

Decision Making during the Project Management Life Cycle of Infrastructure Projects

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Abstract—The various disciplines in the construction industry and the co-existence of the people in the various disciplines are what builds well-developed, closely-knit interpersonal skills at various hierarchical levels thus leading to a varied way of leadership. The varied decision making aspects during the lifecycle of a project include: autocratic, participatory and last but not least, free-rein. We can classify some of the decision makers in the construction industry in a hierarchical manner as follows: project executive, project manager, superintendent, office engineer and finally the field engineer. This survey looked at how decisions are made during the construction period by the key stakeholders in the project. From the paper it is evident that the three decision making aspects can be used at different times or at times together in order to bring out the best leadership decision. A blend of different leadership styles should be used to enhance the success rate during the project lifecycle.

Keywords—Leadership style, construction, decision-making, built environment.

I. INTRODUCTION

DECISION making has a strong correlation with effective leadership styles that affects the project success. Large infrastructure projects call for a structured, ordered and controlled decision making process to successfully execute the project objectives. Some decisions in project management are made at no particular stage. Decisions made in the construction industry may involve resource allocation, design layout plans, project milestones rescheduling, and unforeseen external events.

The building industry in Iraq has been characterized with failed and delayed construction projects. The lacklustre performance in this industry is becoming a norm in Iraq despite the record budget figures the State is injecting for the large scale infrastructure projects. This poor performance is attributed to poor decision making, incompetent design and constructing companies, and the massive corruption.

The decision making process involves construction industry professionals, who should possess and appropriately use their well-developed interpersonal skills. The effective decision making process is a blend of autocratic, participatory and free-rein leadership styles. Also, for the success of a project,

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stakeholders should consider developing leadership teams that will have an ability to support conflicting requirements in the organization.

II. STUDY OBJECTIVES

The study aimed at exploring the decision making process during the project lifecycle of large infrastructure projects. The paper did explore the leadership styles that have a strong correlation with the decision making process, to identify the effective model.

III. LITERATURE REVIEW

The construction industry is multidisciplinary and multicultural in nature, it handles technically complex projects that are fragmented into many activities and spread across a large area. The project leadership has to provide the effective leadership by making the right decisions on time for a project to be successfully implemented. The decisions should be taken within a particular structure, order and must be controlled.

A. Decisions Making Styles

The project stakeholders and participants are involved in making the decisions during the projects' lifecycle have to possess a continuum of good leadership styles say [1]. The participants must have well-developed interpersonal skills, and use their abilities appropriately for the successful implementation of the project.

Kurt Lewin and other researchers did the first scientific study of the different leadership styles. According to [2] participative, democratic, goal-oriented, and situational leaderships form the five leadership styles. An autocratic leader is authoritarian with singularly made decisions on the project, and their decisions are based on their ideas and judgements, seldom are their decisions informed by other people's input. A participative leader allows the input of other team members to influence their decision; in this case, the adopted decision is the stand of the majority. Free-rein leadership is a hands-off style of indirect supervision, where team members are allowed to make decisions as long as they meet the set goals by the team leader. Finally, goal-oriented and situational leadership are a blend of autocratic, participative, and democratic leadership styles says [2].

In a study of effective leadership in the small construction industry in Mexico, with a sample size of 49, [3] used autocratic, participative, and democratic leadership styles. From the study findings, it was found that liberal and conservative leadership styles were more effective than autocratic leadership style. Therefore, participative and

democratic leadership styles led to successful project implementation than the autocratic style of leadership.

Authentic leaders have elevated the degree of integrity, a sense of purpose, courage, genuine, passion, leadership skills, and charisma. Toot and Ofori [4] admits that effective leadership in the construction industry should adopt authentic leader's skills. These abilities allow the professional to effectively deliver technically complex projects.

Transactional and transformational leadership styles are characterised with coerciveness, authoritative, affiliation, democracy, pacesetter, and coaching. The leadership style has been used by both [5] and [6] to evaluate effective leadership skills in Turkey and Australia, China, Singapore, and the UK, respectively. From the two studies, it was found out that transformational leadership is motivational, thus recommended for a successful project execution.

The decision making process during the lifecycle of a project has a strong correlation with the leadership styles used says [7]. The process of decision making is made by key stakeholders in a project. While most of the decisions are planned, some may not be foreseen despite the planning. An individual's personality may inevitably inform their leadership style, thus impact on their decision making process. However, this might not be the case all the time. Nevertheless, it influences the effectiveness or ineffectiveness of a project execution, consequently leading to its success or failure.

In a construction case scenario, the organizational hierarchy allows each level some degree of authority and amount of freedom to make a decision. According to [1], the decision making process can be executed by an individual, group, authority or consensus.

The decision made during the project lifecycle can be regarding the project requirements, the utilisation of the available resource and the design methodology to be adopted says [9]. A well-made decision during the project lifecycle should be action driven; otherwise, it makes no or little contribution to the success of the project. Some decisions when actualised, will result in a change on the project activities. These changes should be kept at minimum. The process of decision making is motivated by the end-result of the project-success [9]. Finally, decisions should be made in a pragmatic and objective manner asserts [9], and should be free from personal interests.

B. Project Participants and Responsibilities

In any construction project, the developer, the design team and the contractor are the main stakeholders. The developer of a project can range from government institutions to individuals; the project complexity and magnitude varies with the project brief and clients' specification acknowledges [8]. The design team is made of different disciplines that include the architect, landscape architects, and engineers. They have been contracted to produce the drawings for the project implementation. Finally, the constructor is tasked with the implementation of the drawings to the latter. The constructors' team is made of subcontractors, speciality contractors, Mason, and suppliers among others.

Each participant in a project is tasked with different roles and responsibilities that are defined in the contract. The head of each team has different subordinates under their watch, who are supposed to effect given tasks to achieve the project goals. It is likely that some responsibilities might spill over to a different discipline, or they might be duplicated. Therefore, it is imperative to note that all the stakeholders make decisions that should be in sync with the project goals. Professionals should possess strong interpersonal skills to help them apply different leadership styles effectively says [7].

IV. RESEARCH METHODOLOGY

The paper sought to find the decision making during the project management life cycle of infrastructure projects in Iraq. The study used the questionnaire to collect the information from the sample population; the collected data was later analysed and reported as the results.

A. Questionnaire Design

The questionnaire used in the study was designed to have two sections, the informative questions and the Decision making and Leadership Style Questions. The questionnaire consisted of both closed end and open end questions. The closed-end questions were made of the Likert-scale and multiple choices.

The first section of the questionnaire did contain questions about the demographic data, career, and the experience in the construction industry. The second section of the questionnaire was used to determine the decision-making and leadership style used by the different stakeholders in the project. The leadership styles surveyed were autocratic, participatory and free-rein. The study further explored a continuum of leadership behaviours that was adopted from [1], see Appendix.

The study a sampled of 180 senior and middle-level managers on large government infrastructure projects in Iraq. From the initial sample, only 70% of the questionnaires were returned. Moreover, only 108 questionnaires were completely filled, therefore, the study did consider only 60% of the initial sample population identified for analysis.

The study sample population was made of representatives of the owners (government representatives), the design experts, and the constructor's team working in Iraq on large infrastructure project. The study participants were called, and a reminder email was sent to maximise the response rate.

B. Data Collection and Qualification of the Responses

It is worth noting that for a questionnaire to be used in the data analysis, it had to meet the set minimum threshold. First, the questionnaires demographic data had to be completed; with the responses made in the second section being logical. Any questionnaire that did not meet the set requirements was not used for the analysis. Subsequently, the study ended up using 103 questionnaires of the 108 completed.

V. STUDY ANALYSIS

The data for this study was analysed based on the key stakeholder's categories: the owner, design team, and the constructors. The developers' questionnaires were completed by government representatives, with the design team composing of architects, landscape architects, quantity surveyors, and engineers. Finally, the constructors' questionnaires had data from the subcontractors, masons, speciality contractors, and suppliers. Therefore, developer representative, design team experts, and constructor were 24%, 38%, and 42%, respectively, see Fig. 1.

The study was composed of middle and top level managers in different construction companies involved in large infrastructure projects in Iraq. All study participants had a minimum of a Bachelor's Degree, with most of them studying courses in the built environment like Civil Engineering, Construction Management, Architecture, Landscape Architecture, Quantity Surveying and Mechanical Engineering among others. *Decision Making and Leadership Styles*

The decision making process and leadership styles sections inquired from the study respondents to determine the most effective leadership style subsequently the decision making process.

The participants were provided with the three main leadership styles: autocratic, participatory and free-rein; the respondents were asked to determine which the effective decision-making and effective leadership style as per the following categories: Owner, design team and Constructor. The study used the Continuum of Leadership Behaviour that was advocated by [1] to distinctively identify the effective leadership styles, see Appendix.

A. Effective Leadership Style for the Project Owners

The project owners are the project financiers either through financial institutions or from their income. With the help of independent third party technical experts, owners of the project are tasked with the defining of the design brief from which the design team will come up with the principle drawings. Also, the developers are a fundamental determinant in stating the contract terms and its type. Therefore, it is the owners 'instructions' that are executed in the project.

Based on the study results, the developer was consultative in nature. Thus their leadership style was participatory. All the projects surveyed were government owned, and the client allowed participation from the experts and the locals during and before the project commencement. Therefore, the environment the client was dealing with other project stakeholders allowed their participation and considered their input. It is paramount to note that developers' decision making process was consultative, through their representatives.

B. Effective Leadership Style for the Project Design Team

In a given project, it is the role of the design team, led by their lead consultant to interpret the client's brief and come up with the drawing that meets the developer's minimum prerequisites. The design team is made of several consultants, who will need to work collaboratively in a pragmatic and

objective manner to achieve the project goals. Also, there is a hierarchical structure, on how and who makes the decisions within the team. Finally, the team will work and has to provide the leadership needed to the project constructors.

Based on the study results, it can be seen that the majority of design team stakeholders did perceive the autocratic leadership styles. These teams gave out instructions that were to be followed to the letter. However, it was clear that among the design team, the participatory model of leadership was the commonly preferred. Infrastructure projects are technically complex, and only a participatory and not bossy approach will be the effective mode. Nevertheless, when the drawings are handed over to the constructors, autocracy is adopted.

C. Effective Leadership Style for the Project Constructors

The project constructors and their teams implement the owners' design briefs, which are represented as principle drawings by the design team. The constructor deals with the subcontractors, speciality contractors, and suppliers among others. They are to implement and follow the design drawings to the latter.

From the study results, constructors preferred leadership style when dealing with the subordinates was bossy in nature, thus autocratic. Their decision making process did not create a climate for their subordinates to give an opinion. For instance, the suppliers were to deliver what was recommended by the design team and the clients' brief to maintain the quality and standards needed. Also, when it came to design changes on the site, they had to consult the design team and client. Therefore, they did embrace the participatory leadership style, as the decision to ratify the changes had to be unanimously agreed by all the stakeholders.

VI. FUTURE STUDIES

The study explored the decision making process in large infrastructure projects in Iraq. The insightful information from the study opens room for future studies in developing countries that are characterised by lacklustre performance and aborted projects due to a poor decision making process. Also, there is little research done on decision making in the construction industry especially in developing economies like Iraq.

The study sample comprehensively did work for this study; nevertheless, in future studies, scholars should consider increasing the sample population. This move will solidify the base and enhance the integrity of the studies and inform the decision making processes in the construction industry.

Finally, the study opens room for comprehensive comparison on the differences in decision making process in the developed and developing world. There is a sharp contrast to the success rate of project implementation between these economies despite projects in developing countries like Iraq importing foreign experts with the relevant experience.

VII. CONCLUSION

The study explored the decision making process in large scale infrastructure projects in Iraq. The decision making

process was seen to have a strong correlation with the leadership styles adopted by professionals. Therefore, the leadership style informs the decision making process a leader uses.

The findings of the study depict the different leadership styles among the different key stakeholders in a construction project. The client and the design team preferred the participatory model of leadership in executing their core mandates. Their duty calls for consultation due to the complex and dynamic nature, and the high degree of multidisciplinary in infrastructure projects. On the contrary, the contractor adopted an autocratic leadership style when dealing with their subordinates as they have to execute the drawings proposal to the latter. Nevertheless, they did consult with the owner and

the design team before effecting any proposed changes in the drawings recommendations.

Construction professionals should have strong interpersonal skills to allow them to collaborate with their colleagues in the industry. Effective and objective collaboration among the professionals from different stakeholders facilitates project success. The study findings do emphasize the autocratic nature of leaders when dealing with their subjects, while engaging a participatory leadership style when dealing with professional peers. Finally, it is clear that no particular leadership style can guarantee the project success. However, a blend of leadership styles enhances the chances of project success, as the decision making process is dynamic and depends on the situation at hand.

APPENDIX

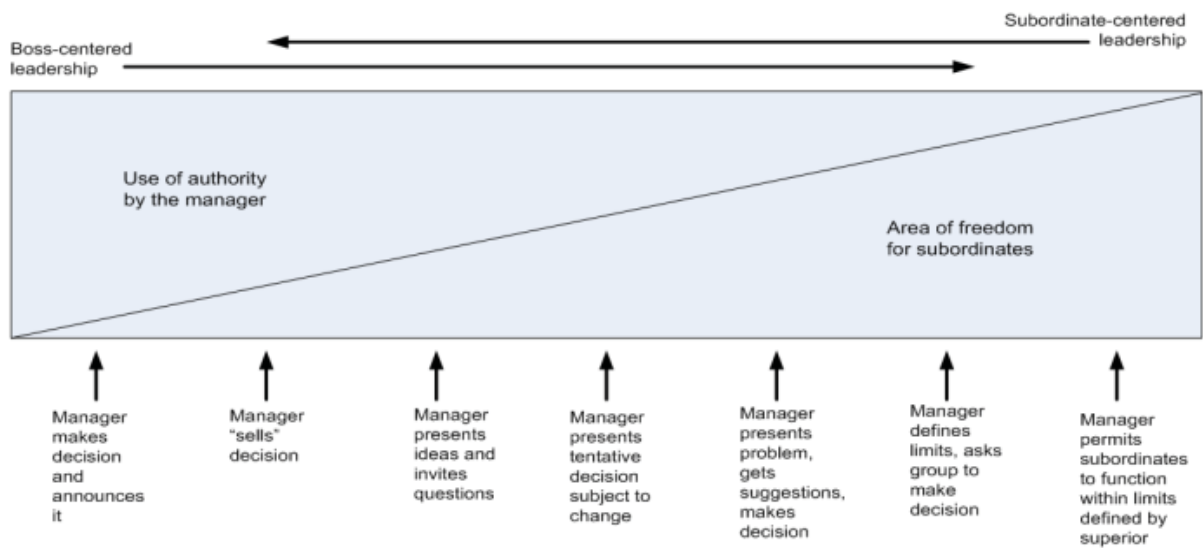


Fig. 1 The Continuum of Leadership Behaviour Adopted from Tannenbaum and Schmidt, (1973) [2]

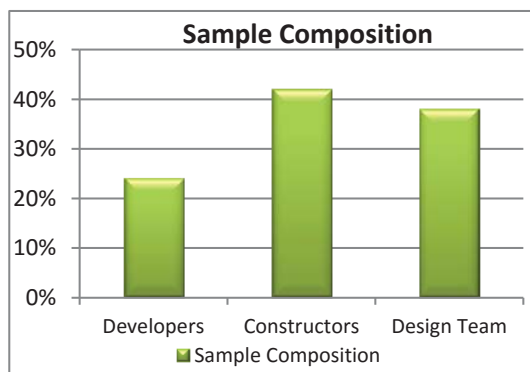


Fig. 2 Sample Composition

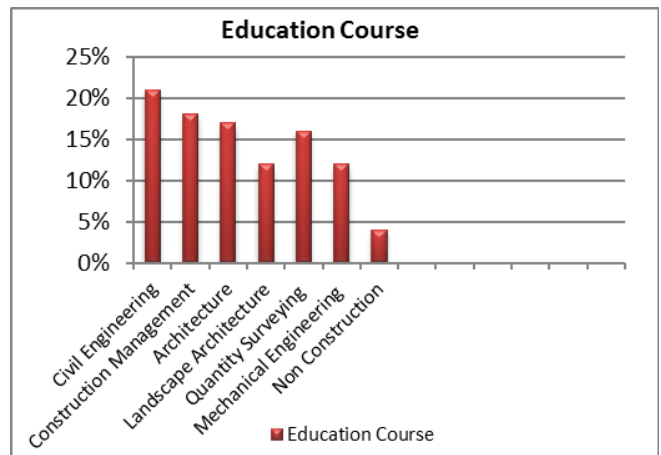


Fig. 3 Education Course

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