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El-Haytham A. Ali

Assuit University, hitham_rashwan@yahoo.com

Ibrahim Mahdi

Future University in Egypt, ibrahim.mahdy@fue.edu.eg

Hesham A. Mahdi

Assuit University, harafat@fue.edu.eg

Kamal A. Assaf

Assuit University, kamalassaf2013@gmail.com

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The impact of stakeholder management on reducing time and cost in the implementation stages of mega projects

El-Haytham A. Ali^{a,*}, *Ibrahim M. Mahdi*^b, *Hesham A. Mahdi*^c, *Kamal A. Assaf*^d

^a Civil Engineer, B.Sc., Civil engineering Assuit University 2009. Egypt: hitham_rashwan@yahoo.com

^b Professor. of project management, Future University in Egypt: ibrahim.mahdy@fue.edu.eg.

^c Chairman for Board of Trustees, Former minister of Transport of Egypt, Future University, Cairo, Egypt: harafat@fue.edu.eg

^d Assistant Professor of Structural engineering Assuit University, Egypt: kamalassaf2013@gmail.com

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ABSTRACT

Stakeholder management continues to be the most important part affecting project duration and cost. The time and cost of the most important problems of mega projects. In this study, interviews were conducted to assess the impact of stakeholder management on project delays and cost overruns. Interviews were conducted with project managers and engineers, in addition to a simple questionnaire to know the impact of stakeholder management in mega projects. The interviews showed the importance of stakeholder management in the different project stages, which start from site preparation, licenses and paperwork, through the various implementation stages to the project delivery stage. It has been shown in this research the importance of stakeholder management before, during and after the project's completion and delivery.

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1. Introduction and Background

It has now become necessary to have stakeholder management in mega projects, because mega projects conflict with utilities, traffic, trade movement, private and public properties, and perhaps also with future projects. The lack of stakeholder management has led to many problems due to the lack of a person charged with dealing with these problems, due to the inability of the owner to solve some problems related to implementation, as well as the inability of the executing authority to solve problems related to expenses outside the scope of the project. Eskerod and Jepsen (2013) saw that stakeholder management as a critical factor for the delivery of construction projects, particularly with regard to project quality, completion time, budgeted cost completion and participant satisfaction. Construction projects cannot be actualized without stakeholder involvement (Cole, 2005; Olatunde et al. 2017). Yang et al. (2009) He explained that one of the most critical factors in the success of the project is the management of stakeholders And from the above in this research and my previous reading of previous researches(e.g., Doloi (2013); Yang et al (2014); Mok .et al (2015); Botwe, et al (2016); Górecka and Górecki (2017); Safapour et al (2019)) According to previous research, a lot of researches has spoken about the importance of stakeholders management to reduce the time and cost of mega projects.

The interviews with project managers revealed many of the obstacles that led to the project being delayed for some time due to stakeholders and also clarified many of the differences that occurred between the owner and the contractor in solving these problems.

* Corresponding author. Department of Civil Engineering, Assuit University, Egypt.

E-mail address: hitham_rashwan@yahoo.com

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The simple questionnaire also showed that the stakeholders' problems are multiple throughout the project, and the owner solves some of them, and the contractor solves others. The designer also requires the designer to solve some problems and change the design to solve some problems. There are some projects, the subcontractor has been changed to use new methods to resolve conflicts with stakeholders.

All of the above illustrates the importance of having a stakeholder management team consisting of a manager-engineer who is familiar with mega projects and has a full mandate and powers to deal with all governmental and private agencies to solve stakeholders' problems before they occur in order to maintain the project's duration, quality and cost.

2. Research Methodology

2.1. Meeting

Many interviews were conducted with project managers, senior engineers in mega projects such as the Cairo metro, bridges over the Nile, tunnels under the Suez Canal, barrage on the Nile, bridges within cities, crowding, giant power stations and other mega projects in order to gather the largest information on the stakeholders' problems.

2.2. Simple Questionnaire

A simple questionnaire was made to find out the problems from stakeholders that lead to an increase in the cost and time of the project due to the lack of stakeholder management. A questionnaire was prepared containing questions about stakeholders. Several engineers are working on mega projects have been selected with at least ten years of experience. I used a simple size equation, which roughly shows the number of engineers required to make the questionnaire that Marzouq et al. (2015) used in their survey of construction. They used the equation:

$$n = \left(\frac{z_{\alpha}^2}{2} \right) \cdot p \cdot (1-p) \quad (1)$$

Where, $\left(\frac{z_{\alpha}^2}{2} \right) = 1.645$, d is the accepted error = 10%, p is the ratio of experts in mega projects (3000) to the total civil engineers (200,000), the estimated sample equals 4. 23 engineers were invited to fill in the first questionnaire, 19 of them actually completed the questionnaire (82%). Most of those selected in the questionnaire are project managers or implementing managers, who are exposed to positions with stakeholders directly.

Engineers	Response	N Non-Response	Percentage of Response
NO	19	4	82%

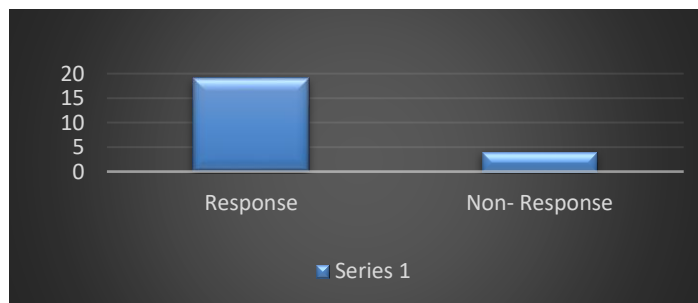


Chart (1-1) response & non response in the questionnaire

Most of those selected in the questionnaire are project managers or implementing managers, who are exposed to positions with stakeholders directly.



Chart (1-2) Experiences of engineers in the questionnaire

3. Data Analysis and Results discussion

3.1. Meeting and Simple Questionnaire

Many interviews conducted with project managers and senior engineers to find out about the stakeholders' problems they were exposed to during the implementation of mega projects, we review some of them:

3.1.1. Delay in Paper Licensing Procedures

The owner makes the necessary licenses for the project, but delays occur because some licenses require the presence of the contractor with the owner, and even some licenses require the presence of the actual implementing subcontractor, and this consumes a lot of time due to the incompatibility of everyone. Also, some licenses require travel to the capital and for this reason, project managers and engineers If the stakeholder management is delegated this task, it will be in the interest of the project, its time and cost.

factor&impact stakeholders	The necessary documents and licenses for the project			
	0%--30%	30%--50%	50%--80%	80%--100%
Owner				✓
Contractor				✓
Designers			✓	
Internal Stakeholders		✓		
Supplier	✓			
Sponsor		✓		
Governmental authorities				✓
Local Residents		✓		
Media	✓			
Political Climate			✓	
Sub contractor	✓			
Private Entities	✓			
Non social stakeholders	✓			

Table (1-1): Stakeholder impact ratios on the necessary documents and licenses for the project.

3.1.2 Removing utilities that conflict with the project.

One of the most common problems facing the establishment of projects is the removal of utilities and obstacles. It requires a high time and effort from all project participants and stakeholders, and also requires many meetings and agreements with the owner, contractor, subcontractor, the people of the region and other stakeholders, so the presence of an experienced stakeholder management in dealing with these problems is important and also agreed upon by project managers. So that the project engineers can prepare the site and study the construction panels and not involve them in matters that may hinder them from performing their original work. As many project managers who are good at their work are not good at dealing with stakeholders from government agencies and private entities.

factor&impact stakeholders	Removing utilities that conflict with the project			
	0%--30%	30%--50%	50%--80%	80%--100%
Owner				✓
Contractor				✓
Designers			✓	
Internal Stakeholders			✓	
Supplier	✓			
Sponsor		✓		
Governmental authorities				✓
Local Residents			✓	
Media	✓			
Political Climate	✓			
Sub contractor		✓		
Private Entities	✓			
Non social stakeholders	✓			

Table (1-2): Stakeholder impact ratios on removing utilities that conflict with the project

3.1.3 Construction Method.

Sometimes the construction method is changed to suit stakeholders in large projects, such as using tunneling instead of excavation or using a bridge instead of a road to suit stakeholders. It is also possible to change the used machines and tools and perhaps change the entire subcontractor so that we can achieve a conflicting area with stakeholders. It is expected to reach a compromise solution that satisfies all parties in the event of an intelligent management of stakeholders.

factor&impact stakeholders	Construction Method			
	0%--30%	30%--50%	50%--80%	80%--100%
Owner			✓	
Contractor				✓
Designers				✓
Internal Stakeholders			✓	
Supplier			✓	
Sponsor		✓		
Governmental authorities	✓			
Local Residents	✓			
Media	✓			
Political Climate	✓			
Sub contractor			✓	
Private Entities		✓		
Non social stakeholders	✓			

Table (1-3): Stakeholder impact ratios on a Construction Method

3.1.4 Safety management.

Safety management has become very important in mega projects because it is involved in design and implementation work and also monitors the entry and exit of materials, so it is considered one of the most important stakeholders' now

factor&impact stakeholders	Safety			
	0%--30%	30%--50%	50%--80%	80%--100%
Owner				✓
Contractor				✓
Designers	✓			
Internal Stakeholders				✓
Supplier		✓		
Sponsor	✓			
Governmental authorities				✓
Local Residents				✓
Media				✓
Political Climate		✓		
Sub contractor				✓
Private Entities	✓			
Non social stakeholders	✓			

Table (1-4): Stakeholder impact ratios on a Safety

3.1.5 The final delivery of the project.

At the end of the project during the final handover phase, some problems arise among the stakeholders such as (returning the thing to its original). The project delivery may be delayed in the end due to technical and financial reasons, and of course it affects the stakeholders. Therefore, precision must be investigated at every stage so that problems do not occur at the end of the project. And here lies the smart role of stakeholder management, which is to follow up the project to the end and to constantly and continuously remind of how to deliver the project as agreed upon, not only with the owner, but with all stakeholders from government agencies, private parties and the people of the region so that major problems do not occur that could lead to major issues. All this happens due to the lack of interest of the implementing agencies (contractor and subcontractor) in matters of project delivery as required

factor&impact stakeholders	The final delivery of the project			
	0%--30%	30%--50%	50%--80%	80%--100%
Owner				✓
Contractor				✓
Designers			✓	
Internal Stakeholders			✓	
Supplier			✓	
Sponsor				✓
Governmental authorities				✓
Local Residents			✓	
Media			✓	
Political Climate			✓	
Sub contractor				✓
Private Entities		✓		
Non social stakeholders	✓			

Table (1-5): Stakeholder impact ratios on The final delivery of the project

3.1.6 Delays in mega projects due to stakeholder problems.

Interviews with project managers and senior engineers showed that the majority of the mega projects they worked on were delayed from six months to one year due to stakeholder problems and some other projects were delayed by more than a year. This shows how important the presence of stakeholder management is to solve problems before and during project establishment.

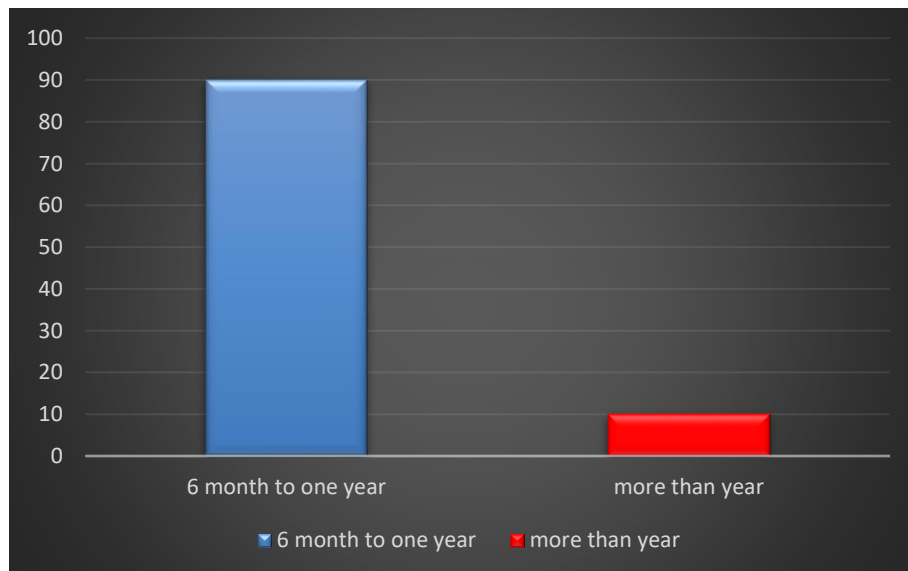


Chart (1-3) Percentage of the number of projects whose opening was delayed from six months to a year & more than a year

4. A Required Attributes and Powers of Stakeholder Management

All project managers and engineers agreed on the importance of having a stakeholder management in the owner and the executing agency. They cooperate to solve all the stakeholders' problems before, during and after the end of the project. Engineers are selected in the stakeholder management on the basis of many features, the most important of which are 1- Previous experiences 2- Awareness Cultural and political 3- Flexibility and intelligence 4- Has a culture of negotiation and future vision 5- Wisdom in making decisions.

Also, all project managers and senior engineers agreed on the importance of having written powers in the project contract that cooperation between the stakeholder management in the owner and the stakeholder management in the executing agency in removing obstacles to the project and bearing the responsibility for this. Therefore, there must be broad powers to take appropriate decisions for the project until It does not affect the time and cost of the project

5. CONCLUSIONS& RECOMMENDATIONS

This research studies the impact of stakeholder management on reducing time and cost in the implementation stages of mega projects, that was done through interviews with managers of mega projects as well as senior engineers. It became clear through the interviews and the questionnaire the importance of the cooperation of stakeholder management on the part of the owner and the executing authority in removing the obstacles to the project. Examples of some of the obstacles that lead to the project being disrupted for sometimes have also been identified. Some features are identified that are required for stakeholder management to be able to carry out its tasks Finally, the importance of having powers to manage stakeholders was clarified so that they can take appropriate decisions to reduce the time and cost of the project.

We recommend that the performance of the stakeholder management be further developed through the application of practical experience in future research

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