

THE MOST IMPORTANT FACTOR AFFECTING DEALING WITH STAKEHOLDERS TO REDUCE TIME AND COST IN MEGA PROJECTS

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ABSTRACT

Until now. Stakeholder problems remain one of the most important factors that affect time and cost, and through our study of mega project delays, we found that one of the most important causes of project delays, which in turn affects cost increases, are stakeholders' problems. We conducted many interviews with project managers and engineers, and a questionnaire was conducted to find out the impact of stakeholders on the projects. We found that some projects here in Egypt were disrupted as a result of stakeholders' problems. We have delved into this topic more and found it necessary to have a stakeholder engineer with distinctive personal features in order to be able to deal with stakeholders. The majority of the survey participants agreed on the importance of having a stakeholder engineer, and through previous literature and experts' opinions, we were able to find the required personality traits for a stakeholder engineer.

Keywords: Stakeholder engineer, Stakeholder management, Stakeholder analysis, Mega projects, Project management.

1. INTRODUCTION AND BACKGROUND

In the last century, the project consisted of the owner's engineer, designer engineer, and execution engineer. The execution engineer was carrying out the implementation, follow-up and inventory work. He was making an enormous effort, and when problems of inventory counting appeared, we had an implementation engineer and a quantities engineer. At the end of the last century and the beginning of this century, the quality engineer appeared to increase the quality of work and control of the work, often from the same company to execute the mistakes before the delivery to the owner engineer

or consultant engineer, also, At the beginning of this century, a quality control engineer appeared for concrete only to ease the work of the implementation engineer and the quality engineer in the project. Then a quality assurance engineer appeared to increase to confirm the quality of the project and then problems emerged contracts between the contractor and the owner and also between the contractor and subcontractor, it was necessary to the emergence of a contract engineer and specifications, which plays a very large role before the start of the project in the choices of contractors and also makes contracts with subcontractors in accordance with quality and speed. Also, a cost control engineer has recently emerged to make a control on the project so that there will be no loss at the end. Also, a newly emerged planning engineer who follows the project path and does not deviate from the target. Also a newly emerged procurement engineer who buys the raw materials needed for the project carefully so as not to steal thefts and he also makes agreements with suppliers, He will review the necessary tests for the raw materials before purchasing them and deliver all the test papers to the quality engineer to make sure they are correct. Now in the major construction companies there is a quality department, a procurement department, a contract department and so on.

From the above it is clear to us that when problems occur in part of the project system, experts tend to have the right person to solve these problems, when quality problems emerged, experts suggested a quality department. When purchasing problems appeared, experts suggested a procurement department, and so on, so that we have engineers in many departments.

In facts, the increase of specializations leads to an increased focus on each element and this is what happened in civil engineering before we became a water engineer, road engineer, construction engineer, irrigation engineer, bridge engineer, foundation engineer and so on. All these specializations have led to increased efficiency and this is what we need of course, But now we have specialized companies in each field separately, we have a company specialized in road works, a company specialized in irrigation works, a company specialized in foundations, a company specialized in sewage works and so on.

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 stakeholder influence over time and cost in mega projects and also because I saw with my eyes the delay of major projects due to the problems of stakeholders, which led to a loss in the projects all the above made me suggest the need for a stakeholder engineer.

The Stakeholder Engineer will relieve a lot of pressure on the Project Manager and the Owner Engineer because he will replace them in the Stakeholder matters. Thus, the project manager and the owner's engineer are devoted to focusing on the success of the operational matters in the project. Because sometimes the project manager or the owner's engineer or his deputy are forced to leave the project and travel to the capital to negotiate with external stakeholders, disrupting the workflow. However, with a stakeholder engineer, each of them will be dedicated to their work so that the project will not be disrupted. He will also be responsible for solving problems with the

stakeholders and negotiating with them before the start of the project and making a plan to deal with them, Thus, project disruption does not occur because of stakeholders.

Since the beginning of my work in mega projects and I asked why there is no person qualified to deal with stakeholders Why should the project manager to deal with stakeholders and may be ineligible for this deal with being qualified to manage the project technically and administratively. Stakeholder Engineer A- profession is no less important than a cost control engineer or procurement engineer and other disciplines where we have previously explained the impact of stakeholders on the time of the project and the cost of the project and how through the questionnaire shows the suspension of mega projects about six months at least. It became clear to us from the foregoing the importance of having a stakeholder engineer to be responsible for not increasing the duration of project implementation which will certainly affect the cost.

Later, we will determine how the stakeholder engineer is selected, what are the characteristics of his personality, what tasks are required of him and what powers he should have with him.

2. RESEARCH METHODOLOGY

A questionnaire was prepared containing 22 questions about stakeholders, including the proposal of a stakeholder engineer to solve the problems of stakeholders, and notes that many them accepted this proposal and good comments on this proposal. Several engineers are working on mega projects have been selected with at least six 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:

$$n = \frac{\left[\left(\frac{z_{\alpha}}{2}\right) * p * (1-p)\right]}{d^2} \dots\dots\dots (1)$$

Where, $\left(\frac{z_{\alpha}}{2}\right) = 1.645$, 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. In this study 60 experts were invited to fill in the first questionnaire, 52 of them completed the questionnaire (86%). Figure (1)

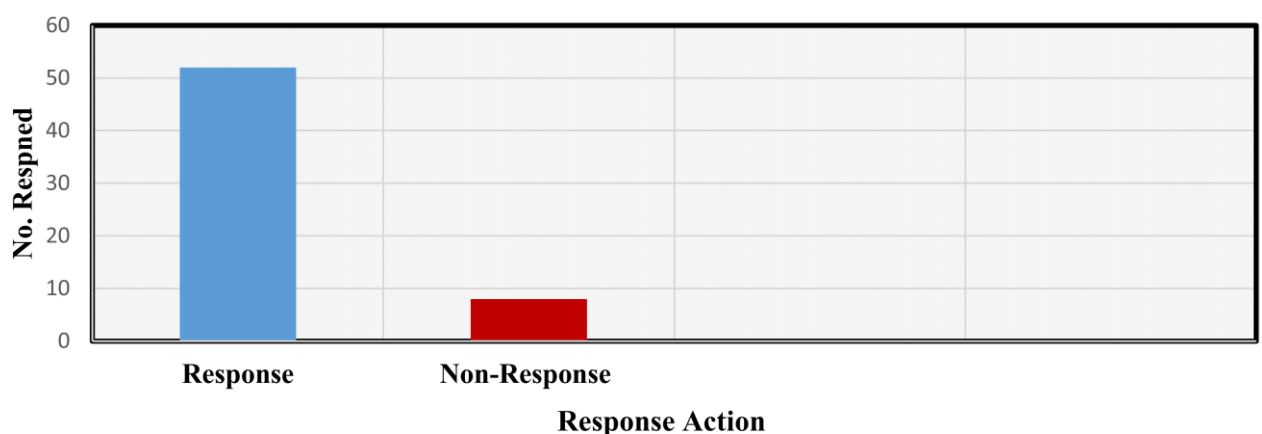


Figure (1) response & nonresponse in the questionnaire

3. Respondents classification.

3.1-Experiences

Experiences	5—10 years	10—20 years	More than 20 years
NO	15	28	9

Often, less than five years of experience in administrative work is not included in major projects, so a minimum of five years has been set in the first questionnaire.

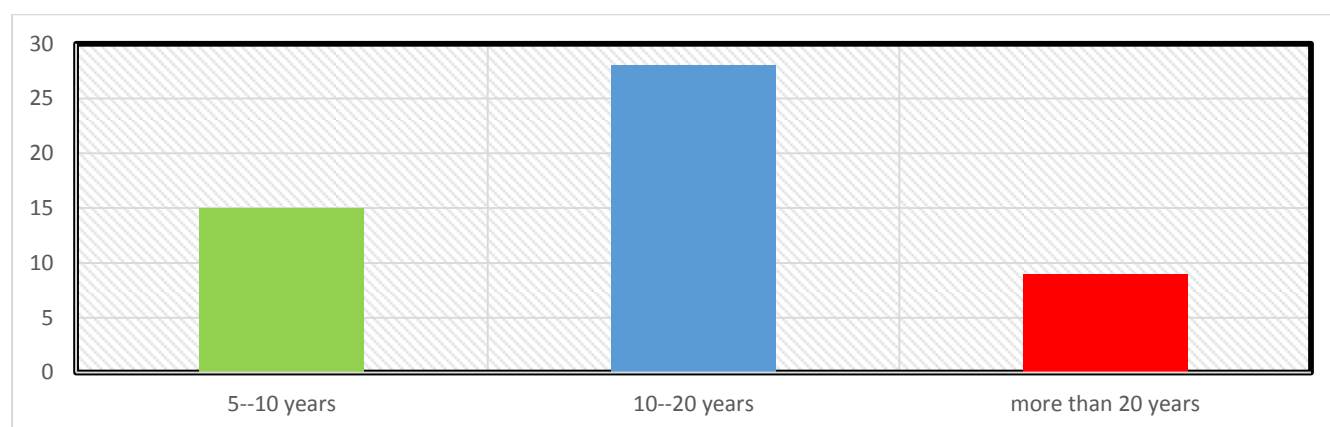


Figure (2) Experiences of engineers in the questionnaire

3.2- owner or(consultants) engineer /contractor engineer

The consultant is often delegated to carry out the work of the owner in major projects, so we will divide the engineers into consultants and contractors to learn about different points of view.

Engineers	consultant	contractor
NO	22	30

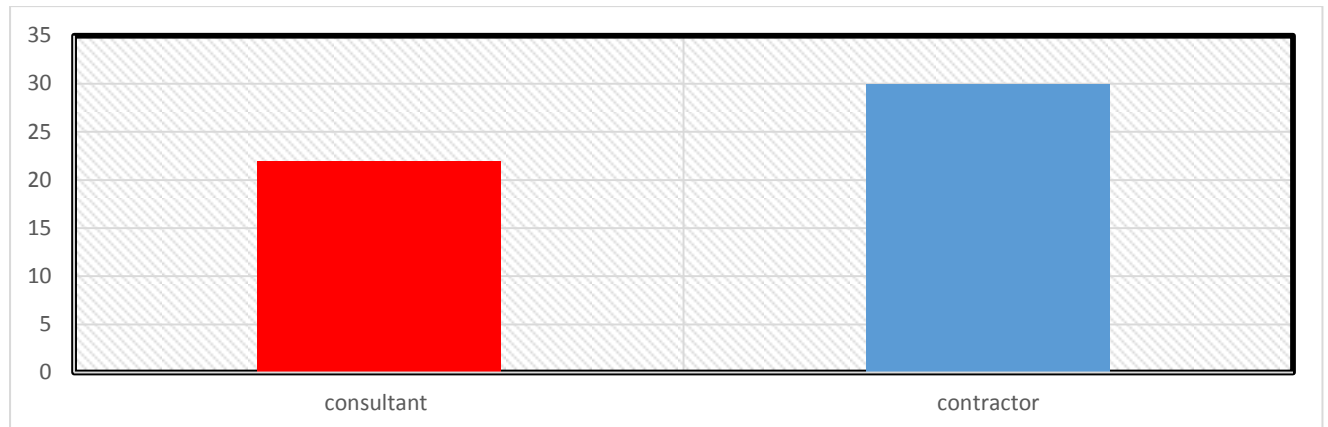


Figure (3) owner or(consultants) engineer /contractor engineer in the questionnaire.

3. DATA ANALYSIS AND RESULTS DISCUSSION

After reviewing the results of the questionnaire then analyzing the results and opinions of experts, the most important elements of the questionnaire were reached:

4.1-Maximum project downtime due to stakeholders: - Statistical work was done for the duration of the pause in the project as a result of lack of coordination between the project managers and stakeholders. Note: This statistical work was done based on the most interrupted period of one of the projects that the engineers participated in the questionnaire.

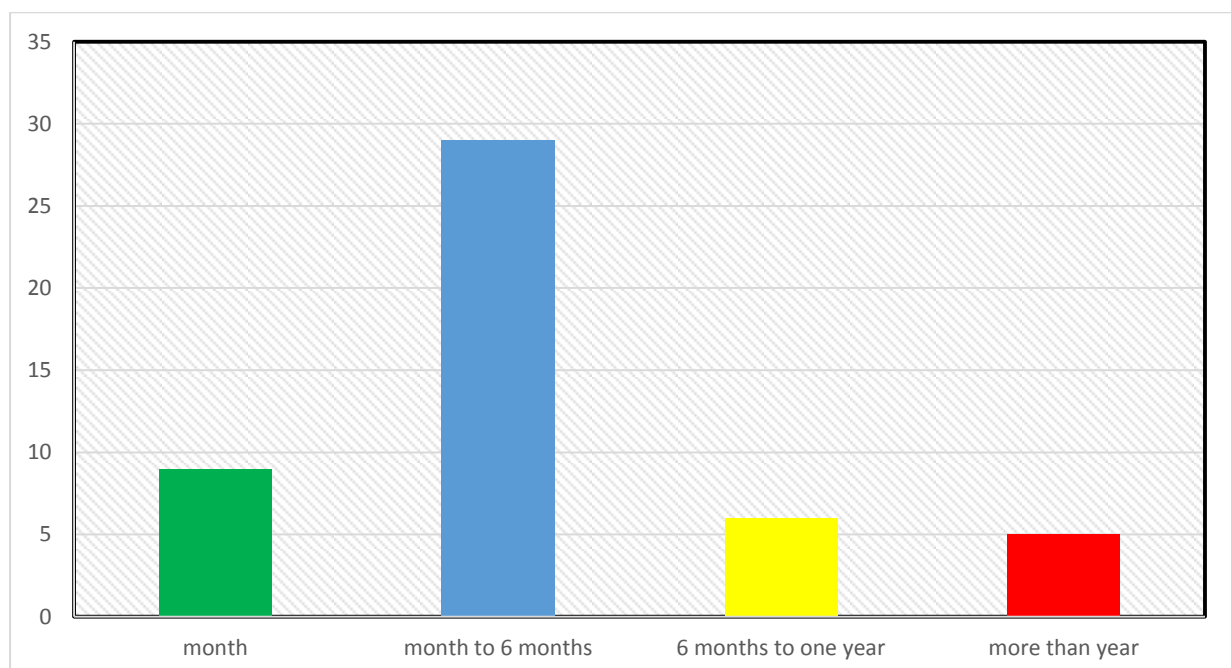


Figure (4): Statistical work of the pause in the project as a result of the change in design or lack of coordination between the project managers and stakeholders

It was found that many projects stopped from one month to six months because of the problems of stakeholders or in other words due to lack of good coordination and here we are talking about stopping a specific part of the project and not the whole project because the project consists of several parts and several items. See Figure (4)

4.2 Changes in design due to stakeholder's problems :-It was also found that the percentage of engineers who faced changes in design due to stakeholders is more than 90% in their projects, as shown Figure (5)

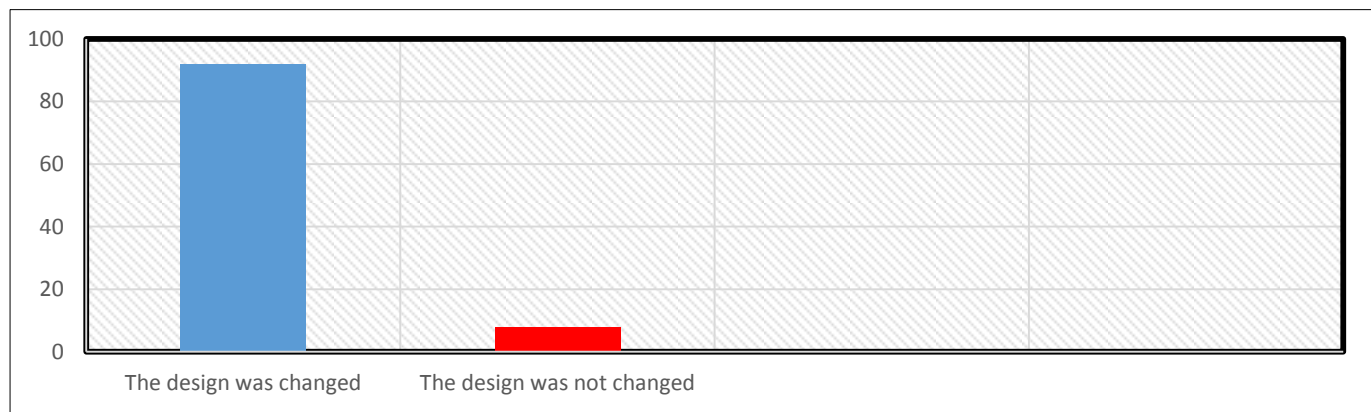


Figure (5) the percentage of engineers who faced changes in design due to stakeholders is more than 90% in their projects

It is a very large percentage indicating the lack of identifying the stakeholders and not identify their needs and how to deal with them and design designs do not conflict with them or agree with them on a suitable solution even does not happen Increase in time and cost. This shows the importance of this study to reduce losses of time and cost.

4.3 Stakeholders engineer suggestion (Stakeholder Affairs Department)

I suggested to the engineers participating in the questionnaire the idea of creating a new profession, a stakeholder engineer. The majority of respondents welcomed the idea very high and some suggested the necessary features in the personality of the stakeholder engineer. About 90% agree to create a new profession, which is a stakeholder engineer, and this is what encouraged me to do this research. We will review the following the most important personal qualities required for a stakeholder engineer and the necessary powers for him, and also the tasks assigned to him. Figure (6)

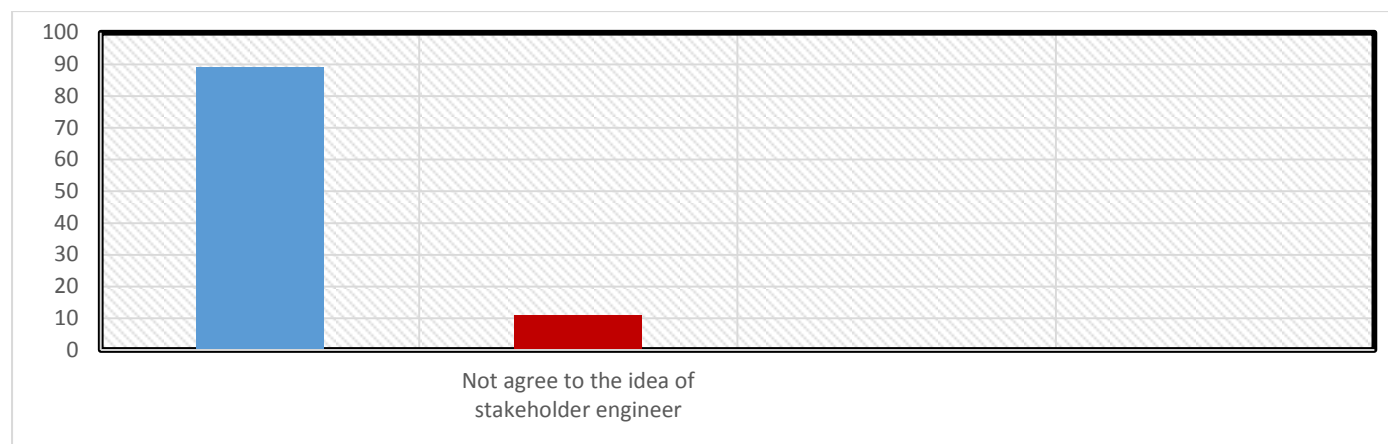


Figure (6) Proportion of those who agree to create a stakeholder engineer career



Figure (7) stakeholders engineer (ST Engineer)

4.3.1-Distinctive characteristics of stakeholder engineer

- *Projects experience*; the stakeholder engineer must have undergone at least three mega projects in order for him to gain experience of the stakeholders' problems so that he can anticipate the problems before they occur.
- *Project management experience*; Stakeholder engineer must be fully familiar with project management and have the necessary courses for project management as PMP or MBA.
- *Honesty and integrity*; These are characteristics that should be in the engineer in general, but when dealing with stakeholders, especially external one's, care must be taken so that things do not turn upside down.
- *Understanding of personnel problems*; the stakeholder engineer must be aware of the problems of internal stakeholders and ensure that there are fair contracts for employees and that he is familiar with labor laws.
- *Alertness and quickness*; The stakeholder engineer must be attentive to the stakeholders so that they do not work contrary to the agreements.
- *Decision-making ability*; the stakeholder engineer must be able to take decisions and take responsibility for his decision, as he sees in the future from the stakeholders.
- *Communication*; The stakeholder engineer must have communication skills with the stakeholders in terms of determining the type of communication needed with each category of stakeholders, whether personal interview, inclination, telephone or other means of communication.
- *Versatility*; Stakeholder engineer should have the skills of intelligence and dexterity and find appropriate solutions to the problems of stakeholders by imposing a solution and an alternative solution.
- *Flexibility*; the stakeholder engineer must be flexible in dealing with stakeholders in order to gain confidence from them and the stakeholder engineer can gain cooperation with stakeholders through flexibility.
- *Negotiation*; the stakeholder engineer must have negotiation skills with the stakeholders so that he can convince the stakeholders to solve the problems without losing to either party. The skill of negotiation depends on patience and hope, and therefore the architect of the stakeholders must be patient, who does not lose confidence quickly, but rather, he tries again and again.
- *Political and culture awareness*; the stakeholder engineer must have a political and cultural awareness of all stakeholders and how to deal with them, and also he must have a political and cultural awareness of the project area where the cultures differ in different places, it is not necessarily what is permitted in one region to be permitted in another region, as well as in dealing with stakeholders.
- *Able to balance technical solutions with time, cost, and human factors*: The stakeholder engineer must not be hasty in taking decisions in solutions with the stakeholders except after he makes sure that the solution or alternative solution does not affect the time and cost of the project or that a balance is made between them so that there is no loss.

- *A generalist rather than a specialist:* The stakeholder engineer must consider matters from a high perspective so that if there is little loss, but the project will be rewarded with great gains if there is no problem, for example, making a way for residents living in this area to facilitate movement or bringing in labor from the resident population or creating noise barriers for the resident population, and so on.
- *Charisma and persuasiveness:* The stakeholder engineer must have a balanced personality, not too much laughter, too much talk, or too much humor so he must be balanced because he is likely to meet a minister or president of a high authority and others.

These are the most important qualities that must be available when choosing a stakeholder engineer. It is proposed that there be at least in every company, institution or authority of the stakeholder engineer in order to be responsible for dealing with stakeholders and finding appropriate solutions.

4.3.2-Powers required for stakeholder engineer

The stakeholder engineer must have all powers to deal with the stakeholders and negotiate with them and find appropriate solutions that do not affect the time and cost of the project. Also, its powers must be specified in the contract between the owner and the contractor in order to be able to perform a currency according to pre-agreed rules. And he must receive all support from the higher management, whether from the owner or the implementing agency, according to the contract in terms of residence, transfers and travel if necessary

4.3.3-The tasks required of the stakeholder engineer

The stakeholder engineer must read the project contract well and determine the project objectives and gains, as well as identify the damages to the surrounding area and the stakeholders in the event of damages. The steps are as follows: -

- *Determine the stakeholders and their requirements*
The first role of the stakeholder engineer is to identify the stakeholders in the project which is to identify everyone involved in the project and then identify all the entities that conflict with the project and then define their needs and requirements. It is not necessary to identify all stakeholders before starting the project, but it is enough to identify at least 80% of them so that we can start the stakeholder analysis, which is the second step.
- *Stakeholder analysis and requirements*
The second step for the stakeholder engineer is an important step which is to analyze the stakeholders and classify them as the strongest and weakest of those interested in the project and who is not interested in the project. We can use any of the stakeholder analysis methods such as, *Internal and external stakeholders*, *Power/interest grid* - *power/influence grid*, and *Method of (power, legitimacy and urgency)* as shown Figures 8, 9, 10, and 11.
This step is the most important role for the stakeholder engineer, because he will record in his own note the arrangement of stakeholders in terms of importance and

also he will record their requirements. The identification and analysis of stakeholders is considered one of the most important data for the stakeholder engineer because in the case of incorrect identification and analysis of stakeholders, this will lead to waste time and direction of the project in another path, Therefore, the stakeholder engineer should focus on these two previous points.

- *Determine ways to communicate with stakeholders*

It is the third step of the stakeholder engineer's role, which is to define ways to communicate with stakeholders, each according to his degree. The methods of communication are meetings, communication by phone and e-mail to know their needs, and there is an informal communication that is indispensable in our time, this is the main role of the stakeholder engineer to determine the needs of stakeholders, which will result in the next step.

- *Develop a plan for dealing with stakeholders and their requirements*

All of the above is to collect data only. As for this step, it is the practical step. It is the first implementation step, and it is a plan to deal with stakeholders, developing a plan for dealing with stakeholders, including interviews with them and methods of communication, as well as developing solutions to problems, as well as alternative solutions in proportion to the cost of the project and does not affect time.

- *Monitor the plan for dealing with stakeholders and their requirements*

The last step of the stakeholder engineer's role is to monitor the implementation of the previously agreed plan with the stakeholders and find weaknesses and defects in it during implementation. Also, he makes a final report on each of the stakeholders and submitted it to the higher authority with which he recorded the full plan and the way the stakeholders deal with the plan and the financial and other matters.

- *Record all notes to be used in the implementation of upcoming projects*

This is a professional plan from the stakeholder engineer, where important notes are recorded in dealing with stakeholders, as well as ways to solve project constraints from stakeholders and how they were dealt with so that he can benefit from them in future projects.

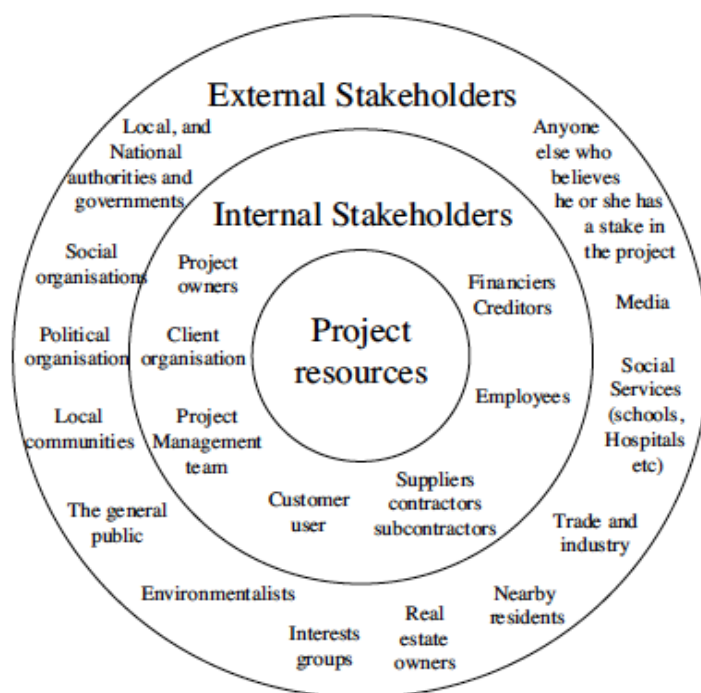


Figure (8) internal and external stakeholders (Chinyio & Olomolaiye, 2010)

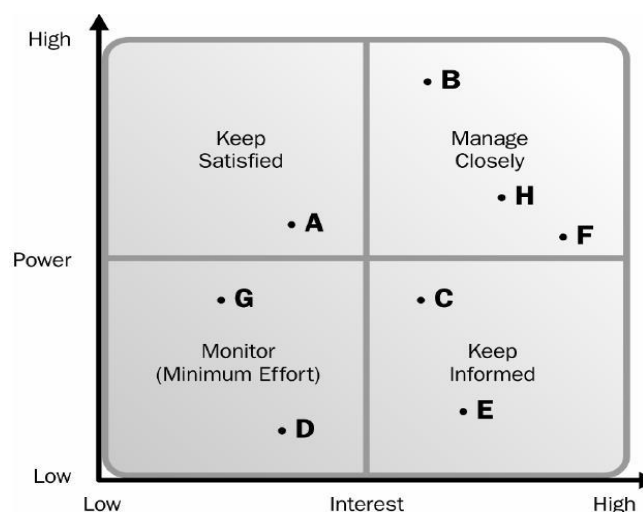


Figure (9) power/interest grid

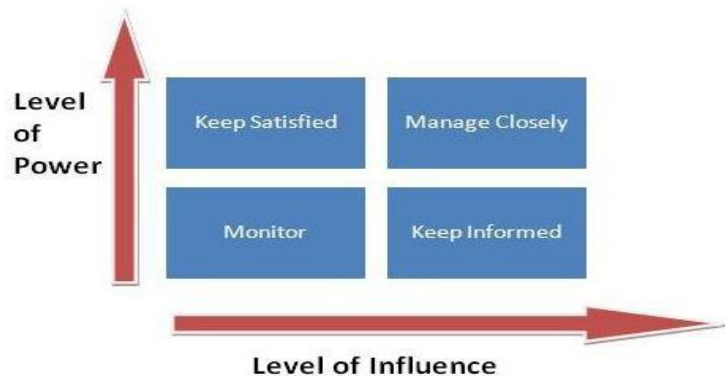


Figure (10) power/influence grid

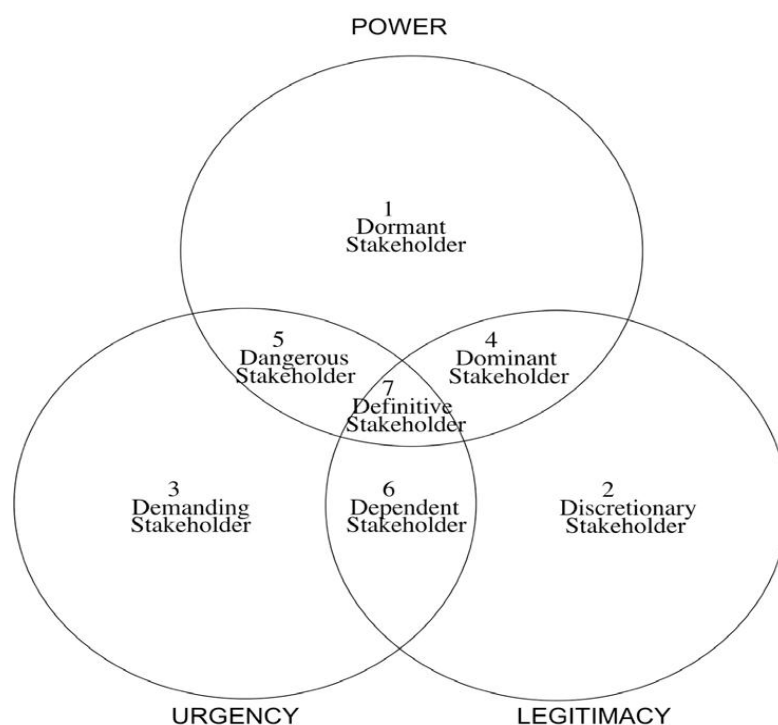


Figure (11) Stakeholder classes (Mitchell et al. 1997)

4. CONCLUSIONS& RECOMMENDATIONS

This research discussed the most important factor affecting dealing with stakeholders to reduce time and cost. The questionnaire was used to know the opinion of the experts on this proposal, Through the questionnaire, it was discovered that many projects were disrupted as a result of stakeholders' problems and also many designs have changed due to stakeholder problems, which means that stakeholders' problems

affect the time and cost of projects. And most experts agreed on the importance of having a stakeholder engineer to solve stakeholder problems. And we have known the following:

- 1-Distinctive characteristics of stakeholder engineer.
- 2-Powers required for stakeholder engineer.
- 3-The tasks required of the stakeholder engineer.

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

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