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Stakeholder Management in Mega Construction Projects: Challenges and Lessons Learned

Vasiliki SAMIKOU-SPEGKA[1], Theodoros KALOGEROPOULOS[2,*], Konstantinos KIRYTOPOULOS[2]

[1]Athens MBA, AUEB – NTUA, Athens, Greece
[2]School of Mechanical Engineering, National Technical University of Athens, Zografou 15780, Greece
samikou.vasiliki@gmail.com, thkalo@th-kalogeropoulos.gr, kkir@mail.ntua.gr

Abstract
This paper focuses on stakeholder management in mega construction projects in Greece. Within this context, the aim of the paper is to improve stakeholder management and address potential gaps in the current management practices. The research questions include the challenges arising from the existing stakeholder management processes and how lessons learned can be leveraged to meet the needs of similar projects in the future. The goal is to study the influencing factors of mega construction projects, thereby facilitating more efficient stakeholder management at each phase of the projects. Research findings are analyzed and categorized into nineteen codes and then into three categories: (i) skills, (ii) influencing factors, and (iii) ways to improve stakeholder management methods. Findings mainly highlight the interpersonal relationships with important stakeholders, relations with local authorities, environmental awareness, bridging cultural differences, seeking alternative plans, excellent guidance and training for project members and **recognition of the importance and satisfaction of key stakeholders**. Following this, lessons learned suggest the necessity of continuous stakeholder engagement, differentiated communication strategies for internal and external stakeholders, and training for project teams. Moreover, the study recommends implementing structured stakeholder management frameworks, including a stakeholder management plan, **dedicated stakeholder managers**, and standardized processes to replace ad hoc or empirical methods. A practical framework is proposed aimed at enhancing project manager competencies and aligning stakeholder strategies with project phases.

Keywords
Stakeholder Management, Mega Construction Projects, Challenges, Lessons Learned, Greece

1. Introduction

The focus of this paper lies in the management of stakeholders in mega construction projects (MCPs). An MCP is defined as the project that attracts public and political interest, as it critically impacts society, environment, and economy (Capka, 2004). The most important criterion to name a project as MCP is its budget, which usually exceeds €0.5 billion (Fiori & Kovaka, 2005). Additional characteristics include high complexity at technical, organizational, and managerial aspects, as well as a considerable number of stakeholders with varying interests (Eweje, 2012). MCPs differ from traditional ones in the scale and the extreme complexity – both technical and human, thus they are not scaled -up versions of smaller projects (Flyvbjerg, 2014). Managing stakeholders, considering their needs and requirements, is a complex process but simultaneously an essential and integral part of project management and a critical success factor (Bryson, 2004).The processes followed by each construction company, the selected methods of stakeholder management, and the lack of understanding of stakeholder intentions are potential influencing factors during the lifecycle of a mega construction project (Aarseth, 2013). It must be identified that construction companies have limited experience in managing complex construction projects, particularly regarding stakeholder management (Prince Boateng, 2015).

The aim of this paper is to improve the effectiveness of stakeholder management in mega construction projects, as a key factor for the success of such projects. To address this aim, the results will be presented by project phase, allowing for segmented analysis. The two research questions that this study addresses are:

RQ1: What are the challenges faced by mega construction projects in stakeholder management?
RQ2: How can the experience gained be utilized in new projects to improve stakeholder management?

2. Literature Review

Stakeholder management is a critical issue in project management (Assudani & Kloppenborg, 2010) but it is noted that research findings concerning stakeholder management processes often do not draw comprehensive conclusions (Van Marrewijk & Smits, 2014). Stakeholder management is of significant research interest because, although its strong correlation with the success or failure of a project has been recognized, its complexity does not allow for the application of a single theory that can be applied to all projects (Wang & Huang, 2006). The development of a broader framework for stakeholder management in mega projects is also the subject to significant research, with emphasis on the categorization of stakeholders based on their role in project development (passive or active role), their position within the project environment (internal or external), the stage at which they are involved (planning, construction, maintenance), and their financial commitments to the development process (e.g., financiers, compensation recipients, service providers, etc.) (Podnar & Jancic, 2006). The main categories of stakeholders involved in MCPs are financial institutions, labor unions, public authorities, competitors, press and media. (Karlsen, 2002).

Huemann et al. (2016) proposed the development of an integrated framework for stakeholder management in mega projects as a process that precedes the actual project planning. They argue that the creation of an effective framework—where rapid exchange and swift transmission of information are achieved—significantly increases the likelihood of reaching agreements with stakeholders. The importance of such a framework had already been identified by Karlsen (2002) who developed a six-stage process for stakeholder management, as follows:

i. Process Design
ii. Identification of Stakeholders
iii. Analysis of Key Dimensions of the Process
iv. Communication between Stakeholders
v. Action taken by the respective stakeholder, or action taken towards the respective stakeholder
vi. Feedback on the effectiveness of the process

These steps, in general terms, are still forming the basis of stakeholder management in the mainstream project management organizations such as PMI (2023).

3. Methodology

Qualitative research was used in this research, and the data was collected through interviews. The purpose of the research was to gain a deep understanding of the perceptions and experiences of the individuals who participated in the interviews regarding stakeholder management in mega construction projects in Greece. This research is based on an inductive approach. Specifically, the approach of a grounded theory was followed. Grounded theory is an inductive research methodology characterized by continuous interaction between data collection and data processing (Smith et al., 1995).

To collect the data, semi-structured interviews were used. According to Blumberg et al. (2011), semi-structured interviews provide a rich collection of data, allowing for the clarification and expansion of questions and answers during the interview process, thus increasing the validity of the responses. The interview questions were designed to be open-ended and common to all participants. The final transcripts of the interviews were subcategorized and used to prepare the subsequent stages of the research, such as creating codes, groups, and categories based on the statements made by the engineers who participated.

The data collected from the interview responses were analyzed with minimal use of a predefined theoretical framework. As a result, the empirical data collected from the participants guided the analysis and conclusions. Data was recorded in the form of written text following the transcription of the interviews. The data obtained from the research subjects provided descriptions of the study regarding stakeholder management in mega construction projects, without automatically providing explanations and interpretations. The aim in this case was to understand the data, decode it, and interpret it so that the research questions originally posed could be answered to the greatest extent possible. This approach was chosen because the ultimate goal was to develop an empirical theory for the future management of stakeholders in mega construction projects.

Seven practitioners took part in the study (consisting of three women and four men), who were selected based on specific criteria to ensure diversity in the responses. All of them have managed stakeholders in mega construction projects in Greece and have to demonstrate an average of over seventeen (17) years of experience in technical projects. Regarding their academic background, the selected interviewees are graduates of Technical Universities and hold at least one postgraduate degree related to the subject of this research. To ensure anonymity and protect personal data, all participants' quotes are presented in a codified form in this paper.

4. Research Findings

The selected quotes of the interviewees were initially grouped into nineteen codes and then categorized into three groups: Skills, Influencing factors and Management methods for stakeholders aiming to contribute to the effective management of stakeholders in a mega construction project. Finally, during the analysis of the results, and considering the responses of the research subjects, the codes were divided not only into categories but also into the typical phases of a construction project. A project, according to the PMBOK, is divided into specific phases: initiation, planning, execution, monitoring & controlling, and closure.Almost all responses from the participants included the component of project managers' skills in stakeholder management. Managing relationships among stakeholders carry significant weight in the ultimately shaping of the project outcome. According to the project phase, the project manager's perception of applying the appropriate skills is presented in Table 1.

Table 1. Skills

Project Phase	**Skills Identified**	**Key Insights from Interviews**
Initiation	Interpersonal Relationships: Building early stakeholder relationships and managing their perceptions.	*"Building trust and understanding between the project team and stakeholders is a key component for positively influencing the outcome of the project itself"* (01PM). *"Investing in relationships early on. With good relationships, everything ran smoothly"* (02WE). *"Different personalities require different management—time investment"* (06CM).
Planning	Social Skills: most interviewees highlighted the uniqueness of each project as something unaffected by management tools and methodologies.	*During planning, the project manager must think that every project is unique and cannot be managed the same way: different people—different handling"* (06DK). *"it's about managing relationships—people, not the construction itself"* (07GD).

Project Phase	Skills Identified	Key Insights from Interviews
Execution	Scientific Background: Actions essential for the proper management of stakeholders remain necessary. These actions are intrinsically linked to the scientific background a project manager must possess.	*“When you know what you’re doing and can justify it with knowledge of the laws, everyone feels confident"* (01PM). *"To communicate effectively with technical people, you must understand their technical concepts" (02WE).* *"Knowledge of legislation for licensing large construction projects" (03PM).* *"experience alone is not sufficient without knowledge, nor is knowledge alone sufficient without experience"* (07GM).
	Use of Expertise: In cases where the project manager possessed this expertise, it contributed to the accurate drafting of a schedule that ensured proper interconnections and the critical path, thereby preventing delays or allowing for pre-planned mitigation actions.	*"Lack of expertise results in plan failure"* (03PM). *"Saying 'I don’t know' is an acceptable answer, but knowing helps you weather the storms"* (01PM). need for a *"project manager with knowledge of the subject and a willingness to take responsibility"* (04GM).
Monitoring & controlling	Environmental Awareness: project managers, regardless of the actions they undertake during the construction phase, are equally responsible for the environmental aspects of the project.	There is *"a fear of complaints and damage to the company's reputation"* (05EE). *Environmental awareness validated the theoretical approach to stakeholder management, since "manuals were created with a chapter on Stakeholder Analysis, training, coordination, periodic updates as needed, and monitoring based on levels of importance/influence" (01PM).*

The interview responses revealed that several factors influence the successful delivery of a mega construction project in Greece. These influencing factors, which are not limited to project management practices, enclose organizational and external dimensions where each of them Table 2 is contributing in the scope, timeline and overall performance of the project.

Table 2. Influencing factors

Project Phase	Influencing Factors identified	Key Insights from Interviews
Initiation	Relations with Local Authorities: Early community engagement to prevent risks.	From the very start of the project, *"informational letters from all construction sites and calls from responsible people to make them feel the immediacy and professionalism were distributed to local community stakeholders in order to reduce "the fear of complaints and the company's negative publicity"* (07GM).

Project Phase	Influencing Factors identified	Key Insights from Interviews
Planning	Relations with Public Authorities: Understanding their influence and making necessary compromises.	It is recognized that *"the biggest obstacle was the public authorities"* (03PM). *"Small compromises were made when it came to public authorities"* (06CM). *"knowing that the project will get stuck in public services, it's better to plan how to deal with it and act proactively than wait for it to happen"* (01PM).
Execution	Cultural Differences: Language and behavioral impacts on collaboration.	*"Common communication code and terminology must be established, which will be used by all stakeholders"* (01PM). *"the consultant of the lenders was English and had a different approach to how the requirements should be delivered"* (07GM).
	Development of Alternative Plans: Flexible timelines to adapt to unforeseen events.	*"The company took corrective actions with people who could assist more in managing stakeholders during the project, although this was not initially foreseen"* (02WE).
Monitoring & Controlling	Ensuring Satisfaction of Key Stakeholders: Prioritizing and balancing varying stakeholder expectations.	*"Conflict of interests – you had to choose, but in the end, you had to satisfy everyone"*(02WE). Therefore, it was considered essential in the research *"that those who directly impact the project must be satisfied"* (01PM). *"There were instances where a prioritization of satisfaction was required: "there were service priorities"* (03PM).

Various methods and frameworks Table 3 have been developed to manage efficiently stakeholders during all the phases of the project. Important finding derived from the analysis was that most methods were missing from the project phase in which they were expected to be present and appeared at a later phase, challenging the project delivery.

Table 3. Stakeholders' management methods

Project Phase	Communication Techniques & Methods	Key Insights from Interviews
Initiation	Guidance/Training: Early instruction leads to better organization. Two-Way Communication: according to the research direct discussions preferred. Corporate Processes: the creation of guidelines by the project leaders for stakeholder identification would help.	"*Handbooks: step-by-step instructions saving time on communication later"* (07GM). *"the right people with experience – companies should value such people so they can pass on their knowledge to others"* (02WE). *"a crowd of 20 people, each supporting a different opinion based on their own interest"* (03PM). *Procedures always help teams in growing projects: small steps, not complex ones that resemble bureaucracy"* (07GM). "

Project Phase	Communication Techniques & Methods	Key Insights from Interviews
Planning	Recognition of Importance: Acknowledging stakeholder influence. Empirical Method: Managing without formal tools, relying on past experience.	*"One of the most important things – a vital part of the project, the project doesn't proceed without them"* (04CD). *"The rules of construction projects are always the same, so it requires experience from the project manager to design stakeholder involvement during the execution phase"* (03PM).
Execution	Trial and Error Method: No clear methodology, relying on learning as the project unfolds. Support from Upper Echelon: Involving senior executives, especially when PM experience is limited.	*"We hit a wall, learned, and moved on"* (06CM). *"It's difficult for such a role to gain the acceptance of everyone—without strong management support"* (07GM).
Monitoring & Controlling	Documentation and Monitoring: Keeping updated lists of stakeholders and tracking their evolving needs.	*"There were never a record of the stakeholders involved"* (01PM).

A significant point raised by the project managers were the gaps that appeared in stakeholder management during the closure of each project. It seems that debrief, or post-project review is often missing, as there is no documentation of the management processes that could be utilized in future projects with similar needs.

In some projects, it was described that it was impossible for the project manager to organize all activities solely, and someone else had to undertake, "informally," responsibilities, especially when the project was already facing time and cost risks. Therefore, one suggestion for improvement would be to have a dedicated role specifically for managing stakeholders. Nearly all participants mentioned that stakeholder identification and involvement happened much later than it should have. As a conclusion, it was considered helpful for future projects that, *"even if everything were done the same way in a future project, involving stakeholders in the planning phase would save time in negotiations during the subsequent phases"* (01PM).

5. Analysis of findings

5.1 Stakeholder Management challenges

The results of the study reveal that project managers often face difficulties in identifying stakeholders and their needs. The primary challenge identified in the research findings was the inability to identify all stakeholders at the start of the project. This recognition is completed before the start of construction, meaning two phases later (i.e. after initiation and planning phase).

During the project initiation phase, it is recognized that great importance should be placed on interpersonal relationships between stakeholders and on relationships with the local community as is the first to be affected by the announcement of a new project.

During the planning phase, the challenges identified mainly relate to relationships with public authorities, as there was a noticeable influence on the project's schedule due to tasks which involve approvals dependent on public authorities. In this phase, the plan for involving stakeholders is implemented. The best way to involve stakeholders is to engage and integrate them into the activities of the project that concerns them. Furthermore, the lack of certain key

competencies, such as scientific background and lack of technical knowledge by project managers, is considered a challenge for managing stakeholders.
Another challenge that emerged from the findings is the cultural differences between the project members. The difference in national culture if not addressed may result in significant negative effects on the exchange of information, joint problem-solving, and flexibility when changes are requested, thus affecting cooperation between project team members.
During the execution phase, communication between the project manager and stakeholders converges on meeting their needs and requirements. To address this challenge, the requirements were prioritized based on the importance of the stakeholders and their influence on the project.
During the monitoring and controlling phase, a major challenge occurs when there is a lack of environmental awareness. In construction companies, environmental responsibility is often translated only into cost and safety control.

5.2 Lessons learned from Stakeholder Management

The research showed that the lessons learned from project management failures can create a framework for stakeholder management strategies to facilitate better decision-making by project managers and increase the likelihood of successful stakeholder management outcomes. Initially, construction companies in Greece, in order to effectively manage stakeholders in the construction projects they undertake, must ensure the training and guidance of their teams for stakeholder management. Furthermore, emphasis should be placed on communication between stakeholders. The developed communication techniques will be different for managing internal and external stakeholders, but the ultimate goal will be to create a trust-based environment. According to this study, the method of continuous interaction strengthened stakeholders' commitment to actively participate. For managing internal stakeholders, a different strategy should be followed, as their motivations differ. For example, the success of a project for an ambitious manager translates into personal development. Project managers do not only rely on the communication strategy they develop but also seek comprehensive corporate processes and standards, so they know the rules they must follow to manage stakeholders.
In a corporate environment where there were no defined processes and methods for managing stakeholders, alternative management methods were developed and applied. Two techniques stood out: the empirical management method and the trial-and-error method.
Moreover, the suggestions for improving stakeholder management that emerged from this paper included (i) creation of an exclusive specialized role for stakeholder management (stakeholder manager), (ii) involvement of stakeholders from the project planning phase for better communication, (iii) stakeholder management throughout all project phases, (iv) creation of a plan and documentation of the stakeholder management processes for implementation in project phases by all team members (stakeholder management plan).

6. Conclusion

This research focuses on analyzing stakeholder management in MCPs. Specifically, conclusions were drawn regarding the challenges faced by project managers throughout the life cycle of a MCP and moreover, ways to manage stakeholders based on the experience acquired from similar projects were exhibited.
This paper identified that stakeholder management is extremely critical and important for the outcome of an MCP. However, there are no predefined processes to ensure that. For this reason, a stakeholder management framework is proposed focusing on the skills and training of project managers and the influencing factors.
Moreover, certain ways to manage stakeholders have been identified and proposed by this paper findings. Additionally, a significant finding from the research is the need to evaluate past projects (lessons learned) regarding stakeholder management. The evaluation is proposed to be carried out with the closure and delivery/acceptance of the project firstly, because if included as part of the project process, it is more likely to be executed mechanically as a rule by those involved, and secondly, because everyone will have recent memories of the project where challenges could have been improved. The lessons learned from the projects examined in this research included the creation of a specialized role in the project focusing on stakeholder management with specific processes and standards and the recognition and involvement of stakeholders from the very first phase of the project (initiation phase). Stakeholders' satisfaction was acknowledged as significant influencing factor and the research showed that it should be the outcome

of the constant communication among the project manager and the stakeholders. The value of a trial-and-error approach was also pointed out from the research findings, a rather significant outcome as this approach is not directly mentioned from PMBOK.
The research conducted is subject to certain limitations. First of all, it should be noted that this is a qualitative study thus it includes the element of subjectivity in responses. Moreover, the projects examined, seven in total, are located within the geographical area of Greece and are exclusively projects exceeding one hundred eighty million euros (€180M). Potential future research could aim at creating a stakeholder management manual for use by construction companies and project managers, including standardized management procedures. Finally, stakeholder management in MCPs can be seen as human relationships management, thus analyzing behavior patterns would be of great interest.

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