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Factors Affecting the Client's Performance in the Public Construction Projects: Case Study of Oman

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Abstract: Despite the vast research on construction projects management issues in the Middle-East, little is known about client involvement in public projects. This article presents a study on identifying significant factors affecting client participation performance in public construction projects in the Sultanate of Oman. The study was conducted in quantitative approach where the data was collected through questionnaire survey. The collected data was analysed statistically to determine the ranking of the identified factors based on the degree of involvement in the project. The study found that the handover phase had the highest client's participation, while the operations and maintenance phase had the lowest client's participation among all the five construction phases. The low client participation in any project has an undesirable influence on the projects' overall outcomes. Consequently, this condition has harmed the time of completion of construction projects in the Sultanate of Oman. This condition is also the main reason for the quality problems in construction projects in Oman.

Keywords: Client, Construction projects, Public projects

1. Introduction

Construction sector has always been considered as one of the crucial players in the economies all over the world for its strong and broad linkages with other industries which motivate the growth of the country as well as it has been considered as the main generator of jobs and essential element of Gross Domestic Product (GDP). Construction industries worldwide have a significant role in socio-economic development, as the construction industry is essential for any infrastructure development. Oman as well is adopting the same method of introducing new sectors of development to reduce the dependencies on oil and petroleum. Oman witnessed a significant development program from the late 1970s. Since then, the government and the private sector have been equally involved in the development practice. The new infrastructure in Oman, such as the residential buildings, asphalt roads, commercial complexes, bridges, buildings, electrical networks, dams, and many other facilities, has built through the construction sector.

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The construction sector in the Sultanate of Oman share of the Gross Domestic Product (GDP) was USD 230.1 million in 1976. In 1981 jumped to USD 376.74 million and in 1985 jumped again to USD 629.72 million (Oman Chamber of Commerce and Industry, 1991). Due to the economic recession decline in the government expenditure in 1989, the share of the construction industry in the GDP fell to USD 275.6 million, and in 1990 it began to recover again to reach USD 334.88 million. In the year 2003, the figure has reached USD 693.519 million (Statistical Year Book, 2004). Gross domestic product (GDP) from the sector of construction in Oman increased to 5.94 USD Billion in 2016 from 230.1 USD Million in 1991. GDP from construction in Oman averaged 2.5 USD Billion from 1998 until 2016, reaching in all time, high of 5.94 USD Billion in 2016 and a low of 0.47 USD Billion in 2000 (Central Bank of Oman, 2017).

The industry becomes more complicated because of the number of parties involved such as users, designers, clients, contractors, suppliers, regulators and others and also because of the intricacy of the construction process itself. The industry has a quick response and cyclical nature to the changes in the economy (Olomolaiye et al., 1998). The problems encountered in the construction sector in Oman have been caused mainly by the low degree of client participation during the most severe project activities. A low level of client participation in the construction activities of the projects has been recognized as the main reason for several operational problems. Clients are the central and energetic force in construction projects. However, the right outcomes during the construction project phases heavily influenced the successful execution of a construction project (Parliament, 2007). The success in construction projects is attributed to the skills and knowledge of the client (Chigangacha, 2016). Clients have a primary role in construction projects that have a significant impact on the project results, and these roles differ from one stage to another in the construction phases, and the systems followed for the procurement (Alharthi et al., 2014). Courtney et al. (2008) indicated that the client's perception of their role in the project influences their decision making efficiency in the early stages of the project. Moreover, clients need to fully understand the required quality requirements to achieve customer satisfaction (Ramabodu, 2014). The client, as the owner of the project, must ensure that the project is implemented in a way that minimizes all risks (Construction Design and Management (CDM), 2015). Construction clients must understand their roles to ensure prompt delivery of projects (Aiyetan et al., 2014). A study conducted by Bubshait et al. (1992) found that when clients were managing a project carefully and frequently, they were pleased mostly with the outcomes. All client actions and decisions at various stages of the project will impact either positively or negatively on the project (Jawahar-Nesan et al., 1997). Aiyetan et al. (2010) concurred with the viewpoint that the client's actions have a considerable influence on a contract as they affect the outcome of the project. The clients should implement their roles effectively at the correct time. Moreover, the clients should utilize the right methods to have their optimum participation across entirely the construction project stages (Al Solaiman, 2014). Given that clients enjoy a high level of influence on the project results, it is necessary to focus on their participation significantly, as this has an essential role in increasing the overall quality of the project (American Society of Civil Engineers (ASCE), 2012). Clients should have acceptable skills and knowledge of the construction process for them to be efficiently and effectively involved in their projects. As construction projects are faced with numerous complex situations affecting project success Sweis et al. (2008), active client participation has been known as one of the solutions to improving construction sector performance (Boyd et al., 2006).

Studying the factors that affect the involvement of the clients in the construction project will lead to come up with guidance to enhance the participation of the clients and to increase their performance in construction projects, which will minimize the construction problems. Therefore, the aim of the current research deeply explores the current client practice of participation through the construction public project phases in Sultanate of Oman to recognize the current status of client participation in construction projects as a part of further research to develop a decision-making framework for guiding client's engagement towards project performance in Oman. However, understanding the current client participation status in construction projects in Oman will figure out which construction phase needs more attention from the client to reach desired optimum construction outcomes.

2. Methodology

This study adopted quantitative mode research where the data was collected through questionnaire survey. The questionnaire was designed with three sections which are section A and B. Section A is the demographic information of the respondents, section B is list of factors affecting the client's performance in four phases of the construction. Respondents are required to rate each of the factor using Likert scale of the degree of the involvement in the project. The targeted population is the people in the government agencies that handled construction public projects in Sultanate of Oman. While the sampling frame is the clients representing Omani government in public projects. The sample technique used was purposive samples technic. A total of 350 questionnaires were distributed to the selected respondents who are either construction managers, engineers or technicians with experience in the construction projects. However only 221 responses are valid which means a 63% response rate. The collected data was initially analysed for reliability test using Cronbach alpha value. Then the data was analysed for mean score and standard deviation value for each factors which are used to determine the ranking of the factors in each phase of the construction.

3. Current Client Involvement Analysis

The data collected through the questionnaire was analysed to recognize the current client practice participation in public construction projects in Oman. Before the data was further analysed, the reliability test of the data was conducted using Cronbach's value. The results of the reliability test are as in table 1. For the value of Cronbach alpha 0.7, it is considered acceptable but 0.8 and above is more preferred (Pallant et al., 2010).

Table 1 - Reliability test using Cronbach's Alpha value

Construction Project Phase	No. of Items	Cronbach's Alpha	Reliability
Planning Phase	11	0.823	Very Good
Design Phase	10	0.815	Very Good
Construction Phase	11	0.909	High
Handover Phase	3	0.825	Very Good
O&M Phase	4	0.829	Very Good
All Construction Phases	39	0.949	High

A total of 221 valid responses from the sample were processed and the demography of the respondents are as in table 2 and 3.

Table 2 - Respondent age and qualification

Age	Frequency	Percentage	Qualification	Frequency	Percentage
21-30	60	27.1	Doctor	8	3.6
31-40	82	37.1	Master Degree	44	19.9
41-50	50	22.6	Bachelor's	124	56.1
51-60	24	10.9	Higher Diploma	41	18.6
Above 60	5	2.3	Other	4	1.8
Total	**221**	**100.0**	**Total**	**221**	100.0

Table 2 shows the descriptive analysis of the age of the respondents that (37.1%) of the respondents are ranging between 31 years and 40 years and which is the majority group in number. It also shows the descriptive analysis of the education level of the respondents showed that 98.2% of the respondents having University degrees or held post-graduate degrees. This shows there is an indication of a high education level among the respondents.

Based on the analysis of the demographics in the current study, the descriptive analysis of the age of the respondents, as illustrated in Table 3, showed that (37.1%) of the respondents are ranging between 31 years and 40 years and which is the majority group in number. As shown in Table 4 respondents work in the government agency (public agencies) are 93.7 %, while 6.3% of the respondents work in semi-public. However, this indicated the sample of the public agencies was represented more in the current study. The descriptive analysis of the education level of the respondents showed that 98.2% of the respondents having University degrees or held post-graduate degrees, as illustrated in Table 5. This shows there is an indication of a high education level among the respondents.

Table 3 - Courses attended and experiences

No. of courses attended	Frequency	Percentage	Experience (year)	Frequency	Percentage
Nil	36	16.3	Less than 5	66	29.9
1-5	112	50.7	6-10	55	24.9
6-10	33	14.9	11-15	21	9.5
More than 10	40	18.1	16-20	37	16.7
Total	221	100.0	Above 20	42	19.0
			Total	221	100.0

Table 3 indicated that 50.7% of the respondents attended in the last five years less than five workshops while in term of experiences more than 70% of total respondents within range of 6 years and above of working experience this insight that the majority of the respondents are capable of giving more reliable answers about their organization.

3.1 Planning Phase

The planning phase in the current study was represented through 11 items. The average level of client participation in the planning phase was (3.19), which considered neutral. As presented in Table 4 the most of the items were at a neutral level of client involvement. It is observed from the Table that three items namely "Determining materials and specifications", "Analysing end user requirements", "Writing contract documents" have high client involvement. On the other hand, securing the funds, and having a standard for selection of the project location, take the lowest ranking through all the planning phase. According to the qualitative results, all of the participants in the semi-structured interviews nearly reported that there is very less involvement of the clients in the planning phase in construction projects in Oman. Qualitative data clarifies the average rating on client involvement in the planning phase, as suggested by quantitative data.

Table 4 - ranking of factors in planning phase

Planning Phase Tasks	Mean	Std. Deviation	Rank
P2-A-8 -Determining materials and specifications	3.65	1.22	1
P2-A-3 -Analysing end user requirements	3.53	1.22	2
P2-A-4 -Writing contract documents	3.46	1.29	3
P2-A-5 -Estimating the Cost	3.31	1.36	4
P2-A-1 - In-house preliminary study	3.18	1.24	5
P2-A-6 -Seeking cost approval	3.15	1.44	6
P2-A-2 -Appointing consultant to carry the design	3.08	1.30	7
P2-A-10 -Spread the responsibilities	3.05	1.33	8
P2-A-11 -Conducting the feasibility study	2.93	1.31	9
P2-A-9 -Selecting location standard	2.92	1.44	10
P2-A-7 -Securing the funds	2.85	1.45	11

3.2 Design Phase

The design phase in the current study was represented through 10 items. The average level of client participation in the design phase was (3.37), which considered neutral. As presented in Table 5 most of the items were at a high level of client participation. It is observed from the Table that three items namely "Studying consultant qualification", "Negotiating the consultant", and "Selecting the design team" have less client care as they have a low ranking. The participants were unanimous in reporting that there is very less involvement of the clients in the design phase in construction projects in Oman and this clarified the average rating on client involvement in the design phase as suggested by quantitative data.

Table 5 - ranking of factor in design phase

Design Phase Tasks	Mean	Std. Deviation	Rank
P2-B-1 - Preparing the contract documents	3.83	1.16	1
P2-B-8 - Reviewing the drawings	3.71	1.23	2
P2-B-9 - Updating the specification	3.52	1.26	3
P2-B-5 - Providing design information	3.51	1.27	4
P2-B-10-Clarifying the standards	3.45	1.29	5
P2-B-6 - Design maintained and updated	3.43	1.24	6
P2-B-7 - Evaluating the basic design	3.25	1.35	7
P2-B-2 - Studying consultant qualification	3.24	1.28	8
P2-B-3 - Negotiating the consultant	2.91	1.40	9
P2-B-4 - Selecting the design team	2.87	1.42	10

3.3 Construction Phase

The construction phase in the current study was represented through 11 items. The average level of client participation in the construction phase was (3.35), which considered neutral. As presented in Table 6 most of the items were at a high level of client participation. It is observed from the Table that three items namely "Conducting tests at various stages", "Negotiating the contractor", and "Writing guidelines for quality control" have less client care as there have a low ranking. According to the qualitative results, the majority of the participants in the semi-structured interviews were reported that there is very less involvement of the clients in the construction phase in construction projects in Oman and that is matching the results found by the quantitative data.

Table 6 - ranking of factors in construction phase

Construction Phase Tasks	Mean	Std. Deviation	Rank
P2-C-11 -Visiting the site regularly	3.70	1.21	1
P2-C-6 - Evaluating the variation	3.62	1.29	2
P2-C-7 - Controlling the quality	3.54	1.36	3
P2-C-4 - Clarifying contract documents	3.50	1.23	4
P2-C-5 - Reviewing contractor documents	3.48	1.35	5
P2-C-1 - Evaluating the contractors	3.33	1.37	6
P2-C-2 - Explaining the project for bidding	3.32	1.29	7
P2-C-8 - Ensuring the health and safety	3.13	1.38	8
P2-C-10- Conducting tests at various stages	3.12	1.44	9
P2-C-3 - Negotiating the contractor	3.11	1.34	10
P2-C-9 - Writing guidelines for quality control	3.00	1.40	11

3.4 Handover Phase

The handover phase in the current study was represented through 3 items. The average level of client participation in the handover phase was (3.46), which considered high. It is observed from Table 7 that the variable "As-built reviewing and others documents" has high client involvement, while the other two variables namely "Adopting criteria to accept completed projects", and "Monitoring testing and commissioning", considered as neutral client involvement. Nearly all participants reported that there is very less involvement of the client in the handover phase in the semi-structured interviews. Qualitative data help to clarify and bring to life the average rating on client involvement in the handover phase, as suggested by quantitative data.

Table 7 - ranking of factors in handover phase

Handover Phase Variables	Mean	Std. Deviation	Rank
P2-D-2 –As-built reviewing and others documents	3.68	1.32	1
P2-D-1 - Adopting criteria to accept completed projects	3.38	1.26	2
P2-D-3 -Monitoring testing and commissioning	3.33	1.45	3

3.5 Operation and Maintenance Phase

The operation and maintenance phase in the current study was represented through 4 items. The average level of client participation in the operation and maintenance phase was (3.00), which considered neutral. It is observed from Table 8 that the variable "Recording references and Warranties" has high client involvement among the other variables, while the variable "Listing maintenance schedules and plan," ranking the lowest client participation in operation and maintenance phase. The participants in the semi-structured interviews were unanimous in reporting that there is very less involvement of the clients in the operation and maintenance phase in construction projects in Oman and this clarified the average rating on client involvement in the operation and maintenance phase as suggested by quantitative data.

Table 8 - ranking of factors in operation and maintenance phase

Operation and Maintenance Variables	Mean	Std. Deviation	Rank
P2-E-3 - Recording references and warranties	3.17	1.39	1
P2-E-4 - Spare parts list	3.03	1.43	2
P2-E-2 - Clarify information of system operation	2.94	1.38	3
P2-E-1 - Listing maintenance schedules and plan	2.87	1.38	4

4. Discussion

As indicated in the current study, the process of the construction project consists of five phases and 39 variables that measure most construction project cycle activities. The average level of client participation in the planning phase was (3.19), which considered neutral. It is observed from the table that three items namely "Determining materials and specifications", "Analysing end user requirements", "Writing contract documents" have high client involvement. This result indicated that the clients are emphasizing those three items more but they should give the same care to the rest of the items. "Securing the funds", and having a standard for selection of the project location", have the lowest ranking through all the planning phase. The clients should be realized that more care should be given to securing the fund's item. The restrictions which executed via the Ministry of Finance regarding the approval of project funds are behind the reduction of the client's ability to invest in construction projects due to budget limitations. Therefore, budgetary and the system of financial management in Oman needs to change and reform. On the other hand, the selection of the right location is very critical to any project and clients should put this issue into future consideration.

The design phase is an important phase in construction projects. Whelton et al. (2003) mentioned that eighty present of any project can be identified at this phase. The average level of client participation in the design phase was (3.37), which considered neutral. It is observed from the result that three items namely "Studying consultant qualification", "Negotiating the consultant", and "Selecting the design team" have less client care as they have a low ranking. This result indicated that the clients are not giving that much attention to the qualification of consultant, and this might lead latter on to face many construction problems due to un-capability of the consultant to carry on the job in the right direction. At the same time, negotiating the consultant is important as many consultants start with high fees more than they should be. Also, the selection of the design team is very critical and more attention should be given to this task. For clients to be able to go through the design documents and review the design drawings and to give positive feedback, they should have design skills and advanced knowledge, so educating the client or the client representatives is an essential requirement.

The average level of client participation in the construction phase was (3.35), which considered neutral. It is observed from the result that three items namely "Conducting Tests at various stages", "Negotiating the contractor", and "Writing guidelines for quality control" have less client care as they have a low ranking. This result indicated that the clients are not paying that much attention to conduct tests at various stages, even is important stage to control the quality, at the same time the clients not caring as they should be with the negotiating of the contractor as that might end up with increasing the cost of the project more than it should be. Moreover, the clients are given less care to the quality control for the project which might end up with unsatisfied project outcomes.

At the end of any construction project, the contractor will hand over the project to the client, which consider as an essential step of the project facility operation success and procurement. Thus, the average level of client participation in the handover phase was (3.46), which considered high. It is observed from the result that the variable "As-built reviewing and others documents" has high client involvement, while the other two variables namely "Adopting criteria to accept completed projects", and "Monitoring testing and commissioning", considered as neutral client involvement. This result indicated that the clients are giving much attention to the handover phase more than most of the phases. If commissioning is not managed in an organized manner during the handing over it will heavily impact the use of the project. During the operation and maintenance phase, the satisfaction of the project is measured. The average level of client participation in the operation and maintenance phase was (3.00), which considered neutral. It is observed from the result that the variable "Recording references and Warranties" has high client involvement among the other variables, while the variable "Listing maintenance schedules and plan", ranking the lowest client involvement in operation and maintenance phase. The result showed that the level of client involvement in the operation and maintenance phase was found to be the weakest amongst all construction project phases. Careful consideration should be given to the operation and maintenance phase during the early construction stages. The client should allocate a particular operation and maintenance representative to guide the project team during the construction stage to complete the products correctly to achieve the project's needs of operation and maintenance.

5. Conclusion

The findings from the study showed that the ongoing client participation in construction projects in Oman is at the level of neutral participation. However, this level of participation as clients in planning and the design phases leads in the early stage of the project to weak decision-making, which may result on conflict to the project in the later stages. The study also found that the handover phase had the highest client's participation, while the operations and maintenance phase had the lowest client's participation among all the five construction phases. The low client participation in any project has an undesirable influence on the projects' overall outcomes. Consequently, this condition has harmed the time of completion of construction projects in the Sultanate of Oman. This condition is also the main reason for the quality problems in construction projects in Oman.

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