

Study Of High Impact Factors Effecting on Delaying Construction Projects in Egypt

Mostafa Abd Elrazek¹, Yasser Abdel Shafy Gamal²

¹Lectures of properties and strength of materials, Civil Department, High Institute of Engineering Technology, EL-MINA. (dr.mostafa.abd.k@mhiet.edu.eg)

² Lectures of structural engineering, Civil Department, High Institute of Engineering Technology, EL-MINA. (Yasser.gamal2310@mhiet.edu.eg)

Abstract: The delaying in the construction project is one of the most important factors which is facing the construction industry in Egypt and the identification and assessment of delay entitlement can be difficult and time consuming. There are a lot of reasons lead to delay in the construction project and many researchers and practitioners interested it, this research focus on the most important factors causing delaying the construction projects in Egypt and analyzed the level of impacts on the project completion, The causes and effects of delay in construction were solicited from contractors, clients, and consultants through a questionnaire survey with the participation of 39 respondents, this study is depending on conceptual model to create the delay factors. The study identified 3 main delay model causes (1) lack in understanding of the project management knowledge (2) the lack of adequate recognition of the importance of project management plan (3) incapability's of the contractor's companies to adopt the project management plan as a basic to achieve the project objectives, each model is divided into a sub model, no of sub models are 10 and their effects are contained a list of 42 causes. At the end of research it is obviously that the most potential impact main factors of project completion in Egypt are: The third main Factor: incapability's of the contractor's companies to adopt the project management plan as a basic to achieve the project objectives which contains the three biggest mean values (3-B-6) absence the motivation system for sharing and commitment the plan, (3-B-7) absence the historical information from the previous projects, (3-A-7) Non commitment of the planned time according to the schedule baseline), The first main Factor: Delaying the construction projects in the execution due to lack in understanding of the project management knowledge with two biggest mean values ((1-B-1) absence of the coordination between planning department and other departments in the organization, (1-B-4) Lack of experts required to contribute in execution of planning decision), The results can help the organizations to avoid the most potential impact factor effecting on the delaying of the construction projects.

[Mostafa Abd Elrazek, Yasser Abdel Shafy Gamal. **Study Of High Impact Factors Effecting on Delaying Construction Projects in Egypt.** *N Y Sci J* 2019;12(1):4-15]. ISSN 1554-0200 (print); ISSN 2375-723X (online). <http://www.sciencepub.net/newyork>. 2. doi: [10.7537/marsnys120219.02](https://doi.org/10.7537/marsnys120219.02).

Keywords: Conceptual model, Delay factors, Project management plan, multiple Regression analysis, Cronbach's alpha

I. Introduction

Realistic construction time is now increasingly of the essence of the construction projects because it often serves as a crucial benchmark for assessing the performance of a project and the efficiency of the project organization. Time is one of the important factors to measure the success of a project. Delay in the construction projects has had a significant impact on economic growth of Egypt, so that the research focuses on the important factors shortcoming completion the project in the contract date. This research is holding up in Egypt and trying to collect the most important factors affecting on the delaying of the construction projects. Construction project risks with respect to time should be effectively managed, otherwise they can end up in failure in achieving the objectives of the project. Delaying of the construction has a main effect on others constraints (Cost, Resource, Scope, Quality.... etc) which should be controlled in the project.

Majority of the organizations in Egypt should realize the important of reactive risk management. Time delay is a vital risk factor for construction projects because of complex nature and uncertain environment involving contractors, consultants, clients, and suppliers [1].

There are various causes of delaying the construction projects including shortage of material and failure of equipment etc [2]. In some scenarios, where the delays are interlinked, situation becomes more complicated. Construction delays become a source of many negative impacts on the project and its stakeholders, this will lead to loss of profit, Penalty punishment, loss of reputation for the organization, Unsatisfied stakeholders, and Failure in achieving the objectives for which the project was undertaken including legal proceedings, loss of profit, and in the final may be led to contract cancellations.

Delay of a project is the primary cause of construction claims Therefore, there is immense need

to find out the causes of delays as well as their effects on the construction industry [2].

II. Objectives Of The Research

The major issues which this study sets out to address are as follows:

- To identify the main factors of delaying in construction projects in Egypt.
- to identify the severity of impact factors and the most potential impact.
- The most important recommendation to avoid the delaying shortcoming.
- To evaluate knowledge and understanding of project management in construction organizations.

III. Literature Review

Delays in Construction

There are several factors of delays that have been discussed and identified by researchers in the field of project management in the construction industry. There are several attempts to categorize the causes of delays based on certain factors. These categories may have related to some geographical limitations which is differ from country to another and as such cannot be applied uniformly as whole approach. So that this is considered as unique factors for each country. There are a several researches discuss the causes of delays of the construction projects from several countries.

Although there are some similarities in these results, the differences reiterate the need to have geographic location to this subject matter.

This probably explains why there are several researches on the causes of delays in construction projects from several countries. Available literature reviewed indicate categorization of the various factors in groups of up to eleven [3] categories of consultant-related, contractor - related, design-related, equipment-related, externality - related, labor -related, material-related, owner-related, project-related, engineer-related and human behavior related among.

Kraiem and Diekman [4] classified construction delays into three categories: excusable, excusable compensable and nonexcusable.

Excusable delays [8] are those for which the construction contract allows the contractor additional time only which is equal to the time consumed by the delay. This type of delays includes force majeure, strike, and exceptionally inclement weather. Excusable compensable delays are those for which the construction contract allows the contractor to claim additional monies equal to the monies lost by the contractor due to the delay and also additional time.

Non-excusable delays [5] are those in which the contractor is not entitled to claim extension of time nor additional compensation.

Compensable Delays [2] result from the negligence of owner or its agents. Inadequate drawings and specifications is the most common form

of this delay. Compensable delays may also occur because of owner's failure to provide adequate information or respond properly in time. The contractor is provided with both extra money and extra time in case of compensable delays.

Non-Compensable Delays [2] are induced by events or third parties beyond the reach of the client or the contractor. Some of its examples are protests, shutdowns, fires, and government actions in its sovereign capacity, etc. In these delays, the contractor normally gets extension of completion time but no reimbursement is given for damages caused by delay.

Concurrent Delays [6] is used where the different causes of delay overlap during period of time or schedule window, as such, concurrent delay could occur during window if a delay cause by the owner is on the same activity path or a parallel activity path as a delay that was caused by the contractor.

The delay leads to the construction period becomes longer, increasing overhead costs and expenses for the longer period of the project.

Some Previous Cases of Studies for Delaying Factors.

Many researchers and practitioners have studied the reasons of delay in construction projects. Most of the previous researches only conducted on the severity and level of impacts of the causes of delay, Kazemi and Katebi [7] studied that change orders and changes in scope of work by owner, delay in reviewing of documents by consultant, inadequate experience and knowledge and errors during construction by contractor, and low productivity of laborer have been indicated as key factors comparing with the other as crucial factors causing delay in the oil and gas construction projects.

Shabbab Al Hammadi, M. Sadique Nawab [8] studied the importance of Project owner's role, contractor related, Financing related, Materials related, Design documents have been cited as main delay factors.

Remon Fayek Aziz [9] Ranking of factors and categories was demonstrated according to their importance level on delay, especially after 25/1/2011 (Egyptian revolution). According to the case study results, the most contributing factors and categories (those need attention) to delays were discussed, and some recommendations were made in order to minimize and control delays in construction projects.

Mohamed M. Marzouk, Tarek I. El-Rasas Analyzing [10] delay causes in Egyptian construction projects were grouped to seven categories: owner related, consultant related, contractor related, material related, labor and equipment related, project related, and external related, Ogunlana and Promkuntong. [11] The main causes of delay could be: (a) shortages or inadequacies in industry infrastructure (mainly supply

of resources); (b) caused by clients and consultants and (c) caused by contractor's incompetence/inadequacies.

Ubaid [12] The performance of contractors as one of the major causes of delay. Thirteen major measures related to contractor resources and capabilities were considered.

Aziz determined various factors causing delay in construction projects in Egypt [9]. Ninety-nine factors were short-listed to be made part of the questionnaire survey and were identified and categorized into nine major categories consist of consultant, contractor, design, equipment external, labor, material, owner and project related factors.

Atafar and Eghbali [13] investigated Project pathology and causes of delay in the projects of zone 3 of Iranian Gas Transmission Company based on finding from this research, the most effective reasons of project delay from the respondent's point of view was the contractor's failure.

IV. Methodology Of Research

In this section delay factors categorized into three major delay causes affecting in the construction projects are categorized and were divided as 1) lack in understanding of the project management knowledge (2) the lack of adequate recognition of the importance of project management plan (3) incapability's of the contractor's companies to adopt the project management plan as a basic to achieve the project objectives and each group decomposes into ten sub divided Fig (1).

This research identified the causes of delay given by previous researches and the quantitative questionnaires to provide a large number of responses from Egypt construction expert advice by the experienced industry personnel. And the research depends in choosing the responders from different phases to get realistic behavior towards the delaying factors on different types of the project Fig (2) and taking different factors in choosing of responders like the no of experience years Fig (3), the age of responders Fig (4).

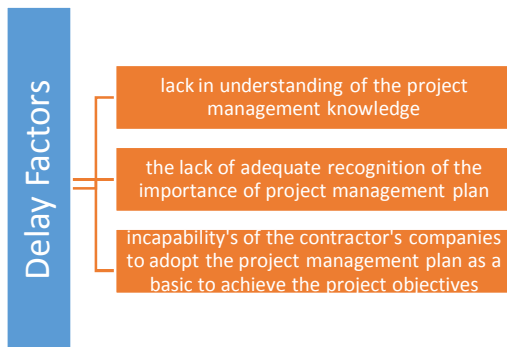


Fig (1)

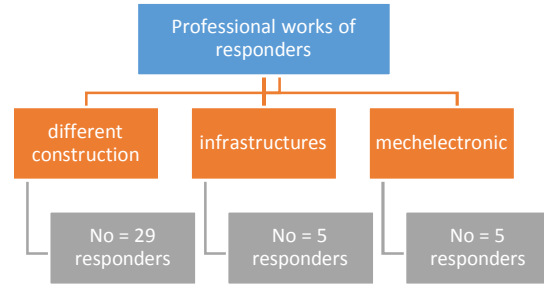


Fig (2)

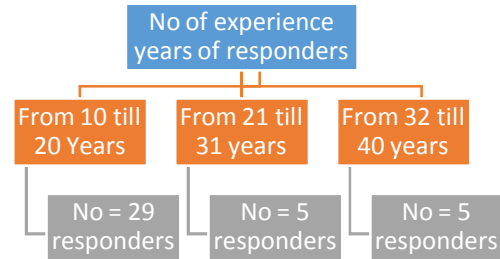


Fig (3)

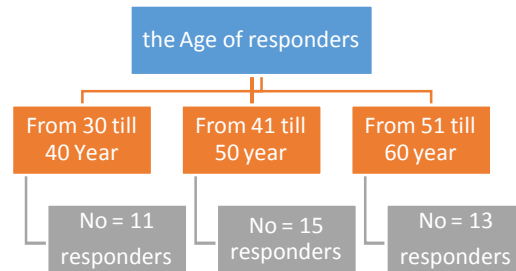


Fig (4)

V. Results And Discussion

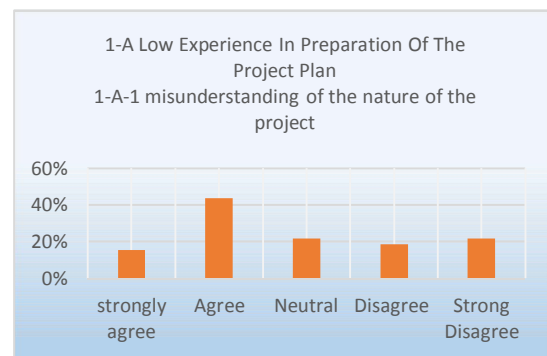


Fig (5)

All the collected data gathered for different factors was studied and analyzed using statistical tool. Using the histogram diagram (Fig 5: Fig 46) to illustrate the results of the questionnaire and then

analyzed using the basic principles of statistics. The factors diagram can be divided as following:

The first Factor: Delaying the construction projects in the execution due lack in understanding of the project management knowledge

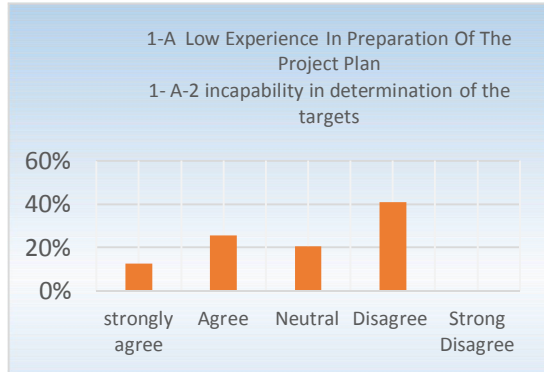


Fig (6)

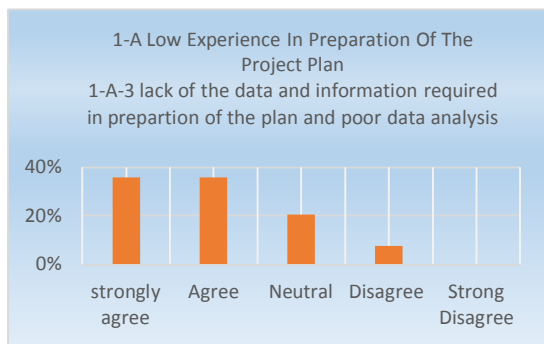


Fig (7)

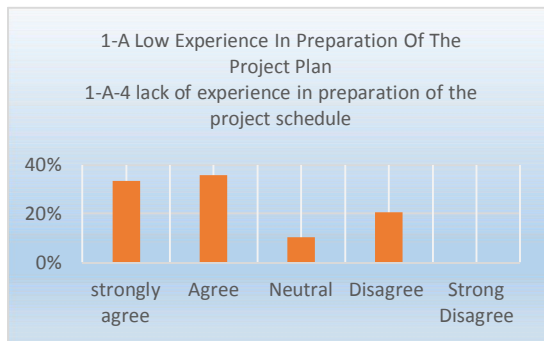


Fig (8)



Fig (9)

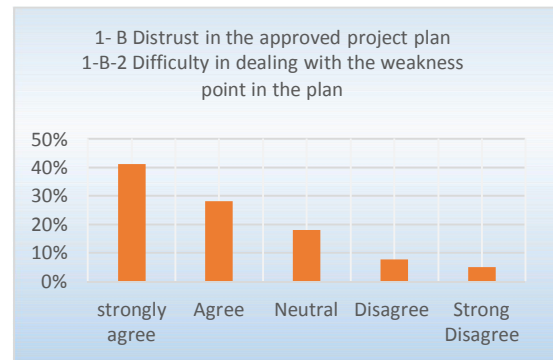


Fig (10)

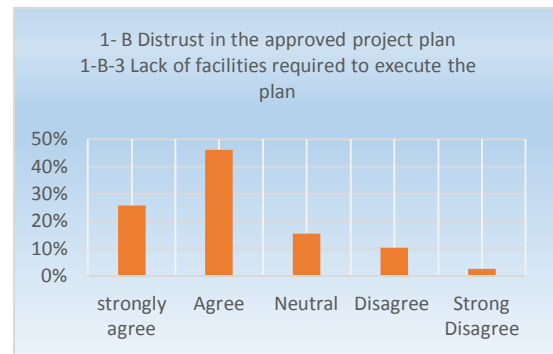


Fig (11)

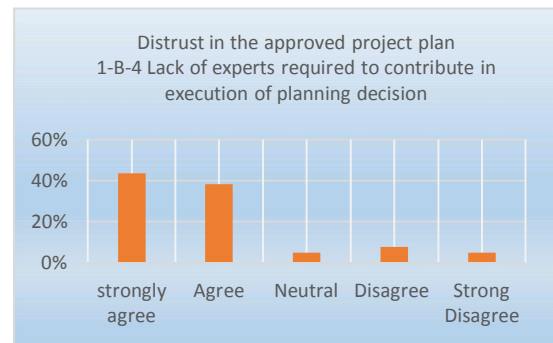
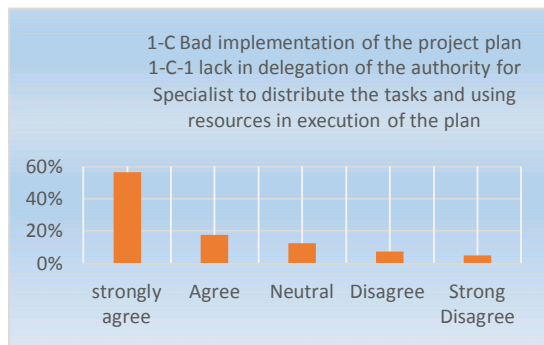
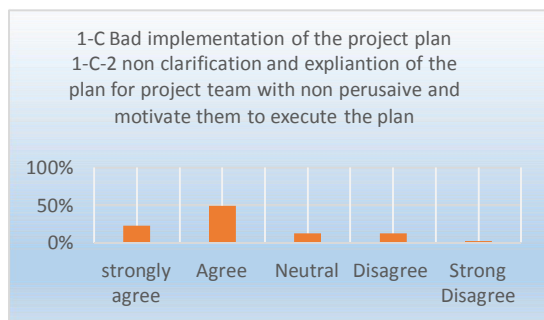
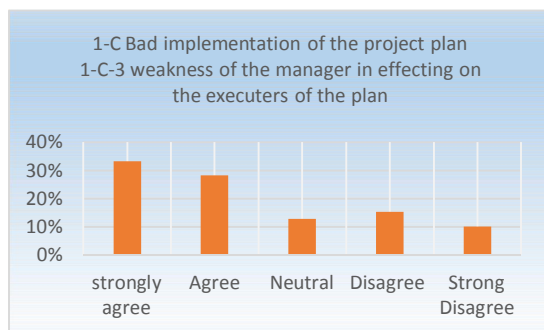
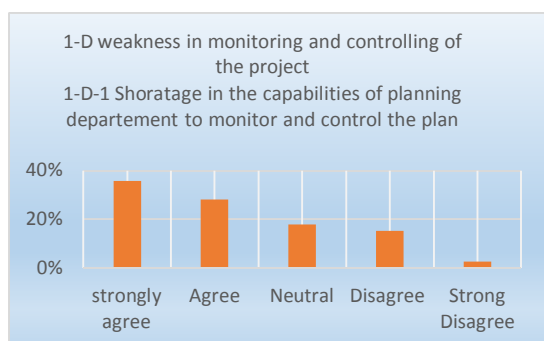
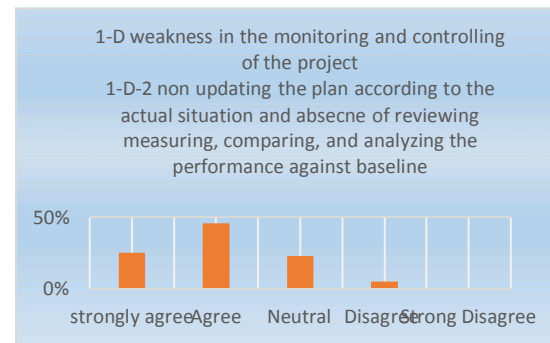
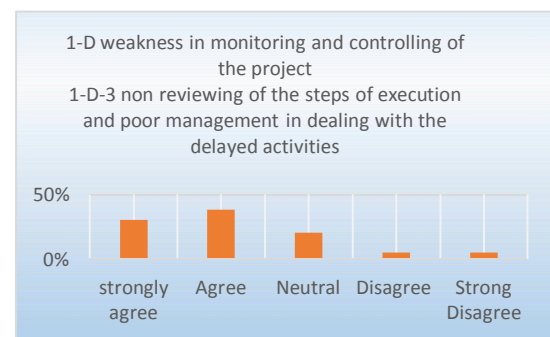
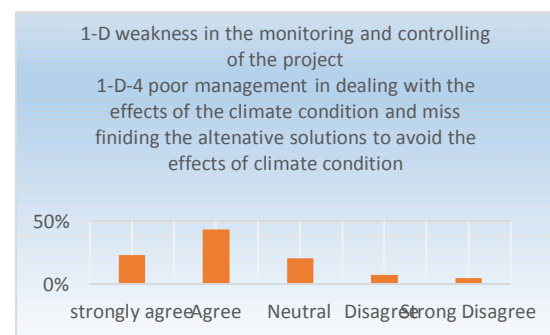
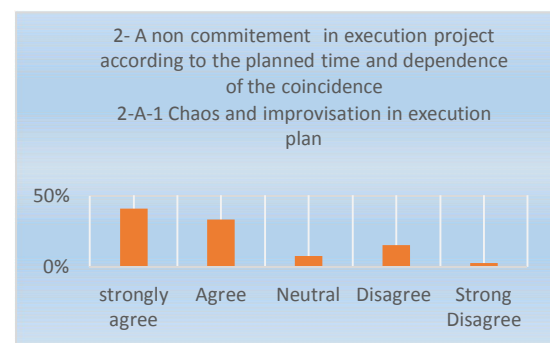
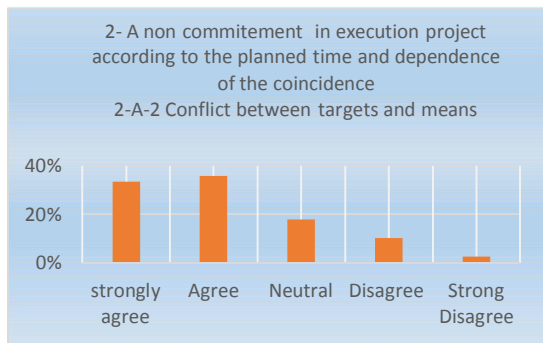
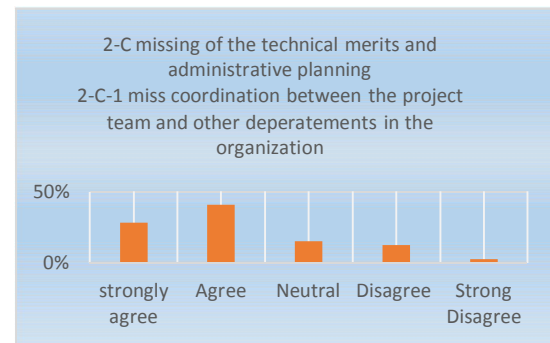
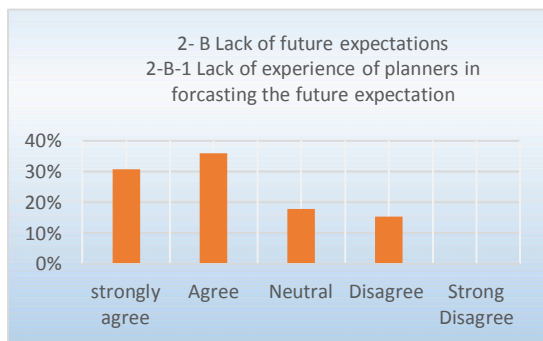
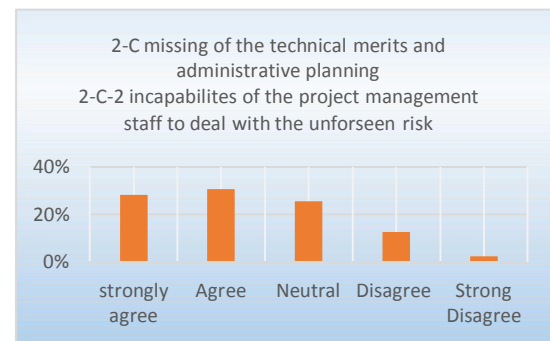
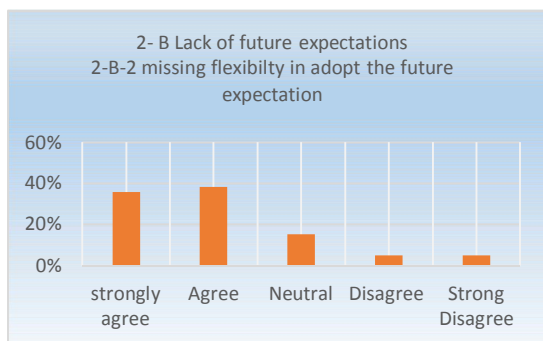
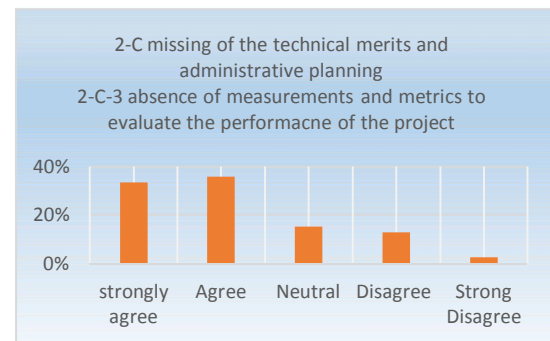
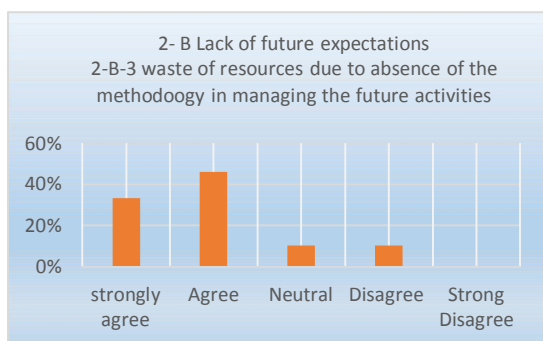
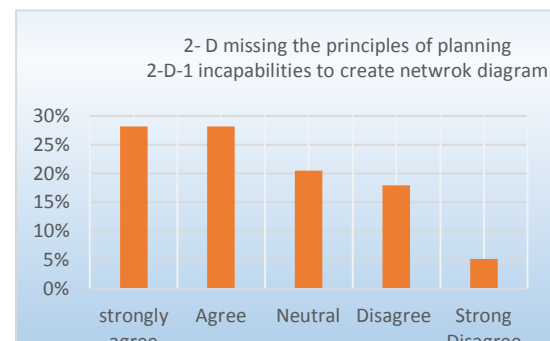


Fig (12)

**Fig (13)****Fig (14)****Fig (15)****Fig (16)****Fig (17)****Fig (18)****Fig (19)**

The second Factor: Delaying the construction projects in the execution due to lack of adequate recognition of the importance of project management plan

**Fig (20)**

**Fig (21)****Fig (25)****Fig (22)****Fig (26)****Fig (23)****Fig (27)****Fig (24)****Fig (28)**

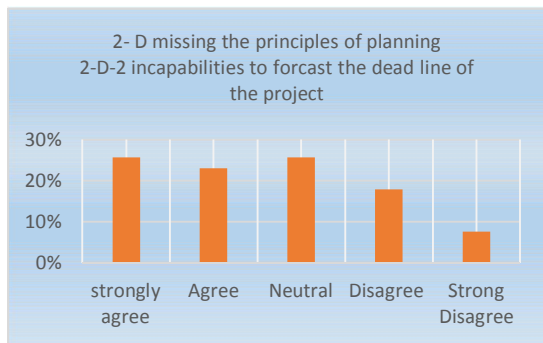


Fig (29)

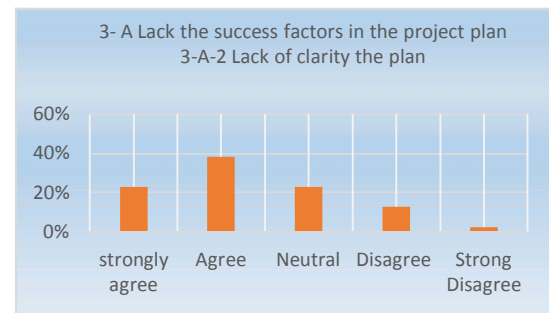


Fig (33)

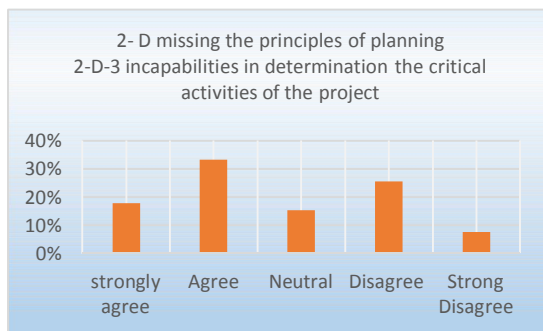


Fig (30)

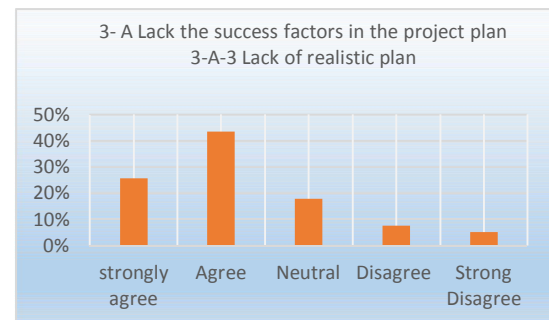


Fig (34)

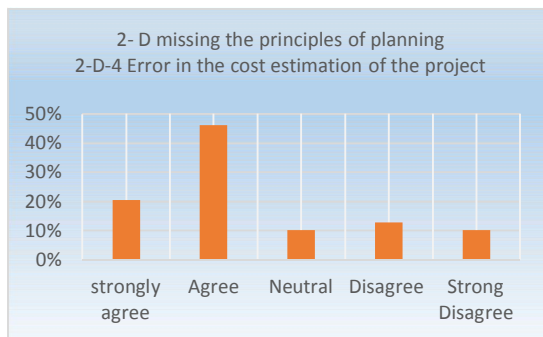


Fig (31)

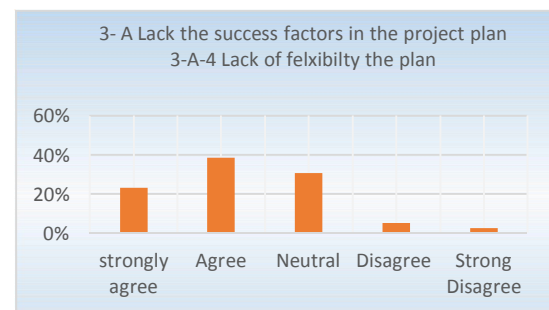


Fig (35)

The third Factor: incapability's of the contractor's companies to adopt the project management plan as a basic to achieve the project objectives

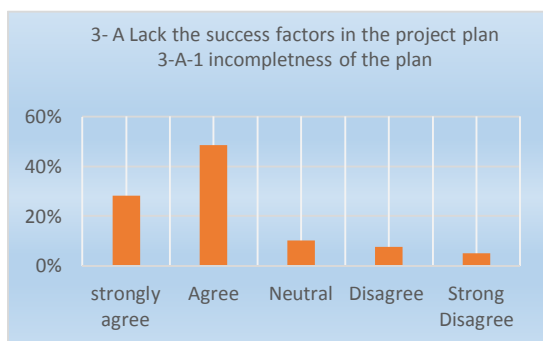


Fig (32)

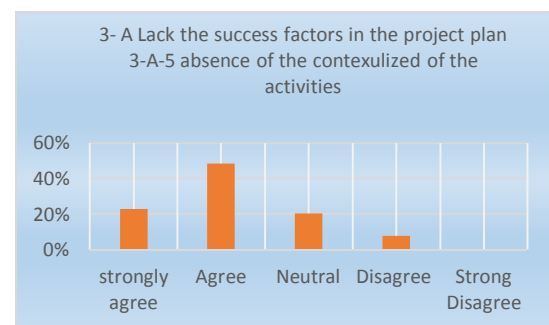
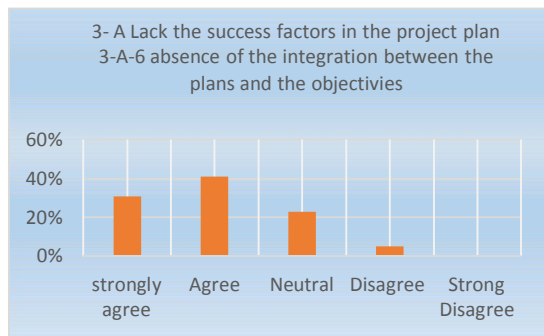
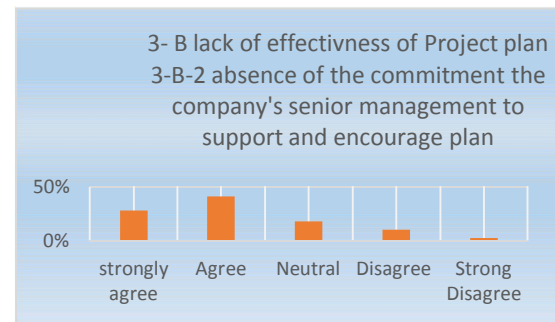
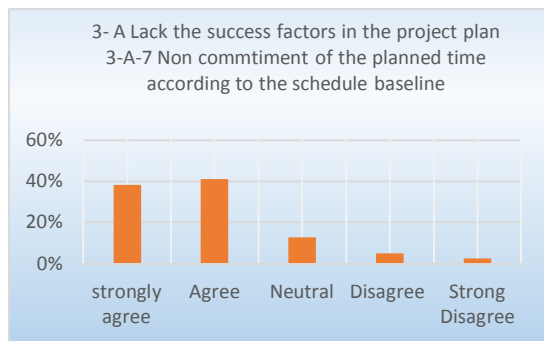
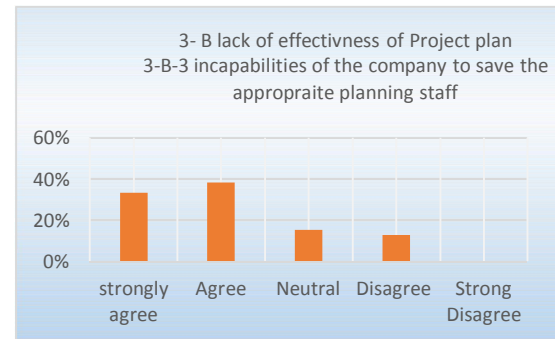
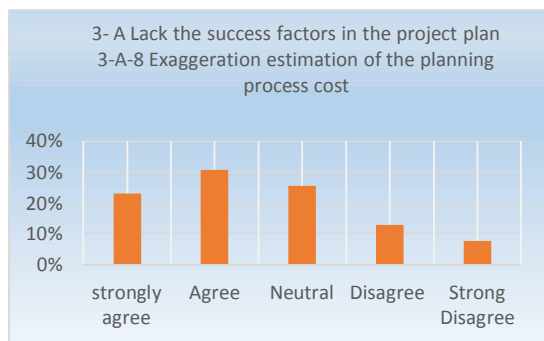
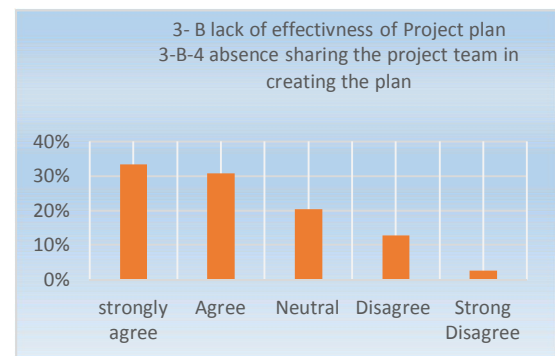
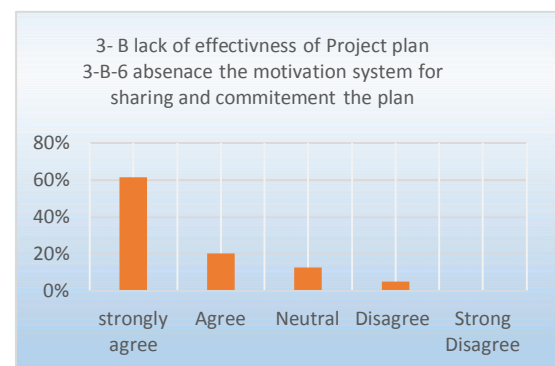


Fig (36)

**Fig (37)****Fig (41)****Fig (38)****Fig (42)****Fig (39)****Fig (43)****Fig (40)****Fig (44)**

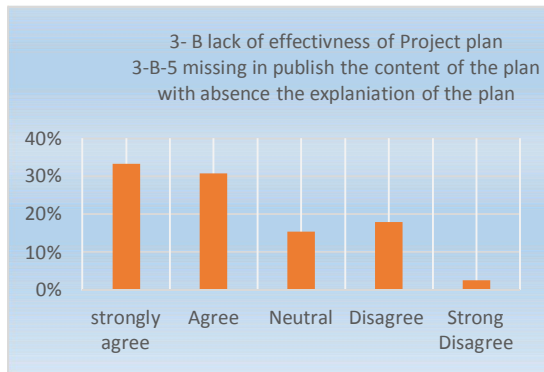


Fig (45)

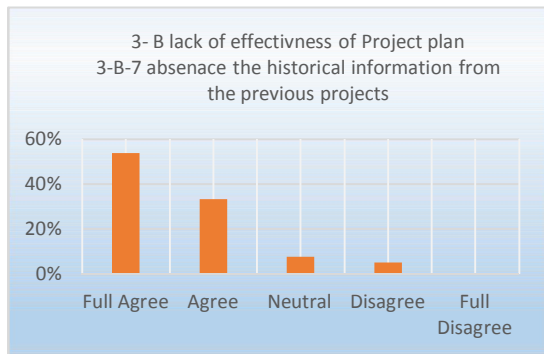


Fig (46)

VI. Analysis Of Results And Statistical Analysis

Reliability Analysis

Cronbach's alpha is a convenient test used to estimate the reliability, or internal consistency that is made from several scale used in Likert-Type scales, so that it was used to assess the questionnaires reliability, from Likert-Type scales five-point scale was used in the research ranges from 1 (strongly disagree) to 5 (strongly agree) [Strong Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5].

The acceptable lower limit for the Cronbach's alpha is usually considered to be 0.7, although values as low as 0.6 are sometimes acceptable [14].

The Cronbach's alpha values related to three major factors (1] lack in understanding of the project management knowledge, 2] the lack of adequate recognition of the importance of project management plan, 3] incapability's of the contractor's companies to adopt the project management plan as a basic to

achieve the project objectives) are in turn 0.618, 0.789, 0.843 and its value for all factors was 0.779 which is considered the good result for questionnaires, in the final the measurement was reliable and consistence.

The Ranking of The Delay Factors

From the present study the major delay factors was obtained and determined the most potential impact factor. The studies were mainly done on time delay only, and determined forty-two factors effect on the delaying of the construction project in Egypt. The Table (1 & 2) comprise the delaying factors rank according to the value of their mean from research it can be seen that that the most potential impacts effect on delaying the project that Fig (47):

absence the motivation system for sharing and commitment the plan, absence the historical information from the previous projects, absence of the coordination between planning department and other departments in the organization lack in delegation of the authority for Specialist to distribute the tasks and using resources in execution of the plan, Lack of experts required to contribute in execution of planning decision.

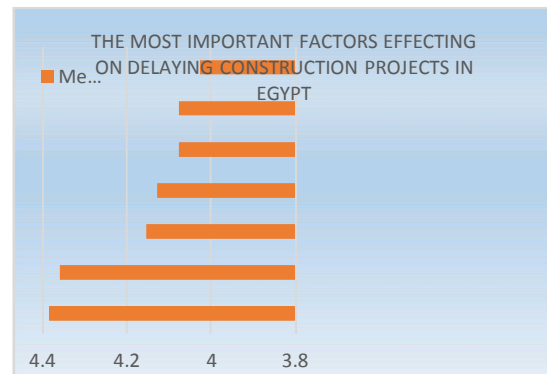


Fig (47)

Multiple Regression Analysis

To complete the research, it should be investigated the multiple regression analysis to get the relationship between the extracted delay factors and the project completion date.

Table 1.

Factor code	The delay factors	Mean	Rank
3-B-6	absence the motivation system for sharing and commitment the plan	4.385	1
3-B-7	absence the historical information from the previous projects	4.359	2
1-B-1	absence of the coordination between planning department and other departments in the organization	4.154	3
1-C-1	lack in delegation of the authority for Specialist to distribute the tasks and using resources in execution of the plan	4.128	4
1-B-4	Lack of experts required to contribute in execution of planning decision	4.077	5
3-A-7	Non commitment of the planned time according to the schedule baseline	4.077	6
2-B-3	waste of resources due to absence of the methodology in managing the future activities	4.026	7
1-A-3	lack of the data and information required in preparation of the plan and poor data analysis	4	8
3-A-6	absence of the integration between the plans and the objectives	3.974	9
2-A-1	Chaos and improvisation in execution plan	3.949	10
2-B-2	missing flexibility in adopt the future expectation	3.949	11
3-B-1	absence of the commitment in the execution of the plan inside the organization	3.949	12
1-B-2	Difficulty in dealing with the weakness point in the plan	3.923	13
1-D-2	non updating the plan according to the actual situation and absence of reviewing measuring, comparing, and analyzing the performance against baseline	3.923	14
3-B-3	incapabilities of the company to save the appropriate planning staff	3.923	15
2-A-2	Conflict between the targets and means	3.872	16
3-A-1	incompleteness of the plan	3.872	17
3-A-5	absence of the contextualized of the activities	3.872	18
1-D-3	non reviewing of the steps of execution and poor management in dealing with the delayed activities	3.846	19
2-C-3	2-C-3 absence of measurements and metrics to evaluate the performance of the project	3.846	20
1-A-4	1-A-4 lack of experience in preparation of the project schedule	3.821	21
2-B-1	2-B-1 Lack of experience of planners in forecasting the future expectation	3.821	22
3-B-2	3-B-2 absence of the commitment the company's senior management to support and encourage plan	3.821	23
1-B-3	Lack of facilities required to execute the plan	3.816	24
1-D-1	Shortage in the capabilities of planning department to monitor and control the plan	3.795	25
2-C-1	miss coordination between the project team and other departments in the organization	3.795	26
3-B-4	absence sharing the project team in creating the plan	3.795	27
1-C-2	non clarification and explanation of the plan for project team with non persuasive and motivate them to execute the plan	3.769	28
3-A-3	Lack of realistic plan	3.769	29
3-A-4	Lack of flexibility the plan	3.744	30
3-B-5	missing in publish the content of the plan with absence the explanation of the plan	3.744	31
1-D-4	poor management in dealing with the effects of the climate condition and miss finding the alternative solutions to avoid the effects of climate condition	3.718	32
2-C-2	incapabilities of the project management staff to deal with the unforeseen risk	3.692	33
3-A-2	Lack of clarity the plan	3.667	34
1-C-3	weakness of the manager in effecting on the executers of the plan	3.59	35
2-D-1	incapabilities to create network diagram	3.564	36
2-D-4	Error in the cost estimation of the project	3.538	37
3-A-8	Exaggeration estimation of the planning process cost	3.487	38
2-D-2	incapabilities to forecast the dead line of the project	3.41	39
2-D-3	incapabilities in determination the critical activities of the project	3.282	40
1-A-1	misunderstanding of the nature of the project	3.103	41
1-A-2	incapability in determination of the targets	3.103	42

Table 2 shows the results of the multiple regression analysis which focuses on the major model factors affecting on the delaying of the project and from the results, it can be conclude that the major main factors impacting on the delaying of the project is (Incapability's of The Contractor's Companies To Adopt The Project Management Plan with β coefficient as 0.598).

Table 2.

Variable	β .Co	SE	t-value	Sig
Constant		.001	.579	.566
Lack in understanding of the project management knowledge	.460	.000	1356.87	.000
The lack of adequate recognition of the importance of project management plan	.518	.000	1506.09	.000
Incapability's of the contractor's companies to adopt the project management plan	.598	.000	1739.85	.000

So that it is obviously the incapability of the companies to align the performance of the project work with the project management plan is the most potential impact in the project and it should be focus to avoid the harmful effects by following change control procedure by the corrective actions and preventive action to maintain the alignment with the project management plan.

VII. Conclusion:

This research is based on a conceptual model of delay factors affecting the completion date of the construction projects in Egypt and analyzed the level of impacts on the project completion, The findings of the factor ranking show that the fifth most potential impact factors of project completion are:

A. Absence the motivation system for sharing and commitment the plan (Mean =4.385).

B. Absence the historical information from the previous projects (Mean =4.359).

C. Absence of the coordination between planning department and other departments in the organization (Mean =4.154).

D. Lack in delegation of the authority for Specialist to distribute the tasks and using resources in execution of the plan (Mean =4.128).

E. Lack of experts required to contribute in execution of planning decision (Mean = 4.077).

The results show that:

- Absence the motivation system for sharing and commitment the plan, obtaining commitment involves interaction among all relevant stakeholders, both internal and external to the project one of the most important factor to achieve the objective of the project so that the research recommends to create commitment plan from all stakeholders which should have confidence that the project can be performed within time and avoiding delaying.

- The absence of historical information so that if the historical data are available, some proven statistical forecasting methods (analogous estimation, parametric estimation, beta distribution or triangular estimation method) have been developed the required

time to complete the project and avoid any delaying the project due to wrong estimation of project time.

- Absence of the coordination between planning department and other departments in the organization so that to avoid delaying the project due to the absence of the Coordination which is considered as the primary method of synchronization to avoid any delaying in the performing the activities of the project according to the baseline and to ensure unity of action among the team and planning department, to work together to accomplish organizational goals and end the project on the completion date.

- Lack in delegation of the authority is one of the greatest challenges to manage the project and motivate structure resources to be effective and efficient in execution of the project plan. And to overcome that challenge, must partnership relationships between and among all resources, these patterns are established through the delegation process involving a sharing of authority.

References

1. R. Masood, R.M. Choudhry, Identification of risk factors for construction contracting firms-encompassing mitigation stance, in: Second International Conference on Construction In Developing Countries (ICCIDC-II) Cairo, Egypt, 2010.
2. Rehan Masood1, Mahboob Ali, Faizan Shafique, Muhammad Awais Shafique, Bilal Zafar, Ahsen Maqsoom and Zeeshan, the Delay Factors of Construction Projects in Metropolitan City of a Developing Country. Journal of Civil Engineering and Architecture Research 2015; pp. 947-955.
3. Al-Kharashi, A., and Skitmore, M., 2009, Causes of delays in Saudi Arabian public sector construction projects, Journal of Construction Management and Economics, 27(1), pp. 3–23.
4. Kraiem and Diekmann.1987. Concurrent delays in construction projects. Journal of Construction Engineering and Management. 113 (4):591-602.

5. Mohammed Alias bin Yusof, Noraziah binti Mohammad. excusable and compensable delays in the construction of building project. Journal - The Institution of Engineers, Malaysia (Vol. 68, No.4, December 2007) .
6. Richard J. Long, PE, Analysis of concurrent delay on construction claims, Long international.
7. Aliyeh Kazemi, Ali Katebi, Mohammad-Hossein Kazemi, Causes of delay in construction projects: The case of oil and gas projects, International Journal of Advanced Research in Engineering (ISSN Online: 2412-4362).
8. Shabbab Al Hammadi, M. Sadique Nawab, Study of Delay Factors in Construction Projects, International Advanced Research Journal in Science, Engineering and Technology Vol. 3, Issue 4, April 2016.
9. Aziz R.F., "Ranking of delay factors in construction projects after Egyptian revolution", Alexandria Engineering Journal, 52, 2013, pp 387–406.
10. Mohamed M. Marzouk, Tarek I. El-Rasas Analyzing delay causes in Egyptian construction projects, 2090-1232, 2014 Cairo University. Production and hosting by Elsevier B.V. All rights reserved.
11. Ogunlana SO, Promkuntong K. Construction delays in a fastgrowing economy: comparing Thailand with other economies. International Journal of Project Management 1996; 14 (1): 37–45.
12. Ubaid AG. Factors affecting contractor performance. Master thesis, CEM Dept., KFUPM, Dhahran, Saudi Arabia, 1991.
13. Atafar A., Eghbali M., "Analyzing the Factors Influencing Delay of Projects in Zone 3 of Iranian Gas Transmission Company", Journal of Industrial Management, 5(2), 2013, pp 85-102.
14. Hair, J.F., Black, W.C., Babin, B.J., and Anderson, R.E. (2010). Multivariate data analysis, 7th Ed., Pearson Education, Upper Saddle River, NJ.

2/13/2019