3-13****Figure 3-14**

## CONCLUSION

The study included some cost basics and the extent of their application in construction companies in Sudan, almost half of the sample community agreed that the higher management in the construction institutions are interested in applying the concept of cost management.

However, most of these institutions do not use modern methods of managing and controlling costs.

Although the application of target costing and value engineering helps the company to:

- Helps construction organizations to achieve the greatest profit.
- Cost control gives the owner a rational value for the construction cost.
- Monitoring and controlling cost is an essential factor in projects success.

Value engineering success factors appear in

- The commitment of the higher management towards the application.
- Training a number of individuals to apply the curriculum.
- Approving items in the budget to study value engineering.
- Understanding and support of stakeholders.

The study concluded that a large percentage of construction companies in Sudan do not apply value engineering in their work. These companies face difficulty in changing the familiar way of designing and implementing projects, as well as the lack of trained cadres in the field of value engineering.

### ***Recommendations***

The study recommended the need to encourage construction institutions to apply value engineering, and remove any obstacles that stand in the way of its implementation, and the recommendations are:

- The application of value engineering in all companies due to the importance of the value engineering method and the resulting benefits.
- Adopting the value engineering approach and adding it as an item in the terms of the Sudanese contracting contract.
- Teaching value engineering and its application methods extensively and practically to students of engineering faculties and holding seminars and training courses.
- We recommend that companies form committees of experienced engineering and financiers to review the available alternatives when implementing any project in application of value engineering.
- Considering the application of value engineering as an essential part of the stages of any architectural project, especially in the early stages of preparing the project.

**REFERENCE**

1. Kelly, J., Male S. and Graham D., Value Management of construction projects, Blackwell publishing, United Kingdom, 2004.
2. Ashworth, A. and Hogg, K., Added value in design and construction, pearson publication Ltd., United Kingdom, 2000.
3. Luke, A. Forming features, what strategies are formworks companies implementing, in order to counteract the economic slowdown? Construction week investigates, construction week, 2009; 2- 8: 27-28.
4. AHUJA. H.N.” Construction Performance Control by Network”. John Wiley & sons Inc, U.S.A, 1976.
5. AZHAR, N.; FAROOQUI, U, R.; and Ahmed, M.S. Cost Overrun Factors In Construction Industry Of Pakistan. First International Conference On Construction in Developing Countries, 2008.
6. Arab British Academy for Higher Education, 2011.