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The Impact of Critical Success Factors and Project Manager on the Key Elements of Project Management

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Abstract

This study aimed at examining the relationship between the identified critical success factors by project managers and their impact on key project management elements at the General Electricity Company of Libya. It focused on the project manager's role and highlighted the importance of senior management's commitment to effective project management practices. The findings showed that the project manager's ability and commitment were crucial for project success, while other factors, such as regular meetings and communication with international expertise, had less impact. The study confirmed that critical success factors significantly influence key project management elements and the project manager's role. Senior management's support and the project manager's effective leadership were found to be the most important factors in achieving success. Additionally, the study emphasized the importance of planning meetings in developing a schedule management plan as a key element of project management. It concluded with recommendations to enhance project management in the company, stressing the need for stronger involvement from senior management and project managers, as well as the development of strategies to identify and manage critical success factors to improve project performance and efficiency.

Keywords: Project Management, critical success factors; project manager role; General Electricity Company; Libya.

1. Introduction

Many organizations face significant challenges in project management, as many projects experience delays in delivery or complete failure. This problem stems in part from the lack of understanding of the critical factors that affect the success of project management in this sector. Critical success factors (CSFs) are a very important in the development or the enhancement of the information systems, process, and decision-making processes. CSFs, generally, help in defining the objectives, priorities, and indicators that measure the success of projects. These factors are considered the focal point to the development and processes as ensuring that the system strategy is consistent with the organizational strategy. In addition, CSFs enable the availability of a useful information systems and flow for project managers as they indicate the important points that managers should pay special attention. This, correspondingly, highlights the key role of the project manager in understanding the impact of CSFs on building collaborative relationships with different departments within the organization, which leads to ensuring efficient and effective workflow. This collaboration extends to managing changes that may occur to processes within the organization.

In the recent years, the General Electricity Company in Libya has faced major challenges in project performance. Despite the crucial role of this sector in the economy and infrastructure of the country, a large number of projects did not achieve the desired results and faced some delays for years. The Libyan Audit Bureau indicated in their reports that a large number of projects of the General Electricity Company cost the Libyan state about seven billion and 48.7 million during the period from 2008 to 2018 including 29 contracts for the construction of production sector projects and 45 contracts for electrical transmission. Expenditure on most of these projects have already commenced. However, the completion rate did not exceed 70%. According to the Bureau's report, the causes are due to weak performance,

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whether at the level of the company's management as a whole or its inability to control the progress of projects, in addition to, the security chaos, particularly in the projects of the southern region (Audit Bureau Report, 2018). Furthermore, the General Electricity Company annual report shows that there is a significant delay in the planned schedule in many energy production projects coupled with an increase in the construction cost from one billion and eight hundred thousand dinars to more than two billion and one hundred thousand dinars due to problems in supply and delays in receiving materials (the company's annual report, 2023).

Despite the large funds allocated to projects, projects did not achieve the desired results facing some issues such as poor performance and other major challenges in managing and implementing the projects. Moreover, many of these projects suffer from long delays and budget overruns and sometimes failure to complete such projects. Hence, this paper focuses on exploring the extent of the impact of critical factors that affect the success or failure of the company's projects, and the role of project managers in improving project management and increasing their success rate. There is no doubt that delving into project management literature, especially for the purpose of identifying critical success factors, is of utmost importance. This is evident through in-depth research into the relationship between critical success factors and key project elements such as time, quality, and cost. These concepts play a fundamental role in improving project quality and reducing wasted time and exaggerated costs resulting from ineffective project management.

This study contributes to bridging the knowledge gap by identifying and analysing critical success factors such as leadership skills, communication efficiency, risk management, and interaction with stakeholders, and their relationship to the basic elements of project management, namely scope, time, cost, quality, and human resource management. These relationships constitute the independent, moderating (the project manager's application of critical success factors), and dependent (project outcomes in terms of key elements) variables of this study. This is especially important in the context of the General Electricity Company, which suffers from the stumbling and failure of many of its projects.

Through this study identifies the critical factors that affect the success of projects and identify areas that need improvement in project management processes which helps the company improve the quality of its projects, reduce wasted time and exaggerated costs, and contribute to creating successful and profitable projects in the true sense of the word. Identifying and exploring the critical factors of projects helps the company improve its performance and increase the chances of success in future projects. The company will be able to avoid mistakes made in previous projects, and work on improving current processes to achieve the best results and continuously improve its performance in project management.

This study will be a reference that can be used by project management researchers, decision-makers, and workers in the electricity industry related to the same field of work. This study is divided into five sections. The first one commences with introduction. The second one provides a review to literature and hypotheses development while the third one is about methodology. The fourth section

provides the analysis and results and it concludes with the discussion, recommendations, limitations, and future research.

2. Literature review and development of hypotheses

Sarosh, (2023) study finds that construction projects suffer from many problems and high rates of failure, understanding the main factors that affect success and determining success criteria becomes essential to achieving the best performance in this sector. Other studies highlight the importance of work conditions for the success of project implementation in organization with good organizational culture and distributed environment include clear rules for communication, project management style and goal setting, and managers' competencies and confidence in the work team (Chen & Partington, 2004; Mir & Pinnington, 2014). More studies (Wang, Zaman, Rasool, Zaman, & Amin, 2020) stress the importance of technical and organizational support where a distributed work environments can lead to project success (Mavi & Standing, 2018; Verburg, Bosch-Sijtsema, & Vartiainen, 2013).

Gallego et al. (2021), study find that many projects face difficulties in achieving sustainable success due to a lack of adequate understanding of the factors that affect project management performance. Fazly, Raees, Shafi, Iqbal & Nawaz, (2024) research stress the role of project manager competencies in planning and success of public sector projects regarding the increase in the quality of project planning which will be reflected in the project management success (Zwikael, 2008). Hence, choosing the right project manager can greatly affect the identification problems, challenges, and the achievement of project goals.

From the previous literature, the relationship between the variables is clear as CSFs as include setting clear and tangible objectives such as time, cost, and quality. These element or factors can create a huge challenge towards the process of the project where a manager of the project as an intermediary his role is to direct the team towards achieving these objectives by coordinating efforts and providing the necessary support (Alazzabi, Mustafa, & Issa, 2021; Fayaz et al., 2017). The manager sets objectives, distributes tasks, and monitors performance to ensure compliance with the specified objectives key project elements as results Improve time, cost, and quality as results achieved by focusing on achieving pre-defined objectives. Management by objectives theory was used in this paper in order to explain the relationships. The theory focuses on recognizing organizational objectives, directing efforts to achieve these objectives by coordinating efforts, and evaluating performance based on the results achieved. Using the management by objectives theory helps in monitoring and evaluating performance continuously to ensure these objectives are achieved. Hence, this paper assumes based on the theory and the existing literature that there are statistically significant positive differences in the impact of the project manager as an intervening variable in the relationship between critical success factors and the main project management elements in the General Electricity Company in Libya and the hypothesis are as the following;

H1: CSFs significantly influences the project management process

H2: CSFs significantly influence the project manager role

H3: Project manager competencies significantly influence project management process

H4: Project manager competencies mediate the relationship between the CSFs and project management process.

3. Study Methodology

This study uses the descriptive analytical method, which is based on analysing the data by paying attention to details and focusing on description and analysis in an accurate manner. The study sample is Employees of the General Electricity Company in Libya using the Morgan table to determine the sample size. a sample size of 380 was chosen according to the statistical methods recognized in engineering sciences according to the table, the probability that this sample will represent the community well reaches 95% or higher (confidence level exceeding 0.95). The study relied on the questionnaire as a tool for collecting data through which the study questions are answered.

It is a common and effective tool used to collect data, as the questionnaire is used to obtain the opinions and attitudes of individuals regarding a specific topic, and provides a means to measure and analyze quantitative data relatively Fast and effective. The questionnaire was designed based on previous references. The questionnaire was divided into two parts, the first related to personal information related to the study sample, and then it was subjected to scientific evaluation and validity and reliability procedures for the sample.

4. Analysis and results

Descriptive statistical analysis of the data allows for a general description of the status of the data and how it is distributed among the respondents' answers. Through this analysis - which contains the values of arithmetic averages, standard deviations of the data from their arithmetic mean, frequency distributions, and percentages it is possible to obtain an overview of the trends of the respondents' answers, as well as their demographic characteristics and the extent of their diversity and representation of the sample of respondents, as well as the study community and the extent of their suitability to represent the data that serves the study objectives (Al-Baldawi, 2009). Additionally, SPSS program, version (IBM SPSS Statistics 21), was used to conduct all descriptive analyses. Table 1 shows the demographic information.

The respondents' data shows that the number of males among them is equal to (311) and a percentage of (82%), while the number of women represented (69) of the study sample individuals and a percentage of (18%) clearly tends towards the ranking number (1) which symbolizes the male gender in this study. This gives an indication that men dominate the jobs and tasks of project management and engineering and work in companies of a professional and field nature in Libya, unlike women who may dominate in other sectors and activities such as education and businesses that suit their nature and the Libyan environment.

Type	Description	Frequency	Percentage
Gender	Male	311	82
	Female	69	18
Age	Less than 25	6	2
	25- less than 35 years	64	17
	35 – less than 45 years	142	37
	45- less than 55 years	112	29
	55 – less than 65	36	9
	More than 65	20	5
Material Status	Married	176	46
	Married with children	154	41
	Single	50	13
Education	Diploma	113	30
	Bachelor	182	48
	Master's	65	17
	Doctorate	20	5
Work Experience	Less than 5	8	2
	5-10 years	65	17
	10-15 years	124	32
	15-20 years	88	23
	20-25 years	58	15
	More than 25	37	10

The table also shows that the majority 46% of the respondent are married with children and 41% just married while 13.1% are single. The age of the respondents shows that the majority is between 35 and 55 years which is 254 with a percentage of (66%), while the age of the respondents who are older than 65 constitute 5.3%, while those under 25 years represent less than 2% which indicates that the younger age group represents only a very small percentage of the total sample.

As for the distribution of academic qualifications among the study sample members, most of them were between the intermediate and master's levels. Specifically, the sample of respondents was characterized by a majority of holders of

academic qualifications at the university level and diploma, with a number of (182, 113), respectively, and with percentages of (48, 30) respectively, followed by holders of academic qualifications of master's degree, with a percentage of (17), then holders of doctorate degrees with a percentage of (5). This can be explained as it is likely that interest in obtaining university and higher institute degrees in Libya became widespread during the eighties and nineties and up until now, especially in the field of engineering and management while the interest in studying for getting a master's degree began at the beginning of the millennium. However, the doctorate degree holders by nature have few outcomes.

As for the experience of the research sample individuals in the field of work, the majority of them (335) individuals with a percentage of (88 %) have a work experience between 5 and 25 years. The remaining percentages were

distributed between those with less than five years of experience and those with more than 25 years of experience (2 % and 9.8%) respectively.

Table 2: Descriptive data for the critical success factors variable.

No	Statement	M	SD
1	Management aptitude in implementing project management methods influences the projects	3.73	0.96
2	Senior leadership stability, lack of administrative disputes, absence of administrative bureaucracy, organization and delegation of authority affects the projects	3.66	0.95
3	Setting a good work environment and establishing an organizational structure affect the projects the company	3.41	0.96
4	Selection and formation of the team and teamwork	3.48	1.01
5	Participation of team members in the planning process	3.37	1.01
6	Availability of technical skills for the project team	3.47	0.93
7	Availability of sufficient funding for the project and a sufficient budget	3.49	1.06
8	Availability of previous experiences in similar projects	3.52	1.00
9	Economic, social, and environmental and conditions of the local market in the country	3.34	1.02
10	The infrastructure available for the project	3.52	1.06
11	Political stability of the country	3.44	1.03
12	Technological progress and availability of modern technologies	3.57	1.00
13	Government and industry standards and policies affecting the project	3.29	1.00
14	Establishing a clear project charter	3.50	0.98
15	Availability of Labor, materials and equipment for the project	3.42	1.03
	Overall	3.48	1.00

This variable (CSFs) includes 15 statements that reflect the opinion of a sample of 380 respondents. The descriptive results indicate that the overall average of the variable is 3.48 with a standard deviation of 1.00, which indicates a good impact of these statements on the success of the company's project process and performance.

Table No. (2) shows the descriptive data for the project manager as the mediating variable. This variable contains a number (14) item. The descriptive results shown in Table No. (3) show that the average value of the variable in general is equal to (3.70) with a standard deviation of (0.95) from the arithmetic mean, which gives a very good impression that the sample members' answers about the extent of the project manager's influence on the success of the company's performance.

In detail, statement No. (1) "the project manager's ability and commitment to managing the project" can be considered the most influential and important among the manager's activities and characteristics with an average value close to 4 on the Likert scale, as it reached (3.78) and a standard deviation from the arithmetic mean of (0.93). It can be noted that the statements of the project manager's ability to control resources and their schedule, communication between the project manager and the international expertise within the project, and maintaining cultural diversity and the background of each member of

the project team had the highest standard deviation from the rest of the other statements.

While the arithmetic means value (3.60) for the two statements No. (9, 13) respectively "the project manager holds periodic meetings with the project team and the ability to exchange experiences between team members; "communication between the project manager and the international expertise within the project and maintaining the cultural diversity and background of each member of the project team" had less impact on success among the activities and characteristics of the project manager. It can be noted that the statements "the project manager's ability to control resources and their schedule, communication between the project manager and the international expertise available within the project and maintaining cultural diversity and the background of each individual on the project team had the highest standard deviation from the rest of the other statements.

Table 3: Descriptive data for the project manager variable.

No	Statement	M	SD
1	The project manager's ability and commitment to manage the projects	3.95	0.93
2	The project manager must be specialized in the project management field	3.80	0.88
3	The project manager's political and cultural awareness and understanding of the impact of the cultural factor of the workers on the project's progress in the best possible way	3.63	0.94
4	The ability to negotiate, build trust and manage conflict	3.78	0.93
5	Motivating and training workers adequately and developing training programs according to the actual needs of work requirements	3.65	0.97
6	The project manager's ability to maintain the schedule according to the pre-planned schedule	3.79	0.92
7	The project manager's ability to control the project's cost without exceeding the pre-planned schedule	3.62	0.98

8	The project manager's knowledge of the importance of maintaining the quality of the project according to the requirements of the project beneficiaries	3.75	0.92
9	the project manager's holding of periodic meetings with the project team and the ability to exchange experiences among team members	3.60	0.96
10	The project manager's experience, especially in using analytical techniques and parameter estimation methods	3.66	0.92
11	The project manager's relationship with senior management and the lack of disagreements between them.	3.65	0.98
12	The project manager's ability to control resources and their schedule.	3.73	1.00
13	The communication between the project manager and the international expertise within the project and maintaining the cultural diversity and background of each member of the project team	3.60	1.04
14	The project manager's ability to negotiate with other beneficiaries of the project.	3.73	0.94
Overall		3.73	0.95

Descriptive statistical analysis of the dependent variable main project management element. Table No. (4) displays the descriptive data for the dependent variable, the main project management elements, as this variable consists of (12) statements. The descriptive results shown in Table No. (4) indicate that the average value of the variable in general is equal to (3.32) with a standard deviation of (1.02) from the arithmetic mean, which gives a good indication of the sample members' answers about the extent of the impact of the main project management elements on the success of the company's performance.

In general, the results of the descriptive data for the variables under study give good indications of the existence of correlational and influential relationships between these variables. Considering the descriptive statistical analysis of the dependent variable, which was divided into three main

groups: project time management, project quality management, and project cost management. The statements related to project time management using tools and techniques include timelines, planning meetings, defining the list of activities, and benefiting from experts' previous experience. The arithmetic mean for this group is 3.53, with a standard deviation of 0.93. This indicates that time management is an important element that greatly affects the success of projects. The results show that project time management has the greatest impact on the success of the company's projects, followed by project quality management, and then project cost management. These results reflect the importance of time, quality, and cost management in achieving project success, with variation in the impact of each element.

Table 4: Descriptive data for the variable of main project management elements.

No	Determine project funding requirements and develop a mechanism for them	M	SD
1	Use scheduling and resource estimation tools and techniques	3.51	0.95
2	Planning meetings to develop a schedule management plan	3.57	0.88
3	Identify a list of activities that will require duration estimates as well as activity characteristics	3.53	0.93
4	Consult experts with previous experience in similar projects	3.48	0.95
5	Identify organizational process resources (organizational quality policies, procedures, and guidelines, historical databases, lessons learned from previous phases or projects.	3.25	1.00
6	Compare actual or planned project practices to those in similar projects to identify best practices, generate ideas for improvement, and establish baselines for performance measurement	3.20	0.99
7	Hold periodic meetings (to plan the development of a quality management plan with everyone involved in the project.	3.18	1.06
8	Use the seven basic quality tools (cause and effect diagrams, flowcharts, inventory records, flowcharts, Pareto charts, control charts, scatterplots.	3.18	1.05
9	Estimate the cost of each project activity	3.27	1.09
10	Develop a budget by determining: Total project component estimates	3.25	1.10
11	Determine project funding requirements and develop a mechanism for them	3.21	1.12
12	Determine project budget forecasts	3.18	1.07
Overall		3.32	1.02

4.1 Hypothesis Testing

There is an effect of the project manager as an intermediary variable in the relationship between critical success factors and key project management elements in the General Electricity Company in Libya. Before analysing the role of the intermediary variable, it must be ensured that there is a relationship between the independent variable and the dependent variable.

It should be noted according to the Kenny Approach that if the relationship of influence between the independent variable critical success factors and the dependent variable key project management elements disappears due to the entry of the intermediary variable project manager, then, it is considered a complete intermediary. However, if the

influential relationship between the independent variable and the dependent variable remains in the presence of the intermediary variable, then the intermediary variable is considered partial here (Reinhold, Gegenfurtner, & Lewalter, 2018).

Through the results presented in Tables (5) and (6), it is clear that the influential relationship of the independent variable, critical success factors, on the dependent variable, the main project management elements, still exists in the presence of the mediating variable, as the value of ($R = 0.535$) was reached. The coefficient of determination was also influential, as its value was ($R^2 = 0.286$), and the value of ($F = 76.021$ calculated) was also reached, with a significance level of (0.000).

Table 5: Regression analysis of the effect of the independent variable on the mediating variable.

Model	R	R ²	Adjusted R ²	Estimated Standard Error	Durbin-Watson
1	.535 ^a	0.286	0.283	0.68288	1.902

This means that the mediating variable Project Manager partially mediates the relationship between CSFs and project management elements (partial mediator), i.e. it

shares with CSFs the effect on the main project management elements.

Table 6: Regression analysis (regression coefficients) for hypothesis testing.

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Standard Error	Beta		
1	Constant	1.120	.189		5.938	.000
	Factors	.402	.050	.402	8.050	.000
	Manager	.217	.052	.207	4.158	.000

It is clear from figure (1) and table (7), which draws the mediation relationship of the project manager variable between the critical success factors variable and the main project management elements, where it is clear that there is an influential relationship between the critical success factors and the main project management elements. Where the value of the regression coefficient reached (0.40), there is an influential relationship between the critical success

factors and the project manager where the value of the regression coefficient reached (0.491) and finally there is an influential relationship of the project manager on the main project management elements where the value of the regression coefficient reached (0.217), and all of these influential relationships are statistically at the level of significance ($\alpha < 0.05$).

Table 7: Regression coefficients between the three variables.

Relation			Estimation	P
A	MGR →	ELS	0.491	*
B	MGT →	ELS	0.402	*
C	MGT →	MGR	0.217	*

It is worth noting that the variables were coded with abbreviations (ELS, MGR, MGT) where Els represents the critical success factors, (MGR) means the project manager, (MGT) means the main project management elements

(until they are accepted by the AMOS program. The independent variable in the AMOS program is called (exogenous variables) while the dependent variable is called (endogenous variables).

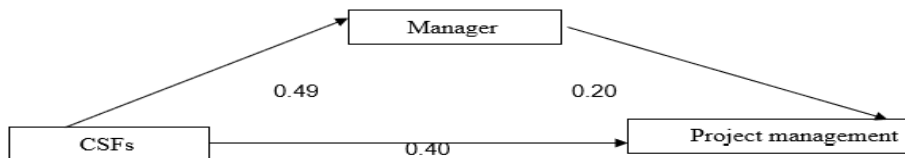


Fig. 1: Path analysis model.

In this test, to determine whether there is an indirect (mediating) effect of the project manager variable, the results of the path analysis are presented using the (Indirect effects) feature as shown in Table No. (8). The indirect

effect coefficient reached (0.102) and this coefficient can be found by multiplying the effect coefficients between the critical elements variable (0.49) and (0.21) the project manager.

Table 8: Indirect influence relationship between success factors and project management elements.

	Critical Success Factors	Project Manager
Project Manager	0	0
Key Project Management Elements	0.102	0

In order to know whether the indirect effect relationship (the effect of the mediating variable) was statistically significant, we can rely on the (bootstrap) feature provided

by the AMOS program, and as Table (9) shows, there is an indirect effect relationship with statistical significance at a significance level of (0.004).

Table 9: Effect of the direct relationship between the critical success factors variable and the project management elements mediated by the project manager variable.

	Critical Success Factors	Project Manager
Project Manager
Key Project Management Elements	0.004	...

The CFA was used through the Amos18 program. At this stage, the reconciliation is carried out between keeping the largest number of variables (statements) for each main variable under the criteria of accepting the model (Model fit) or testing the validity of the model (Model Testing) or testing the goodness of fit (Goodness of Fit). This is for the purpose of verifying the consistency of the study variables and indicating the validity of the measurement model (Hair, Sarstedt, Pieper & Ringle, 2012). A set of indicators was relied upon, such as: Root Mean Square Error of Approximation (RMSEA); Goodness of Fit Index (GFI); Chi Square (χ^2); Normed Fit Index (NFI); and Comparative Fit Index (CFI). The Tucker-Lewis Index (TLI) and other indicators that will be taken into account when conducting confirmatory factor analysis. In other words, the practical analysis can only be done through the suitability of the model, which depends on criteria and conditions that must be met to determine the validity of conducting the practical analysis. Some modifications can be made, such as deleting some variables (observed variables) or developing the correlation value by merging two variables (covariance) to increase the correlation value between the variables and the factors (dimensions) that

form them. These steps continue until the model meets the acceptance criteria. The initial results of the confirmatory analysis showed that the model obtained the health and acceptance criteria.

Confirmatory factor analysis was conducted between the three variables, where the saturation values (Items Loadings) or what is called the standard scores between the phrases (questions) of the variables and their main variables were mostly high values except for 3 variables, the first and second questions for the management variable (m1, m2) and the second question for the project manager variable (mr2), where the saturation values between the question and the variable were weak (55, 52, 53) respectively and are less than (0.60). Also, the correlation values between the three variables are good, where the correlation coefficients fell between (42, 52) and are very close to the results of the correlations conducted through the SPSS program before conducting the hypothesis test, and Table No. (10) shows the outputs of the confirmatory factor analysis (first stage) and the extent of the suitability of the criteria, based on the method used by many previous studies (Hooper, Coughlan & Mullen, 2008).

Table 10: Confirmatory factor analysis outputs (first stage) and the appropriateness of the criteria.

Fit Indices and common Names	Criteria	Results	Model suitability
Goodness of fit index	Equal to or greater than 0.90	0.91	Suitable
Chi-square index	The ratio of chi-square to degrees of freedom must equal or exceed the critical value 2(2:1; 3:1 or 5:1)	6.23	Acceptable
root mean square error of approximation	The average of the differences per degree of freedom that would be expected in the population, not the sample. Acceptable values should be (from 0.05 to 0.10).	0.10	Acceptable
Tucker Lewis Index	Acceptable level is equal to or greater than 0.90	0.94	Acceptable
Standard fit index	Acceptable level is equal to or greater than 0.90.	0.95	Acceptable
Comparative fit index	Acceptable level is equal to or greater than 0.90.	0.95	Acceptable
Economic goodness of fit index	After re-adjusting the model so that its higher values indicate a high level of economy in the free parameters of the model. It is used to compare models.	0.55	Inappropriate
Economic fit index	Its high value indicates a good fit and is only used for comparison between alternative models	0.98	Average
Economic Comparative Fit Index	Sensitive to model size	0.71	Average

Based on these results, it can be said that the statistical model performs well in some indicators, but it requires modifications and improvements in some other aspects to ensure a better match to the real data. This study provides a comprehensive view to evaluate the model's performance

and identify its strengths and weaknesses, which helps in directing future efforts to improve it. Figure (2) shows the final model for factor analysis (CFA) of the main variables of the study.

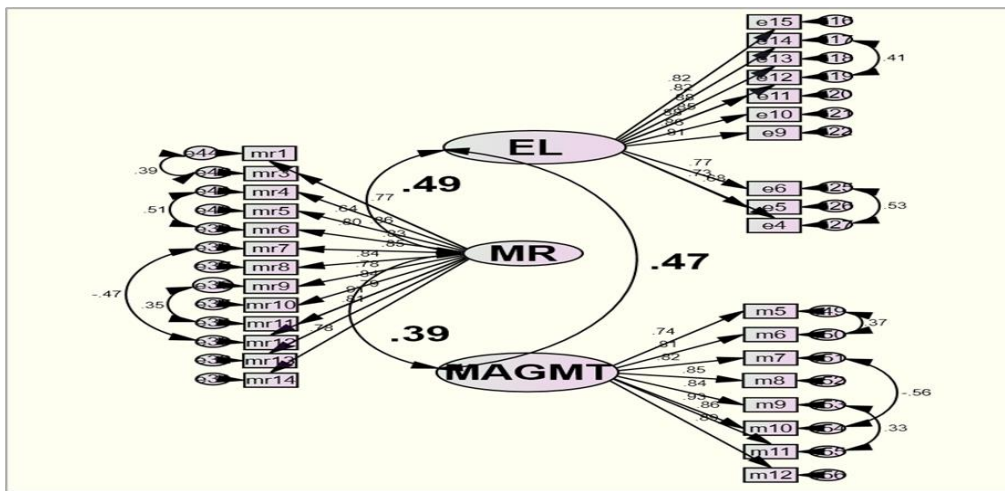


Fig. 2: Final CFA model for the main variables of the study.

The figure shows the correlations between the three main variables (0.47) between critical elements (EL) and project management (MAGMT), while the correlation was (0.49) between critical elements and the project manager, while the correlation between the project manager and project management (0.39), which is a good indicator of the existence of a weak correlation that is suitable for conducting a regression analysis between the variables. On the other hand, the extent of saturation for each statement with its dependent variable can be observed, as they all have high values (greater than 0.60), which indicates the suitability of the model for conducting a hypothesis test. After completing the factor analysis (CFA), also called the measurement of effects (Measurement Model), and ensuring the suitability of the data for regression analysis. The study hypothesis test was conducted in order to find the project manager variable can play an intermediary role

between the independent variable Critical Success Factors and the dependent variable Key Project Management Elements, using the Structural Modeling equation. In general, the test results show that the model matching values are consistent with what was interpreted when conducting the factor analysis (CFA) above in Table No. (10) for matching the criteria, as the value of the chi-square index to the degrees of freedom was (5.1), and the value of the matching index was (0.75) and all the rest of the indicators were at a reasonable level of matching. Looking at the Model in Figure (3), it becomes clear that the value of the regression coefficient (which represents the effect of the independent variable on the dependent variable) between the variable Critical Success Factors (EL) and the mediating variable Project Manager and their effect on the variable (MAGMT) Main Project Management Elements reached a total regression coefficient value (0.40).

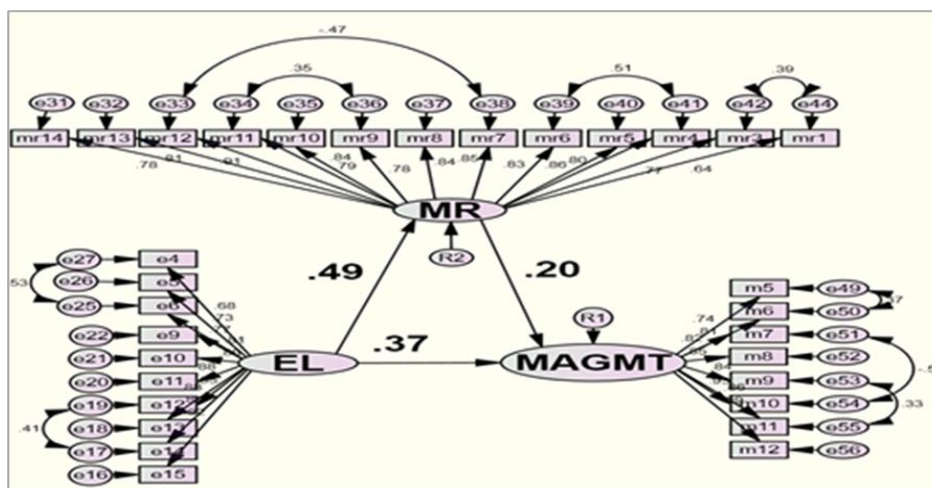


Fig. 3: Structural Modeling (SEM) results of the mediating role of the project manager variable (MR) on the effect of the independent variable (EL) on the dependent variable (MAGMT)

In short, the mediating role of the project manager variable was measured to mediate the relationship between the critical success factors variable and the main elements of management success. The results showed that there is a statistically significant indirect effect relationship for the critical success factors variable on the main elements of management, as it was positive and statistically significant (b= 0.088; p = 0.04), which supports the acceptance of the hypothesis. In addition, there are statistically significant positive differences in the impact of the project manager as

an intermediary variable in the relationship between the critical success factors and the main project management elements in the General Electricity Company - Libya in the presence of the mediating variable that is also statistically significant (b= 0.32; p = 0.000). Therefore, the project manager plays a partial and not complete mediating role. Based on the results of the AMOS program regarding the hypothesis test, which states that there are statistically significant positive differences in the impact of the project manager as an intermediary variable in the relationship

between the critical success factors and the main project management elements in the General Electricity Company - Libya, the hypothesis is accepted.

4. Discussion and conclusion

The most important results reached by the study of the impact of critical success factors by the project manager on the main project management elements can be identified as follows. The study concluded that the demographic factors of the study sample, represented by gender, are that more than 81% of the total study sample members are males and that females constitute only less than 19% of the study sample members, which gave an indication of the logic of this classification and an indication of the credibility of the data, as men dominate the jobs and tasks of project management and engineering and work in companies of a professional and field nature in Libya, unlike women who may dominate in other sectors and activities such as education and businesses that suit their nature and the Libyan environment.

The study finds that the demographic factors of the study sample, represented by academic qualifications, are mostly between the intermediate and master's levels, as the sample of respondents was characterized by a majority of holders of academic qualifications at the university level and the higher diploma, respectively, followed by holders of academic qualifications of a master's degree, then holders of an intermediate diploma and a doctorate, respectively. This distribution also seems to be considered, as it is likely that interest in obtaining university and higher institute degrees in Libya became widespread in the eighties and nineties and up until now, especially in the field of engineering and management in the field of study under study, while interest in studying for a master's degree began at the beginning of the millennium, and this perhaps justifies the shortage of holders of intermediate certificates that prevailed in the seventies and eighties, and the doctorate, by its nature, has few outputs. 3. The study concluded that the demographic factors of the study sample, represented by the experience of the research sample members in the field of work, were the majority of them (88.3%) between 5 years and 25 years, and the remaining percentages were distributed between those with less than five years of experience and those with more than 25 years of experience (2.1%, 9.7%) respectively.

The study determines that the demographic factors of the study sample, represented by the characteristics of the social status of the study sample members, represented the largest number of married and supporting individuals, followed by the married category, then came the single category, respectively, and this is logical when compared to the number of age groups, most of which were from the age group (between 35 and 55 years). 5. The study concluded that the statistical analysis of the independent variable (critical success factors) showed that the phrase "commitment and support of senior management to implement project management methods and techniques affects the projects of the General Electricity Company" has the strongest impact and importance among the critical success factors, and that the phrase "government and industry standards and policies affecting the project" has the least impact on success among the fifteen critical success factors. 6. The study concluded that the statistical analysis of the mediating variable (project manager)

showed that the phrase "the ability and commitment of the project manager to manage the project" has the strongest impact and importance among the activities and characteristics of the manager, while the two phrases "the project manager holds periodic meetings with the project team and the ability to exchange experiences among team members"; "communication between the project manager. The international experiences within the project and maintaining cultural diversity and the background of each individual in the project team" have less impact on success than the activities and characteristics of the project manager. The study concludes that the statistical analysis of the dependent variable (main project management elements) showed that the phrase "planning meetings to develop the schedule management plan" has the strongest impact and importance among the main project management elements, while the phrases "holding periodic meetings (to plan to develop the quality management plan with everyone involved in the project)"; "using the seven basic tools of quality"; "determining project budget forecasts had less impact on success than the main project management element. The study concluded that the hypothesis is valid, which supports the statement that there are statistically significant positive differences in the impact of the project manager as an intervening variable in the relationship between critical success factors and main project management elements in the General Electricity Company in Libya.

This study is significant as it does not only bridge the existing knowledge gap, but also provides practical insights and guidance to project managers, enabling them to apply these critical success factors more effectively in project management practices. This ultimately leads to higher success rates in project implementation. The importance of this scientific study also attributed to findings provided to the field of project management, especially in the context of large companies such as the General Electricity Company. This paper stresses the critical factors for success in the project environment of the Electricity Company such as leadership skills, communication efficiency, risk management, and interaction with stakeholders, and linking them to the basic elements of project management such as scope, time, cost, quality, and human resources management. The study provided a scientific framework that links these factors and elements, which helps guide project managers to improve the overall performance of the project. It also bridged the knowledge gap in understanding how to apply critical success factors to improve project quality and reduce failure, through an applied model that explains how these factors affect project performance.

5.1 Study Recommendations

Based on the results of the study that were presented, recommendations can be formulated that include the following points;

1. Strengthening the role of senior management: Senior management in the General Electricity Company must provide full support and commitment to applying the best methods and techniques in Project management, with a focus on improving processes and practices
2. Developing government policies and standards: The company needs to review and update government and industry policies and standards that affect projects,

- with the aim of improving performance and efficiency.
3. Training and develop project managers' skills: Advanced training programs should be provided to project managers to improve their ability to manage projects efficiently, with a focus on enhancing communication skills and dealing with cultural diversity within team.
 4. Improving planning and scheduling: Enhance the use of planning meetings to develop schedule management plans, and adopt effective management tools to determine forecasts and budgets.
 5. Evaluating and managing risks: The company must develop an effective system for assessing and managing risks, to deal with challenges that projects may face and their impact on overall performance.
 6. Enhance internal and external communication: Improve communication channels between project managers and team members, as well as between the company and international experts to exchange experiences and continuous learning.
 7. Analyze and use data effectively: Encourage the use of data and analysis to evaluate project performance and make more accurate and effective decisions.
 8. Improving transparency and accountability: Implementing systems that ensure transparency at all stages of the project, while enhancing accountability to ensure that all parties adhere to the specified standards.

5.2 Study limitations and challenges

Research faces different limitations and challenges which are critical factors that effect on the results of the research and its credibility. These determinants are related to multiple factors including the research methodology the sample used, and the environment surrounding the study. Furthermore, challenges, include the obstacles that the researcher may face while collecting and analysing data. The determinants of the study can be summarized in the following points;

1. 1.Geographical scope: The study includes the General Electricity Company in Libya. This geographical definition affects the generalization of the results to other different economic and political environments.
2. Time frame: The time period during which the data was collected was during the second half of 2023 until the end of the first quarter of 2024. It can be explained that this period witnessed many economic and political changes that will have an impact on the results as the Libyan state has become experiencing a kind of stability after years of wars and military conflicts in addition to governmental stability, especially with regard to the Ministry of Electricity and Renewable Energy.

This study provides implications and practical guidance for project managers to help them apply critical factors effectively, allowing them to improve the overall performance of the company and reduce the problem. The decision makers in the General Electricity Company can benefit from the results of the study to improve the performance of projects in general, which is positively reflected in the status of the general network Future research can be through using mixed method in the same company to provide further insights and findings.

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