Exploring Criteria and Critical Factors for Governmental Projects Implementation in Yemen: A Case Study

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ABSTRACT
Success is the ultimate goal to be achieved in any project; consequently, studies concerning project success are essential. The purpose of this study is to evaluate significant success criteria and identify critical success factors to ensure project success. Furthermore, this research aids in changing the method of project implementation in Yemen to help conserve time, money, and natural resources. To explore the process and project implementation in Yemen; to evaluate the criteria for time, cost, and quality determination; and to identify the success and failure factors of project, are the three goals of this study. Case study method and structured questionnaire survey method are applied in this research. Fieldwork involves the investigation of the stages of a project in Yemen: from the design stage, the tender stage, and to the construction stage. Thematic narrative analysis is conducted to analyze the case studies. Data are examined with the statistical package for social sciences (SPSS). Three success criteria have been recognized, twenty success factors have been ranked and documented, while thirty-one failure factors have been identified. Fieldwork in Yemen revealed that professionals involved in project implementation can develop the construction industry if subjected to strict regulations.

Keywords: Project management, success criteria, success and failure factors, Yemen

INTRODUCTION

The construction industry is one of the most important components of any developing country; it has a major contribution to the country's national economy (Sultan, 2005). Yemeni professionals must change their method of managing architectural projects to help conserve time, money, and natural resources. Most Yemeni construction projects in the past were executed with inappropriate and costly construction and design practices resulting in low-quality buildings. These practices cause further escalation in construction and housing costs to prices beyond the affordability of the majority of the population in Yemen (Sultan, 2008b). This research highlights the implementation of architectural projects in Yemen and the failure and success factors. The analysis encompasses the design and tender stage as well as the construction stage.

Following this introduction comes the literature review, which clarifies the project management concept, then the research's objectives come afterwards. The next section discusses the method of

this research; subsequently, analysis of the case study as well as the questionnaire are elucidated. Later, discussion is presented, finally, the last section concludes the study.

LITERATURE REVIEW

Project Management Criteria

According to Eriksson and Westerberg (2011), the construction industry has been criticized for its inefficiency in terms of outcome, such as time and cost overruns, low productivity, poor quality, and low customer satisfaction (Chan et al., 2003; Egan, 1998; Yasamis et al., 2002). Lock (2007) reported that the objectives of any project can be grouped under three headings: performance and quality, budget, and time of completion, clearly considered quality, cost, and time as the main constraints in completing a project.

Sorting these three constraints based on priority requires consideration. The concept of perfect order or the best arrangement of constraints does not exist in project management. Dobson and Feickert (2007) concurred with this claim by posing this simple question: "What's worst? Miss a deadline, go over budget, or fail to deliver every iota of the expected performance?" No one can answer this question in an exact manner because in practice, success depends on the situation of the project. Thus, they considered project management constraints "the triple constraints" as shown in Figure 1.

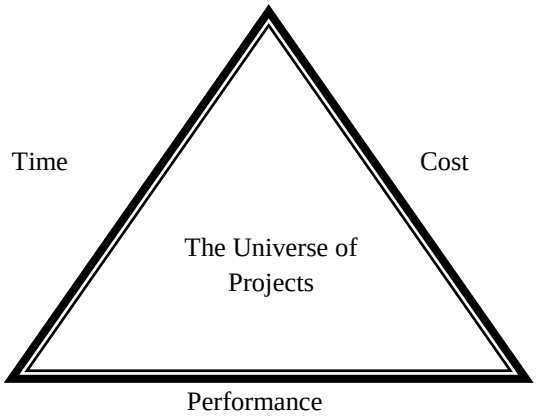

Figure 1: Three fundamental constraints, namely, time, cost, and performance that set the borders of a project universe

(Source: Dobson & Feickert, 2007)

Project Management Critical Factors

Researchers have attempted to identify the reasons for project success or failure regardless of the success criteria. One of the most common approaches is to search for critical success factors (Belassi & Tukel, 1996; Morris & Hough, 1987; Munns & Bjeirmi, 1996; Pinto & Slevin, 1988; Sauser et al., 2009). The assumption in these studies is that projects succeed or fail for similar reasons. These studies produced a list of typical factors, including project mission, project manager, planning, communication, politics, control, top management support, technical tasks, and so on.

A competent project manager is vital to project success. Several studies have highlighted the importance and critical skills of a project manager (Avots, 1969; Belassi & Tukel, 1996; Crawford, 2000; Sayles & Chandler, 1971). Ahadzie (2007) also confirmed the industry's growing awareness of the relationship between project success and construction project management competency. Successful construction organizations now focus on ensuring that project managers acquire the core

competencies required to be successful in their assignments. According to Frank (2002), the project manager has direct influence over 34% to 47% of project success. These previous studies clearly indicate that project managers play an important role in determining the success of a project (Hwang & Ng, 2013).

Maimun (2010) conducted an intensive literature review on project success factors and came up with 33 project success factors. The research yielded 18 significant project success factors as follows: team and leadership, project manager, communication, stakeholder management, monitoring and control, planning, scheduling, quality management, risk management, contracting, contractor, innovation, technical, organizational structure, financial resources, policy and strategy, learning organization, and external environment.

Project Management in Yemen

Yemen has established a unique building tradition. The rich, characteristic, and uniform style of traditional Yemeni architecture and townscape is greatly admired. This tradition was successfully maintained until thirty years ago (Sultan & Kajewski, 2003). Subsequently, the construction blast and rapid urbanization have resulted in shortage of skilled labor and construction materials. Inadequacies in building materials, building design and project management abilities aggravated the problem. The lack of any approved national system of codes or standards also worsened the construction industry's problems (UNIDO/World Bank, 1981).

According to Sultan (2005), the construction industry is largely responsible for the physical provision of housing and infrastructure and is considered the backbone of prosperous economies, providing social development and employment. What aggravated the industry's problems is poor and inadequate architectural and structural designs that are not in accord with local needs or priorities and do not adapt to local conditions and resources. Inexpensive modern buildings are typically achieved by lowering quality (Sultan, 2008a). Construction projects are executed with inappropriate and costly construction and design practices, resulting in low-quality housing and causing further escalation in construction and housing costs to prices beyond the affordability of the majority of the population in Yemen (Sultan, 2008b).

OBJECTIVES

The aim of this research is to contribute in changing the method of project implementation in Yemen to help conserve time, money, and natural resources. There are three objectives to be achieved in this study as follow:

1. To explore the process and project implementation in Yemen.
2. To evaluate the criteria for time, cost, and quality determination.
3. To identify the success and failure factors of project.

METHODOLOGY

According to Babbie (2013), Biggam (2008), and Creswell (2013), a researcher must determine the type of research and how it will be conducted before initiating. Case study method and structured questionnaire survey method are applied in the present research. The case study method is selected to address the first objective, which is to explore the process of projects and their implementation in Yemen. Structured questionnaire survey method is selected to address the second and third objectives, which are to evaluate the criteria for determining time, cost, and quality and to identify success and failure factors, respectively.

The main objective of developing a conceptual framework is to have a basis and guide for the research (Sekaran, 2000). A conceptual model is developed based on the literature review. Most project management experts agree that successful project management must involve quality, cost, and time control (Dobson & Feickert, 2007; Levy, 2007; Lock, 2007; PMI, 2008). Management of architectural projects in Yemen is insufficient as indicated in the literature review. By evaluating project success criteria and implementing project success factors, the project would be managed in a way to ensure project success. Figure 2 presents the conceptual framework of this study.

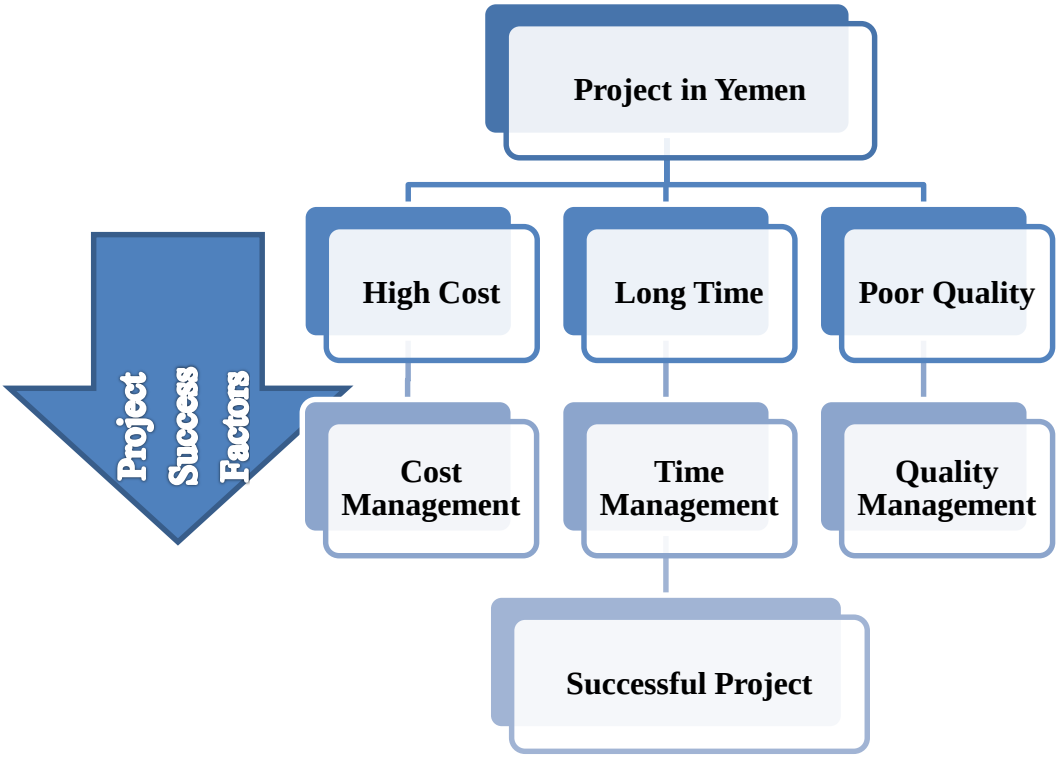

Figure 2: Conceptual framework

An office governmental project in Yemen is selected as a case study due to governmental projects:

- Cause the government enormous amounts of money.
- Are difficult to control because of their size and function as well as the number of participants in the project.
- Do not belong to any specific person or group; they are public properties.

The questionnaire is answered by the designers, contractors, and officials in the case study. All aspects of the case study are considered, including success criteria, success factors, and failure factors. The data is analyzed with SPSS.

The primary reason for utilizing the survey approach rather than relying on secondary data alone is that questionnaires can be customized to fit the research objectives (Tricker, 2001). Project success criteria and project success factors are determined from the literature review, adopted in the project stage, and then analyzed based on the case study. Peterson (2000) believes that the questionnaire is the "heart and soul" of a research; it must be constructed effectively to ensure that the respondents understand the questions. Answers are then encoded to obtain relevant information (Maimun, 2010).

According to Bryman (2004), narrative analysis is an approach for the elicitation and analysis of data that is sensitive to the sense of temporal sequence that people, as tellers of stories about their lives or events around them, detect in their lives and surrounding episodes and inject into their accounts. Thematic narrative analysis is selected in this study to analyze the case studies; emphasis is placed on *what* is said rather than on *how* it is said.

The questionnaire is analyzed with SPSS. Babbie (2013) stated that analysis of data would generate acceptable conclusive results through statistical means. Creswell (2013) pointed that statistical means construct a detailed description of a phenomenon to provide recommendations for the problems identified. Data analysis in survey design is mainly performed through descriptive statistics and statistical testing (Edwards & Talbot, 1999). Consequently, the percentage, frequency distribution, average, and mean provided by descriptive statistics are calculated to analyze the data and to provide recommendations for the problems identified.

Helms et al. (2006) indicated that data consistency is measured by the value of the alpha coefficient obtained. The higher the value of the coefficients obtained, the more consistent data sets are. A mark below 0.70 is considered lacking in internal consistency. Cronbach's alpha coefficient test is adopted in this study to determine the consistency of the questionnaire's variables.

ANALYSIS

CASE STUDY

The Ministry of Youth and Sports building in Sana'a, Yemen has a total building area of 16,000 m². Conventional contract was applied in this project. After appointing a consultant, the selected contractor began the tender process and construction. A description of the project implementation is obtained from secondary data such as designs and working drawings, specifications, tender documents, and construction reports. Primary data are also obtained from interviews with designers, contractors and officials of the projects.

Managing the Design Stage

According to the interviews conducted with the stockholders, a feasibility study was conducted in 1995 in the pre-design stage as a part of a ministerial plan because the ministry building was on lease until 2012. A new minister was elected in 2001. The implementation of the project began by selecting a consultant. The consultant analyzed the project and all its requirements and visited the site. The consultant verified the city requirements to begin the preliminary design stage. This stage lasted two months without a contract or fees.

The consultant prepared the proposal in the preliminary design stage. Several presentations and discussions were held with the minister and other officials of the ministry. Afterward, the consultant prepared the design concepts. Several presentations and discussions were held again. This stage lasted 21 months without a contract or fees. The consultant signed the contract after all the preliminaries. The contract value was USD 100,000. Deferred payments were made until the final submission of the working drawings and specification documents (period of one month). The final design stage began after the signing of the contract. The consultant developed the design with the owners, obtained their approval, and then submitted the final design to the owners.

The working drawings stage is linked to the previous stage. The consultant hired other consultants of different specialties in this stage. Architectural, structural, electrical and mechanical working drawings were prepared. The working drawings were delivered on time as stated in the contract. The last stage of designing is the specification stage, which is connected to the working drawings stage. Architectural, structural, electrical, and mechanical specification documents were prepared and

delivered on time with the working drawings. The consultant was paid within a month after the submission.

Managing the Tender Stage

The consultant prepared the tender documents and the detailed cost estimate, which was 539,000,000 YR or 3,097,700 USD, in the pre-tender stage. The invitation for tender stage took place with the publication of the tender in the official newspaper. A-grade contractors joined the tender with a fee of 50,000 YR (280 USD) to buy the tender documents.

The opening of the tender stage began a month later with commission meetings with the minister and chief officials of the ministry, the consultant, and the contractors. The criteria for selecting the best contractor bid depended on the lowest-priced bid, experience and previous projects of the contractor, and construction assurances and warranties. The contract was offered to the contractor who met all the criteria. The value of the contract was 540,000,000 YR (3,100,000 USD). Construction period was 24 months as stated in the contract. The tender stage was managed by the owner (Ministry of Youth and Sports administration). This stage lasted nine months.

Managing the Construction Stage

The construction stage began with the preparation of the site. However, the owner (Ministry of Youth and Sports administration) changed the location of the project for several reasons. This action delayed the contractor for four months and required new soil testing procedures for the new site. Eight months passed before the new results were obtained. The new results needed new designs for the foundation and the structure in general. The new designs, working drawings, and specification documents for the structure were prepared by the project consultant in five months. The contractor cleared the obstructions, leveled the ground, strengthened the soil, and applied a regular concrete layer while waiting for the new project foundation designs.

The contractor demanded different rates for construction because the price of concrete materials increased. The price increase was due to the decrease of the value of the Yemeni rial compared with the US dollar. The initial strengthening of the soil and regular concrete layer applied by the contractor were abolished because they were not suitable for the new design. The contractor strengthened the soil again, applied another regular concrete layer, and demanded indemnity. This process lasted five months.

Construction continued for three months, and then the contractor terminated the construction work because he received no response to his demands. The Ministry of Works interfered, and a committee was formed to resolve the conflict. The committee studied the project situation, and discussions were conducted with the minister and chief staff of the ministry for 15 months. After the discussions, the committee decided to grant the contractor indemnity. Afterward, the Council of Ministers opted to adopt the recommendation of the Supreme Committee for State Tenders and Procurement and signed a new contract with the same contractor to complete the project. The new contract valued 1,238,000,000 YR (5,500,000 USD) was signed after eight months. Construction was set for 24 months in the contract.

Super structure stage began with the contractor establishing the building columns, beams, ceilings, and walls. The finishing stage followed with the installation of doors, windows, and electrical, plumbing, and mechanical equipment as well as conducting finishing work for walls, floors, and ceilings. Cleaning inside the building and its surrounding site, paving sidewalks, and preparing the garden were the final tasks of the contractor. These stages lasted 30 months. The auditorium was built in another 20 months. The defects liability period was 12 months after the completion of the project.

The main reason for cost overrun in this project was the increase in the price of materials owing to the decrease of the value of the Yemeni rial against the US dollar. Other reasons, such as the changes made by the stockholder and the additional work, contributed to cost overrun. The main reasons the project exceeded the set period were changing the location of the project and the additional work required by the stockholder. The delays in payments after each claim by the contractor also contributed to the extension of the project period. The project was supervised not by the consultant but by individuals from the Ministry of Youth and Sports paid by the contractor himself. According to the supervisors (individuals from the Ministry of Youth and Sports), the quality of this project reached 80% of the required specifications.

The project was implemented in 11 years as shown in Table 1 and 2. The findings of the case study analysis shown in Table 3 are remarkably significant, confirming the importance of this research.

Table 1: Duration of the case study project (detailed)

Project stage	Detailed stages	Case Study
Design stage	Pre-design	2 months
	Preliminary design	21 months
	Final design	
	Working drawings	1 month
	Specification	
Tender stage	Pre-tender	1 month
	Invitation for tender	
	Opening tenders	9 months
	Signing the contract	
Construction stage	Preparing and changing the site	17 months
	Sub structure	8 months
	Super structure	73 months
	Finishing	
	Cleaning site & landscaping	
Defects liability period		12 months
Total period		132 months

Table 2: Time and cost of the case study project

Project stage	Case Study	
	Time	Cost
Design stage	24 months	100,000 USD
Tender stage	10 months	280 USD (Tender documents)
Construction stage	98 months	5,500,000 USD
Total	132 months	5,600,000 USD

Table 3: Summary of the case study project

Description	Case Study
Project name	Ministry of Youth & Sports Building
Stockholder (owner)	Ministry of Youth & Sports
Location	Sana'a
Type of project	Governmental project
Components	Office building & auditorium
Total building area	16,000 m²
Implementing organization	The Stockholder
Type of contract	Conventional contract
Cost of design	100,000 USD
Grade of consultant and contractor	A
Cost of tender documents	280 USD
Cost of construction at tender	3,100,000 USD
Final cost of construction	5,500,000 USD
Time for design	24 months
Time for tender	10 months
Time for construction at tender	24 months
Quality of construction	80% as specified
Final time for construction	98 months
Supervising authority	The Stockholder
Supervising expenses paid by	The contractor
Defects liability period	12 months

STRUCTURED QUESTIONNAIRE

Respondents' Background

The demographic characteristics of the respondents in Yemen are summarized in Table 4. The respondents are categorized by age, highest educational attainment, years of experience, qualification, organization type, and position in organization. Twenty respondents (33.3%) are less than 30 years old. Fifty respondents (83.3%) have a bachelor's degree. Fifteen respondents (25.0%) have experience of less than five years. Twenty-eight respondents (46.7%) are architects. Twenty-seven respondents (45.0%) work in a government agency (Ministry of Works). Fifteen respondents (25.0%) are project managers.

Table 4: Respondents categorization

Demographic	Characteristics	Yemen	
		Frequency	Percentage
Age	Less than 30 years	20	33.3 %
	Between 30 – 39	15	25.0 %
	Between 40 – 49	13	21.7 %
	Between 50 – 59	12	20.0 %
	More than 60 years	0	0.0 %

Highest education	High School	2	3.3 %
	Diploma (2 years)	0	0.0 %
	Bachelor's Degree	50	83.3 %
	Master's Degree	5	8.3 %
	PhD	3	5.0 %
	Others	0	0.0 %
Years of experience	Less than 5 years	15	25.0 %
	Between 5 – 10	14	23.3 %
	Between 11 – 15	10	16.7 %
	Between 16 – 20	7	11.7 %
	Between 21 – 25	5	8.3 %
	More than 25 years	9	15.0 %
Qualification	Architecture	28	46.7 %
	Civil Engineering	24	40.0 %
	Quantity Survey	2	3.3 %
	Management	4	6.7 %
	Semi-professional	1	1.7 %
	Others	1	1.7 %
Organization type	Government Agency	27	45.0 %
	Consulting Firm	12	20.0 %
	PM Consultant	6	10.0 %
	Contracting Firm	15	25.0 %
	Professional Crafts	0	0.0 %
	Others	0	0.0 %
Position in organization	Chairman or Director	11	18.3 %
	Project Manager	15	25.0 %
	Project Consultant	15	25.0 %
	Site Engineer/Arch	13	21.7 %
	Site Resident	3	5.0 %
	Others	3	5.0 %

Internal Consistency of the Scale

The scale utilized in this research is based on the order of importance of the variables, which are project success criteria and project success factors. The least important item is given the value of 1 and the most important item the value of 5. Consequently, a high value implies importance and a low value non-importance as perceived by the respondents. The Cronbach's alpha coefficients of reliability are calculated for the items in the questionnaire as shown in Table 5. The cut-off point of 0.70 is considered the benchmark.

Table 5: Reliability coefficients

Variable	Number of items	Cronbach's alpha
Project success criteria	4	0.8952
Project cost	15	0.8535
Project time	15	0.8956
Project quality	15	0.9381
Project success factors	21	0.9616

As shown in Table 5, all the items have alpha coefficients greater than 0.70. Therefore, the data sets are consistent and reflect the reliability and validity of the comparisons and assessments made.

Project Success Criteria

The three project success criteria, namely, cost, time, and quality, are considered. The respondents are asked to rank the importance of the three success criteria, and the means of these values are then computed. The result, which is shown in Table 6, reveals the order of importance of the success criteria. Quality comes first, then time, and last is cost. The mean scores are also shown in the same table.

Table 6: Importance of the success criteria

Rank	Criteria	Mean score
1	Quality	4.2833
2	Time	3.6833
3	Cost	3.5500

Table 7 shows the detailed evaluation and mean scores of the descriptions of each success criterion. The mean scores of each description of success criteria are computed. With regard to the quality criterion, the most important description for the project is *completed according to the required specification, drawings, etc.* followed by *good workmanship and minimum defects* then *minimum scope change.* In terms of time, *completed on or before the date of completion* is the most important description for the project followed by *delays rectified* then *minimum extension of time*. In terms of cost, the project have the ranking of *completed as budgeted* ranking first, *minimum variations* ranking second, and *minimum delay fines* ranking third.

Table 7: Mean scores of each description of success criteria

Rank	Criteria / Description	Ranking	Mean score
1	Quality		
	Complete as the required specification, drawings etc.	1	4.0833
	Good workmanship and minimum defects.	2	3.9833
	Minimum scope change.	3	3.4833
2	Time		
	Complete on or before date of completion.	1	3.7167
	Delays rectified.	2	3.6000
	Minimum extension of time.	3	3.3833
3	Cost		
	Complete as budgeted.	1	3.5500
	Minimum variations.	2	3.4333
	Minimum delay fines.	3	3.2667

An additional set of questions is included in the questionnaire to determine the importance of the reasons affecting the success criteria. Table 8 indicates the mean scores of the reasons affecting the success criteria.

Table 8: Mean scores of reasons affecting the success criteria

Rank	Criteria / Reasons affecting	Ranking	Mean score
1	Quality		
	Stakeholders' requirements.	5	3.4667
	Choosing the right consultant & construction company.	1	4.0167
	Specifications of the project.	4	3.6500
	Quality of materials.	3	3.7500
	Labor skills.	2	3.9000
	Cost overruns in the project.	6	3.3500
	Exceeding the period of the project.	7	3.2833
2	Time		
	Time for preparing designs and drawings.	6	2.8667
	Time for the project's tender.	6	2.8667
	Time for construction.	5	3.4833
	Time for finishing works.	3	3.5667
	Labor working hours.	4	3.5333
	Cost overruns in the project.	2	3.6000
	Level of quality required for the project.	1	3.7000
3	Cost		
	Cost of designs and drawings.	7	2.6167
	Cost of materials.	1	3.6167
	Cost of construction and structure elements.	5	3.3333
	Cost of finishing works.	4	3.4167
	Cost of labor.	6	3.1833
	Exceeding the period of the project.	3	3.4667
	Level of quality required for the project.	2	3.5833

Given that project success is essential in this research, another set of questions is included in the questionnaire to determine the importance of the success factors for each success criterion. Table 9 shows the mean scores of the success factors for each success criterion.

Table 9: Mean scores of success factors for each success criterion

Rank	Criteria / Factors	Ranking	Mean score
1	Quality		
	Human Management.	1	3.9500
	Management Process.	2	3.9000
	Organization.	3	3.8167
	Contractual and Technical.	4	3.5667
2	Time		
	Human Management.	2	3.7167
	Management Process.	1	4.0000
	Organization.	3	3.6833
	Contractual and Technical.	4	3.5000
3	Cost		
	Human Management.	2	3.7833
	Management Process.	1	3.8667
	Organization.	3	3.5667
	Contractual and Technical.	4	3.4333

Project Success Factors

Aside from the project success criteria, the questionnaire also addresses the project success factors. The respondents are required to rank the importance of the success factors, and the means of these values are then computed. The result, which is shown in Table 10, reveals that *management process* comes first followed by *human management* then *contractual and technical*. The last is *organization.* The mean scores are also shown in the same table.

Table 10: Ranking of the success factors in general

Rank	Success factors groups	Average mean score
1	Management Process	3.9375
2	Human Management	3.8027
3	Contractual and Technical	3.7624
4	Organization	3.5638

Table 11 shows the mean scores of individual factors within the factor groups. The mean scores of each individual factor within the success factor groups are computed. In the *management process* group, the most important factor is *planning* followed by *monitoring and control*, *scheduling,* then *risk management*. In the *human management* group, *team and leadership* is the most important factor followed by *project manager*, *performance, effectiveness, and efficiency*, *attitude, behavior, and commitment*, *stakeholder management*, then *communication*. In the *contractual and technical* group, the most important factor is *consultant and contractor* followed by *technical*, *innovation*, then *contracting and procurement*. In the *organization* group, *resources* is the most important factor followed by *learning organization*, *organization structure, policy and strategy*, *culture*, then *external environment*.

Table 11: Mean scores of individual factors within the factor groups

Rank	Success factors	Ranking	Mean score
1	Management Process		
	Monitoring and control.	2	3.9167
	Planning.	1	4.3000
	Scheduling.	3	3.8667
	Risk management.	4	3.6667
2	Human Management		
	Attitude, behavior and commitment.	4	3.7000
	Communication.	6	3.5833
	Performance, effectiveness and efficiency.	3	3.8000
	Project manager.	2	4.0000
	Team and leadership.	1	4.1000
	Stakeholder management.	5	3.6333
3	Contractual and Technical		
	Contracting and procurement.	4	3.7000
	Consultant and contractor.	1	3.8333
	Innovation.	3	3.7333
	Technical.	2	3.7833
4	Organization		
	Organization structure.	3	3.7000
	Resources (Financial resources).	1	4.0500
	Learning organization.	2	3.8500
	Policy and strategy.	4	3.5833
	Culture.	5	3.2500
	External environment.	6	2.9500

Project stage, which is most important for the project success factors, is shown in Table 12.

Table 12: Project success factors according to project stages

Success factors	Project stages
Management Process	
Monitoring and control.	Construction
Planning.	Design
Scheduling.	Construction
Risk management.	Construction
Human Management	
Attitude, behavior and commitment.	Construction
Communication.	Design
Performance, effectiveness and efficiency.	Construction
Project manager.	Construction
Team and leadership.	Construction
Stakeholder management.	Tender
Contractual and Technical	
Contracting and procurement.	Tender
Consultant and contractor.	Construction
Innovation.	Design
Technical.	Construction
Organization	
Organization structure.	Construction
Resources (Financial resources).	Construction
Learning organization.	Design
Policy and strategy.	Tender
Culture.	Tender
External environment.	Construction

Project Failure Factors

Table 13 shows the frequency of project failure factors. The frequencies for each individual factor in the failure factor groups are computed. In the *management process* group, the most important failure factor is *lack of planning* followed by *lack of scheduling (delays)*, *lack of monitoring and control*, *cost overruns*, *insufficient quality*, then *modifications*. In the *human management* group, *inefficiency of the project manager* is the most important failure factor followed by *inefficiency of performance*, *lack of qualified team and leadership*, *lack of communication*, *improper attitude and behavior* and *lack of commitment*, then *stakeholder mismanagement*.

In the *contractual and technical* group, the most important failure factor is *inefficiency of the consultant and contractor* followed by *adverse selection of consultant and contractor*, *lack of quality in building materials and implementation* and *lack of modern technical equipment, mechanisms, etc*, *unstable prices of construction materials*, *lack of clarity in the contract*, and then *lack of innovation*. In the *organization* group, *inadequate resourcing or lack of funding* is the most important failure factors followed by *ignorance of laws and regulations*, *instability because of lower market prices of the Yemeni Rial against foreign currencies* and *delays in paying financial dues*, *lack of specifications and conditions*, *unstable country (crises and wars)* and *corruption of organization*, *inappropriate location of the project*, *emergence of new construction work*, *failure to provide infrastructure* and *security in the workplace*, then *unexpected obstacles* and *obstacles and difficulties*.

Table 13: Project failure factors frequencies based on the survey (open ended question)

Project failure factors (Number of frequency)			
Management Process	Human Management	Contractual and Technical	Organization
Lack of planning (23)	Inefficiency of the project manager (21)	Adverse selection of consultant and contractor (14)	Inadequate resourcing or lack of funding (17)
Lack of monitoring and control (9)	Lack of qualified team and leadership (13)	Inefficiency of consultant and contractor (15)	Lack of specifications and conditions (4)
Lack of scheduling (delays) (18)	Inefficiency of performance (20)	Lack of quality in building materials and implementation (5)	Ignorance of laws and regulations (5)
Cost overruns (6)	Lack of Communication (12)	Lack of clarity in the contract (2)	The emergence of new construction works (1)
Insufficient quality (4)	Improper attitude and behavior, and lack of commitment (9)	Instable prices of construction materials (4)	Instability due to lower market prices of Yemeni Rial against foreign currencies (5)
Modifications (1)	Stakeholder mismanagement (3)	Lack of modern technical (Equipment - mechanisms, etc.) (5)	Unstable country (Crises and wars) (3)
----------	----------	Lack of innovation (1)	Delays paying financial dues (5)
----------	----------	----------	Corruption of organization (3)
----------	----------	----------	Failure to provide infrastructure and security in the workplace (1)
----------	----------	----------	Unexpected obstacles (1)
----------	----------	----------	Inappropriate location of the project (2)
----------	----------	----------	Obstacles and difficulties (1)

DISCUSSION

According to the respondents, fieldwork in Yemen revealed that professionals involved in project implementation can develop the construction industry if subjected to strict regulations. Moreover, the majority of respondents claim that the problem in Yemen is not the lack of regulations but the failure of law enforcement officers to apply these regulations. The solution to this problem depends on the strategy or policies of the country as well as its inherited culture and the ethical standards in its society.

The case study indicated that the cost of design and construction in Yemen is extremely low. A cost overrun occurred in the project, this occurrence indicates that cost management in Yemen is lacking. Furthermore, the project exceeded the set period of implementation. In terms of quality, the project fulfilled only 80% of the specified quality. The implementing organization responsible for controlling

and managing the project stages in Yemen was the owner (Ministry of Youth and Sports administration). The supervising authority (individuals from the Ministry of Youth and Sports) in Yemen was paid by the contractor, leading to dishonesty and corruption as well as cost overrun and project period extension.

Analysis of the project success criteria indicated that the ranking of criteria in Yemen is quality, time and then cost. In terms of quality, *completed according to the required specifications* was most important. In terms of time, *completed on or before the date of completion* was most important. *Completed as budgeted* was most important in terms of cost. The ranking of the reasons affecting the success criteria was as follows. In terms of quality, selecting the right consultant and construction company came first. In terms of time, the level of quality required for the project was most important. Cost of materials was the leading factor in terms of cost. The correlations between the success factors and criteria are as follows. In terms of quality, human management came first. In terms of time, the most important factor group was management process. Management process was the most important factor in cost criteria affirming the importance of the management process in project implementation.

The ranking order for project success factors is management process, human management, contractual and technical, and organization. For management process, planning ranked first; risk management ranked last. For human management, the most important factor was team and leadership; the least important was communication. For technical, consultant and contractor ranked first; contracting and procurement ranked last. For organization, resources (financial resources) ranked first; external environment ranked last. The project implementation stages are significant in this study; therefore, respondents were requested to assign each project success factor to a project stage where the factor is deemed most important. Most success factors were allocated to the construction stage. Project control is exerted in the construction stage (last stage), thus highlighting the disadvantage of the Yemeni approach.

The project failure factors were in the following order; in the management process group, the most important factor was lack of planning followed by lack of scheduling (delays), lack of monitoring and control, cost overruns, insufficient quality, then modifications. In the human management group, inefficiency of the project manager was the most important factor followed by inefficiency of performance, lack of qualified team and leadership, lack of communication, improper attitude and behavior, lack of commitment, then stakeholder mismanagement. In the contractual and technical group, the most important factor was inefficiency of the consultant and contractor followed by adverse selection of consultant and contractor, lack of quality in building materials and implementation and lack of modern technical equipment, mechanisms, etc., unstable prices of construction materials, lack of clarity in the contract, and then lack of innovation. In the organization group, inadequate resource or lack of funding was the most important factor followed by ignorance of laws and regulations, instability due to the lower market value of the Yemeni Rial against foreign currencies and delays in paying financial dues, lack of specifications and conditions, unstable country (crises and wars) and corruption of organization, inappropriate location of the project, then emergence of new construction work, failure to provide infrastructure and security in the workplace, unexpected obstacles, and obstacles and difficulties.

CONCLUSION

This research managed to indicate three success criteria for project implementation. In addition, twenty success factors have been ranked and documented, while thirty-one failure factors have been identified. Fieldwork in Yemen revealed that professionals involved in project implementation can develop the construction industry if subjected to strict regulations. Future studies are needed to conduct further analysis in determining and identifying critical criteria and factors of project

implementation in Yemen. This can be achieved by studying other case studies to verify the outcome of this research.

REFERENCES

Ahadzie, D. K. (2007). *A model for predicting the performance of project managers in mass house building projects in Ghana* (PhD thesis). University of Wolverhampton: Wolverhampton, UK.

Avots, I. (1969). Why does project management fail? *California Management Review, 24*(4), 77–88.

Babbie, E. R. (2013). *The practice of social research* (12th ed.). Cengage Learning.

Belassi, W., & Tukel, O. I. (1996). A new framework for determining critical success/failure factors in projects. *International Journal of Project Management, 14*(3), 141–151.

Biggam, J. (2008). *Succeeding with your master's dissertation.* Berkshire: McGraw-Hill.

Bryman, A. (2004). *Social research methods* (2nd ed.). New York: Oxford University Press.

Chan, A., Chan, D., & Ho, K. (2003). An empirical study of the benefits of construction partnering in Hong Kong. *Construction Management and Economics, 21*(5), 523–533.

Crawford, L. H. (2000). *Project management competence: The value of standards* (Ph.D. thesis). Henley Management College, Brunel University: London, UK.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. (2nd ed.). London: Sage.

Dobson, M., & Feickert, H. (2007). *The six dimensions of project management: Turning constraints into resources.* Vienna: Management Concepts.

Edwards, A. & Talbot, R. (1999). *The hard-pressed researcher: A research handbook for the caring professions.* London and New York: Longman.

Egan, J. (1998). *Rethinking construction.* Report of the Construction Task Force on the Scope for Improving the Quality and Efficiency of UK Construction. London: Department of the Environment, Transport and the Regions.

Eriksson, P. E., & Westerberg, M. (2011). Effects of cooperative procurement procedures on construction project performance: A conceptual framework. *International Journal of Project Management, 29*(2), 197–208.

Frank, T. (2002). *The superior project manager.* New York: Marcel Dekker.

Hwang, B. G., & Ng, W. J. (2013). Project management knowledge and skills for green construction: Overcoming challenges. *International Journal of Project Management, 31*(2), 272–284.

Helms, J. E., Henze, K. T., Sass, T. L., & Mifsud, V. A. (2006). Treating Cronbach's alpha reliability coefficients as data in counseling research. *The Counseling Psychologist, 34*(5), 630-660.

Levy, S. (2007). *Project Management in Construction* (5th ed.). Sidney: McGraw-Hill.

Lock, D. (2007). *Project Management* (9th ed.). Hampshire: Gower Publishing Ltd.

Maimun, W. (2010). *Critical factors in project success: A study of public sector construction projects in Malaysia* (Ph.D. thesis). University of Malaya: Kuala Lumpur, Malaysia.

Morris, P. W. G., & Hough, G. H. (1987). *The anatomy of major projects: A study of the reality of project management.* New York: Wiley Press.

Munns, A. K., & Bjeirmi, B. F. (1996). The role of project management in achieving project success. *International Journal of Project Management, 14*(2), 81–87.

Peterson, R. A. (2000). *Constructing effective questionnaires.* California: Sage publications Inc.

Pinto, J. K., & Slevin, D. P. (1988). Critical success factors across the project life cycle. *Project Management Journal, 19*(3), 67–75.

Project Management Institute, PMI. (2008). *A guide to the project management body of knowledge,* PMBOK Guide (4th ed.). Pennsylvania, USA: Project Management Institute, Inc.

Sauser, B. J., Reilly, R. R., & Shenhar, A. J. (2009). Why projects fail? How contingency theory can provide new insights – A comparative analysis of NASA's mars climate orbiter loss. *International Journal of Project Management, 27*(7), 665–679.

Sayles, L. R., & Chandler, M. K. (1971). *Managing large systems*. New York: Harper & Row.

Sekaran, U. (2000). *Research methods for business: A skill-building approach* (3rd ed.). New York: John Wiley and Sons, Inc.

Sultan, B. (2005). *The construction industry in Yemen: Towards economic sustainability*, Ph.D thesis, Queensland University of Technology: Australia.

Sultan, B. (2008a). Construction in Yemen and sustainable development: Are they sustainable? *The Yemen Times*, 24th of January.

Sultan, B. (2008b). Housing construction costs in Yemen: Affordability & purchasing power. *The Yemen Times*, 6th of March.

Sultan, B., & Kajewski, S. (2003). *The Yemen construction industry: Readying the industry for the successful implementation of sustainability.* Paper presented at the International Conference on Smart and Sustainable Built Environment, 19-21 November, 2003. Brisbane, Australia.

Tricker, M. (2001). *Exploring alternative research designs*. Applied research resource pack. Aston University: Birmingham, UK.

United Nations Industrial Development Organization, UNIDO / World Bank Cooperative Programme. (1981). *Yemen Arab Republic: The Construction Industry,* (Report no. 17). Vienna.

Yasamis, F., Arditi, D., & Mohammadi, J. (2002). Assessing contractor quality performance. *Construction Management and Economics, 20*(3), 211–223.