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Abstract. The traditional project delivery systems in Iraq is unsubstantial, due to the delays and poor planning to manage these projects within the required quality and within the allocated budget by the public sector. Build Operate Transfer (BOT) approach, considered an option helps the governments to overcome the above problems. This research aims to determine the factors of applicability of BOT for infrastructure project in Iraq. The research initiates with reviewing the references about BOT and fieldwork process, which includes personal interviews and preparing closed questionnaire forms, the distribution of these forms to the sample members of the research to answer questions, collect these forms, and analyze the results statically. By discussing, the results found that the percentages of the factors affecting the applicability of the BOT are in three weights medium, good and very good. The percentage of medium Weight was about 9% and the good weight was about 19%. The very good weight was 72%. In addition to in this research, indicate the political and security stability among the decision factors as the most important, with 72.64% effect on the BOT applicability.

1. Introduction
The infrastructure projects commonly large projects, which are usually, performed by the government or by private sector participation. Build Operate Transfer scheme known by BOT, can be considered as one of the private sector involvement methods to take actions on infrastructure projects. Especially in developing countries, BOT has gained popularity now, with the private sector financing, designing, establishing, operating and maintaining the project, and then transferring it to the government after the concession period [1]. The acquisition of these projects under the BOT concept is very complex, sophisticated, risky and ultimately costly [2]. Since the possibility of implementing such projects on the basis of consultants’ opinion on the feasibility studies prepared, expensive, take time and a major effort to the projects may not success or subject to loss due to the risks surrounding these projects. Therefore, it is required to understand the BOT system in details and analysis of all elements of its applicability in accordance with the reality of the case of Iraq as a modern knowledge of this system. Iraq is undergoing an unpleasant situation with the lack of essential required services and the increased demand for new development in many sectors such as housing, power supply, water, roads, transportation, technology, health, education, and many other basic requirements. Iraqi government fund resources are unable to keep pace with these demands, especially under such conditions of war, the political conflicts, and other critical factors that restrict the improvement of infrastructure projects. Traditionally, these public infrastructures have been constructing by the public sector using the (DBB) procurement system [3]. Therefore, infrastructure project needs an adequate funding to build and maintain that scheme; in general, accomplish infrastructure projects requires a bulky capital investment [4]. However, as noted before with an insufficient budget for the establishment of infrastructure.
projects of some countries such as Turkey, Malaysia, and others. These countries apply investments approaches to solve this issue like Public-Private-Partnerships (PPPs) and their forms of a contract like Build-Transfer-Operate (BTO), Rehabilitate-Operate-Transfer (ROT), Build-Operate-Transfer (BOT), Build-Own-Operate (BOO), etc. Governments in poor countries in the budget are unable to finance the development and rehabilitation of basic infrastructure, so they are increasingly moving towards large international corporations as a source of funding through grant contracts such as Build-Own-Transfer (BOT) [5]. In recent years, there has been a growing trend for many countries governments to position greater public investments, especially of infrastructure projects, into the privatization. Among the most common privatization approaches is the (BOT) contracts, which has become the major trend for the privatization [6].

2. Background of BOT project in Asia and Turkey

BOT is not a new form, although it is written in a relatively modern way and can be attributed to Turgut Ozal the Ex. Prime Minister of Turkey in the 1980s [7]. The first formal private facility, developed under the name "Build-Operate-Transport", was used in Turkey in 1984 as part of a massive privatization program to develop new infrastructure [8]. The idea was attractive, especially for developing countries, which see BOT as a way to reduce public sector borrowing while encouraging foreign direct investment in infrastructure and industrial projects. Therefore, Law 3096 was the first law to deal with BOT applications in Turkey, which came into force on 4 December 1984, dealing with the production, transmission, distribution, and trade of electric power by institutions other than the Turkish authority [9]. In developing countries, BOT mechanisms are becoming increasingly popular, as developing countries are increasing investment, procurement, construction and other employment opportunities for investors from developing countries [10]. In addition, Many Asian countries turned to the privatization of infrastructure in the mid-1980s to overcome bottlenecks that threaten to constrain economic growth and development. Access to the private sector and capital management in the areas of transport, water, and sanitation, energy, and telecommunications services is the solution for obtaining and maintaining infrastructure more quickly and at a lower cost than traditional government methods [7,11,12]. Since the late 1980s, the number of BOT type infrastructure projects that have executed in Asian countries reached approximately 150 [13]. Power plants, toll roads, tunnels, bridges, and oil and gas pipeline systems are examples of such projects [14]. In China, the first successful BOT project was the Guangdong Shajiao power plant in 1984 by Hopewell Holdings Company. The project successfully transferred to the Guangdong Provincial Government in 1997 [15].

3. The trend of BOT approach in Iraq

Iraq suffered years of negligence, embargo, wars, and the insurgency that has severely affected its infrastructures in most sectors such as water, power, transportation, etc. In recognition of this need, the Ministry of Electricity (MoE) would like to promote the participation of the private sector in generating electricity through the adoption of BOO plans. The Ministry of Electricity conducted a tender, resulting in the signing of contracts with five potential investors to add 1,250 MW of new energy; however, progress has been stalled [16, 17]. Previous studies conducted by Healy (2010), through a questionnaire on BOT contracts in Iraq, have shown that the concept of BOT contracts is uncommon in Iraq. Globally, research and implementation in the BOT delivery system have directed several effective ways to leverage private sector funds, technological innovation, managerial skills, and operational efficiencies to develop public infrastructure. However, many countries and regions lack BOT experience. The BOT concept works well in Hong Kong, with special reference to the five tunnels that have applied to it [19].

4. Major participants in BOT projects - BOT structure

In general, projects are long life projects such as BOT; therefore, it has also demanded that the political and the government system must be stable enough to ensure return or repayment of investors to reduce their financial risks. Since the productive life of the project varies according to the type of project and structurally, it sometimes complicates the formulation of BOT policies and regulations so that all parties remain in their favor. Contractual arrangements between these parties and risk assessment can
be complex. Previous study papers by Al-Astad (2002) [22] and Liang (2006) [34] indicated that BOT projects involve a number of elements, which must meet together to ensure the success of the project.

The key stakeholders in projects of the BOT are:
- Host Government or Principal.
- Concessionaire or Project Company (Sponsor).
- Construction Contractor.
- Operation and Maintenance Contractor.
- Financial or Lending Institutions or Lenders.
- Equity Investors.
- Suppliers.
- End Users.

5. **BOT applicability decision factor**

To determine the applicability of BOT contracts, the factors contributing to success and restraint factors must be known. The government should assess the Factors that make the host country attractive to lenders and foreign investors as investors should [2]. Thirty-two BOT decision factors have been collected and nominated from several previous studies. All factors will be assessed based on the importance weight assessment of the field survey. Since it is not possible to include all decision factors for all types of different BOT projects, from previous studies, decision-making factors carefully selected, like Mubin (2016) [12], Salman (2015) [2], Abdel Aziz (2012) [3], Chen (2007) [13], Zhang (2005) [22], Sherif (2005) [18], Ock (2002) [23], Tiong (1996) [25], and Tiong (1992) [24]. In addition, other factors have been added and they are related to the case of Iraq such as the security and political situations. The impact of the Investment Law No. 13 on 2006 with modifications in order to be comprehensive. The critical factors can be identified based either on expert opinion or on quantitative measures [23].

5.1 **Political and security stability of the host country of the project.**

In general, BOT projects require an appropriate economic and political climate, a specific and stable regulatory and legal environment, a freely convertible currency, as well as other elements suitable for foreign investment [15, 22]. The stability of security and political situation of host country can be considered the most important elements of the success of investment projects.

5.2 **The independence organizations and institutions that in-charge on privatization and investments.**

Various ministries and their staff at the provincial and municipal levels often govern infrastructure projects and the interferences can occur among them. Therefore, the project approval procedure is difficult and full of uncertainties either to bidders or to the sponsoring government agency or concessionaires [15].

5.3 **Develop a legal framework is logical and reasonable to accommodate the concept of BOT contracts and to ensure the rights of all parties involved in the project, according to experts in this field.**

A practical legal and regulatory framework must be developed to enable the formulation of effective contractual agreements for BOT projects that are consistent with the country's legal system. This framework needs to be updating with experience and lessons learned over time. The development of new laws should not be in consisting with prevailing laws [22, 26].

5.4 **The need for experts with a high level of qualifications and practice in BOT contracts who have the experience of the actual preparation of contractual assignment and negotiating methods.**

Participants in the BOT projects must include qualified professionals with a high degree of qualification. The competent authorities of the bidding government must have sufficient experience in the BOT system to form project documents and evaluate project bids [2].
5.5 The application and adherence to standards, laws, and regulations for the implementation of infrastructure projects and developed in accordance with qualified experts who have actual practice in this area.

For BOT projects to succeed there must be regulations and Laws that govern the lenders and sponsors such as security legislation, foreign investment, corporate law, taxation, etc.

5.6 Centralization of the decision in developing the infrastructure projects.

A critical factor in the success of BOT projects is the decision to choose the right project to start [24]. Therefore, the decentralization of decision on the infrastructure development projects is important for applicability of BOT [11, 28]. The political and technocratic forces influence this decision [29]. The government must decide whether a doubtful facility project should be operated either under the BOT system or to the sponsoring publicly [30].

5.7 Attraction and the strength of the legal guarantees provided by the host government to the investor.

The host government offers legal guarantees to the project promoters like supporting loans, guarantees of minimum operating income etc. If projects not covered in an existing political and legal framework, the development process must achieve new ground, often against a firm opposition [27].

5.8 The impact of the Investment Law No. 13 of 2006.

The most important law that regulates the investment in a infrastructure project in Iraq is the Investment Law No. 13. This approved by the Iraqi Parliament in October 2006 and became effective in January 2007 [31]. The organization of investment in infrastructure projects in Iraq based on Investment Law No. 13, which approved by the Iraqi Parliament in October 2006 and became effective in January 2007 [31].

5.9 Government experience in BOT contracts.

An important factor in the development of infrastructure projects by the BOT, the host country of the project must be familiar with and understand BOT contracts from the contractual, technical, financial, economic, legal and other aspects as it considered the main party in this approach.

5.10 The company experience in implementing BOT contracts.

There must be a strong partnership within the consortium for a successful BOT project. The Consortium should have persevered financial strength for protracted negotiations and a multidisciplinary and a multi-stakeholder group of stakeholders [24]. The stakeholder group may be small, but it must be composed of highly qualified professionals with technical, financial, engineering and local partners, especially those with Political relations [32]. It is necessary to include a local company in a BOT consortium and this applies to many developing countries [27].

5.11 The economic system is encouraging and appropriate to the host country of the project.

A favorable economic system is one of the factors that private investors attach particular importance to, including the economic system of the host country, the degree of development of market structures and the degree to which the country has already been successful in privately financed infrastructure projects over the years [33].

5.12 Evidence of the tax rate to the investor and the project.

Another way that the Government could support the implementation of privately financed projects was to grant some form of exemption or reduction of taxes and customs to encourage foreign investment, as in some countries [32].

5.13 Technological development of the host country.

One of the factors that help attract foreign companies to invest in the technological development of the host country as this technology helps to reduce costs and save time, especially in large projects.
5.14 Project type (service projects, investment, energy, etc.).
The quality of the project significantly affects the viability of the project and determines that; therefore, determining the products area and the future expansion of the project helps to estimate the amount of capital and expected risk. In relation to the BOT concept, it is usually preferable for projects with cost-effective content, whether of service or productivity, but investors would prefer a quick profit as soon as fast.

5.15 Limited competition from other projects in the same type and specialty.
Unlike traditional bidding, BOT does not necessarily aim to increase the number of competitors. The limited number of competitors is important in the BOT project and aims to improve quality. Bidding on a BOT is usually expensive. A long list of bidders will hold a negotiation process with bidders [2].

5.16 Accept and understand the idea of the project by the public (end user).
Facilitate the development under a good quality service that should provide. That is the government objective required for such BOT projects and the tolls/tariffs should be acceptable to the public. The level of tariff and revenue depends on the accuracy of expectations. Therefore, the sponsors must study carefully the traffic-volume forecasts.

5.17 The strength of the technical and economic feasibility study of the project.
All technical and economic data required for the overall socio-economic assessment of the project must be present in the feasibility study [34]. The feasibility study for the evaluator must be unable to complain about lack of data or incomplete analysis because the decision maker does not find anything hidden or missing.

5.18 General needs for the service or product available from the Project (offer and demand).
The need for a particular the project must be evaluated and determining before the tender is announced [35]. There must be a clear and acceptable need for the project [27]. For example, utility projects such as a power plant or water supply, the obvious need is a severe shortage of electricity or water to meet domestic or industrial demand [26].

5.19 Functional capability of the project and meeting the requirements of the public service.
The BOT project design function must meet at least project requirements, provide a project that largely matches the user's expectations, and satisfies the government. The design function must be tested thoroughly before proceeding with bidding [2].

5.20 Amount of fee or pricing for the product or service provided by the project and the proper adjustment formula as even it ascending or descending.
Fees must clearly define for users to be proportionate to the economic situation of users. There should be no differences between the investor and the government regarding the definition of fees. [2].

5.21 The simplicity of design of the project.
BOT must be flexible in growth and future changes, and the design concept must has designed to achieve the flexibility and simplicity of future change and scalability to accommodate future growth [2].

5.22 Concession period and Construction for the project.
The period of Concession is an important factor affecting the success of the Bot projects directly and effectively, especially in the high rates of inflation in developing countries. [2].

5.23 Cost of the project.
The main objective of the investor and the government is the cost of the project because it affects the economic viability of the project by the government and investors.
5.24 The viability of capital recovery during the operation period.
The internal rate of the expected unplanned revenue generated by the project investment called ROI [2].

5.25 Sufficient profits through the operation of the project.
The BOT project will not be funding normally unless the financial position of the project is sufficient to attract private sector investment. For this reason, project performance and financial evaluation are the cornerstones of the full feasibility analysis of the BOT project [16].

5.26 Strength and guarantee of the financial institutions of the project and financial facilities.
Banks often offer a loan facility for any cost overruns not covered by the BOT contract [37]. Therefore, they require the first security on the infrastructure that had created. In addition, there must be sufficient capacity to manage the financial aspects of the project and the ability to maintain financing requirements for all phases of the project [32].

5.27 Flexibility in the conversion of currency to and from the host country of the project.
Foreign currency must be protected from losses arising from the inability of the investor to convert the local currency legally (capital, interest, head, profits, proceeds and other transfers) into foreign currency and / or local currency conversion or foreign exchange outside the country where such a case resulting from government action or failure to act. Compensation must have paid in the currency specified in the World Insurance Contract [36].

5.28 Availability of resources.
The host country should be examining and evaluating, and other resources to be imported should have identified prior to the commencement of the bidding process [2]. The availability of project resources such as equipment, raw materials, and fuel supplies are important for BOT project.

5.29 Availability of skilled labor in the country.
When delivering some responsibilities to the project, the government reaches a set of skills provided by the private party. These skills include all skills required in infrastructure development, project management skills, contract management skills and specific service skills [37] if the service purchased. In addition, it must be ensured that sufficient skills and experience exist in both the public and private sectors and those they are effectively deploying in project planning during the subsequent procurement and delivery process [36].

5.30 Considerations of the project's impact on health and public safety.
Determining the project's compliance with environmental standards is important for the environment surrounding the proposed project [2].

5.31 Expansion and future development of the project.
Once the project is completed and operational, there is a real need to expand the project so the designs must be qualified and prepared in a way that will accept future development [2].

5.32 The geographic location of the project.
Opportunity studies for small industrial investment projects can be preparing for geographical regions and for specified sectors, it also needs to take into consideration the distribution of consumers, who might for instance, be clustered in certain areas or dispersed over a region [34].

6. Fieldwork
The fieldwork is divided into two phases the Phase I includes personal interviews. To collect the information and the opinions of top seniors manages, and the participants of BOT projects including the host government represented by the administration of the institutions and the head of each department for each ministry and institution of the government who have a good impact on the
infrastructure development in Iraq. In addition, to the private sector represented by the investors and the academic in the projects managements sector that have knowledge in BOT concept. These information and opinions are being about the basic concept of the infrastructure status in Iraq and the knowledge of BOT culture in Iraq. Phase II includes constructing closed questionnaire forms depending on the results obtained from personal interviews and review of literature, distribute these forms to the individuals to answer the questions, collect forms, then statistical analysis, and discussion of the results have obtained.

7. Method of analyzing the results of the questionnaire
Results analysis depends on the frequency number of responses and the weighted rate of answers to determine the prevailing views of respondents by the steps:
- Questions consist of five options since respondents' answers to one of these options. The options were as shown in Table 1.

| Answers       | Weak   | Medium | Good   | Very Good | Excellent |
|---------------|--------|--------|--------|-----------|-----------|
|              |        |        |        |           |           |

- The first step of the analysis begins by determining the frequency count for each of the five options.
- To calculate the weighted average of respondents' answers, a weighted value for each selection has assumed based on a number of previous research. This is the average range of the assumed interval of each answer, as shown in Table 2.
- To calculate the average of weight, by the Equation 1.

\[
\text{Weight Average} = \frac{\sum (\text{Number of Frequencies} \times \text{Weight Value for the Particular Choice})}{\text{Total Number of Answers}} \quad (1)
\]

Table 2. Assumed Weighted Values for Answers [18].

| Answer      | Interval  | Weighted Value |
|-------------|-----------|----------------|
| Weak        | 0 - < 20  | 10             |
| Medium      | 20 - < 40 | 30             |
| Good        | 40 - < 60 | 50             |
| Very Good   | 60 - < 80 | 70             |
| Excellent   | 80 - 100  | 90             |

8. The significance weight of BOT applicability decision factors
To evaluate each factor impact on the applicability of BOT contracts the research uses the same formula as Equation 1 to calculate the weighted average, and the same interval that assumed for each of the answers, as shown in Table 2. For example, the data of question 15 given in Table 3, to complete the analysis of the answers to question 15, as follows:
Table 3. Number of frequencies for each answer choice of question 15.

| Question | Weak | Medium | Good | Very Good | Excellent |
|----------|------|--------|------|-----------|-----------|
| limited competition from other projects in the same type and special | 5    | 11     | 20   | 11        | 38        |

Weight Average = \( \frac{5 \times 10 + 11 \times 30 + 20 \times 50 + 11 \times 70 + 38 \times 90}{85} = 65.53 \)

Therefore, the next step, evaluate the results that obtained by comparing them within the assumed intervals. As a result, it concluded from the above example that the result is within the interval 60-80 and this means the answer is "very good". Moreover, it indicates that the factor No.15 (Limited competition from other projects in the same type and special) have a very good impact on the applicability of BOT. Mathematically, this factor affects with 65.53% on the applicability of BOT. For the speed of calculations and to obtained greater accuracy, the researcher depends on the MS Excel program 2016 to extract the weight average for each factor, and the results are as shown in Table 4.

Table 4. Results of the statistical analysis for the factors effects on the applicability of BOT.

| SN | Question                                                                 | Factor weight |
|----|---------------------------------------------------------------------------|---------------|
| 1  | Political and security stability of the host country of the project.       | 72.64         |
| 2  | The independence organizations and institutions that in-charge on privatization and investments. Develop a legal framework is logical and reasonable to accommodate the concept of BOT contracts and to ensure the rights of all parties involved in the project, according to experts in this field. The need for experts with a high level of qualifications and practice in BOT contracts who have the experience of the actual preparation of contractual assignment and negotiating methods. The application and adherence to standards, laws and regulations for the infrastructure projects implementation and developed in according to the qualified experts who have actual practice in this area. Decentralization of decision in the development of infrastructure projects and developing new laws not inconsistent with the prevailing laws. Gravity and the strength of the legal guarantees provided by the host State to the investor. | 69.34         |
| 3  | The impact of the Investment Law No. 13 of 2006.                           | 68.88         |
| 4  | Government experience in BOT contracts.                                  | 68.66         |
| 5  | The company experience in implementing BOT contracts.                    | 68.66         |
| 6  | Economic system is encouraging and appropriate to the host country of the project. | 64.55         |
| 7  | Evidence of the tax rate to the investor and the project.                | 62.66         |
| 8  | Technological development of the host country.                           | 65.55         |
| 9  | Project type (service projects, investment, energy, etc.).                | 57.88         |
| 10 | Limited competition from other projects in the same type and specialty.  | 65.53         |
Continued Table (4)

| SN | Question                                                                 | Factor weight |
|----|--------------------------------------------------------------------------|---------------|
| 19 | Functional capability of the project and meeting the requirements of public service. | 65.77         |
| 20 | Amount of fee or pricing for the product or service provided by the project and the proper adjustment formula as even it ascending or descending. | 44.94         |
| 21 | Simplicity of design of the project.                                     | 35.40         |
| 22 | Construction and concession period for the project.                      | 42.41         |
| 23 | Cost of the project.                                                     | 41.03         |
| 24 | Viability of recovery of capital in the operating period of the project. | 67.47         |
| 25 | Sufficient profits through the operation of the project to attract investors. | 62.72         |
| 26 | Strength and guarantee of the financial institutions of the project and financial facilities. | 60.68         |
| 27 | Flexibility in the conversion of currency to and from the host country of the project. | 61.60         |
| 28 | Availability of resources.                                               | 70.00         |
| 29 | Availability of skilled labor in the country.                            | 67.32         |
| 30 | Considerations of project's impact on health and public safety.          | 63.48         |
| 31 | Expansion and future development of the project.                         | 65.45         |
| 32 | Geographic location of the project.                                      | 66.02         |

9. Conclusions

- The percentage of factors that affect with medium Weight on BOT application is 9.
- The percentage of factors effect with Good Weight is 19.
- The factors that have impact with Very Good Weight it is about 72% of the factors.
- Factor No.1 effect with 72.64% on the applicability of BOT, which means it has the greatest impact on the applicability of BOT among the other factors.
- Factor No.8 effect with 20.54% on the applicability of BOT, which means it has the lowest impact on the applicability of BOT among the other factors.

The factors that have impact with less than 50% are F8, F9, F10, F20, F21, F22, and F23, respectively. The weight percentages for each one of these are 20.45, 23.95, 30.88, 44.94, 35.4, 42.41, and 41.03.

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