Identifying and investigating variables affecting Public Private Partnerships (PPP) in Iran by Importance-Performance Analysis (IPA)

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Abstract

This research aims to identify and evaluate the influencing variables on Public Private Partnerships (PPP) success. PPP contracts include some types of contracts which public sector due to its limited capability in infrastructure procurement or public service deliverance goes into partnership with private sector. In these types of contracts, Private sector accepts to finance or implement the project. There are different models for PPP, such as Build-Own-Operate (BOO), Build-Operate-Transfer (BOT), Build-Transfer-Operate (BTO) and Design-Build-Finance-Operate (DBFO) in action. During our research we explored among experts of this scientific field and distributed questionnaires among 25 of these experts. The questionnaire had two separate Likert spectrums to answer the questions. One was about the importance of variables and the other for evaluating the very existence of these variables in PPP contracts in Iran. The questionnaire had been formed based on the literature and theoretical-related articles. To measure the questionnaire's reliability, Cronbach's Alpha Test was used. While the output of this test in SPSS software was "0.934". Through this research we have used Importance-Performance Analysis (IPA) method for evaluating and ranking variables affecting success of PPP projects in Iran. As a result "Trust between partners" is the most important influencing variable existing throughout Iran's PPP contracts. Unfortunately this important variable had few existences in PPP contracts in Iran. As a result the public Agencies and the private consortiums should make a better and more trustful relation to each other to accomplish success on their agreement.

Keywords: Concession; Importance-Performance Analysis (IPA); Lease; Private Finance Initiative (PFI); Procurement and Management Contract; Public-Private Partnerships (PPP); Turnkey Contract.

1. Introduction

The Public Management movement emerged in 1980 in some industrial countries. This movement believed in market efficiency and public sector inefficiency. Advocates of New Public Management believe that public sector has not the necessary motivation to limit its size and operation area; therefore governments are large and inefficient. To solve this problem, the followers of management approach, suggested principles based on market such as compete with public sector to develop necessary motivations for emergence of a sufficient government. The advocates of fundamental principles of New Public Management and Public Private Partnerships (PPP) believe that by transferring responsibility of service delivery to private sector, the public sector is more efficient in control of market (Vrangbaek, Saltman, Bankauskaite, 2007).

PPP is a kind of contract between public and private sectors in which the private sector has a considerable responsibility of procuring financial and technical resources and participates in design, finance, build and operate risk of a project (Ngcuka, 2101). This type of partnership includes factors such as contract process, risk allocation, payment mechanism and cooperation between partners. Hasanzadeh(2012) has stated that for this economic activity, there are various models depending on contract type and transfer of risk such as: 1- Buy-Build-Operate (BBO) 2- Build- Own-Operate (BOO) 3- Build-Own- Operate, Transfer

(BOOT) 4- Build- Operate- Transfer (BOT) 5- Build- Lease- Operate-Transfer (BLOT) 6- Design- Build- Finance- Operate (DBFO) 7- Finance Only (FO) 8- Operate and Maintenance (O&M) 9- Design- Build (DB) 10- Operation License.

Building infrastructures takes place in long term; sometimes it takes 30 years and needs high initiative investment. Due to weakness of public sector to accomplish all of infrastructure projects governments can reduce problems of developing infrastructures by participating with private sector. This model is a well known method to accomplish infrastructure projects. In Britain from 2000 to 2004 in transport section more than 1000 projects were performed through PPP. It seems that it is necessary for Iranian policy makers to think about PPP for accomplishing infrastructure projects such as road, rail and airport transportations in Iran. Based on published information and statistics from World Bank in 2007 in Britain 17 € billion was invested in transportation section (Economic and Financial Report, 2010). So this research aims to identify and analyze variables affecting PPP success in Iran and provide applied suggestions to use this method in Iran.

2. Literature review

2.1 Theoretical Background

The Bureau of Effectiveness in Hong Kong presents this definition for PPP:
Arrangements in which both public and private sectors bring complementary skills and techniques to accomplish public projects and services (Ahmad, Azhar, Mohamad, 2007).

Based on PPP law in Kosovo, contracts of these projects should contain following issues:

1- Private partner should undertake activities that were already performing by public institutions in social field.
2- Private partner should undertake the whole or partial of risks associated with economic activities.
3- Government should provide annual report of required PPP through minister of economics and submit that report to Republic of Kosovo Parliament.
4- These partnerships should not cause privatization and disclaim of responsibility of public infrastructures from government and public institutions.
5- These projects should not include the right of harvesting mines and underground networks(Kosovo PPP law).

2.2 Types of Public Private Partnerships

There are different classifications of PPP models presented by different experts and researchers. For example Canadian Council for PPP classified models based on amount of activities in projects and responsibilities of each party and divided risk between parties (Ke, Wang, Chan, Cheung, 2009; Canadian Council for PPP, 2007).The most common forms of PPP are: Design and Build (DB), Design-Build-Maintenance (DBM), Design-Build-Operate (DBO), Build-Transfer-Operate (BTO), Design- Build-Operate-Maintenance (DBOM), Build-Operate-Transfer(BOT), Build-Own-Operate-Transfer(BOOT), Build-Own-Operate(BOO), Design-Build-Finance-Maintenance(DBFM). Many of these PPP models are performed by service contracts, management contracts, leas, concession or claim of ownership (Gunnigan, Rajput, 2010). Despite of several models of PPP are used in countries around the world only DB and BOT are used in Iran that recently is considered by politicians and juristic.

2.3 Types of PPP contracts

There are some common forms of contracts used in PPP projects as below:

1- Procurement and Management Contracts:
In this contract, private sector is paid by public sector to design, operate and manage workers and equipments of a facility. The payment is usually short term and based on performance of private sector. Management of a seaports or airports can be performed through these contracts (Addul Quium, 2011). In management contracts the management of the whole or part of the public institute undertakes by private sector. This contract causes private sector skills enter to design, procurement, operation and management of people and equipments (Hasanzadeh, 2012).

2- Turnkey Contracts:
In this method the private sector undertakes design and development of facility and operates for a determined period of time and the public sector finances the project (Shiravy, 2005). This type of contract is a traditional model for development of infrastructures by public sectors and in this way the

private sector is chose by bidding. The private sector in this contract undertakes all risks in design and construction phases without any force to increase investment in project, because the period of contract is short and all steps are defined in bidding process.

3- Lease/Farming:

In this form of PPP the lessee is responsible for operation and maintenance of leased infrastructural facility. This type of PPP is usually used with models such as BOT (Abdul Quium, 2011).

4- Concession:

In this type of PPP the government defines special rights to build and manage an infrastructural facility for a constant period of time and gives this right to a private sector. Government may be the final ownership of facility. In this contract payments are performed by two ways: 1- The Concessionaire pays to government according to an agreement 2- Government pays to Concessionaire for some of special commitments (Hasanzadeh, 2012).

5- Private Finance Initiative (PFI):

In this model the private sector is responsible for design, build and operate of an infrastructural facility. In some cases the public sector waives his ownership right. In this model the public sector purchases infrastructural services through an agreement with private sector. In this model the owner of facility is the public sector at the end of agreed period of time (Hasanzadeh, 2012).

2.4 Factors affecting the success of public- private partnerships in the world

Brink (2006) identified some of the most common obstacles for success of PPP which includes: lack of trust between two parties, lack of foreign investment, bureaucratic red tape, lack of leadership, poor management, fraud and corruption and political dominance. Brink examined mentioned factors in a research entitled “Corporate governance in public-private partnerships: A public sector management perspective” in 2006 in Hong Kong.

Researchers identified 19 success factors for PPP projects including: 1- strong private consortium 2- appropriate risk allocation and risk sharing 3- competitive procurement process 4- commitment/responsibility of public/private sectors 5- true and realistic cost/benefit assessment 6- project technical feasibility 7- transparency in the procurement process 8- good governance 9- favorable legal framework 10- available financial market 11- political support 12- multi-benefit objectives 13- government involvement by providing guarantees 14- sound economic policy 15- stable macro-economic environment 16- well organized public agency 17- shared authority between public and private sectors 18- social support 19- technology transfer.

3. Methodology

3.1 Theoretical framework

After studying several researches about PPP we chose 13 researchers that investigated success factors of PPP. Based on these success factors we developed a theoretical framework that contains 66 variables. Some of these variables are identified by many of researchers. The theoretical framework of this research is depicted in table 1 below.

Table 1. Success factors of PPP according to researchers around the world

Success Factors of PPP	Kwoak et a, 2009	Ismaeil et al , 2011	Helmy, 2011	Brink et a, 2006	Li et a, 2001	Chiung et a, 2009	Wong et a, 2006	Mital , Kumar , 2010	Hardcastle et al, 2007	Lihong, 2008	Chan et al, 2008	Agrawal, 2010	Mortazavi et al, 2012
Trust between two parties		X		X						X			
Foreign investment				X			X						

Legal framework		X	X	X		X	X		X		X		X
Leadership in partnership													
Project management				X	X							X	X
Political dominance and its effects on PPP project				X			X						X
Effective communications between two parties		X				X		X		X			
Cooperation among members and two parties								X					
Cooperative problem solving							X	X				X	
Variety, transparency and multi beneficiary of objectives		X				X	X	X	X				
Compatibility between two parties						X	X	X		X		X	X
Contract Management			X		X	X	X	X				X	
Risk allocation and risk sharing	X	X	X		X	X	X	X	X		X	X	
Support from project management			X			X		X		X			
Definition of roles and responsibilities of members and parties	X					X		X					
Balance of power between two parties						X		X					
Commitment of two parties		X	X			X	X	X	X				X
Economic stability while implementing the project		X	X			X	X		X				X
Specialty of private sector		X				X	X		X			X	
Government and political support from participation		X				X	X		X			X	
Transparency in PPP projects		X	X			X			X			X	
Flexibility for innovation in project implementation					X	X						X	X
Effective and positive media						X							
Public consultancy for participation						X							
Number of operative elements of project						X							
Predictability of project						X						X	

Market demand for products and services of project						X						X	
Availability of financial markets	X	X	X		X	X			X		X	X	X
Appropriate schedule						X						X	
Competitive procurement and selection of private sector	X	X	X		X	X	X		X			X	X
Safe and sound economic policies in the country that implements PPP		X	X				X		X				
Good governance		X	X						X				
Project technical feasibility		X							X				
Shared authority between public and private sectors		X	X				X		X				
Social support		X					X		X		X	X	
Well organized public agency		X	X		X				X				
True and realistic cost/benefit assessment		X							X				
Speed of PPP process			X										
Existence of complementary and various skills in project			X									X	
Strong incentives for private sector to participate			X		X							X	
Optimal use of assets and equipments in project					X		X					X	
Offering primary services for beginning of project					X								
Behaviors and actions outside the scope of the partnership agreement					X								
Environmental concerns and considerations					X		X					X	
Amount of duties and tariffs							X					X	
Effective control mechanism in projects							X						
Unnecessary and							X						

parallel works in project													
Stable political environment							X				X	X	
Development of job opportunities through project							X						
Offering stable and reliable services by project							X						
Value of project							X						
Size of project							X						
Previous experience of partners										X			
Appropriate performance of private sector										X			X
Existence of complete agreement between partners										X			X
Short period of time to implement project												X	
Effective organizational structures for private sector consortium												X	
Safety considerations in partnership												X	
Existence of proven technologies for project												X	
Safety of investment													X
Interference of government in PPP project													X
Participation of private sector in legislation of PPP													X
Meritocracy in public sector													X
Bureaucracy in the country implementing PPP													X
Cultural obstacles for implementation of PPP													X
Inability of public sector to renew its structure for PPP													X

3.2 Data analysis

This research is an applied survey research. We used exploration method for data collection. In exploration studies, studying research literature and performing explorative interview helps to formulate theoretical framework. Studying research literature helped us to develop the questioner. Since the concept of PPP is a new course of discussion in Iran, access to experts in this field of study was difficult. The questioner including 66 items about variables of research distributed among 25 experts in the field of PPP.

Questionnaire formulated based on theoretical fundamentals and related articles. To examine reliability of questionnaire, Cronbach Alpha was used through SPSS software and the acquired value was 0.934. Table 2 shows reliability of questionnaire.

Table 2. Reliability of questionnaire

Cronbach Alpha	Number of items
0.934	66

3.3 Importance-Performance Analysis (IPA)

IPA is a statistical instrument for prioritizing plans and projects. In this model there are two criteria: importance and performance. In IPA the priority is with high importance and low performance plans. Performance and importance are shown in two axis of X and Y. There are four areas in IPA matrix which is depicted in Table 3.

Table 3. Importance-Performance Analysis (IPA) matrix

Area 1 Focus for improvement High importance Low performance	Area 2 Maintain competitive advantages High importance High performance
Area 3 Low priority Low importance Low performance	Area 4 Waste of resources Low importance High performance

Importance

Performance

In area 1 importance of project is very high and performance is low. So projects of this area are vulnerable and should consider with priority of improvement. In area 2 importance and performance of project are high, so projects in this area are considered as competitive advantage and should be maintained. In area 3 importance of project is low and performance is poor, so projects of this area do not need any additional investment. Area 4 is a section with low importance and high performance, so projects of this area cause waste in system and should eliminate or operate correctly (Behmanesh, Zare, Saleh, 2012).

4. Results

In this research we tried to find importance of success factors in PPP projects through IPA technique in Iran. In this method we used IPA matrix with two dimensions of Y (Importance) and X (Performance) which is shown in table 4.

Table 4. IPA for success factors of PPP projects in Iran

	Importance	Variable	Performance
1	3.548400	Trust between two parties	1.378800
2	3.467700	Foreign investment	1.471200
3	3.631100	Legal framework	1.729300
4	3.334300	Leadership in partnership	1.598800
5	3.287500	Project management	1.605600
6	3.280700	Political dominance and its effects on PPP project	1.609700
7	3.428000	Effective communications between two parties	1.853900

8	3.388800	Cooperation among members and two parties	1.897100
9	3.212700	Cooperative problem solving	1.662800
10	3.068200	Variety, transparency and multi beneficiary of objectives	1.464300
11	3.139600	Compatibility between two parties	1.609700
12	3.280700	Contract Management	1.819300
13	3.311700	Risk allocation and risk sharing	1.897100
14	3.154400	Support from project management	1.815500
15	3.139600	Definition of roles and responsibilities of members and parties	1.807000
16	3.606500	Balance of power between two parties	2.469400
17	3.118300	Commitment of two parties	1.814600
18	3.258400	Economic stability while implementing the project	2.014700
19	3.221200	Specialty of private sector	1.963700
20	2.944000	Government and political support from participation	1.591300
21		Transparency in PPP projects	
22	3.012500	Flexibility for innovation in project implementation	1.721200
23	3.318600	Effective and positive media	2.224200
24	3.280700	Public consultancy for participation	2.277100
25	3.388800	Number of operative elements of project	2.429700
26	3.296200	Predictability of project	2.325200
27	3.206000	Market demand for products and services of project	2.229900
28	2.772100	Availability of financial markets	1.701500
29	2.896600	Appropriate schedule	1.973000
30	2.964100	Competitive procurement and selection of private sector	2.105200
31	2.914800	Safe and sound economic policies in the country that implements PPP	2.042300
32	2.910300	Good governance	2.051900
33	3.060100	Project technical feasibility	2.251000
34	2.791000	Shared authority between public and private sectors	1.910000
35	2.615700	Social support	1.769600
36	2.671000	Well organized public agency	1.844300
37	2.556200	True and realistic cost/benefit assessment	1.709500
38	2.498000	Speed of PPP process	1.662800
39	2.709000	Existence of complementary and various skills in project	1.963700
40	2.434800	Strong incentives for private sector to participate	1.628300
41	2.474600	Optimal use of assets and equipments in project	1.682000
42	2.261700	Offering primary services for beginning of project	1.481200
43	2.930200	Behaviors and actions outside the scope of the partnership agreement	2.346100
44	2.568200	Environmental concerns and considerations	1.986500
45	2.446300	Amount of duties and tariffs	1.857800
46	2.434800	Effective control mechanism in projects	1.849100
47	2.683600	Unnecessary and parallel works in project	2.174600
48	2.783700	Stable political environment	2.341100
49	2.568200	Development of job opportunities through project	2.148700

50	2.341100	Offering stable and reliable services by project	2.005300
51	2.526900	Value of project	2.277100
52	2.727500	Size of project	2.509800
53	2.652900	Previous experience of partners	2.429700
54	1.973000	Appropriate performance of private sector	1.709500
55	2.204400	Existence of complete agreement between partners	2.038000
56	2.568200	Short period of time to implement project	2.457800
57	2.303400	Effective organizational structures for private sector consortium	2.204400
58	2.883000	Safety considerations in partnership	2.842600
59	1.941300	Existence of proven technologies for project	1.901100
60	2.277100	Safety of investment	2.255700
61	2.292600	Interference of government in PPP project	2.352200
62	2.515000	Participation of private sector in legislation of PPP	2.610200
63	1.866600	Meritocracy in public sector	2.061600
64	2.210200	Bureaucracy in the country implementing PPP	2.446300
65	2.810000	Cultural obstacles for implementation of PPP	3.154400
66	2.746100	Inability of public sector to renew its structure for PPP	3.227900

In next step geometric mean is used to integrate respondents' views, and then threshold value is calculated by arithmetic mean to determine IPA matrix cells. In table 5 threshold value for importance and performance of variables is depicted.

Table 5. Threshold value for importance and performance

	Number of variables	Arithmetic mean
Importance	66	2.85392121
Performance	66	2.01964848

Based on data from IPA matrix depicted in table 6, four area of matrix can be described as below:

Area 1 – Focus for improvement: variables with high importance and low performance in PPP projects in Iran are placed here.

Area 2- Maintain competitive advantages: variables with high importance and performance in PPP projects in Iran are placed here.

Area 3- Low priority: variables with low importance and performance in PPP projects in Iran are placed here.

Area 4- Waste of resources: variables with low importance and high performance in PPP projects in Iran are placed here.

5. Conclusion

The results of this research are similar to previous researches in this field. Therefore according to this research Iranian experts consider those variables that other researchers in the world realize them as effective success factors in PPP projects. All 66 factors mentioned in this research are effective in success of PPP projects in Iran which are depicted in table 6.

Based on this research it is suggested that two partners cooperate with trust and compatibility. Also two partners should make effective communication. This research shows there is lack of good cooperation in PPP projects in Iran.

Since there is not an integrated legislation about PPP in Iran, legislators at parliament should approve a legal framework for PPP.

Project Management is a scientific concept that is well known around the world, but it is a forgotten subject in PPP projects in Iran. Therefore it is suggested to employ featured project managers in PPP projects.

Project risks should allocate appropriately between partners and roles of each party should be defined. The contract should be able to imply partners to act on their commitment. A PPP contract should be managed appropriately. This contract should determine objectives, obligations and schedule of project precisely. The contract should be flexible for innovation and initiative of partners.

Government and political institutes should support PPP projects in Iran. Especially the project managers need more supports to direct projects towards success.

About variables in Area 2 of table 6, it is suggested that current trend continues in future, because in PPP projects in Iran these variables are in good situation.

Another important issue is about Area 4 of IPA matrix which includes waste of time and resources. For example political stability of PPP environment is not an important factor in success of PPP projects in Iran. Therefore it is suggested that PPP managers in Iran reduce their attention in these variables and focus on important success factors of PPP projects.

Table 6. IPA matrix of PPP success factors in Iran

High Importance	**Area 1 (Focus for improvement)** • Trust between two parties • Legal framework • Foreign investment • Leadership in partnership • Project management • Effective communications between two parties • Cooperation among members and two parties • Cooperative problem solving • Variety, transparency and multi beneficiary of objectives • Appropriate schedule • Contract Management • Political dominance and its effects on PPP project • Risk allocation and risk sharing • Support from project management • Definition of roles and responsibilities of members and parties • Commitment of two parties • Economic stability while implementing the project • Specialty of private sector • Government and political support from participation • Flexibility for innovation in project implementation • Compatibility between two parties	**Area 2 (Maintain competitive advantages)** • Balance of power between two parties • Transparency in PPP projects • Effective and positive media • Public consultancy for participation • Number of operative elements of project • Predictability of project • Market demand for products and services • Competitive procurement and selection of private sector • Behaviors and actions outside the scope of the partnership agreement • Good governance • Project technical feasibility • Safe and sound economic policies in the country that implements PPP • Safety considerations in partnership

Low Importance	**Area 3 (Low priority)** • Availability of financial markets • Shared authority between public and private sectors • True and realistic cost/benefit assessment • Well organized public agency • Speed of PPP process • Existence of proven technologies for project • Strong incentives for private sector to participate • Social support • Optimal use of assets and equipments in project • Offering primary services for beginning of project • Environmental concerns and considerations • Amount of duties and tariffs • Effective control mechanism in projects • Offering stable and reliable services by project • Appropriate performance of private sector • Existence of proven technologies for project	**Area 4 (Waste of resources)** • Unnecessary and parallel works in project • Stable political environment • Development of job opportunities through project • Value of project • Size of project • Previous experience of partners • Existence of complete agreement between partners • Short period of time to implement project • Effective organizational structures for • private sector consortium • Safety of investment • Interference of government in PPP project • Participation of private sector in legislation of PPP • Meritocracy in public sector • Cultural obstacles for implementation of PPP • Inability of public sector to renew its structure for PPP • Bureaucracy in the country implementing PPP
	Low Performance	High Performance

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