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# Optimizing Methods of Funding Residential Complexes Projects

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***Abstract:*** Residential complexes suffers from a series of complex problems that make the progress of projects difficult either in new projects or in the rehabilitation of existing projects. The Residential complexes problem, especially in developing countries, including Iraq, faces many challenges. Perhaps the most difficult problem is the problem of financing, since financing is an essential element in the completion of projects he Iraqi government, whether locally or globally, has faced a severe shortage of financing due to financial crises and security conditions, which has resulted in incomplete projects. Because of the financial crisis that Iraq went through, which led to the suspension of many residential complexes projects and the difficulty of returning work to them through the use of public financing methods therefore the researcher study the private financing (Public-Private partnership) methods instead of public financing method in residential complexes projects by the optimization models that will be used on two stages , the first stage by maximize the number of the projects turn into investment and the second stage by selecting the optimal financing method for the investment project by using PSO , GSA and GA algorithms..

***Keywords:*** *finance methods; residential complexes projects; Optimizing Methods.*

## 1. Introduction

Traditional methods of financing government Residential complexes through budgetary provisions and execution by direct contract award has proven to be inadequate and most often unimplemented creating a financing gap for execution of projects. Raising capital to finance Unfinished projects is a challenge. Private investors could not only help to provide the financing, but also help to ensure that a project is run efficiently. If contracts are designed properly, private investors have an incentive to see that an projects is executed efficiently because it increases the likelihood that their investment is safe and as profitable as expected. The challenge for project owners, and hence the public sector, is to design contracts such that the risks and returns are distributed in an incentive-compatible way. The Iraqi state, then, has to experiment with new incentives to involve the private sector into the government project sector.The traditional financing may not be sufficient to provide all the necessary funds for the development of residential complexes [1]. Therefore, building development is not a responsibility Only the government can implement projects through public-private partnerships Where it is an auspicious way to attract private financial resources. A public-private partnership is a collaborative relationship between public entities and Private entities through a legal framework based on mutual benefit in relation to Projects that are in the interest of the government and monitor a specific time period. Public-private partnership has become a popular tool for building development worldwide [2]. PPP enables Governments to get projects and implement them without the need for it Borrow or raise taxes (World Bank, 2009). In developed and developing countries also, PPP . has been used Also in the development of infrastructure and the development of buildings through its various arrangements. There are several projects in many countries that have been successfully implemented through this approach.

There are Barriers of Application PPP Approach

Table (1) shows the barriers to PPP implementation identified by previous researchers

| Authors and Year | Barriers |
|---|---|
| [3] | Inadequate skills and experience; a protracted bidding and negotiation procedure; a lack of competition; and a lack of a well-established legal framework |
| [4] | Legal and political and risks; adverse economic and commercial conditions; a lack of mature financial engineering methodologies; public sector-related issues (e.g., inexperienced government and a lack of awareness of PPP); and private sector-related issues (e.g., most people, including investment banks still prefer traditional methods). |

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| | |
|---|---|
| [5] | Inadequate skills and expertise, as well as a protracted bidding and negotiation procedure |
| [6] | In the public sector, there is a scarcity of financial expertise. a failure to use innovative funding instruments and procedures, The public sector's financial and tax support is insufficient. The inability to guarantee a return on investment and a fair profit, During the commissioning era, the project's financial dependence on other projects, government's a scarcity of liquidity in the private sector, Contractors' lack of attention to cost-cutting techniques, Due to inflation, there is a lack of confidence in financial costs throughout maintenance and commissioning, and there is a lack of financial feasibility of the project for the private sector. Low contract values and a lack of investment certainty |

Table (1) The barriers to PPP implementation

Knowing residential finance requires knowing the criteria that are used for financing in the field of residential, which can located into the following [7]:

### 2. 2. Financing according to the ownership of the invested money

2.1 Public financing

It means the financing that is managed on the general budget of the state. Public financing stems from the main sovereign sources, which are taxes, fees, and the transferred public sector surplus.

2.2 Financing the private sector

its sources are divided into three main items, namely self-financing, bank financing, and the stock market.

2.3 Financing (Public-Private Sector Partnership)

The most popular and effective private sector methods are B.O.T projects, and there are many huge projects globally that have been carried out under the B.O.T system.

The term BOT is used a lot and it has been widely used to express a large group that includes a number of types of contracts, usually between two parties, one of whom is the government or the country that wants to implement a project and the second party from the local or international private sector, and this contract includes the rights and duties of each party according to the type of contract or privileges.

This group includes (Muhammad M.,2005) the following:

1. B.O.T (Build, operate and transfer)

this contract is between two parties, the first party is the government and the second party is the private sector that builds and operates for a certain period of time and then transfers ownership to the first party.

2 . B.O.O.T (Build, operate, owns and transfer)

is a contracting system in which the private sector builds the project and exploits it for a limited period during which it itself is the owner and takes all the project's proceeds during that era, and eventually transfers the ownership of the project to the government.

3. B.O.O (Build, operate and own)

is a contracting system in which the private sector builds, operates and owns.

4.B.O.L.T (Build, operate, lease and transfer)

is a contracting system in which the private sector builds, operates, leases and transfers ownership after a period of time.

5. B.T.O (Build, transfer and operate)

a system in which the private sector builds, transfers ownership and then operates.

6. M.O.T (Maintain, operate and transfer)

Modernization or development, operation and transfer of ownership.

7.B.L.T (Build, lease and transfer)

where the private sector builds the facility and the project and rents it for a period and then transfers the possession to the public sector.

8. B.O.R (Build, operate and renew concession)

In this contract, the private sector builds and operates the project and renews the concession.

9. D.B.F.O (Design, Build, finance and operate)

the private sector designs, builds, finances and manages the facility or project.

10 .R.O.T (Rehabilitate, operate and transfer)

In this contract, the government gives the private sector the responsibility and bears all risks for repair (rehabilitation), upgrading existing investments, applying new technologies, then operating and transferring ownership.

11. O.M ( Operation and maintenance)

12. Concession:

Concession contract, the private sector shall have the right to own and manage a facility or project and to take the proceeds from it during the concession phase.

The B.O.T projects provide the government with the necessary financing for various projects, and hence the countries of the world, whether developed or developing, have sought the participation of the private sector in the implementation, management and operation of projects (Ikram, Ab. Aziz,2008). Among the most important justifications for resorting to this is the inability of governments to achieve sustainable development on their own, reducing costs, sharing risks, improving the level of service, achieving an additional return, and speeding up implementation according to specifications [8].

### 3. Data Acquisition Stage

In order to solve the problem of financing for Residential Complexes projects, data were collected from different methods, first from previous studies as mentioned in the second chapter. Then the data from the field study was collected into two sources, paper data and questionnaires. The data is represented as follows in figure (1)

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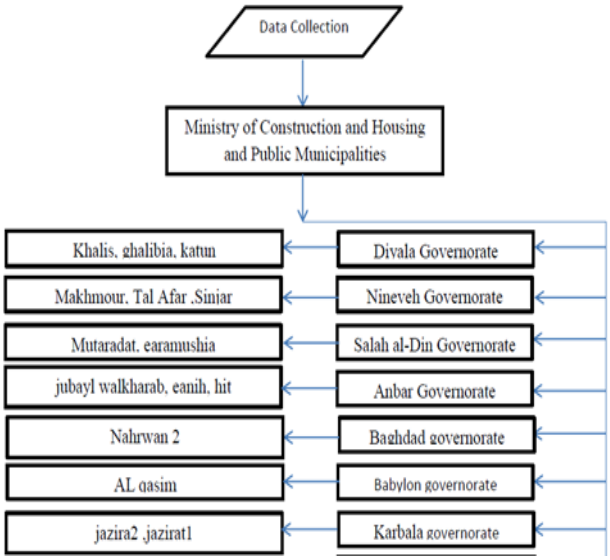


Figure (2) data collection

**4. Applying the algorithms**

This section include the applications of the algorithms in the residential complexes projects in term of increasing the efficiency or the numbers of complexes projects that can be turn into investments.

4.1 Gravitational Search Algorithm (model 1)

The steps of the algorithm in the selecting the numbers of the projects as shown in the flowcharts in figure ( 2 )

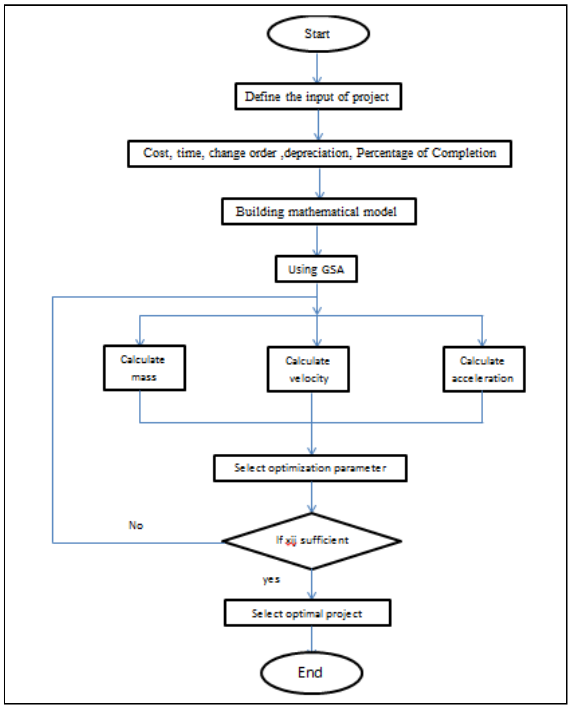


Figure (2) The steps of the algorithm GSA

the algorithm that has been used is explained in the algorithm below

| Algorithm :- Select The Optimal Projects that Can be Invested Using GSA |
|---|
| Input: Data of the entire projects<br>Output: minimization the change order to select optimal projects |
| Begin<br>Step (1): Input the GSA parameters<br>Step (2): Define the file name<br>Step (3): Define the range of the data<br>Step (4): Calculate the mass, velocity and acceleration<br>Step (5): Define the mathematical model<br>Cmij(i)= bmax-ci(i))* pj(i)* max(xij);<br>Smij(i)= tmax- Dij(i)) * pj(i)*max(xij) ;<br>if xij(i)+X(1,n)> 0 & xij(i)+X(1,n)<= 1<br>Zz=chij(i)*0.001;<br>Else<br>Zz= chij(i)* X(1,i);<br>Ch is the change order of the projects<br>tmax is the total time for the entire projects<br>D is additional time added to the project<br>bmax id the total budget of the projects<br>Pj completion ratio<br>xij from 0-1 which is uncertainty variable<br>Step (6): Define upper and lower limit for Xij which is range from 0-1<br>Step (7) : Calculate the objective function according to<br>Min Zz= chij(i)* X(1,i);<br>Step (8) : Update the mass , velocity and acceleration<br>Step (9) : Optimize the projects<br>END |

4.2 Result

This section include the results of the first model , which ,mean select the projects that candidates to be award to the investments (PPP).

Table (2) show the inputs that have been used in the mathematical model that include information about the projects regarding their cost , time , additional time , and change orders.

| Item | Government | Projects | cij | pi | D | B | T | CH |
|---|---|---|---|---|---|---|---|---|
| R1 | Diyala | ghalibia | 40059 | 63.1 | 510 | 65340 | 2220 | 1642 |
| | | katun | 23021 | 52.8 | 485 | 53002 | 852 | -12 |
| | | Khalis | 12611 | 26.9 | 246 | 1122379 | 913 | 89 |
| R2 | Nineveh | Tal Afar | 15402 | 28.03 | 176 | 58688 | 911 | 451 |
| | | Sinjar | 15875 | 41 | 80 | 42808 | 730 | 845 |
| R3 | Salah al-Din | Mutaradat | 39051 | 71.3 | 812 | 59204 | 900 | 829 |
| | | earamushia | 966 | 4 | 27 | 57015 | 880 | 0 |
| R1 | Anbar | jubayl walkharab | 17870 | 33.9 | 106 | 45174 | 915 | 0 |
| | | eanih | 56599 | 96.6 | 0 | 52131 | 913 | 4293 |
| | | hit | 52124 | 84 | 80 | 59525 | 913 | 1987 |
| R2 | Karbala | jazira2 | 27717 | 51.2 | 681 | 74517 | 913 | 3391 |
| | | jaziratl | 7853 | 19.3 | 176 | 52520 | 577 | 76 |

Table (2) input of GSA (model 1)

After the inputs have been completed , there were entered to the algorithms GSA as shown in the following section :

4.2.1 GSA Results (model 1)

This section include the results of the algorithm and as illustrated in the table (3) that show the output of the algorithm.

| Government | Projects | Zij | Xij | Velocity s |
|---|---|---|---|---|
| diyala | katun | 0 | 0.27 | 0 |
| Nineveh | Tal Afar | 0 | 0.99 | 0 |
| Salah al-Din | earamushia | 0 | 0.99 | 0 |
| Anbar | jubayl walkharab | 0 | 0.01 | 0 |
| Karbala | jazirat 1 | 0 | 0.99 | 0 |

In case of diyala government, the project that be select (katun) at iteration 50 with velocity 0 ,xij=0.27 and zij= 0 see figure (3)

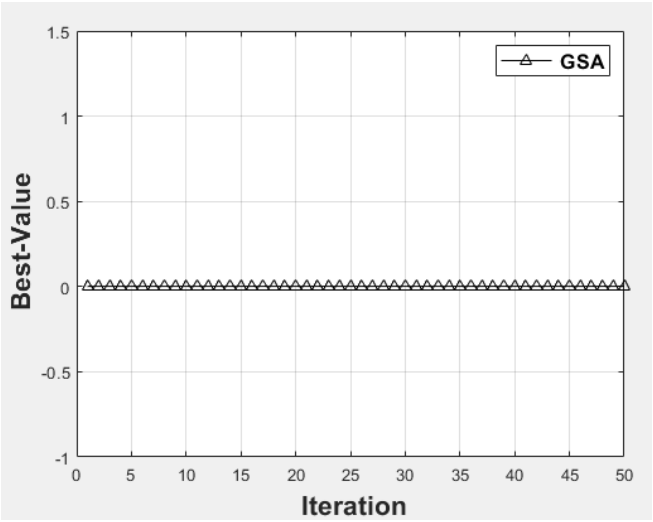


Figure (3) katun Residential Complex (GSA)

In case of Nineveh government, the project that be select (Tal Afar) at iteration 50 with velocity 0 ,xij=0.99 and zij= 0 see figure (4)

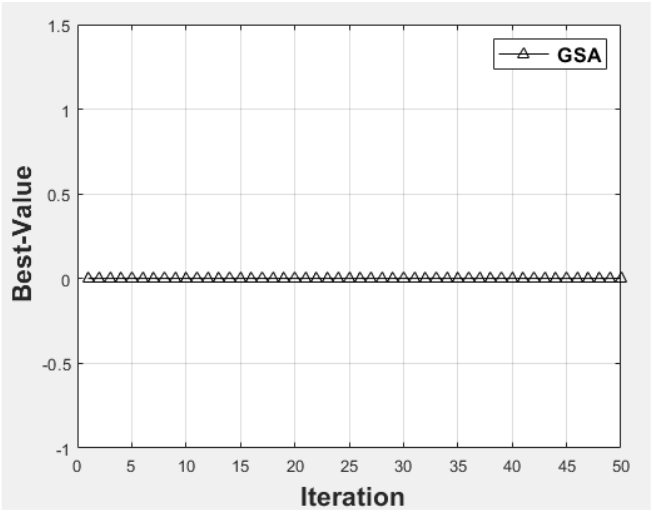


Figure (4) tal afar Residential Complex (GSA)

In case of Salah al-Din government, the project that be select (earamushia) at iteration 50 with velocity 0 ,xij=0.99 and zij= 0 see figure (5)

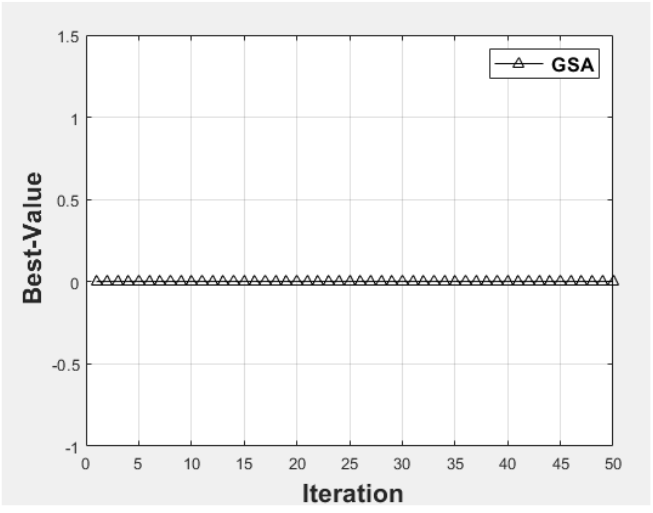


Figure (5) earamushia Residential Complex (GSA)

In case of Anbar government, the project that be select (jubayl walkharab) at iteration 50 with velocity 0 ,xij=0.01 and zij= 0 see figure (6)

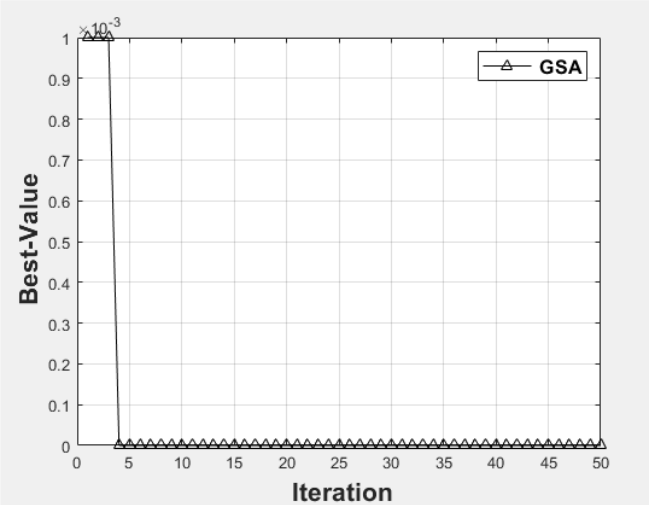


Figure (6) jubayl walkharab Residential Complex (GSA)

In case of karbala government, the project that be select (jazirat 1) at iteration 50 with velocity 0 ,xij=0.99 and zij= 0 see figure (7)

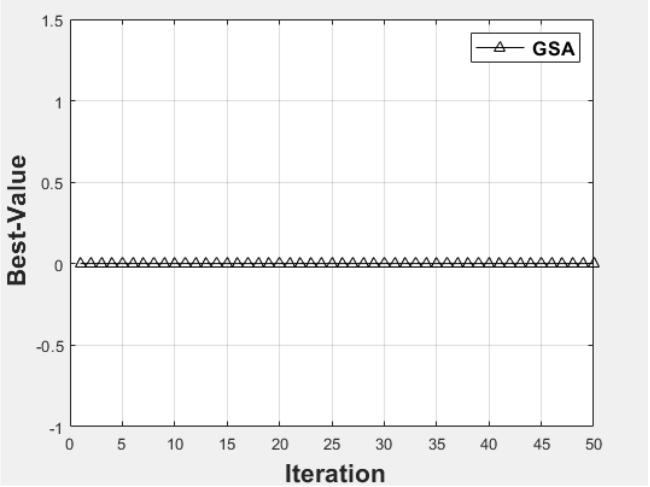


**figure (7 ) jazirat 1Residential Complex (GSA)**

4. 3 Selecting Optimal Financing Method

This section include the selection of the optimal financing method the projects that have been selected to the investment by using the same algorithms and as follow:

4.3.1 GSA algorithm (model 2)

This algorithm is used to select the optimal financing method for the projects Algorithm below

| Algorithm: Select The Optimal Projects that Can be Invested Using GSA |
|---|
| Input: Data of the entire projects<br>Output: minimization the change order to select optimal projects |
| Begin<br>Step (1): Input the GSA parameters<br>Step (2): Define the file name<br>Step (3): Define the range of the data<br>Step (4): Calculate the mass, velocity and acceleration<br>Step (5): Define the mathematical model<br>Dj *Xij < 0.1 B<br>Cij *Xij <B<br>sij*Xij <0.2 T<br>Zz=eij(i)*0.001;<br>Else<br>Zz= eij(i)* X(1,i);<br>T max is the total time for the entire projects<br>D is depreciation<br>Bmax is the total budget of the projects xij from 0-1 which is uncertainty variable<br>Step (6): Define upper and lower limit for Xij which is range from 0-1<br>Step (7) : Calculate the objective function according to<br>Max Zz= eij(i)* X(1,i);<br>Step (8) : Update the mass , velocity and acceleration<br>Step (9) : Optimize the projects<br>END |

Table (4) show the inputs that have been used in the second mathematical model.

| Method of (PPP) | e | T | B | Sj | Sij | ci | R |
|---|---|---|---|---|---|---|---|
| Build-Operate-and-Transfer (BOT) | 0.9 | 852 | 53002 | 681.6 | 5300.2 | 0 | R1 |
| Build-Own-Operate-and-Transfer (BOOT) | 0.8 | 852 | 53002 | 553.8 | 6360.24 | 0 | |
| Build-Own-and-Operate (BOO) | 0.77 | 852 | 53002 | 468.6 | 4770.18 | 0 | |
| Design-Build-Finance-Operate (DBFO) | 0.87 | 852 | 53002 | 656.04 | 5830.22 | 0 | |
| Build-Transfer-and-Operate (BTO) | 0.85 | 852 | 53002 | 570.84 | 8480.32 | 0 | |
| Build- finance- operate -maintain- transfer (BFOMT) | 0.78 | 852 | 53002 | 485.64 | 9540.36 | 0 | |
| Build, operate and renew concession (BOR) | 0.67 | 852 | 53002 | 639 | 4240.16 | 0 | |
| Rehabilitate, operate and transfer (ROT) | 0.89 | 852 | 53002 | 715.68 | 4664.176 | 0 | |
| Design - Build- maintain (DBM) | 0.74 | 852 | 53002 | 520.41 | 9540.36 | 0 | |
| Design- build- operate (DBO) | 0.87 | 913 | 53002 | 692.36 | 6360.24 | 0 | |
| Build-Operate-and-Transfer (BOT) | 0.99 | 911 | 58688 | 728.8 | 5868.8 | 0 | R2 |
| Build-Own-Operate-and-Transfer (BOOT) | 0.89 | 911 | 58688 | 592.15 | 5868.8 | 0 | |
| Build-Own-and-Operate (BOO) | 0.75 | 911 | 58688 | 501.05 | 5868.8 | 0 | |
| Design-Build-Finance-Operate (DBFO) | 0.87 | 911 | 58688 | 701.47 | 5868.8 | 0 | |
| Build-Transfer-and-Operate (BTO) | 0.89 | 911 | 58688 | 610.37 | 5868.8 | 0 | |
| Build- finance- operate -maintain- transfer (BFOMT) | 0.79 | 911 | 58688 | 519.27 | 5868.8 | 0 | |
| Build, operate and renew concession (BOR) | 0.78 | 911 | 58688 | 683.25 | 5868.8 | 0 | |
| Rehabilitate, operate and transfer (ROT) | 0.88 | 911 | 58688 | 765.24 | 5868.8 | 0 | |
| Design - Build- maintain (DBM) | 0.78 | 911 | 58688 | 519.27 | 5868.8 | 0 | |
| Design- build- operate (DBO) | 0.85 | 911 | 58688 | 501.6 | 5868.8 | 0 | |
| Build-Operate-and-Transfer (BOT) | 0.99 | 880 | 57,015 | 704 | 5701.5 | 0 | R3 |
| Build-Own-Operate-and-Transfer (BOOT) | 0.89 | 880 | 57015 | 572 | 5701.5 | 0 | |
| Build-Own-and-Operate (BOO) | 0.75 | 880 | 57015 | 484 | 5701.5 | 0 | |
| Design-Build-Finance-Operate (DBFO) | 0.87 | 880 | 57015 | 677.6 | 5701.5 | 0 | |
| Build-Transfer-and-Operate (BTO) | 0.89 | 880 | 57015 | 589.6 | 5701.5 | 0 | |
| Build- finance- operate -maintain- transfer (BFOMT) | 0.79 | 880 | 57015 | 501.6 | 5701.5 | 0 | |
| Build, operate and renew concession (BOR) | 0.78 | 880 | 57015 | 660 | 5701.5 | 0 | |
| Rehabilitate, operate and transfer (ROT) | 0.88 | 880 | 57015 | 739.2 | 5701.5 | 0 | |
| Design - Build- maintain (DBM) | 0.78 | 880 | 57015 | 501.6 | 5701.5 | 0 | |
| Design- build- operate (DBO) | 0.85 | 880 | 57015 | 695.4 | 5701.5 | 0 | |
| Build-Operate-and-Transfer (BOT) | 0.91 | 915 | 45174 | 732 | 4517.4 | 0 | R4 |
| Build-Own-Operate-and-Transfer (BOOT) | 0.86 | 915 | 45174 | 594.75 | 4517.4 | 0 | |
| Build-Own-and-Operate (BOO) | 0.77 | 915 | 45174 | 503.25 | 4517.4 | 0 | |
| Design-Build-Finance-Operate (DBFO) | 0.82 | 915 | 45174 | 704.55 | 4517.4 | 0 | |
| Build-Transfer-and-Operate (BTO) | 0.85 | 915 | 45174 | 613.05 | 4517.4 | 0 | |
| Build- finance- operate -maintain- transfer (BFOMT) | 0.88 | 915 | 45174 | 521.55 | 4517.4 | 0 | |
| Build, operate and renew concession (BOR) | 0.89 | 915 | 45174 | 686.25 | 4517.4 | 0 | |
| Rehabilitate, operate and transfer (ROT) | 0.89 | 915 | 45174 | 768.6 | 4517.4 | 0 | |
| Design - Build- maintain (DBM) | 0.95 | 915 | 45174 | 521.55 | 4517.4 | 0 | |
| Design- build- operate (DBO) | 0.89 | 915 | 45174 | 456 | 4517.4 | 0 | |
| Build-Operate-and-Transfer (BOT) | 0.96 | 577 | 52520 | 461.6 | 5252 | 0 | R5 |
| Build-Own-Operate-and-Transfer (BOOT) | 0.86 | 577 | 52520 | 375.05 | 5252 | 0 | |
| Build-Own-and-Operate (BOO) | 0.79 | 577 | 52520 | 317.35 | 5252 | 0 | |
| Design-Build-Finance-Operate (DBFO) | 0.86 | 577 | 52520 | 444.29 | 5252 | 0 | |
| Build-Transfer-and-Operate (BTO) | 0.81 | 577 | 52520 | 386.59 | 5252 | 0 | |
| Build- finance- operate -maintain- transfer (BFOMT) | 0.85 | 577 | 52520 | 328.89 | 5252 | 0 | |
| Build, operate and renew concession (BOR) | 0.92 | 577 | 52520 | 432.75 | 5252 | 0 | |
| Rehabilitate, operate and transfer (ROT) | 0.89 | 577 | 52520 | 484.68 | 5252 | 0 | |
| Design - Build- maintain (DBM) | 0.95 | 577 | 52520 | 328.89 | 5252 | 0 | |
| Design- build- operate (DBO) | 0.89 | 577 | 52520 | 273.6 | 5252 | 0 | |

Table (4) input of GSA (model 2)

This section include the results of the first algorithm and as illustrated in the table (5) that show the output of the algorithm.

| Government | Projects | method | Zij | Xij | Velocity |
|---|---|---|---|---|---|
| diyala | katun | BOO | 0 | 0.134 | 0 |
| Nineveh | Tal Afar | BOO | 0 | 0.442 | 0 |
| Salah al-Din | earamushia | BOO | 0 | 0.021 | 0 |
| Anbar | jubayl walkharab | DBFO | 0 | 0.453 | 0 |
| Karbala | jazirat 1 | BFOMT | 0 | 0.249 | 0 |
| Wasit | eleazizia | BFOMT | 0 | 0.102 | 0 |
| Wasit | aldibuni | DBO | 0 | 0.431 | 0 |
| Muthanna | Alramitha | DBFO | 0 | 0.321 | 0 |
| Diwaniyah | Aldaghaara | BOT | 0 | 0.010 | 0 |
| Diwaniyah | alsunia | DBFO | 0 | 0.431 | 0 |
| Diwaniyah | alshanafia | BTO | 0 | 0.260 | 0 |
| Maysan | qlieat salh | ROT | 0 | 0.058 | 0 |
| Dhi Qar | hay alshuyukh | BOT | 0 | 0.401 | 0 |
| Dhi Qar | eikika | BOT | 0 | 0.241 | 0 |
| basra | alsabikh | BOOT | 0 | 0.213 | 0 |

Table (5) out put of GSA (model 2)

## 5.Conclusion

the optimization models that will be used on two stages , the first stage include maximize the number of the projects turn into investment and the second stage include selecting the optimal financing method for the investment project by using GSA algorithms where the appropriate method was chosen for each project instead of the traditional methods. Various governorates were taken. Each governorate contains more than one project. Each method was chosen to suitable the project

## 6. References


[1]. Asian Development Bank, Public–Private Partnership Operational Plan 2012–2020:Realizing the Vision for Strategy 2020.The Transformational Role, Asian Development Bank, Mandaluyong City, Philippines, 2012.

[2]. Vanitha, D. D. . (2022). Comparative Analysis of Power switches MOFET and IGBT Used in Power Applications. International Journal on Recent Technologies in Mechanical and Electrical Engineering, 9(5), 01–09. https://doi.org/10.17762/ijrmee.v9i5.368

[3]. Akintoye, M. Beck, Introduction: perspectives on PPP policy, finance and management, in: A. Akintoye, M. Beck (Eds.), Policy, Finance and Management for Public–Private Partnerships, Blacwell Publishing Ltd., 2009.

[4]. Shabbar, Haroon, et al. "Empirical evidence of extension of time in construction projects." Journal of Legal Affairs and Dispute Resolution in Engineering and Construction 9.3 (2017): 04517008.

[5]. Zhao, Zhirong, Kirti Vardhan Das, and Kerstin Larson. Joint Development as a Value Capture Strategy in Transportation Finance. No. 10-3372. 2010.

[6]. Zavadskas, E.K.; Turskis, Z.; Tamosaitiene, J "Risk assessment of construction projects." Journal of civil engineering and management 16.1 (2010): 33-46.

[7]. Bulla, P. . “Traffic Sign Detection and Recognition Based on Convolutional Neural Network”. International Journal on Recent and Innovation Trends in Computing and Communication, vol. 10, no. 4, Apr. 2022, pp. 43-53, doi:10.17762/ijritcc.v10i4.5533.

[8]. Tamošaitienė, J., Sarvari, H., Chan, D. W., & Cristofaro, M.. "Assessing the Barriers and Risks to Private Sector Participation in Infrastructure Construction Projects in Developing Countries of Middle East." Sustainability 13.1 (2021): 153.

[9]. Ikram Abdel Aziz, and Louay Al-Malahweesh. Housing finance and housing need in Iraq with reference to some Arab experiences. Journal of the planner and development 19 (2008).

[10]. Boyapati, B. ., and J. . Kumar. “Parasitic Element Based Frequency Reconfigurable Antenna With Dual Wideband Characteristics for Wireless Applications”. International Journal on Recent and Innovation Trends in Computing and Communication, vol. 10, no. 6, June 2022, pp. 10-23, doi:10.17762/ijritcc.v10i6.5619.

[11]. Muhammad Mahmoud Abdullah Youssef ,Sources of funding for municipal investments in the fields of urban planning, movement and transportation and the extent of the development of these investments in Egypt .Urban Planning Symposium and Issues of Movement, Traffic and Transport in Arab Cities, Hama - Syria, p. 110. 2005

[12]. Sehirli, E., & Alesmaeil, A. (2022). Detecting Face-Touch Hand Moves Using Smartwatch Inertial Sensors and Convolutional Neural Networks. International Journal of Intelligent Systems and Applications in Engineering, 10(1), 122–128. https://doi.org/10.18201/ijisae.2022.275

[13]. Ghazaly, N. M. . (2022). Data Catalogue Approaches, Implementation and Adoption: A Study of Purpose of Data Catalogue. International Journal on Future Revolution in Computer Science &Amp; Communication Engineering, 8(1), 01–04. https://doi.org/10.17762/ijfrcsce.v8i1.2063