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ENERGY SERVICE COMPANIES WITHIN PROJECT MANAGEMENT APPROACH

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ABSTRACT

Project management is carried out formally and informally in different areas of human endeavor. Examples of this are a trip, the construction of a house, a research project, the construction and assembly of a substation, the construction and assembly of a hydroelectric power station, etc. In electric power service companies, there are numerous projects; however, their management faces numerous problems derived from various factors that affect their success or failure. This incident can have serious consequences related to its cost, completion time and performance. One of the leading causes is not recognizing that most companies' organizational structure is not prepared to achieve efficient project management. Carrying out project management more consciously and formally through the implementation of widely accepted practices will allow companies to achieve better results. This work aims to present the conceptual framework of project management, describe the problems and opportunities for improvement faced by project management in electric power service companies, and identify some actions that can be carried out to improve performance in this vital activity.

1. Introduction

From the ancient pyramids of Egypt or the monumental buildings of ancient Rome or ancient Greece to today's complex technological platforms, projects have always existed. They were passing through the construction of the first skyscrapers, railway networks or aircraft of the 20th century, which have involved day after day the improvement and refinement of the different techniques, theories and skills of project management and the application within organizations (Aoki et al. 2014).

During the cold war, the United States government already saw the need to have a project manager who has control over all phases, so this role began to be applied in the construction of combat aircraft and tanks and all space programs. Of NASA, however, aerospace projects were excessively expensive (200 to 300% over planned) due to the inability to predict technology. In the 1950s and early 1960s, project management grew at a slow pace except for the aerospace and defense industry (Deflorian, et al. 2010). Hence, the United States government established a life cycle model for project planning and control and created specialized auditors to ensure that what was planned is being accomplished. In the mid-to-late 1960s, more executives looked for new management techniques and organizational structures, especially for organizations with complex tasks and a dynamic environment such as aerospace, construction, high-tech, engineering, computing, and electronics (Albareda, et al, 2010). Apart from the aerospace, defense and construction industries, the other industries sector maintained informal project management. Most projects were managed by one or two supervisors depending on the functional structure, and communication was relaxed or non-existent. At the same time in this decade, essential tools were developed such as the PEP (Program Evaluation Procedure), PERT (Program Evaluation and Review Technique, CPM (Critical Path Method) and the PMI were formed faster with high-quality results. In projects with a high degree of uncertainty and multiplication of risks and maintaining a good atmosphere in the project team, they adapt to flat organizations and continuous reorganizations and mergers and excessive dependence on information technology (Kappenman, 2013).

The challenge of modern project management continues to maintain a high degree of commitment, discipline, and knowledge as traditional management; however, it undergoes a profound transformation when handling considered profession in developed countries. It has not been well understood in Libya. In our country, it is accepted that to guarantee the success of a project, only several years of experience and training in the project's main subject are enough. However, nothing could be further from the truth. This work proposes to show the conceptual framework of project management, describe the problems that commonly occur in electric power service companies in project management, and identify some actions that companies could carry out to improve their performance in this area. Section II presents the conceptual framework of project management necessary to understand the work better. Section III studies the international experience on the added value that companies expect from project management implementation. Section IV offers a description of the opportunities for improvement that are presented and possible actions that can be carried out to improve the day-to-day project management of companies in the electricity sector. The work's conclusions are presented in section V, acknowledgements in section VI, and finally, the bibliography used is in section VII.

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2. Project Management in Libya

As anywhere in the world, Libya manages many projects of various types. Likewise, many universities offer postgraduate academic programs in this area. Project management methodologies, such as the worldwide spread of the Project Management Institute (PMI), have been introduced in our environment, being applied in the beginning mainly by information technology professionals. As a result, the Libya chapter of the PMI is about to be inaugurated (Doukas et al., 2011).

On the other hand, due to the outsourcing policies of previous government periods, many of the electric service companies in Libya operated with the minimum required staff. Consequently, the ability to manage projects directly was lost. Thus, several companies in the sector have been forced to hire companies in charge of the management and execution of the project. However, companies that did have the human resources to carry out tasks directly usually have been working without adhering to any standard and with organizational structures not suitable for efficient project management. Despite the programs and courses offered in project management, this is responsible for directing the project. This includes, but is not limited to, preparing the project planning together with the management team, coordinating meetings with the members of the project team, solving problems that arise during the march. Reporting the project's progress to the Local Coordination of Projects, including the progress of each of the deliveries or activities, requesting financial resources, requesting human resources from the Functional Area Managers (Shi et al., 2014).

3. Conceptual Framework of Project Management According to the PMI Standard

3.1. Project Definitions and Terms

To create a unique product, service, or result. Project manager or project use, but who, due to their position in the client organization or performing organization, can exert a positive or negative influence on the project's course (Buck, Elliott, Niehaus, Rives, & Thomas, 2012). Figure 1 explains in some way the relationship that people or groups of people have with the project, as described above.

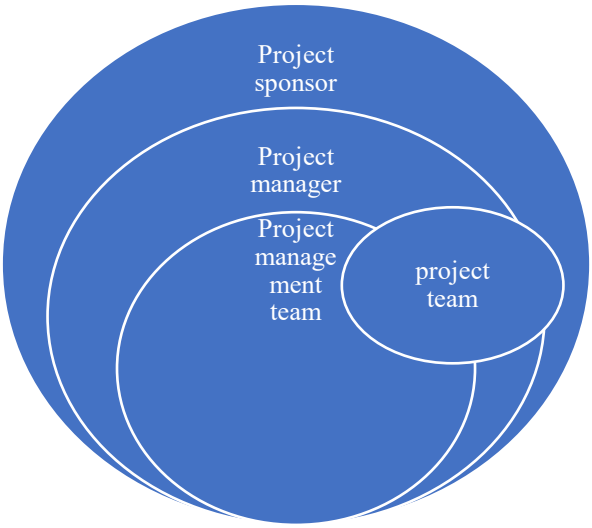

Figure 1: Relationship between stakeholders and the project

Projects are a means to meet the strategic objectives of the organization. Like the other activities that take place within the organization, project management has its processes, tools, techniques, etc., the results can and should be measurable (Figure 2).

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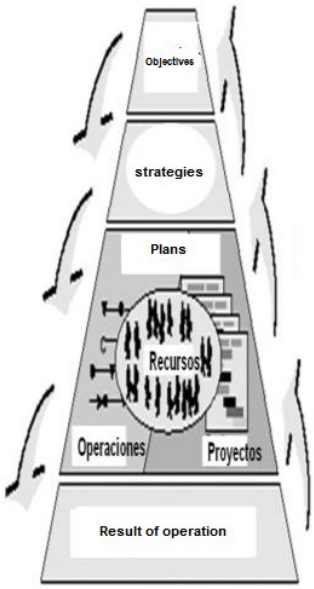

Figure 2: Alignment of projects with objectives in the organization

This does not mean that the previous knowledge, skills, and processes should always be applied uniformly across projects. In collaboration with the project team, the project manager is always responsible for determining which processes are appropriate and the corresponding degree of rigour for any given project (Miller et al., 2011). The life cycle of a project defines the phases that connect the beginning of a project to its end. When an organization identifies an idea or opportunity which it would be interested in developing, a feasibility study is authorized to decide whether the project should be started. When the outcome of such a preliminary effort is not identified, it is best to treat such efforts as a separate project. Some technology transfer defines the transition from one phase to another within the life cycle of a project. Deliverables in a phase are reviewed for completeness, accuracy and approved before starting work on the next phase. It is also not unusual for a phase to begin before the previous phase's deliverables when the risks involved are considered acceptable. There is no single way to define the ideal life cycle (He et al., 2013).

Projects in various organizations can be tangible and intangible. The tangible value fundamentally means the company can measure through the Internal Rate of Return (IRR) or other financial indicators (Araya 2015). According to the study, not many companies are willing to quantify the advantages of implementing project management using such measures (Pankratov et al., 2014). An organizational structure for project management in the project owner's organization implies managing the project directly, which can lead to savings between 5% and 30%. It should be clarified that this saving is attributable to the direct management of the project and not to the organizational structure, but having a corporate system prepared for this makes the task much more likely to succeed and to achieve significant savings. Regarding intangible value, Parrot and Tierney (2012) also mention the following:

- Improvements in decision making.
- Improvements in communication and organizational collaboration.
- More effective work cultures.
- Alignment between methodology, terminology, and values within the organization.
- General effectiveness of the organization.
- Greater transparency, clarity of structures, roles, and responsibility.

Sponsor the person or group that provides the financial, monetary, or in-kind resources for the project. Client/user it is the person, group of people or functional area that will use the project's product. Project team members perform the project work, such as project manager, deliverables, technical experts, support team, execution team, contractors, etc. Project management team members of the project team who are directly involved in project management activities (Perninge et al. 2011). The performing organization, the company whose employees are most directly involved in project work. Influencer (Seki and Tadakuma 2010) These are the people or groups that are not directly related to the acquisition. The project manager is the person responsible for achieving the project objectives.

Project management (PMI project management) is applying knowledge, skills, tools, and techniques to project activities to satisfy project requirements. According to the conceptual framework of the PMBOK, the management or direction of projects is achieved through the application and integration of the project management processes of initiation, planning, execution, monitoring, and control, and closing (Kitamura et al. 2014). The PMBOK standard defines nine knowledge areas that are applied in the different project management processes. These areas are scope management, time, human resources, communications, risks, supplies, cost, quality, and integration management. The latter involves the activities

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and processes necessary to identify, define, combine, unify, and coordinate project management's different processes and activities. Likewise, the PMBOK standard in its third edition considers the application of 44 techniques within project management, which will not be treated in this work because they are outside of its general-purpose (Makino et al. 2014). In some organizations, policies are established that standardize all projects with a single life cycle; in others, the project management team chooses the appropriate life cycle.

iii) Success factors in project management

For a project to be as successful as expected, under the traditional project management approach, the triple constraint of cost, time, and performance must be met. Any deviation in these restrictions would impact the project's quality and the resources allocated for it—figure 5 Triple restriction in project management (Holburn and Zelner 2010).

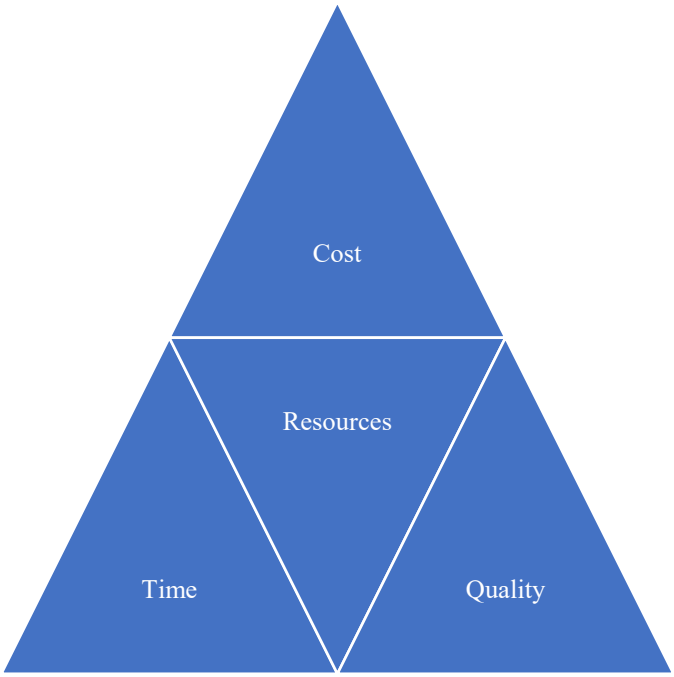

Figure 3: Triple restriction in the management of Projects

At this point, it is worth mentioning, according to research carried out at an international level by specialized companies, that on average, the projects exceed the budget by 90% and their schedules by 120%; 50% fail to reach their goals, and 30% are cancelled before completion. The use of resources is 65%; the remaining 35% are underutilized in unproductive tasks (Guikema, et al. 2010).

4. Opportunities for Improvement in Project Management in Libya

In 2008, some opportunities for improvement were identified in the previous Hidropaute S.A. that we firmly believe are characteristics of functional and project-oriented organizations. Weak matrices maintain many available organizations' features, and the project manager is more of a coordinator than a manager. Similarly, robust matrices have many characteristics of project-oriented organizations; they may have full-time project managers with considerable authority and full-time administrative staff. While the balanced matrix organization recognizes the need for a project manager, it does not give the project manager full authority over the project or its funding (Regnier & Winters, 2013). Most modern organizations present all these structures at different levels, as shown in Figure 6f (Combined Organization). For example, even a fundamentally functional organization can create a special project team to manage a critical project. This team can have many of the characteristics of a project team within a project-oriented organization. The team may include full-time staff from different functional departments, develop its own set of operating procedures, and work outside of the standard, formalized structure (Okumoto et al., 2013).

The question that should be asked at this point is the best structure for the Libyan electricity sector. This work believes that fully functional and fully project-oriented designs are not suitable in the electricity sector. The first makes project management difficult. The second bypass the crucial processes of functional areas dealing with risk and monitors risks to determine how they have evolved within the project.

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5. Added Value of The Implementation of Project Management Structures

According to Akiyama and Hosoe (2011), the value of implementing management structures is replicated in the rest of the companies in the electricity sector and described below.

I. Organizational structure in Libya

Most electric power service companies have a classic functional structure where each employee has a clearly established superior. Members are grouped according to specialty: operation, maintenance, financial, legal, engineering, etc. Each department can be subdivided into smaller functional areas, such as civil maintenance, electrical maintenance, etc. Active organizations also have projects; however, the project's scope is restricted to the limits of the function. This means that the maintenance department will independently carry out the project work of the operation, financial, legal, etc. The processes involved usually have to pass these departments' entire hierarchy; schematically shows project management within a functional organization (Hatta and Kobayashi 2013).

At the opposite end of the spectrum is the project-oriented organization, as shown in Figure 6b. In a project-oriented organization, team members are often located in one place. Most of the organization's resources are involved in project work, and project managers have great independence and authority. Project-oriented organizations often have departments called departments, but they report directly to the project manager or provide support services to various projects. Matrix organizations, a mix of operation and maintenance, would only be suitable for an organization whose main activity is project management in its characteristics concerning the project (Stoutenburg, Jenkins and Jacobson 2014). The ideal would be to achieve a balanced matrix structure or, even better a combined system. To try to alleviate the organizational structure in project management, as the first step in CELEC S.A. A National Directorate for Project Management has been incorporated, whose initial function is to monitor and control execution and support project planning.

II. Risk management

Within the scope of project management, the risk is defined as measuring the probability and consequence of not achieving a previously described project objective. It has two components:

i. The probability of an event occurring, and
ii. The impact caused by the occurrence of such an event.

In its ninth section, the constitution, Article No. 389, tends to create a system for managing risks and natural disasters within public activities. This topic has been dealt with recently in Libya, but very little applied in the management of projects in the electricity sector, despite its great importance. Understand that project management risks are threats of natural nature and everything that threatens the project's cost, time, and performance; for example, there are financial risk (Araya 2015) or political, natural, and technological risks (Arocena, Saal and Coelli 2012).

Risk management within project management involves planning, identifying, and analyzing risks. Developing strategies to correct implementing a project management methodology would solve previously mentioned issues such as risk management and the communication structure. However, this section emphasizes that this will allow certainty to obtain some of the intangible values mentioned, such as better work culture, greater clarity in roles and organizational structures, greater efficiency. This would also allow all companies, project managers, stakeholders, organizations, and international companies that use such a methodology (Schrijver et al. 2014), to use the same terminology in project management, which would undoubtedly make processes and communication much more manageable. With the correct implementation of a project management methodology, there is much more probability of achieving tangible savings in projects.

A project is taking the first steps to implement a formal methodology for project management, which is expected to be replicated to the other business units. We are aware that this is a long-term process, and it means a cultural change; however, it is expected to have measures of the advantages of its implementation (Sun et al., 2014).

III. Communications structure

An effective communications system within the project ensures that the correct information is delivered to the right person at the proper time and cost-effectively. In this sense, it is easy to notice that much of the information handled within most companies in the sector is duplicated in various areas. Often, the information that circulates within those involved in the project is not updated (Chaves et al. 2014). On the other hand, the project's basic information is not adequately disseminated within the members of the organization, so much so that few are those who know what projects are being developed within the company. Accordingly, proper socialization, the implementation of robust computer systems that integrate the information of the entire company, as well as the use of video conferencing resources, intranet, etc., greatly facilitate the management of project information (and of processes) of the organization (Aoki et al. 2014). Communication also implies knowing how to listen. The people who are directing projects must be people willing to listen to their group and deal with professional and personal problems.

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IV. Project management methodology

In section IV, project management was reviewed within the PMBOK methodological framework of that work in such a way as to be able to fulfil the strategic goals of the organization. Project management focuses on working on the project the right way, while portfolio management focuses on suitable projects or programs. From now on, projects and programs will be called portfolio components. Among the essential processes that must be carried out for correct and efficient portfolio management are the following (Deflorian, et al. 2010):

i. Identification: the purpose of this process is to create an updated list with sufficient information on new and ongoing components that will be managed through portfolio management.
ii. Categorization: the objective is to group the identified components within the organization's relevant groups. The categories will be defined according to the strategic plan. The components of a given group have a common purpose and can be measured on the same basis, regardless of origin within the organization. The categorization of the components allows the organization to balance its investments and its risks among all the categories and strategic objectives (Albareda, et al. 2010).
iii. Evaluation: This is the process to collect all the pertinent information that provides elements of judgment to evaluate the components. The information can be qualitative or quantitative. This data collection should have been checked a few times until it reaches the required level of precision.

Describe some opportunities for improvement in project management in electricity service companies and suggest possible actions in which to direct efforts, some of them in the process of implementation in CELEC SA. From the research carried out and the experience obtained in the companies of the sector reflected in this work, the following can be concluded:

- Project management is an activity carried out daily in electricity service companies, with projects from different areas, the importance of which is fundamental to achieving the organization's strategic objectives.
- Success in project management in the organization not only depends on the experience possessed in the main subject of the project but also on other factors such as the organizational structure, methodologies implemented in project management, a robust I.T. structure and communications, planning taking into account risk management, proper portfolio management, among others.
- All improvement actions in project management will produce significant intangible added value to the organization. Even more, it is possible, with a correct structure, to obtain significant economic savings in the management of specific projects.
- The changes that are eventually implemented in the organization to improve project management involve organizational and cultural differences and are long-term. In future work, the progress made in the implementation related to project management at the project level.

As a consultant in the period 1998-2002 in the electrical distribution area. He currently works as Assistant Manager of Planning at the project since May 2007 (Kappenman 2013). He is an active member of the Institute of Electrical and Electronics Engineers (IEEE) and the Project Management Institute (PMI). His areas of interest are project management in the corporate area, the planning and operation of electrical systems, the generation using renewable energies, and the stability and security of transmission systems in technical areas.

The portfolio is defined as the collection of projects (described above) and programs (a set of projects managed in a coordinated way to obtain benefits and control not available if they were managed individually) that are grouped to facilitate effective management.

iv. Selection: It is the process to produce a shortlist of components based on the evaluation process's recommendations and the evaluation criteria of the organization. The evaluation determines each component's value and creates a list of features that are ready for prioritization. v) Prioritization: The objective of this process is to assign degrees of importance to the components within each strategic or financial category (e.g., innovation, savings, growth, maintenance, and operations), time frame investment (ex: short, medium, and long term), risk vs return, etc. vi) Portfolio balance (Doukas et al. 2011): The purpose is to develop the mix of portfolio components with the most significant potential, to collectively support the organization's strategic initiatives and achieve strategic objectives. vii) Authorization: This process formally allocates the human and financial resources required to develop the business cases or execute the selected components and officially communicate the portfolio's balance decisions. According to what is known, the portfolio management in companies in the Libyan electricity sector has not been a formal practice; however, the recently formed project is implementing this activity within its organizational processes.

6. Conclusions

The objective of this work has been to present the conceptual framework of project management within the PMBOK.

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