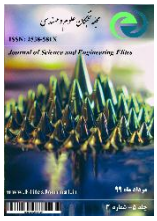
www.ElitesJournal.ir

مجله نخبگان علوم و مهندسی

Journal of Science and Engineering Elites

جلد ۵- شماره ۳- سال ۱۳۹۹



Using Journal 469 in the Project Implementation Method with Model BOT in a Real Project

Niloofar Ghannad

M. Sc. student of Construction Management, School of Science and Engineering, Sharif University of Technology, International Campus, Kish Island, Iran

*niloofarghannad@yahoo.com

Received: July 2020 Accepted: August 2020

Abstract

A careful attention paid to the writing of similar contracts, which each year provides a large number of designs, can prevent many challenges. In this research, identifed and investigate the advantages and disadvantages of the BOT contract (Journal 469) in Iran's industries (case study of water and wastewater projects), to identify the weaknesses, ambiguities, contradictions of 469, in order to provide a clearer picture of dimensions of these relationships and to present the main challenges of its projects.

It is seen that these critical success factors are introduced but unambiguous descriptions of all critical success factors are missing which is an essential need. Hence, to understand more, the benefits and challenges of the BOT projects are discussed. In the four section, examples of different cases in the Iranian industry are presented and in these projects there are contractual challenges arising from BOT contract implementation that will be addressed. As the same way one of the challenges is the main and sub-stakeholders and how they relate to them and their performance in the projects that will be discussed in detail.

This research is a qualitative one. By first using library studies and the use of internal and external articles and interviewing experts and extracting and using lessons learned from the projects in question. Projects in the industry were carried out using the BOT method. The key challenges and advantages and disadvantages of each were extracted using the BOT methodology implemented using the 469 Program and Budget Organization Journal. This publication is of the second group type and its use is compulsory and mandatory, but the change is arbitrary. In the meantime, all the key factors that a project needed to succeed were collected. Also, all important and influential stakeholders of the projects in question, their problems and their timelines were provided. The purpose is to explore the major challenges of BOT projects and to explore the advantages and disadvantages of using these types of contracts in real examples, and ultimately to provide an appropriate solution to reduce these challenges in similar contracts and other types.

Key words: Megaprojects, Build–Operate–Transfer (BOT), stakeholders, Journal 469.

1- Introduction

1-1- Megaprojects

According to the Oxford Handbook of Megaproject Management, "Megaprojects are large-scale, complex ventures that typically cost 1 billion dollars or more, take many years to develop and build, involve multiple public and private stakeholders, are transformational, and impact millions of people" [1]. However, 1 billion is not a constraint in defining megaprojects, as sometimes (e.g. in developing countries) a relative approach is needed because in some contexts, a much smaller project (such as one with a 100 million budget) could constitute a megaproject. Therefore, a more general definition is "Megaprojects are temporary endeavors (i.e. projects) characterized by: large investment commitment, vast complexity (especially in organizational terms), and long-lasting impact on the economy, the environment, and society" [2]. The projects that have been made in Iran in this way are: Tehran-Shomal highway and some oil and petrochemical plants in the south of the country and Imam Khomeini International Airport.

1-2-Build–operate–transfer (BOT)

Is a form of project financing, wherein a private entity receives a concession from the private or public sector to finance, design, construct, own, and operate. This enables the project sponsors to recover its investment, operating and maintenance expenses in the project. According to the Cambridge English Dictionary, "Long Term is a time frame for investing in which an asset is held for at least seven to ten years. The measure of a "long term" time frame can vary depending on the asset held or the investment objective". For example, according to Iran's 469 Program and Budget Organization, only the operational part of bot projects can take between 15 and 30 years. Due to the long-term nature of the arrangement, the fees are usually raised during the concession period. The rate of increase is often tied to a combination of internal and external variables, allowing the sponsors to reach a satisfactory internal rate of return for the investment. Examples of countries using BOT are few US states (California, Florida, Indiana, Texas, and Virginia) in some countries, such as Canada, Australia, New Zealand and Nepal [3], Pakistan, Thailand, Turkey, Taiwan, Bahrain, Saudi Arabia, Israel, India, Iran, Croatia, Japan, China, Vietnam, Malaysia, Philippines, Egypt and Myanmar. The following parties may be involved in a BOT project:

- The host government: Normally, the government is the initiator of the infrastructure project and decides if the BOT model is appropriate to meet its needs. In addition, the political and economic circumstances are main factors for this decision. The government provides normally support for the project in some form. (Provision of the land/ changed laws).
- The concessionaire: The project sponsors who act as concessionaire create a special purpose entity which is capitalized through their financial contributions.
- Lending banks: Most BOT project are funded by commercial debt. The bank will be expected to finance the project on "non-recourse" basis meaning that it has recourse to the special purpose entity and all its assets for the repayment of the debt.
- Other lenders: The special purpose entity might have other lenders such as national or regional development banks.
- Parties to the project contracts: Because the special purpose entity has only limited workforce, it will subcontract a third party to perform its obligations under the concession

agreement. Additionally, it has to assure that it has adequate supply contracts in place for the supply of raw materials and other resources necessary for the project.

- A careful attention paid to the writing of similar contracts, which each year provides a large number of designs, can prevent many challenges. In this research, I will identify and investigate the advantages and disadvantages of the BOT contract (Journal 469) in Iran's industries (case study of water and wastewater projects), to identify the weaknesses, ambiguities, contradictions of 469, in order to provide a clearer picture of dimensions of these relationships and to present the main challenges of its projects.
- BOT are methods which find very extensive application in countries which desire ownership transfer and operations including. Some advantages of BOT projects are:
- Encourage private investment
- Inject new foreign capital to the country
- Transfer of technology and know-how
- Completing project within time frame and planned budget
- Providing additional financial source for other priority projects
- Releasing the burden on public budget for infrastructure development.

2. Literature Review

2-1- Megaprojects

Megaprojects are the result of technological advancements and the need to combine such advancements into large and complex systems to satisfy a set of recognized needs in the community and improve human life [4]. Megaprojects have large footprints which impact and interest a wide range of stakeholders whom often are networked [5] and have conflicting interests and expectations [6],[7]. These projects typically have a significant social purpose (Fiori & Kovaka, 2005), uniqueness and specificity [5], and numerous potential externalities and unintended consequences [4]. Given the high level of complexity in megaprojects [8] and their considerable scale [5], these projects demand a long time to develop, over multiple phases, through the actions of project sponsors and the engagement of various stakeholders [9].

2-2- Build Operate Transfer

A BOT Project (build operate transfer project) is typically used to develop a discrete asset rather than a whole network and is generally entirely new or green field in nature (although refurbishment may be involved) [10]. In a BOT Project the project company generally obtains its revenues through a fee charged to the utility or government rather than tariffs charged to consumers. In general, a project is financially viable for the private entity if the revenues generated by the project cover its cost and provide sufficient return on investment. On the other hand, the viability of the project for the host government depends on its efficiency in comparison with the economics of financing the project with public funds. Even if the host government could borrow money on better conditions than a private company could, other factors could offset this particular advantage.

A BOT project generally has following parties involved:

1. Host government

Government is one of the main parties in a BOT contract. Supervising the project is the responsibility of the government or an institute representing the government. It is possible that other governmental authorities are engaged in the project.

2. Consortium

Consortium is the second party in a BOT contract. It consists of private companies which have contracts between them that determine their equity, share, responsibilities and etc.

3. Lenders

Lenders or in general terms, financial institutions are a main source of raising funds for the project. Financial structure strength of the project mainly depends on the lenders.

4. EPC contractor

For construction of the project usually there is an EPC contractor which is responsible for mostly the whole build phase.

5. Suppliers

Raw materials and machinery must be supplied by consortium in BOT projects. In some cases government should support consortium to supply required materials for construction and operation of project.

6. Buyers

Product buyers, may be final customers or private or governmental companies.

7. Spare part suppliers

During operation phase (which may be around 30 years) there is critical need for spare parts and consuming materials which the consortium must supply continuously during operation phase.

8. Operation contractors

Usually for maintain, repair and operation works the consortium outsources the tasks to other contractors.

These factors cover a variety of issues about the project: from project identification to host government stability and from technical issues to financial ones. Paying attention to these factors in all phases of the project is a principle to deliver a successful project.

In a usual BOT contract, a host government grants a right to a consortium consisting of private companies to finance an infrastructure project, to build and construct it, and to cover its fees and gaining profit to operate it for a period of time. The consortium must transfer the entity's ownership to the government without any extra charges. As mentioned previously, BOT projects have more complexity than traditional contract models. A third of BOT projects in Asia have had disappointing results. This shows that delivering a successful project (from initiating stage to transfer phase) is complicated and needs special care and consideration of many factors during project life.

2-2-1- Critical Success Factors in BOT projects

Criteria for project success are well established, and include time, budget and performance goals [11]. The project management body of knowledge refers to project success in terms of time, cost, scope, quality and customer satisfaction widely known as the 'triple constraint' (PMBOK GUIDE) [12], project success is determined based on completing the project objectives within the constraints of time, cost and quality, plus other project achievements, for instance, meeting the strategic objectives of the client organisation and business success, client satisfaction, advantages for stakeholders and project personnel and other business value achievements [13] also suggested using stakeholder satisfaction as a criterion for project success in addition to the traditional measurement of time, cost and quality.

Stakeholders have differing views of success, and these might vary over different timescales [14]. Project managers can use critical success factors (CSFs) to identify the necessary factors

to meet customer requirements [15], [11] extended the notion of project success by adding criteria, such as initial commercial/business success of the products and potential for future business growth. Time, cost, quality, project objectives and stakeholder satisfaction can all be used as criteria for evaluating project success.

Critical success factors of BOT projects have been studied by different scholars in different projects such as: water and waste water, roud and airplane projects. The subject has been developed by introducing different Critical Success Factors from diverse points of views.

Articles have considered Critical Success Factors for countries and specific sectorsLack of clear description of each critical success factor is an obvious fact while studying researches. Some authors took a glance at critical success factor by only one word for each, whereas others went into more details by categorizing and forming tables and illustrating meanings by some examples [16-21].

2-2-2- The Benefits Earned from BOT Projects

Concerted efforts from government and private sectors as well as appropriate political, legal and economic environments are essential to earn the benefits from BOT projects. Considering the large investments, the technical expertise, and the length of commitment that are involved, BOT projects present a unique opportunity for the transfer of technology to the developing countries.

So the expected benefits can be stated as below.

Technology Transfer

Concession Period

Incentive Scheme

Market and Contract Led Revenue

Commercial Freedom

Foreign Exchange

Projects Identification

Entrepreneurship and Leadership

Resources are fully dedicated to client

Greater transparency and control for managing resources during operational phase

This is only a slight glimpse of a large number of expected benefits associated with BOT projects.

2-2-3- Challenges Faced During the BOT Projects

The key to a successful implementation of a BOT infrastructure project is in depth analysis of all aspects related to economic, environmental, social, political, legal, and financial feasibility of the project For these reasons, the analysis of project feasibility decision needs a technique to include the qualitative decision factors that have the strong impact on the project. BOT contracts may be complicated due to its long-term contractual obligations and multiparty involvement, moreover legal, economical and technical framework need to be developed on large scale for successful execution of the project.

In BOT projects, the sponsors of the project are usually a consortium or a joint venture of construction, engineering, and venture capital firms. The capital for the project investment may come from commercial banks or insurance companies.

The major constraints faced by the stakeholders include political, economical, ecological, technological, social, environmental and ecological. In the last twenty years, the political and

economical scenario of developing countries has been under notable transition. The political and economic instability remained as a serious hurdle in the formulation of various infrastructure development reforms like BOT.

In the four section, examples of different cases in the Iranian industry are presented and in these projects there are contractual challenges arising from BOT contract implementation that will be addressed. As the same way one of the challenges is the main and sub-stakeholders and how they relate to them and their performance in the projects that will be discussed in detail below.

2-2-3-1- Stakeholder Involvement and Characteristics

Literature reviews support researchers to better understand the research topic, and assist in identifying the boundaries of the current body of knowledge and research trends and shaping future research. This section analyses the latest research developments on stakeholder characteristics and effective Stakeholder management (SM) in the context of complex projects (CPs). Findings on project complexity and project success, as relevant to the research topic, are also discussed.

CPs have received much attention from researchers and project managers because of an increase in the number of complex projects worldwide across many fields [22], and project failure as a result of this complexity [23]. As projects become increasingly complex, there are increasing concerns about the complexity of project concepts and its effect on the project management process [24].

Stakeholder management (SM) is a key factor affecting project performance in complex projects (CPs) [25]. SM considers not only individual stakeholders but also how stakeholders influence one another in complex interactions [25]; stakeholder interrelationships are themselves a cause of project complexity [26].

It is widely recognised in the literature that many projects fail [27]. There are many causes of failure, one of which is project complexity, which creates difficulty in completing projects and requires extra effort to overcome [28].

The literature demonstrates that stakeholder characteristics play a critical role in effective SM, as project managers select appropriate SM strategies to deal with issues arising from specific stakeholder characteristic, For example, what can they do against powerful or interested beneficiaries? Clear project objectives, agile response to change and effective communication are important components of an effective SM framework in mega-construction CPs. A complex mega-construction project requires a more specialised approach to manage stakeholders [29]. Also, the uncertain and complex nature of mega-construction projects requires an effective stakeholder management approach to resolve conflicting stakeholder interests [7].

Scholars have widely discussed the significance of stakeholder involvement in project management and policy development arenas [30-36]. While a number of scholars have focused on factors that enhance the effectiveness of stakeholder involvement practices [34, 37-39] Others have focused on potential costs and tradeoffs of stakeholder involvement [40-42]. The concept of stakeholder was first introduced by scholars at the Stanford Research Institute in the 1960s as a straightforward, if highly controversial idea, which expanded the definition of stakeholders beyond the exclusive stockholders (shareholders) of a firm and included those groups without whose support the organization would cease to exist [43-44]. Subsequently, other scholars began examining the significance of citizens and citizen involvement in political and economic processes, which led to the pioneering work of Arnstein (1969) who introduced the citizen participation ladder. Freeman (1984) later extended the definition of stakeholder to

include “any group or individual who can affect, or is affected by, the achievement of the organization’s objectives.” Freeman’s work established a clear and fundamental juxtaposition between serving the needs of shareholders through dividend maximization to serving the needs of a broader constituency of stakeholders [44].

Subsequent to Freeman (1984), researchers have attempted to differentiate between stakeholders in different contexts. Hence, a number of stakeholder frameworks emerged such as: stakeholder identification and saliency by Mitchell, Agle, and Wood (1997) and Purdy (2012)’s framework for assessing stakeholders’ power. With time, interest in stakeholders migrated into other realms including project development and management where project sponsors must handle a variety of stakeholders. In the context of BOTs, stakeholders’ classification is quite challenging due to a higher complexity in terms of types of stakeholders’ relationships, their interactions, and responsibilities. A number of scholars have attempted to identify and categorize stakeholders in the context of megaprojects based on stakeholders’ positions. These classifications include: inside and outside stakeholders [45]; direct and indirect stakeholders [46]; internal and external stakeholders [47]; and legal and moral stakeholders [48]. In the context of PPPs, El-Gohary, Osman, and El-Diraby (2006) has classified stakeholders into three groups: responsible, impacted, and interested stakeholders.

Early involvement of stakeholders has been frequently claimed as one of the most essential factors leading to a quality outcome [34, 37-39,49]. Reed (2008) stresses the early involvement of stakeholders and suggests that in cases where early involvement is not feasible some flexibility be incorporated into the process to enable stakeholders to alter the process retrospectively. Without such flexibility, stakeholders’ motivation to engage is undermined; this may place stakeholders in a passive position in the involvement process when they realize that they are involved at a point when key decisions have already been finalized [38].

This sub-section discusses three stakeholder characteristics, namely stakeholder power, stakeholder interests and stakeholder attitudes.

- **Stakeholder Power**

Stakeholder power can be defined as ‘the ability of those who possess power to bring about the outcomes they desire’ [50]. There is three types of power: coercive power, based on physical resources; utilitarian power and normative/social power, based on symbolic resources. Power is obtained by supplying or withholding material, financial, symbolic or physical resources [51]. Power might be increased by gaining political support from local and national authorities [52]. Yang et al. (2014) found that stakeholder power is positively and highly correlated with ‘compromise’ and ‘adaptation’ strategies - if stakeholders have high levels of power, managers should apply gentle strategies. Therefore, stakeholder power in a project can be seen as the ability to affect the implementation and/or outcomes of the project.

Power is one of the main stakeholder characteristics used to classify stakeholders. It is an important characteristic in the stakeholder salience model and stakeholder matrices.

This approach is helpful in identifying stakeholder influence on project decision-making in global projects [47], as stakeholders have differing levels of influence over decision-making processes and project phases [53]. The stakeholder salience model has been applied to identify stakeholder attributes. Johnson and Scholes (1999) simplified and adapted the Mendelow (1981) model, proposing a power/interest matrix, in which the interest axis replaced the dynamism axis (see Table 1). In classifying stakeholders in the power/interest matrix, project

managers obtain a better understanding of how communication and relationships among stakeholders affect the project and its operation [54].

Table 1- Power/ Interest Matrix (Johnson and Scholes, 1999)

Power	Low	High
High	Keep Sastified	Key Players
Low	Minimal Effort	Keep Informed

Level of Interest

Stakeholder power can be classed into different levels, such as weak, medium and strong power positions
[55] and none, low, medium and high levels of power. Luyet et al. (2012) suggested that stakeholders be characterised to understand the power relations between them and their specific interest in projects.

- **Stakeholder Interests**

Stakeholders have different levels of interest in projects [56]. Understanding stakeholder interests is a critical success factor in industrial and construction projects. Understanding stakeholder interests, roles and expectations has become a critical topic of analysis and research, essential for identifying and analysing the positions and interests of stakeholders involved in projects [57]. Identifying stakeholders regarding potential interests in projects is an important part of stakeholder analysis [58]. Further, the purpose of stakeholder analysis is to indicate whose interests should be taken into consideration in decision-making processes and why [52].

3. Research Methodology

Case study research is one of several forms of social science research. Others include experiments, surveys, histories, and archival analyses such as economic or statistical modeling. Doing case study research would be the preferred method, compared to the others, in situations when the main research questions are “how” or “why” questions. Among the variations in case studies, a case study can include single or multiple cases, can be limited to quantitative evidence, and can be a useful method in doing an evaluation. Properly doing case study research means addressing five traditional concerns about case studies—by conducting the research rigorously, avoiding confusion with teaching cases, knowing how to arrive at generalized conclusions if desired, carefully managing the level of effort, and understanding the comparative advantage of case study research. The overall challenge makes case study research “hard,” although it has classically been considered a “soft” form of research.

4- Case Study

4-1- Meybod wastewater treatment plant in Yazd province

4-1-1- Project introduction

This chapter discusses the wastewater treatment plant case. Initially, an explanation is provided about Yazd province and the city of Meybod and its specialties. Next, a summative analysis

follows that presents the case's data, involvement activities, project Stakeholders and the work of them, and the issues raised.

Meybod is located 50 kilometers northwest of Yazd, near the Tehran-Bandar Abbas Road and the Tehran-Kerman Railway, on the outskirts of the central Iranian desert and along the Transit Road (Tehran-Yazd). The city has an area of 3228 hectares, The Figure (1) and Figure (2) shows the location of Yazd province and meybod. The general slope of the city of Meybod is from south to northeast and east to west, the land is mild and almost flat. The altitude is 1115 m in the south and 1060 m in the north. The groundwater level in Meybod is low.

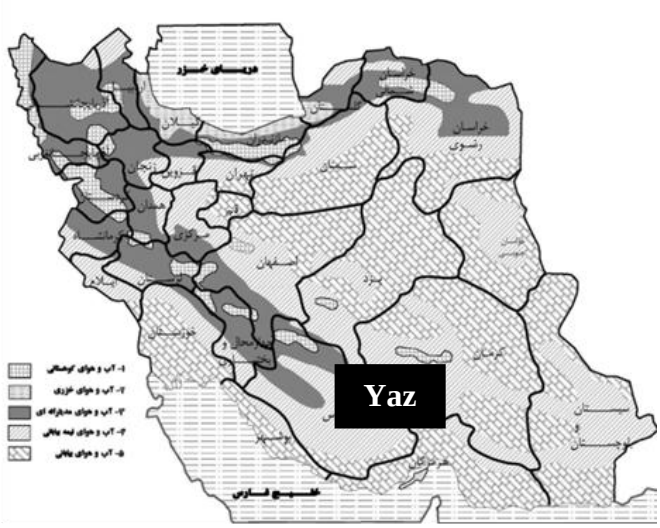


Figure 1- Location of Yazd Province (Source: www.google.com/maps)

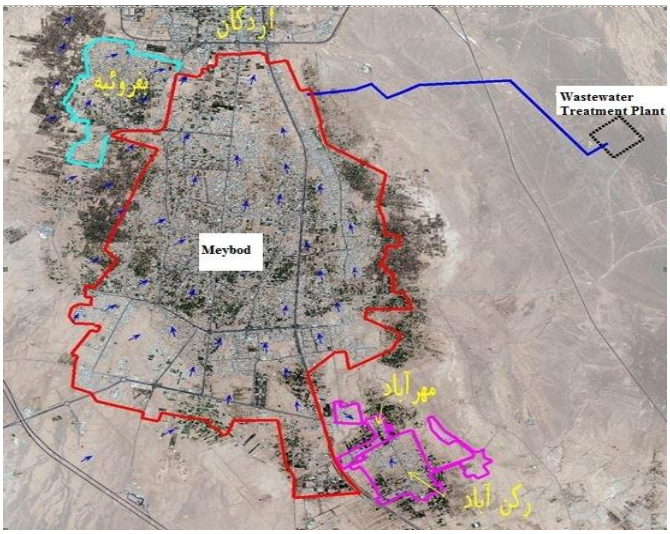


Figure 2- Satellite image of the projection range (Source: www.google.com/maps)

Freezing depth means the depth of the soil that can reach freezing point by lowering the temperature to below zero and freezing to the depth if subsurface moisture is present. In Maybod the frost days in the first six months of the year are equal to zero and in the second six months of the year the ice depth is 70 cm.

The prevailing wind is the wind, known as Isfahan Wind, which blows from northwest to southeast in summer and spring. Meybod wastewater treatment plant start date is 18-08-1395 and the Project end date is 20-08-1400.

Project Cost is 2,000,000 billion rials and the budget management in this project is as follows upon completion of each clause of the contract and approval of the technical and project control

unit and project manager, a request for budget allocation shall be made from Company A to overhead company.

Project-related strategic goal is the Business development with a focus on high-end investment and export-driven and Empowerment of stakeholders.

The nature of the project is about Construction and Industrial. The first phase review and studies of the Maybod project was started in 2014 by the Isfahan Design and Research Organization And it was awarded to Company A during the bidding process .The wastewater treatment plant was allowed to operate for Twenty-five years.

In this regard, the second phase of studies in the field of value engineering was carried out in 2016-2016. The project comprises 360 km of grid that includes 5 priority, 7 km transmission line, 3 filtration modules. In the first phase of operation 250 km and 2 treatment modules will be put into operation and will provide the results of the first phase operation to implement the rest of the necessary design decisions.

Justification for implementation and macro project description in this project is to achieve its long-term goals, Company A has undertaken to evaluate investment projects in the field of water, in this regard the Meybod City Wastewater Treatment Plant has been selected as one of the economic projects in the country in its tender. The bidding came after several bidding stages, the company was announced as the winner of the tender.

Due to the high cost of buying water and wastewater in the Meybod region and the production of ceramic tiles in the region, the sale of effluent is of great importance.

Project scope: Meybod city wastewater transportation and treatment in exchange for the allocation of treated wastewater for a specified use (industry) with a specified volume for a limited operational period (25 years) by BOT contract.

Macro requirements include the following:

Financing by overhead company

Strengthen the contractor's financial need as prices rise

No major delays in the project

People's cooperation in installing house door splits

Providing 50 percent of the effluent during the operation phase.

4-1-2- Stakeholders in Meybod Wastewater Treatment Plant

Following is the definition of key stakeholders in the Maybod project and the important work that it does, (table 2).

Table 2- Stakeholders and their work in Meybod Wastewater Treatment Plant

Meybod Wastewater Treatment Plant in Yazd Province		
Number	**Stakeholders**	**Work**
1	Overhead Company	The investor is the social security organization to achieve the expected profit margin.
2	Company A	Armed Forces Social Security Investment Company and achieving expected profit margins.
3	Governor Maybod	Investigation of potential risks of project implementation in the context of the city
4	Owners of Maybod Industries	Investigate the potential risks of project implementation and endangering business owners
5	Wastewater treatment customers	Converting industrial wastewater to their own benefit and making a profit
6	Yazd Water and Wastewater Company and Meybod City	Planning and coordination necessary to move the project forward faster
7	Imams of Maybod	Investigate the potential risks to the project for the people of the city

8	Maybad City Council	Meeting with the mayor and officials
9	Municipality of Maybod	Investigation of potential risks of project implementation in the context of the city
10	Police Department	Investigation of potential risks of project implementation in the context of the city
11	Department of Water and Wastewater	Facilitate the project implementation process
12	Abfa Office	Coordination for holding the project strategic committee
13	Consulting company	Providing a description of consulting, monitoring and project management services
14	Application team	Recruitment of required personnel according to project organizational chart
15	Project Strategic Committee	Make big decisions at the top
16	Iran Water and Wastewater Engineering Company	Obtain approval of the wastewater treatment plant
17	Minister of Energy and First Vice President	Unveiling the contract with their presence
18	Mellat Bank	Review of Maybod project financing methods, It was agreed to issue several securities in accordance with Project Cash Flow following the agreement of Mellat Bank's Managers
19	Technical Committee	Shortcomings of Phase II Studies of the First Priority Implementation of the Wastewater
20	Capitalist (Yazd Province)	Land Delivery Project for construction of sewage treatment plant
21	Transaction Commission	Quality Assessment Report of Contractors First Priority for Implementation of Meybod Wastewater and Shortlisting
22	Project Manager	Tender documentation and project control and supervision
23	Contracting Company	Implementation of part of Meybod city sewage
24	Supervision	Supervision and Determination of Crockey Road Access to the Treatment Plant Site
25	Governorate of Yazd Province	Visit to the treatment plant site by Yazd political-security deputy to solve problems in the treatment plant, Negotiate with all executives and executives such as governor, Evaluation of the financial and economic impacts of relocation site

4-1-3- Issues in Meybod Wastewater Treatment Plant

There is issue and Key events of the project in the table of 3.

Table 3- Issue and Key events of the project

Meybod Wastewater Treatment Plant in Yazd Province		
Number	**Date**	**Issues**
1	1394/06/22	Investigation of Possibility of Non-Sewage Waste Selling and Negotiation with Managers of Yazd and Meybod Water and Wastewater Company
2	1394/12/22	A review of the Maybad governorate and city council members to create potential risks for the project in the context of the city
3	1395/06/16	Initial negotiations were held with the Bank Mellat financing company on loan to the project
4	1396/02/10	According to the order of the Ministry of Interior and the Yazd governorate to suspend all civil activities during the period of holding city council elections and presidential elections from 20/02/20 to 1396/03/10 and for 20 days all civil activities The project was stopped
5	1396/02/10	Due to the slow process of completing the second phase studies of the sewage network by the Water and Wastewater Design and Research Company, the consultant in the first stage provided all project reports and plans regarding the first priority to the project manager and determined that the studies were completed in priority. Next, run the first priority execution operations
6	1396/02/10	Since the contract of contractor was a five-volume contractor with more than 1,200 pages of various documents and due to the high sensitivity of the contract, the above documentation took a long time from the technical and legal team, which led to several months of delay. The refining activities started

7	1396/02/10	According to the municipality's instruction to stop all civil operations in the city from 13/12/20 to 2016/20/20 Due to Nowruz holidays and the tourist activity of the city of Maybod, all civil works of the project were suspended for one month
8	1396/10/17	Evaluation of delays in submitting contractor engineering documentation and delays in refining engineering services subject to stabilization of refinery ground position and topographic map
9	1397/01/25	Popular protests over the rate of non-native employment in the Maybad project
10	1397/05/02	Slowing down the process of ordering foreign goods and registering due to the new currency system in Nima
11	1397/05/02	The unpredictable inflation that occurred between 94 and 97 resulted in higher costs than previously planned
12	1397/05/11	The tightening of sanctions led to negotiations with the refining contractor and suppliers to sign contracts before the new sanctions were imposed
13	1397/06/20	Meeting with the Water and Wastewater Manager of the country to change the policies of the Central Bank and the Ministry of Industry in registering goods.
14	1397/07/10	The unpredictable and dramatic inflation caused by the prices of materials and equipment, as well as the instability of the market in the sale of materials, and the problems with the supply and delivery of materials have delayed the implementation process.
15	1397/08/23	Delay in payment of contractor status of wastewater collection and treatment plant and slowdown of network operation due to delays in allocation of funds by Company A.

5-Conclusions and Recommendations

According to the explanations given in the literature, the key stakeholders in each project were examined for their strength and interest in the project, and in Table 4, their interest and power in the three Low, medium and high levels were measured. It is suggested that in the projects implemented in the BOT sector in Iran, the first type of stakeholders will be identified and categorized and then given an appropriate response according to the type of beneficiary. For example, considering the matrix of power interests (Table 1) in Literature Review, stakeholders with high degree of influence and interest in the final results of the project should also be considered as key players and given a lot of attention. Stakeholders with high power and low interest should always be satisfied with the project, and stakeholders with low power and interest should always be kept informed and stakeholders with low power and low interest in the project should make little effort towards them.

For example, the Overhead Company and the Governor of the province, the Consulting Company, the Application Team, the Project Strategic Committee, the Technical Committee, the Project Manager, the Supervision, the Group Mapping and the Logistics team, which were key stakeholders in the above three projects, are key stakeholders. And they are interested in all of the project's affairs, and they should be given a lot of attention.

As well as Farmers and landowners near project areas have high power and relatively low interest that should always keep them satisfied with the project.

Table 4- Check the relationship of Stakeholders and their work in Case Study

Key Stakeholder in the project	**Meybod wastewater treatment plant in Yazd province**					
	Power			Interest		
Meybod Stakeholders	Low	Medium	High	Low	Medium	High
Yazd Water and Wastewater Company and Meybod City			*			*
Iran Water and Wastewater Engineering Company			*			*
Governor of Yazd			*			*
Meybod County Cultural Heritage Organization			*			*
Wastewater treatment customers			*			*

In the next section of this chapter and in Table 5, several Critical success factor in the literature chapter are presented in detail in the project that were considered as case study.
For example, success factors such as Political support and Multi-benefit objectives and Guaranteed Government involvement by providing and Shared authority between public and private sectors and Sound economic policy at Project and Meybod wastewater treatment plant in Yazd province. Other Critical success factor items in BOT projects such as Appropriate risk allocation and risk sharing and procurement process and Commitment / responsibility of public / private in the Meybod project due to specific project conditions it is Medium.

Table 5- Check the relationship Critical success factor in Case Study

Critical success factor in BOT project	Meybod wastewater treatment plant in Yazd province
Appropriate risk allocation and risk sharing	Medium
procurement process	Medium
Commitment/responsibility of public/private sectors	High
Project technical feasibility	Medium
Available financial market	Medium
Political support	High
Multi-benefit objectives	High
Government involvement by providing guarantees	High
Sound economic policy	High
Shared authority between public and private sectors	High

6-References

1. Flyvbjerg, B. (2017). The Oxford Handbook of Megaproject Management. Oxford University Press. p. 2. ISBN 978-0198732242.

2. Brookes, Naomi J.; Locatelli, G. (2015). Power plants as megaprojects: Using empirics to shape policy, planning, and construction management. Utilities Policy. 36: 57–66. doi:10.1016/j.jup.2015.09.005.

3. Yu, J.H., & Kwon H.R. (2011). Critical success factors for urban regeneration projects in Korea. International Journal of Project Management. 29, 889–899.

4. Wen Feng, M., Lessard, M. D. R., & Bruce, G. C. (2013). Stakeholders, Issues, And the Shaping Of Large Engineering Projects.

5. Lin, J., Er-shi, Q., & Bo, D. (2008). Study of the Characteristics of Large-Scale Construction Projects with the Viewpoint of Complexity. Paper presented at the Wireless Communications, Networking and Mobile Computing, 2008. WiCOM'08. 4th International Conference on.

6. Fiori, C., & Kovaka, M. (2005). Defining megaprojects: Learning from construction at the edge of experience. Paper presented at the Proceedings of Research Congress, ASCE.

7. Mok, K. Y., Shen, G. Q. and Yang, J., 2015. Stakeholder management studies in mega construction projects: A review and future directions. International Journal of Project Management 33(2): 446-457.

8. Antoniadis, D. N., Edum-Fotwe, F. T., & Thorpe, A. (2011). Socio-organo complexity and project performance. International Journal of Project Management, 29(7), 808-816.

9. Miller, R., & Lessard, D. R. (2001). The strategic management of large engineering projects: Shaping institutions, risks, and governance: MIT press.

10. Cheong Yong, Y., & Emma Mustaffa, N. (2012). Analysis of factors critical to construction project success in Malaysia. Engineering, Construction and Architectural Management. (19) 5. 543-556.

11. Shenhar, A. J., Dvir, D., Levy, O. and Maltz, A. C., 2001. Project Success: A Multidimensional Strategic Concept. Long Range Planning 34(6): 699-725.

12. Ika, L. A., 2009. Project Success as a Topic in Project Management Journals. Project Management Journal 40(4): 6 19.

13. Yang, L. R., Huang, C.-F.and Wu, K.-S., 2011. The association among project manager's leadership style, teamwork and project success. International Journal of Project Management 29(3): 258-267.

14. Turner, J. R., 2009. The handbook of project-based management: leading strategic change in organizations, McGraw-hill.

15. Bond, U. E., 2015. Project management, leadership, and performance: A quantitative study of the relationship between project managers' leadership styles, years of experience and critical success factors (CSFs) to project success.

16. Chang, L. M., & Chen, P. H. (2001). BOT Financial Model: Taiwan High Speed Rail Case. Journal of Construction Engineering and Management, (127) 3, 214-222.

17. Daniel, J. I. (2002). Benefit-Cost Analysis of Airport Infrastructure: the Case of Taxiways. Journal of Air Transportation Management, 8, 149-164.

18. Hanspeter, G. (1973). Cost-Benefit Analysis and Public Investment in Transport: A Survey. London: Butterworths.

19. Asensio, J., & Roca, O. (2001). Evaluation of Transportation Infrastructure Projects Beyond Cost-Benefit Analysis. An Application to Barcelona's 4th Ring Road. International Journal of Transport Economics, 3, 387-402.

20. Xing, W., & Wu, F. F. (2000). Cost-Benefit Analysis of BOT Power Plants. Proceedings of the IEEE PES Winter Meeting, Singapore, 23-27.

21. Lu, Y. C., Wu, Soushan, Chen, D. H., & Lin, Y.Y. (2000). BOT Projects in Taiwan: Financial Modeling Risk, Term Structure of Net Cash Flows, and Project at Risk Analysis. The Journal of Project Finance, 53-63.

22. Floricel, S., Michela, J. L. and Piperca, S., 2016. Complexity, uncertainty-reduction strategies, and project performance. International Journal of Project Management.

23. Vidal, L. A., Marle, F. and Bocquet, J.-C., 2011. Measuring project complexity using the Analytic Hierarchy Process. International Journal of Project Management 29(6): 718-727.

24. Baccarini, D., 1996. The concept of project complexity—a review. International Journal of Project Management 14(4): 201-204.

25. Beringer, C., Jonas, D. and Gemunden, H. G., 2012. Establishing Project Portfolio Management: An Exploratory Analysis of the Influence of Internal Stakeholders' Interactions. Project Management Journal 43(6): 16-32.

26. Yang, R. J., 2014. An investigation of stakeholder analysis in urban development projects: Empirical or rationalistic perspectives. International Journal of Project Management 32(5): 838-849.

27. Damoah, I. S. and Akwei, C., 2017. Government project failure in Ghana: a multidimensional approach. International Journal of Managing Projects in Business 10(1): 32-59.

28. Dao, B., Kermanshachi, S., Shane, J., Anderson, S. and Hare, E., 2016. Identifying and Measuring Project Complexity. Procedia Engineering 145: 476-482.

29. Park, H., Kim, Y.-W., Kim, H. and Kim, K., 2017. Stakeholder Management in Long-Term Complex Megaconstruction Projects: The Saemangeum Project. Journal of Management in Engineering 33(4): 5017002.

30. Ackerman, J. M. (2005). Social accountability in the public sector: A conceptual discussion. SD Papers (Ed.), Paper (82).

31. Bayley, C., & French, S. (2008). Designing a participatory process for stakeholder involvement in a societal decision. Group Decision and Negotiation, 17(3), 195-210.

32. Boyer, E. J., Van Slyke, D. M., & Rogers, J. D. (2015). An Empirical Examination of Public Involvement in Public-Private Partnerships: Qualifying the Benefits of Public Involvement in PPPs. Journal of Public Administration Research and Theory, muv008.

33. Emerson, K., Nabatchi, T., & Balogh, S. (2012). An integrative framework for collaborative governance. Journal of Public Administration Research and Theory, 22(1), 1-29.

34. Reed, M. S. (2008). Stakeholder participation for environmental management: a literature review. Biological conservation, 141(10), 2417-2431.

35. Richards, C., Carter, C., & Sherlock, K. (2004). Practical approaches to participation: Macaulay Institute.

36. Wallner, J. (2008). Legitimacy and public policy: Seeing beyond effectiveness, efficiency, and performance. Policy Studies Journal, 36(3), 421-443.

37. Beierle, T. C. (1999). Using social goals to evaluate public participation in environmental decisions. Review of Policy Research, 16(3-4), 75-103.

38. Chess, C., & Purcell, K. (1999). Public participation and the environment: Do we know what works? Environmental Science & Technology, 33(16), 2685-2692.

39. Walters, L. C., Aydelotte, J., & Miller, J. (2000). Putting more public in policy analysis. Public Administration Review, 60(4), 349-359.

40. Innes, J. E., & Booher, D. E. (2004). Reframing public participation: strategies for the 21st century. Planning Theory & Practice, 5(4), 419-436.

41. Irvin, R. A., & Stansbury, J. (2004). Citizen participation in decision making: is it worth the effort? Public Administration Review, 64(1), 55-65.

42. Jolley, G. J. (2007). Public involvement tools in environmental decision-making: A primer for practitioners. J. Ext, 45, 2-3.

43. Olander, S. (2007). Stakeholder impact analysis in construction project management. Construction Management and Economics, 25(3), 277-287.

44. Stoney, C., & Winstanley, D. (2001). Stakeholding: confusion or utopia? Mapping the conceptual terrain. Journal of Management Studies, 38(5), 603-626.

45. Newcombe, R. (2003). From client to project stakeholders: a stakeholder mapping approach. Construction Management and Economics, 21(8), 841-848.

46. Smith, J., & Love, P. E. (2004). Stakeholder management during project inception: Strategic needs analysis. Journal of architectural engineering, 10(1), 22-33.

47. Aaltonen, K., Jaakko, K. and Tuomas, O., 2008. Stakeholder salience in global projects. International Journal of Project Management 26(5): 509-516.

48. Oyegoke, A. S. (2009). The Contextual Approach to Stakeholder Management in Finland. Construction Stakeholder Management, 65.

49. Mackenzie, J., & Krogman, N. (2005). Public involvement processes, conflict, and challenges for rural residents near intensive hog farms. Local Environment, 10(5), 513-524.

50. Salancik, G. R. and Pfeffer, J., 1974. The Bases and Use of Power in Organizational Decision Making: The Case of a University. Administrative Science Quarterly 19(4): 453-473.

51. Aaltonen, K., Kujala, J., Havela, L. and Savage, G., 2015. Stakeholder Dynamics During the Project Front-End: The Case of Nuclear Waste Repository Projects. Project Management Journal 46(6): 15-41.

52. Aaltonen, K. and Sivonen, R., 2009. Response strategies to stakeholder pressures in global projects. International Journal of Project Management 27(2): 131-141.

53. Herazo, B. and Lizarralde, G., 2016. Understanding stakeholders' approaches to sustainability in building projects. Sustainable Cities and Society.

54. Olander, S. and Landin, A., (2005). Evaluation of stakeholder influence in the implementation of construction projects. International Journal of Project Management 23(4): 321-328.

55. Blokhuis, E. G. J., Snijders, C. C. P., Han, Q. and Schaefer, W. F., 2012. Conflicts and cooperation in brownfield redevelopment projects: Application of conjoint analysis and game theory to model strategic decision making. Journal of Urban Planning and Development 138(3): 195-205.

56. Yang, R. J. and Shen, G. Q., 2014. Framework for stakeholder management in construction projects. Journal of Management in Engineering 31(4): 04014064.

57. Elias, A. A., 2012. A system dynamics model for stakeholder analysis in environmental conflicts. Journal of Environmental Planning and Management 55(3): 387-406.

58. Pan, G. S. C., 2005. Information systems project abandonment: a stakeholder analysis. International Journal of Information Management 25(2): 173-184.