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Article

Practical approach for analysing and engaging stakeholders in construction megaprojects

Ayman Mashali*, Ahmed Eltantawy

Mansoura University, Mansoura 35511, Egypt
*** Corresponding author:** Ayman Mashali, ayman.mashali@yahoo.com

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Abstract: Purpose: The construction industry is a complex environment, it is facing massive challenges, especially on megaprojects, due to the huge construction development and stakeholder management (SM). This paper seeks to explore, investigate, and assess the methods for analysing and engaging stakeholders on construction megaprojects to overcome stakeholder management problems and enhance performance. **Methodology:** The quantitative methodology is adopted in this research; a questionnaire survey is carried out among big construction firms in Qatar, with a 59% response rate. Quantitative data analysis was conducted using the statistical package for social science (SPSS) software. **Findings:** This paper investigated and assessed the common methods for analysing and engaging stakeholders on construction megaprojects, where they come together more integrative. Hence, this will boost their chances of reaching higher levels of success and project effectiveness. Lastly, the findings are foreseen to aid project managers in adjusting their strategies when considering future implementation plans via a broad picture and understanding of SM and their relationships in CMPs. **Practical implications:** Investigating and assessing the methods for analysing and engaging stakeholders is expected to assist project managers in improving projects' performance and completing construction within the predefined time and cost. Besides, it enhances and strengthens the present body of knowledge in SM study domains and provides a starting point for practitioners and academics. **Originality:** This study contributes significantly by investigating and assessing the methods for analysing and engaging stakeholders in MCPs. Moreover, the findings are important for all concerned project stakeholders and are considered as a roadmap for effective stakeholder management in MCPs.

Keywords: stakeholder; management; engagement; construction; megaprojects

1. Introduction

The construction industry is a complex environment where collaboration and coordination among stakeholders are necessary [1]. According to earlier studies, a lack of thorough stakeholder management processes is evident throughout the project life cycle. While stakeholder management has yet to be adopted as a promising strategy for managing construction projects [2,3]. Moreover, all of the stakeholders contributions are significant for planning and control. Even though stakeholder management has long been recognized as a means to increase the likelihood of successful construction projects' completion, the full potential of stakeholder management has yet to be realized [2]. Despite the recognized importance of SM, there is still a lack of research regarding project stakeholders. The concept of SM has developed greatly because it is important to achieve project objectives [4]. Furthermore, poor SM can lead to many serious problems in the CI, such as inadequate scope and activity definition, inappropriately assigned project resources, poor and

ineffective communication, and unexpected scope modifications; all these problems may be the root cause of delays and exceeded cost [5].

Numerous difficulties and obstacles of SM in construction projects recommended by past researchers involve improper stakeholder engagement (SE) [6].

Nonetheless, a deeper understanding of SM would allow project execution teams to value project planning stages and determine if the concerns are being handled as efficiently as possible [7]. This will boost their chances of reaching higher levels of success and, as a result, time savings, cost savings, quality assurance, and project effectiveness [8].

This research aims to present an investigation and assessment of the methods for analysing and engaging stakeholders in MCPs. This knowledge gap is bridged and handled in this paper. Moreover, the research findings serve as a roadmap for governments and clients of construction projects to achieve ultimate benefits and increase earned value in their investments. The research outcomes are anticipated to support project teams and construction organizations in implementing SM.

2. Literature review

2.1. Stakeholders' definition

From Freeman [9] to PMI [10], there are broad stakeholder definitions. In conclusion, the most common definition of project stakeholders is any individual, group, or organisation who can affect or is affected by the project and includes clients, consultants, contractors, subcontractors, suppliers, and all government authorities [2,11].

2.2. Mega-projects

Megaprojects consume enormous resources that can be afforded only by giant international contractors with robust financial capabilities. Besides, it faces a group of political and social conditions [8,12]. Construction megaprojects can be described as "large-scale, complex projects that cost about $1 billion or more, need many years to develop and build, involve multiple stakeholders, and impact millions of people" [13,14].

Furthermore, megaprojects have strong economic and social roles in societies. They are not only characterized by their high construction values but also by their complexity level in design and construction, methodology, technology, schedule, finance, governance, resources, organizational performance, environment, and workflow challenges [12,15]. Moreover, the managerial challenges in mega construction projects (MCPs) are not only purely technical but also involve the management of social, political, and cultural aspects of the project [11].

Considering size and scope, megaprojects confront significant schedule and budget challenges compared to other projects. Reasons include [13]:

- Increased risks due to complex interfaces and long planning.
- Planning processes that comprise many participants with conflicting interests.
- The scope of the project can change over time.

In megaprojects, the project team's instability for a long time through the project

life cycle weakens the ability of leadership to keep constant progress rates [13].

2.3. Stakeholder engagement & involvement

Stakeholder engagement (SE) ensures that long-distance, comprehensive, and consistent participation is required [1]. Previous research describes SE as the participation process of persons and sets that are influenced by the activities of the firm actively. Also, stakeholder activities such as dialogue are one approach to evaluating stakeholder participation [16]. Whereas engagement can be considered as the relationship among the organization and various stakeholders to reinforce the efficacy of the resolutions, strategies, and performance [17]. Furthermore, SE tries realistic stakeholder opinions on their relationship, where SE seeks to better an organization's social and ethical accountability and conduct [18].

2.4. Types of engagement

Bowen et al. [19] displayed three classifications for engagement strategies: transactional, transitional, and transformational, which depend on the nature of the engagement. If society is enough included in the goal-setting and measurement processes, shared responsibility for the engagement process can also be achieved [19].

Additionally, Bowen et al. [19] stated that there is more two-way interaction between the stakeholders and the company. Moreover, many stakeholder groups are not satisfied with simply being assigned some measure of organizational value; they want an opinion on how the organization creates this value [11]. Not all, but numerous stakeholders want some voice in organizational decision-making [20].

2.5. Analysing and engaging stakeholders

Stakeholder analyses (SA) is a crucial and important portion of successfully SM [2,21]. SA means to know the stakeholders and their concerns and to value stakeholders' impact and relations. According to Yang et al., SE is about communicating, involving, and developing connections with stakeholders. Project directors should adopt methodologies that agree with the SM process. Also, they illustrated that there is no stand-alone methodology, and other methodologies should merge most of the methodologies [16].

2.6. Effective involvement of stakeholders

Project managers should establish a stakeholder participation plan to address the needs of various stakeholder groups and improve the efficacy and efficiency of decisions made throughout the project life cycle [6]. Overall, stakeholder involvement, along with other aspects such as leadership, measurement and improvement, teamwork, and process approach, is cited by Toriola-Coker et al. [22] as the most important element influencing the effective implementation of comprehensive management systems. Also, conflicts among plans and other risks to action in the execution and operations phases are mitigated by involving multiple parties in the project planning process, all of whom have different priorities and objectives [23].

However, depending on the project's nature and requirements, only certain people may get involved in the process. According to Mok et al. [24], effective and

active engagement of project members will help to improve the overall quality of the construction and increase the project value. Stakeholder perspectives on prospective engagement in the planning process were offered by Ayodele and Kajimo-Shakantu [1]. Travaglini and Dunović [23] advocated that the project preparation and planning phase is the stage where different stakeholders with various demands and objectives have the most significant possibility to impact projects and their outcomes.

2.7. Stakeholder management and construction project success

All project stakeholders' effective and ongoing involvement has been associated with project success [22,23].

Additionally, stakeholder satisfaction has been added to the traditional criteria for project success: cost, quality, and timeline [5,25].

Moreover, previous studies have linked project failures to either a lack of or ineffective stakeholder management during the project. Therefore, it is crucial to include stakeholders effectively to complete the project successfully and under the current perception of project success in CI [3,22].

Involvement and incorporating stakeholders early on and considering their interests are critical to preventing adverse reactions to the project. Therefore, stakeholder management and involvement should continue the project's duration [2,3].

As evidenced by several problems and project failures around the world, stakeholder participation has a very significant impact on project outcomes [16].

The outcomes of SM are dependent on project managers' knowledge, judgment, relations, and skills. A vital aspect of project success is the ability of the project manager to delineate the project location and engage the local community in the planning process [22].

The construction industry includes a wide range of stakeholders, in which they introduce their interests, concerns, needs, and likely chances [11].

Therefore, effective SM necessitates robust analytical proficiency to identify the concerned stakeholders and work with them to understand their expectations and the impact they can have on project success. This increases positive stakeholder engagement and decreases any probable harmful impact [1].

3. Research methodology/approach

The research strategy can be defined as how the research aims could be investigated, and it is divided into two sorts, namely, quantitative and qualitative [26].

The quantitative methodology involves both studying the overall trends in data and adding appropriate statistical criteria [27].

This study aims to explore, investigate, and assess the methods for analysing and engaging stakeholders in MCPs. To achieve this goal, a questionnaire survey is carried out to gather information from construction practitioners in Qatar. A five-level scoring scale ranging from "1" (very low) to "5" (very high) is used. The collected data is then analyzed using the SPSS software (version 22).

The sample size is selected randomly from different stakeholders representing the licensed engineers. The targeted population is the engineers licensed and working

in Qatar, which numbered 14,000, according to the Ministry of Municipality and Environment. The sample size was determined using Slovin's formula [28] as follows:

$$n = \frac{N}{1 + N(c^2)} \quad (1)$$

c = Margin of error, taken as 10% = 0.10.

N = Total population, taken as 14,000.

n = Sample size.

"Applying the equation": $n = \frac{14{,}000}{1+14{,}000(0.10^2)} = 99.29 \approx 100$

This paper utilized a quantitative approach employing an empirical, realistic survey. The questionnaire was sent to 400 individuals working at different organizations, with 235 (59%) responses received, which is a satisfactory number of responses [25,29]. After designing the questionnaire, a pretesting and pilot study are carried out to refine. Cronbach's coefficient alpha (a) [30] is the most common measure of internal consistency (reliability) when questions are asked on a Likert scale (1 to 5). The values range between 0.0 and 1.0, with the higher values implying a higher degree of internal consistency [31]. According to Pallant [32], a value of a equals or greater than 0.7 means that the data is reliable for analysis. In this study, a equals 0.96, which implies high reliability of the whole questionnaire responses to achieve the study's objectives. The collected data is analyzed through calculation of the RII, using Equation (2) [33]:

$$RII = \frac{\Sigma Wi * ni}{N * A} \quad (2)$$

where:

W_i: the weight given to each factor by the respondents and ranges from 1 to 5;

n_i: the number of respondents gave the weight W_i;

A: the maximum weight (i.e., 5 in this case); and

N: the total number of respondents.

The higher the RII value, the more important the attribute [34].

Although respondents' opinions may be subjective depending on their experience, locations, and other factors, numerous statistical techniques are employed to reduce these biases. The research methodology stages are demonstrated in **Figure 1**.

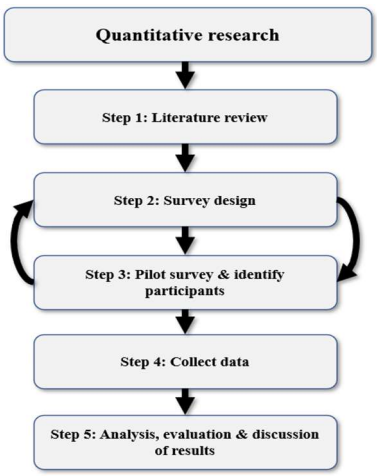

Figure 1. Research approach/methodology.

4. Analysis of results and discussions

This section describes the results of the analysis of the survey data that was obtained and discusses the findings.

4.1. Respondents' demographics

This division includes the available personal/general information about the survey participants (235 responses): in terms of their position, years of experience, nature of the organization, and the type of industry that they are involving in.

4.1.1. Category of respondents' organizations (organizational role)

In terms of the respondents' organizations, as illustrated in **Figure 2**, the plurality of respondents are consultants/designers/managers (43.40%) and contractors (33.19%), whose responses reflect the SM during the construction stage. Also, the high percentage of this class of respondents ensures information goodness.

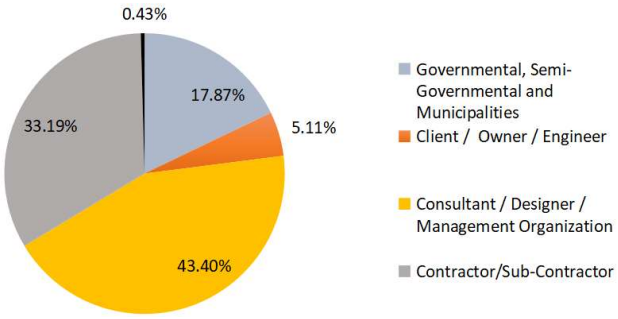

Figure 2. Category of respondents' organizations.

4.1.2. Respondents' roles/current career (respondents' job profiles)

Figure 3 indicates that (director/senior management) is 5.11%, which reflects the decision-maker of development (project manager/construction manager) and (resident engineer/client consultant) have values of 19.57% and 12.77%, respectively, with a total value of 37.45%, obtained from top management who have managerial and professional abilities, which implement the great capacity for assessment of the states. Senior engineer's level responses were 32.77%, which is good for managing and controlling. Furthermore, more than 70% of the responses were from top management and senior levels, which hold critical positions that influence the quality of the data gathered. Since this paper concentrates on SM, these findings prove that proper individuals have been approached.

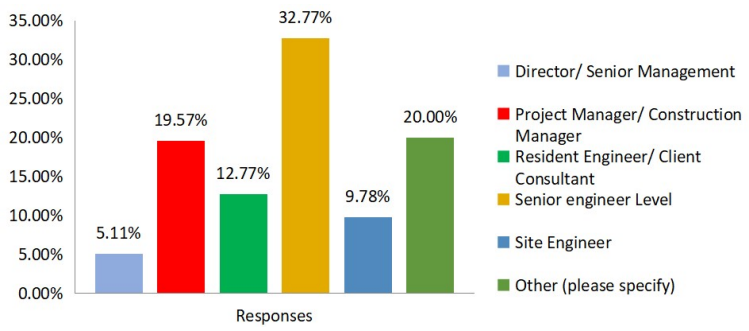

Figure 3. Respondents' job profiles (respondents' roles).

4.1.3. Respondents' years of experience in construction

In terms of years of work experience in construction, the percent of the respondents were shown in **Figure 4**; only 6.81% of participants had less than five years in the industry, and 25.11% of respondents had 11 to 15 years of work experience. Nearly about half of the participants have at least 20 years of experience. They act as leaders and decision-makers in their organizations., which indicates the importance of SM in Qatar's industry sectors.

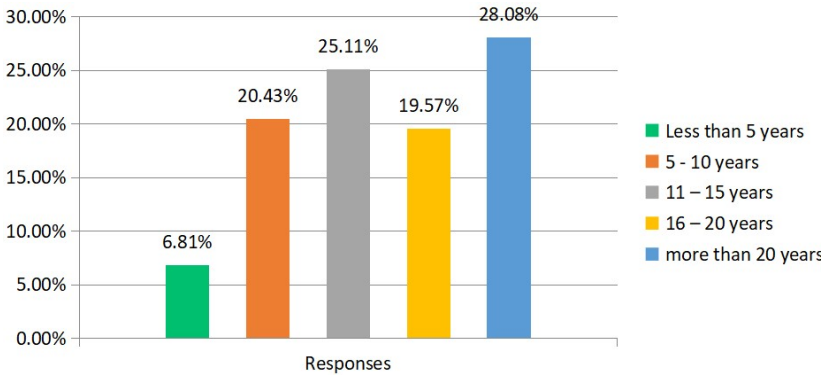

Figure 4. Respondents' "years of experience".

The highest number of extensive experiences increases the degree of assessment accuracy. Furthermore, the variety of experiences enhances the study by various information and knowledge. This is a great sign that the respondents have a minimum degree of expertise with the SM. This profile indicates a considerable experience on which the outcomes of this survey were rested.

4.1.4. Stakeholders management present in the project organization structure

Figure 5 demonstrates the percent of respondents' answers about the following: Are stakeholders management present in your project organization structure? The major answer was yes; they were more than 80.0%, which gives an excellent sign to secure quality information and reflect the current high development proceeded in Qatari construction projects.

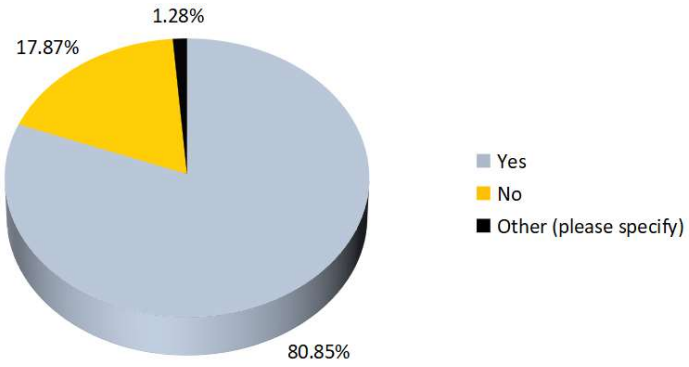

Figure 5. Distribution of respondents' percentage.

4.1.5. Respondents' "client" types

In terms of client types, the respondents indicated that more than 88.0 percent of clients were public/government organisations, as indicated in **Figure 6**. This high

percentage represents the current status of construction in Qatar and accurately reflects the current scenario in the Qatari construction market, where the government is spending and funding infrastructure development projects concerning World Cup 2022.

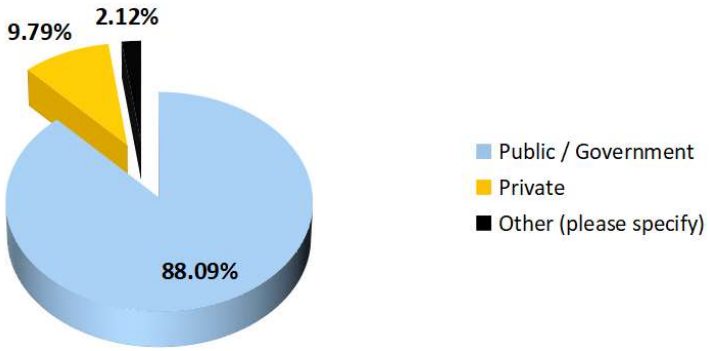

Figure 6. Respondents' "client" types.

To have a deeper understanding of how each group of respondents is involved in the construction process, descriptive statistics was adopted to determine the measures of (mean) and measures of dispersion (standard deviation and variance). The mean reflects the degree of involvement. Respondent perceptions were examined by using a five-point Likert scale: 1 = very low, 2 = low, 3 = average, 4 = high, and 5 = very high.

It is clear from the results displayed previously that the respondents had perfect experience in the construction field, as the majority had more than 20 years of experience from various organizations, and some respondents were involved in stakeholder management. Therefore, this respondents' sample is appropriate and sufficient to provide the research with a consistent view of Qatar's construction projects.

As a result, this further supports and gives more acceptance to the gathered data, later analysis, and investigation.

4.2. Discussion of survey findings

This part presents the collected outcomes of the SM practice of the chosen sample of Qatar's construction stakeholders. The main assignment in SM was stakeholder analysis and engagement. To fulfill the study aims, four questions were outlined in the survey as the following: (a) methods of analyzing stakeholders' concerns and needs; (b) methods of stakeholders' engagement according to the type of contract; (c) methods of engaging the stakeholders according to the type of project; (d) type of reply strategy to transact for the stakeholder demands.

4.2.1. Method of analysing stakeholders' concern and need

Table 1 illustrates that the *P*-value = 0.000, which is less than the significance level ($\alpha = 0.05$) for all factors, and "personal past experience" was rated first, with RII equals (86.57%). The importance of project managers' experience is highlighted in this outcome. When project managers need to gather information about stakeholder's needs and concerns before producing a proposal, they have difficulty with financial resources. Therefore, the past personal experience allows them to overcome this

obstacle because the past personal experience is cheap.

Workshops: was rated in the second position, with RII (86.29%); in this process, the project manager could obtain an opportunity to investigate and analyze the options and deal with challenging issues.

Table 1. Effective methods to analyze stakeholders' concern and need.

Notification	Mean	Std. error	Std. deviation	Variance	RII %	*P*-value (Sig.)	Rank
Personal past experience	4.3151	0.05972	0.72162	0.521	86.57	0.00	1
Interviews	4.0966	0.05899	0.71028	0.513	82.24	0.00	4
Questionnaires and surveys	3.9448	0.06476	0.77977	0.605	82.24	0.00	4
Professional services	4.1310	0.06053	0.72892	0.532	82.94	0.00	3
Workshops	4.2897	0.05529	0.66580	0.438	86.29	0.00	2
All factors of the field	4.1554		0.72127		83.44		

Professional services were ranked in the third position, with RII equals (82.94), because they afford full SM plans and economize the project manager's time.

Interview: although the interview is easy to arrange and low cost, it was ranked in fourth/last position with RII equals (82.24%). This may be related to the pressure of work and the lack of time for the concerned engineers.

Questionnaires and surveys were ranked in fourth/last position, also with RII equals (82.24%), because the project manager avoids the low response rates, which may affect the results, and the collected information may be shallow, and their point of view may not be clear.

Each method has its own power, restriction, and constraint; therefore, the most suitable method for achieving effective SM is to apply a combination of elements of every method according to the actual situation.

4.2.2. Engagement methods for the stakeholders according to type of contract

The respondents were questioned about their view concerning the efficient methods to engage stakeholders (ES) according to the type of contract in Qatar's construction project.

Lump sum contract:

Table 2 shows that "*P*-value = 0.000, which is less than the significance level (α = 0.05)" for all factors, and "meeting" was ranked first with RII (88.11%), while "interviews" with RII (75.80%) was ranked in the lowest position. This result mentions that the experience of project managers is most significant.

Table 2. Effective methods to engage stakeholders in lump sum contract.

Notification	Mean	Std. error	Std. deviation	Variance	RII %	*P*-value (Sig.)	Rank
Meetings	4.3750	0.05985	0.71815	0.516	88.11	0.00	1
Social contacts	4.0278	0.06458	0.77500	0.601	80.28	0.00	4
Negotiations	4.0833	0.07276	0.87306	0.762	81.82	0.00	2
Workshops	4.0210	0.06980	0.83471	0.697	81.40	0.00	3
Interviews	3.8028	0.07224	0.86080	0.741	75.80	0.00	5
All factors of the set					81.48		

Measurement contract:

Table 3 shown that, "*P*-value = 0.000, which is less than the significance level (α = 0.05)" for all factors. Besides, 'meeting' was ranked first, with RII equals (86.29%), while "interviews" with RII equal (75.66%) was ranked in the lowest position.

Table 3. Effective methods to engage stakeholders in measurement contract.

Notification	Mean	Std. error	Std. deviation	Variance	RII %	*P*-value (Sig.)	Rank
Meetings	4.3125	4.3125	4.3125	0.482	86.29	0.00	1
Social Contacts	3.9861	0.05660	0.67922	0.461	79.72	0.00	4
Negotiations	4.0694	0.06659	0.79906	0.639	81.40	0.00	2
Workshops	4.0210	0.06075	0.72645	0.528	80.42	0.00	3
Interviews	3.7887	0.06766	0.80628	0.650	75.66	0.00	5
All factors of the set					80.70		

Cost reimbursable contract (CRC):

Table 4 shown that, *P*-value = 0.000, which is less than the significance level (α = 0.05) for all factor as well as, 'meeting' was ranked first, with RII equals (88.41%), while "interviews" with RII equal (75.24%) was ranked in the lowest position.

Table 4. Effective methods to engage stakeholders in CRC.

Notification	Mean	Std. error	Std. deviation	Variance	RII %	*P*-value (Sig.)	Rank
Meetings	4.3889	0.05671	0.68051	0.463	87.41	0.00	1
Social contacts	4.0347	0.06187	0.74245	0.551	80.14	0.00	4
Negotiations	4.1319	0.06774	0.81289	0.661	82.80	0.00	2
Workshops	4.0559	0.05936	0.70985	0.504	80.98	0.00	3
Interviews	3.7958	0.06519	0.77678	0.603	75.24	0.00	5
All factors of the set					81.31		

It is clear from the above-mentioned tables that outcomes are similar, this means that type of contract does not affect engaging stakeholder's methods.

Design-build (D-B)/(EPC) project:

Table 5 shows that the *P*-value = 0.000, which is less than the significance level (α = 0.05) for all factors, as well as 'meeting' was ranked first, with RII equals (90.07%), but "interviews" with RII equal (78.18%) was ranked in the lowest position.

Table 5. Effective methods to engage stakeholders in D-B.

Notification	Mean	Std. Error	Std. deviation	Variance	RII %	*P*-value (Sig.)	Rank
Meetings	4.4653	0.06380	0.76564	0.586	90.07	0.00	1
Social contacts	4.1111	0.06692	0.80306	0.645	82.66	0.00	3
Negotiations	4.0903	0.07817	0.93803	0.880	83.64	0.00	2
Workshops	4.1189	0.06077	0.72665	0.528	82.66	0.00	3
Interviews	3.9085	0.06772	0.80693	0.651	78.18	0.00	5
All factors of the set					83.44		

Where design-build offers owners a single point of responsibility for both the design and construction services. The designer-builder is thus responsible for any design errors. Design-build offers owners earlier completion of their projects as a result of design and construction activities overlapping.

The previous **Tables 2–5** demonstrate that "meeting" was ranked first for all contract types, and it is the most common method for ES in the Qatari construction projects. While the meeting guarantees that attendees are aware of the subjects and information collected from their perspective, it is typically low-cost and simple to organise.

"Negotiations" was ranked in the second position for all types of contracts, and it is useful for solving the problems with the stakeholder face-to-face and disagreement settlement.

Although the "workshop" is a perfect way for discussion of the issues and analysis of the problems, it was ranked in the third position. This may be related to the individual personal skills of the project manager.

"Social contacts" was ranked in the fourth position for all types of contracts; it appears an ineffective and weak method to engage with the stakeholders.

Although the "interview" is easy to arrange and low cost, it was ranked in fifth/last position for all types of contracts. This may be related to the pressure of work and the lack of time for the concerned engineers.

Summary of effective methods to engage stakeholders according to type of contract:

Table 6 demonstrates that for all types of contracts, the "design-build/(EPC) contract" was ranked first, as well as being the most common contract type in Qatari construction projects. Since, in this project delivery method, the owner enters into one contract with a single entity responsible for delivering a complete solution to address the owner's specific needs or problems, i.e., design and construction.

Table 6. Summary of effective methods to engage stakeholders according to type of contract and procurement.

Engagement methods	Lump sum contract	Measurement contract	Cost reimbursable contract	Design build/(EPC) contract
	RII %	RII %	RII %	RII %
Meetings	88.11	86.29	87.41	90.07
Social contacts	80.28	79.72	80.14	82.66
Negotiations	81.82	81.40	82.80	83.64
Workshops	81.40	80.42	80.98	82.66
Interviews	75.80	75.66	75.24	78.18
All factors of the set	81.48	80.70	81.31	83.44

"Lump sum contract" was ranked second, "cost reimbursable contract" was ranked third, but "measurement contract" was in the last position.

4.2.3. Engagement methods for the stakeholders according to type of project

The respondents were questioned about their view concerning the efficient methods for ES according to the type of project in Qatar's construction project.

Buildings projects:

Table 7 shows that the *P*-value = 0.000, which is less than the significance level (α = 0.05), for all factors, "meeting" was ranked first with RII (87.55%), and "interviews" with RII (76.76%) was ranked in the lowest position.

Table 7. Effective methods to engage stakeholders in buildings projects.

Engagement methods	Mean	Std. error	Std. deviation	Variance	RII %	*P*-value (Sig.)	Rank
Meetings	4.3241	0.05780	0.69605	0.48448	87.55	0.00	1
Social contacts	4.0764	0.05753	0.69039	0.47664	81.68	0.00	2
Negotiations	4.069	0.0628	0.7540	0.56857	81.55	0.00	3
Workshops	3.9795	0.05870	0.70924	0.50302	80.00	0.00	4
Interviews	3.7534	0.06488	0.78399	0.61464	76.76	0.00	5
All factors of the set					81.51		

Infrastructure projects:

Table 8 shown that, "*P*-value = 0.000, which is less than the significance level (α = 0.05)", for all factor and that "meeting" was ranked first, with RII (91.80%), and "interviews" with RII (77.76%) was ranked in the lowest position.

Table 8. Effective methods to engage stakeholders in infrastructure projects.

Engagement methods	Mean	Std. error	Std. deviation	Variance	RII %	*P*-value (Sig.)	Rank
Meetings	4.5241	0.05714	0.68802	0.47337	91.809	0.00	1
Social contacts	4.2153	0.05760	0.69124	0.47781	84.34	0.00	2
Negotiations	4.1250	0.06675	0.80100	0.64161	82.80	0.00	4
Workshops	4.1575	0.06351	0.76734	0.58880	84.06	0.00	3
Interviews	3.8493	0.06250	0.75514	0.57024	77.76	0.00	5
All factors of the set					84.17		

Industrial projects:

Table 9 shows that the *P*-value = 0.000, which is less than the significance level (α = 0.05), for all factors, and that "meeting" was ranked first with RII (88.67%) and "interviews" with RII (76.08%) was ranked in the lowest position.

Table 9. Effective methods to engage stakeholders in industrial projects.

Engagement methods	Mean	Std. error	Std. deviation	Variance	RII %	*P*-value (Sig.)	Rank
Meetings	4.4207	0.05679	0.68383	0.46762	88.67	0.00	1
Social contacts	4.0764	0.05920	0.71036	0.50461	81.68	0.00	3
Negotiations	3.9514	0.06708	0.80497	0.64797	79.58	0.00	4
Workshops	4.0411	0.06365	0.76903	0.59140	81.96	0.00	2
Interviews	3.7603	0.06247	0.75480	0.56972	76.08	0.00	5
All factors of the set					81.59		

Others are combinations of two or more types of projects:

Table 10 shows that the *P*-value = 0.000, which is less than the significance level (α = 0.05), for all factors, and that "meeting" was ranked first with RII (86.62%), and "interviews" with RII (76.36%) was ranked in the lowest position.

Table 10. Others combination of two or more types projects.

Engagement methods	Mean	Std. error	Std. deviation	Variance	RII %	*P*-value (Sig.)	Rank
Meetings	4.2759	0.05911	0.71153	0.507	86.62	0.00	1
Social contacts	3.9653	0.05697	0.68361	0.467	79.86	0.00	3
Negotiations	4.0208	0.06498	0.77971	0.608	80.56	0.00	4
Workshops	3.9795	0.06334	0.76536	0.586	80.56	0.00	2
Interviews	3.7466	0.06507	0.78619	0.618	76.36	0.00	5
All factors of the set					80.79		

Tables 7–10 show that for all types of projects, "meeting" was ranked first, and it is the most engagement method type in Qatari construction projects. Whereas "interview"; although the interview is easy to arrange and low cost, it was ranked in the last position. This may be related to the pressure of work and the lack of time for the concerned engineers. Moreover, it is clear from the above-mentioned tables that outcomes are very closely related; this means that type of project does not affect engaging stakeholder's methods.

Summary of effective methods to engage stakeholders according to type of project:

Table 11 shows that, for all types of projects, "infrastructure project" was ranked first, and it is the most common project type in Qatari construction projects. These reflect the construction stage in Qatar to achieve Qatar Vision 2030.

Table 11. Summary of effective methods to engage stakeholders according to type of project.

Engagement methods	Buildings project	Infrastructure project	Industrial project	Others (combination of two or more types) project
	RII %	RII %	RII %	RII %
Meetings	87.55	91.89	88.67	86.62
Social contacts	81.68	84.34	81.68	79.86
Negotiations	81.55	82.80	79.58	80.56
Workshops	80.00	84.06	81.96	80.56
Interviews	76.76	77.76	76.08	76.36
All factors of the set	81.51	84.17	81.59	80.79

"Industrial project" was ranked in second.

"Buildings project" was ranked in third.

"Combination of two or more types of projects" was ranked in the last position.

4.2.4. Type of response strategy to deal with the stakeholder claims

The respondents were questioned about their view concerning the efficient response strategy types to deal with the stakeholder claims in the construction project.

Table 12 shows that "*P*-value = 0.000, which is less than the significance level (α = 0.05)" for all strategies, and "compromising strategy" was ranked in the first positions in this set with RII equals (83.92%). The respondents chose a compromise strategy to deal with the main stakeholder demands. This is the most preferred strategy in the construction project because the project managers use it in negotiating with the stakeholders, listening to their claims and requirements, and presenting possibilities

and areas for discussion. This strategy can be considered a win-win but is useful when finding a middle ground that satisfies all parties to some degree. Also, in this strategy, no one is truly happy with the solution; both parties must abandon something that is important to them. This is a lose-lose situation.

Table 12. Effective response strategy to deal with the stakeholder.

Strategy type	Mean	Std. error	Std. deviation	RII %	*P*-value (Sig.)	Rank
Adaptation strategy	3.9510	0.07898	0.94443	79.02	0.000	3
Avoidance strategy	3.4056	0.09936	1.18819	68.11	0.000	4
Compromising strategy	4.1958	0.06452	0.77149	83.92	0.000	1
Dismissal strategy	2.9441	0.11086	1.32567	58.46	0.000	5
Influence strategy	4.0559	0.06259	0.74848	81.26	0.000	2

"Influence strategy" was ranked in the second position in this set with RII equals (81.26%). This indicates that the project managers can use this type of strategy with the key stakeholders to seek to affect their claims in conjunction with the project aim. It requires others to undergo the point of view of one side or another. This is not recommended unless very necessary. Generally, this technique involves pushing one opinion at the expense of another. It is a win-lose situation.

An "adaptation strategy" was ranked in the third position in this set with RII equals (79.02%). This technique emphasizes agreement rather than differences of opinion. Whereas the project manager can realize that it is better to accept the demand when it is possible and does not have a major change in the project, this will be useful for achieving the project's objectives.

"Avoidance/withdrawing strategy" was ranked in the fourth position in this set with RII equals (68.11%). This strategy type could be adopted when the request of the stakeholder claim is above the projectability; furthermore, the project manager is seeking to adopt this strategy via preventing and covering himself from the claims and shifting the responsibility of the claims to another in the project. Avoiding or withdrawing from the conflict or possible conflict and allowing the concerned parties to solve the conflict on their own. This strategy is not recommended unless it is a very dangerous situation.

"Dismissal strategy" was ranked in the last position in this set with RII equals (58.46%). Most of the respondents disagreed with this strategy. This means that the project managers should transact with stakeholder's matters in a suitable and proper way.

In conclusion, previous tables clarified that the respondents considered these approaches were useful, and the project managers prefer to use a compromising strategy to deal with the main stakeholder needs. Because they can use this strategy to negotiate with the stakeholders, listening to their requirements correlated to the project, displaying likelihoods, domain for dialogue, creation satisfaction, and awarding reparations. On the other hand, the respondents are not accepting the use of the dismissal strategy.

5. Research's contributions

This study is foreseen to have multiple implications and provide a starting point for practitioners and academics by investigating and assessing the methods for analysing and engaging stakeholders on construction megaprojects.

This paper has contributed to the existing body of knowledge in SM areas, and its findings will create a solid motivation to carry out SM initiatives fully, developing more collaboration among the 'project's stakeholders and supporting the SM initiative in CMPs.

The findings are foreseen to aid project managers in adjusting their strategies when considering future implementation plans via a broad picture and understanding of SM and their relationships in CMPs.

6. Conclusion

This paper seeks to explore, investigate, and assess the methods for analysing and engaging stakeholders on construction megaprojects to overcome stakeholder management problems and enhance performance.

This paper provided the outcomes of the gathered quantitative data that have been received from responded questionnaires. The questionnaire was distributed to 400 persons from various firms, and 235 (59%) responded, which is a sufficient response, and considered a proper receiving. The survey participants have various professional disciplines and organisational backdrops, thus giving creditability to the information gathered. As this paper focuses on SM, these outcomes prove that proper people have been approached.

As a result of the study's outcomes, the conclusions have been described as the following:

- "Type of contract" does not affect engaging stakeholder's methods.
- Design-build (D & B) is the most effective approach to dealing with the stakeholder requirements and claims in MCPs.
- "Meeting" is the most effective method that should be used in engaging the stakeholders.
- "Compromising" strategy was ranked in the first position to deal with the stakeholder needs.
- Dismissal strategy not accepted.

The paper outcome will assist efficient decision-making in MCPs. Additionally, the research conclusions give a roadmap to project stakeholders that enhance SM practices. Generally, the study's outcomes contribute to and develop the goals of SM and the construction industry. However, this study provides a unique practical approach, considering deeper managing stakeholders. Thus, it results in a clear understanding of the stakeholders and their contributions, boosting project value creation.

7. Research limitations

This study, like others, has its limitations. The research was in QATAR. Hence, findings are limited to the Qatari construction projects context with an emphasis on

CMPs. Nevertheless, this research is still robust and suitable for evaluating SM in CMPs.

8. Recommendations

Based on the study outcomes, the recommendations comprise the following:

- There is an urgent necessity for crucial stakeholders to focus on staff human development and to prioritize staff development to enhance current SM practice.
- Government authority and professional organisations should work together to provide financial incentives to construction businesses to encourage them to implement SM practises.
- Government authorities and professional bodies should work toward developing relevant policies and standards within a local context.
- Organizations' senior management should prioritize evolving and installing a reliable working strategy to realize SM practices.
- Further investigation should be performed on an in-depth case study of diverse construction before and after using the outcomes of this research to validate it in practice and further enhance it to achieve more successful outcomes.

Moreover, this research recommends that construction key stakeholders adopt dynamic and positive attitudes toward SM. Owners, clients, and real estate developers are advised to be proactive in adopting efficient SM approaches in their projects to ensure project success.

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