SEM Model of Factors Affecting Public-Private Partnership Success From UAE Perspective

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ABSTRACT

This article presented the development and evaluation of structural model of factors affecting the success of PPP project. These factors were identified through literature review and classified into four groups which are formulation; governance; transparency; trust. Data collected from questionnaire survey involved 295 selected experts involved in of Public-Private Partnership in UAE. The data was used to develop the model usinf AMOS-SEM software. The model was assessed CFA technique at measurement components and found that the entire measurement model has achieved the criteria of goodness of fit. Then the model was assessed at structural level and found that it also achieved the goodness of fit criteria. Finally the model was undergone hypothesis testing using path analysis and found that only two out of four hypothese are significant which are the formulation and governance. This indicates that the respondents gave less priority to transparency and trust. Hopefully, the findings will benefit the stakeholder in PPP projects.

Introduction

A country's economic growth and development is a matter of primary importance to both the government and the country's residents[1]. It is a process involving the use of existing production factors and the development of new production factors to enable people in the country to live a prosperous life. 2] stressed that economic development requires a set of target actions and activities to improve the living standards and well-being of the area's inhabitants (e.g., country). These activities boost people's quality of life and may also help build local wealth. [3] added to this and argued that as the world has become a global village so economic development of a country is not relevant to itself rather it is matter of concern for many neighbouring and other associated countries. In the context of international trade and commerce, countries tend to trade with those countries that has favoured access to factors of production [4]. If the economy of a country will grow, it will have a positive impact on the lives of the people as people may more income that they can spend on obtaining basic and advance amenities of life.

There are number of ways through which economic development can be achieved. For instance, [3] argued that a

country may diversify its economic activities and instead of putting more reliance on one or few sectors, start developing alternate sectors so that they can contribute towards the economic development of the country. A recent example of this is the Kingdom of Saudi Arabia (KSA). [4] highlighted that although KSA has rich oil and gas resources yet the Government has decided to shift the increased reliance on the oil and gas sector and focus on tourism industry and manufacturing. Another example of this is the case of India, which in terms of population, is one of largest countries of the world. [5] highlighted that Government of India is developing human resources of the country so that people with technical skills can work not only in the local market but also go abroad and serve other countries. The residents of India working abroad may send foreign remittances to India, which may enhance economic activities in the country. In the long-term, there will be enough economic activities in the country that Indians may not have to go abroad. Another way in which a country can develop itself is the development of infrastructure in the country. A recent and very pertinent example of this is the One Belt, One Road (OBOR) initiative of China. The project involves development of a road and associated infrastructure, which may connect China to port of Gawadar (Gawadar, Pakistan). [6] analysed the

benefits and implication of OBOR and suggested that this project can be regarded one of the most important projects of the recent time as through development of road and other associated infrastructure, OBOR would bring an economic revolution not only for China and partnering countries but also its trade-partners (North America and Europe) will benefit from this. [7] highlighted the case of public-private partnership and suggested that another way through which Government may use public-private partnership projects for fostering economic development in the country. This, not only help Government in managing economic development while keeping an eye on its meagre resources, it will also help Government in reaping benefits of the talent and expertise of private sector. Public-private partnership (PPP) has long been used in the past and the phenomenon is gaining momentum once again. [7] highlighted the key features of PPP and suggested that it is an agreement between a public-sector enterprise and a private-sector entity, which involves a long-term agreement between the two parties such that both mix their resources and work together on some task. PPP projects are beneficial for both Government and private-sector enterprise.

PPP concept adopted is based on Private Finance Initiative (PFI) which was introduced in UK since 1990s. It was introduced during recession scenario to control fiscal policy with limited public sector spending to increase economic growth [8]. Now many countries had adopted this PPP approach for private financing of infrastructure projects. Beside eceonomy, this approach was accepted due to lessen the government intervention through state production of goods and provision of services to the population with common label such as state monopoly development and business [9]. Government handling approach was criticized for not achieving efficiency in delivery of services and substantial increase in resource and also administrative problem [10]. In Middle East in 1980s, there were strong pressures against state monopoly to end the military dictatorships and experienced a process of democratization. Due to increased demand from society for better social policy, for more allocation of public resources, for investment in infrastructure to stimulate economic growth, hence privatization approach has attracted

many governments to adopt the approach in resolving the challenges [11, 12]. However, privatization also received numerous criticisms worldwide, especially in developing countries for failure to deliver effective results in some sectors, other policy instruments, based on competition in the form of contracting out, became increasingly adopted for delivery of infrastructure [16]. For many undeveloped countries are having financial resources difficulty and not able to spend money of all economy sectors, a suitable solution is to involve private sector investors to finance the projects. Hence, helping the government to achieve economic growth target and also benefit the private-sector. PPP instrument continuously selected as policy tool by governments at all levels due to its perceived benefits and the large number of projects being elaborated[17]. Effective infrastructures determine the key success of every economy. It is an effective provision of infrastructure in housing, water, energy and transport which are critical in improving the standard of living [18,19]. Growing involvement of developing countries in the free market system and also in the world economy has demanded the need for improved infrastructural facilities to allow a sustainable economic. Since these countries cannot effectively cope with the huge capital investments, this has been the reason for the private sector participation in resolving the infrastructure challenges facing the public sector which was originally initiated under the banner of privatization and subsequently Public Private Partnerships (PPP) [20].

Literature Review

Like many other countries of the world, UAE Government is also trying to benefit from PPP. It has developed a separate department that is responsible of taking care of the PPP issues. UAE Government (2018) set out an agenda for developing a sustainable and competitive economy by working on knowledge, expertise and diversity. In order to do so, it has decided to integrate the efforts of Government and private sector as well as pool funds, human capital and technologies so that above mentioned targets can be achieved. It also aimed to involve private sector so that efficient and economic products and services can be achieved. In addition to these, UAE Government (2018) highlighted many other advantages that it can obtain from PPP projects.

These advantages include attracting investment in these projects from local, regional and foreign investors. Further to this, these projects may also help UAE Government in cost saying as only those private sector enterprises will be involved in these projects who use competitive bidding for these projects and may use innovative technologies for reaping such benefits. This would also lead to more job creation and increase in level of income of the residents of UAE.

In 2017, UAE Cabinet issued a resolution, which set out detailed procedures through which, federal and private sector enterprises can develop PPP. This also extended number of services that may be covered under PPP projects. In addition to this, Government of Dubai enacted Law Number 22 of 2015. The focus of this law was to set-up a regulatory framework for governing the PPP projects. The main thrust of this law was to foster investment in PPP by encouraging private sector entities to invest in the diverse projects and become a contributor in economic development of emirates. The law sets out that both public and private sector entities may initiate development of such projects. The contract between the parties should clearly set out the conditions of the project including feasibility of the project, the economic benefit that may arise from the project, financial benefits of the project, technological requirements and benefit and social benefits that a person may obtain from such projects. Based on this, one may start any form of the PPP. The possible options or PPP forms, which can be used in this regard include service contracts, management contracts, leasing contracts, concession contracts, build, operate, transfer (BOT), build, own, operate, transfer (BOOT) and build, own, operate (BOO).

UAE Government has started PPP projects in different field including PPP in education, infrastructure, waste-management and service. As part of these projects, Government has invited private sector to support Government in different projects. For instance, in case of PPP in education sector, UAE Government invited private sector for professional services for curriculum design. Likewise, Abu Dhabi Government also invited 3rd party contractors for educational and administrative supervision of kindergarten and primary schools. The underlying purpose of this is to increase the quality of the educational services offered in these schools. Likewise, UAE also initiated projects in the area of infrastructure development. These projects were focused on mobilizing private sector and use their expertise and financial resources for reducing carbon footprint. The existing and anticipated PPP infrastructure projects include 3 utility scale renewable photovoltaic solar technology, Abu Dhabi's Masdar solar and wind projects, Dubai's Roads and Transport Authority projects and Route 2020 project. Likewise, UAE is working on PPP in waste-management. As a part of this project, Bee'ah, a Sharjah-based private company will recycle waste and offer environmental solutions to different Government department. Likewise, another private sector entity, Masdar will partner with Bee'ah for development of a state-of-the-art plant for conversion of waste in to energy. The main aim of this project is to achieve zero waste-to-landfill target by 2020.

Formulation of the PPP Projects is not an easy task where it involves various complex aspects which need to be evaluated before the projects formulation. One of the complex process is tendering work because it needs to understand the effectiveness and efficiency of the process. However, significant issues in tendering process include high transactions costs, lack of transparency and lengthy durations [19]. Moreover the capabilities of the private sector for the formulation of the PPP also play a key role. If the private sector is capable, then the projects can be completed successfully. The private sector is required to prepare the process in transparent and trustworthy manner[20]. On the other hand the government structure also plays a significant role when it comes to the PPP formulation. Inappropriate government structure can create problems for the PPP project. Governance is one of the key challenges in the PPP because it is important to control and coordinate different activities conccurently [21]. Likewise, [22] suggested that both public and private sector entities must trust each other and breach of trust create problems between the parties. Moreover, [23] added that PPP also involve transparency related to different activities so that stakeholders have an idea of what is going-on in the project. This requires an analysis of the situation so that all problems can be resolved. [24] highlighted that despite the wide coverage of studies on critical success factors, the success criteria for PPP projects in developing and developed economies received less attention in the literature.

Since the formulation and development of PPP accelerated, there are number of associated challenges that arise. With particular reference of UAE, the phenomenon of PPP has not yet matured enough so lots of research is needed in the area. To start with, there is a dire need of a framework, which may determine who PPP should be developed. The development and evaluation of this framework would provide a concrete advice to the stakeholders of the forthcoming PPP projects and they can benefit from such knowledge, as it would help them prepare in overcoming challenges that are associated with the formulation of PPP. Further to this, in the context of UAE, one also has to test, evaluate and develop a framework, which determines the success criteria of the formation of PPP. An evaluation of constraints, challenges and prospects of the PPP would help would be beneficial for both public and private sector as the parties would come to know the factors that they should work on so as to capitalize them and the factors that should be worked on so as to overcome those. An understanding of these would help in bringing richer economic prosperity in the UAE without much reliance on the public sector and through involvement of private sector entities in to it. [25] suggested that PPP in UAE is not a very new phenomenon and there are not a lots of projects in the area, however, over the period of time, this number is increasing which requires an understanding of various facets of the project so that one can ensure the success of these factors. They carried out research focusing on the critical success and failure factors related to PPP in UAE. They argued that since little is known about the process and dynamics of PPP in UAE context so one should carry out research in this regard. They further argued that this issue will continue to remain focus of researcher as it would take sometime to mature the research in this area. They further argued that as macro-environment especially political and social landscape of UAE is changing so one should expect that new developments in the area so new research in the area of PPP is vital[25] further argued that owing to the nature of the research issue, an in-depth as well as large scale research project needs to be carried out so as to understand the dynamics of research in this area. The findings of their research highlighted that if PPP would receive political support from the Government then it would help

PPP in flourishing. Moreover, they also highlighted that since PPP are not very common in UAE so private sector does not have lots of information about it. So, this limited knowledge puts a constraint on the ability of these PPP. Further to this, [26] argued that during the last decade, there is a deep penetration of PPP projects in UAE. The focus of most of these projects was on the development of infrastructure in the UAE. However, there is a little known about the key success factors related to the infrastructure projects in the UAE. They conducted in-depth interviews for experts related to the infrastructure project as well as key personnels who were involved in the establishment of PPP projects in UAE. The focus of these interviews was on evaluation of key success factors that were linked with PPP infrastructure projects of UAE. Based on their research project, they urged that a continuous evaluation of different aspects of the PPP is needed so as to understand the PPP projects in more detail. Such an analysis would enhance the understanding of PPP related to infrastructure development in UAE.

Research Methodology

Analytical approach is primarily qualitative. That included a pilot study using a form of questionnaire. (295) the administration of standardized questionnaire sets. The data collected were then analyzed using the simulation and modeling software package AMOS-SEM to determine the major and dominant factors. The use of the Likert scale of five (5) points was used to develop the questionnaire on the research instrument. Due to the expected method of data analysis (i.e. Structural Equation Modeling SEM) as recommended by [28], the Likert scale is suggested because most questions are related to attitudinal and perceptive views of people (unobserved results) that are normally prone to error. Using aim and systematic sampling techniques, Structural Equation (SEM) modeling was used to assess the impact on citizens ' satisfaction with Smart Government Performance Dimensions. After moving through numerous screening stages including missing data, outlier, reliability test, multicollinearity, confirmatory factor analysis (CFA) and the structural model found to be appropriate, the data revealed a significant P-value of the six main hypotheses.

The P-value showed under 0.05 for the five primary hypotheses.

Analysis for structural equation modeling

This study examined the normality for univariate levels and multivariate levels of the collected data from the questionnaire survey. The recommendation is that the skew and kurtosis values for measuring items should be between-1 and+ 1 and that the results for all items should be within the acceptable range of-1 to+ 1 which implies the hypothesis is fulfilled and does not imply any deviation from the normality of the information. Multic. The off chance that the VIF value exceeds 4.0, or by sensitivity under 0.2 is a multicollinearity problem. The analysis found that the data having VIF values ranged from 1,024 to 1,456 and tolerance values ranged from 0,86 to 0,954, suggesting that there was no problem with multicollinearity in the data analysis. Confirmatory Factor Analysis (CFA) was tested on the measurement method used for the study model and found that the entire measurement model has achieved goodness fit index. After the unidimentionality, reliability and validity of the research constructs were ascertained, the next stage of analysis model is the entire constructs into a single structural equation model using Analysis of Moment Structure (AMOS). The reason for the pull out is to display the causal effects between one construct and the other in line with the set hypotheses. The exogenous and endogenous variables in the research assessment framework were arranged. The arrangement stated with the exogenous variables intervening variable and the endogenous variable at the end. The connection between each construct is linked with arrow in the hypotheses' direction as presented in Figure 1. However, the model was used to analyse the multidirectional relationships within the entire research constructs.
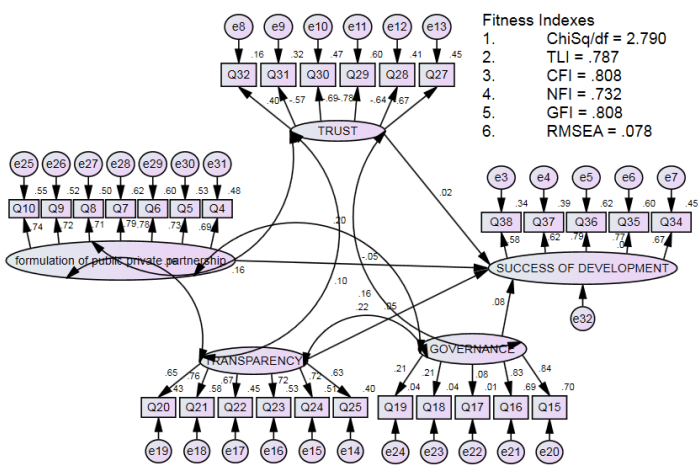

Figure 1: initial Structural model

As shown in Figure 1, and table 1 certain fitness indexes for the structural measurement model do not attain the acceptable and required level of goodness-of- fitness indexes (Awang, 2014). The observed factor loadings for the entire constructs were fulfilled, but; fitness indexes were relatively below the recommended level. Therefore, modification indices examined in order to identify redundant items and they were correlated for the improvement of the model's goodness-of-fitness indexes.

Table 1: The Fitness Indices of structural model

Level of Acceptance	Index Value	Comments
Chisq/df ≤3	2.79	The required level is achieved
TLI ≥ 0.9 means satisfactory	0.787	The required level is not achieved
CFI ≥ 0.9 means satisfactory fit.	0.808	The required level is not achieved
NFI ≥ 0.80 suggests a good fit	0.732	The required level is not achieved
GFI ≥ 0.80 suggests a good fit.	0.808	The required level is not achieved
RMSEA ≤ 0.08 mediocre fit.	0.078	The required level is achieved
Model is not accepted		

The initial structural model was not fit the fitness requirements, but (Q17 and Q18) have low factor loading, hence they are candidate to be deleted. According to Byrne (2013); Hair *et al.* (2006) the modification indices that show high covariance and demonstrate high regression weights are a candidate for deletion. The problem was solved by

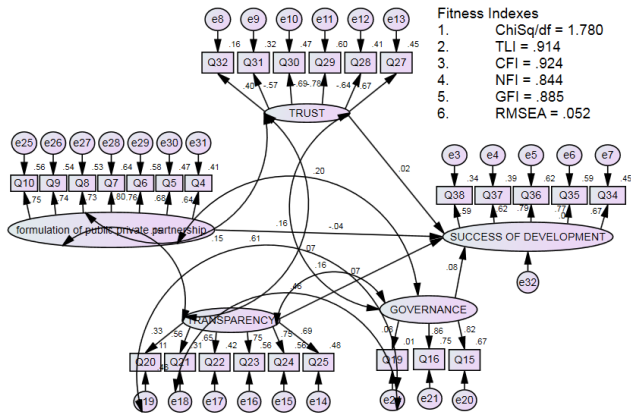deleting them as illustrated in the final structural model of Figure 2.

Figure 2: Final Structural Model

Final structural model as figure 2 presenting standardized regression coefficient for the entire research constructs. The final structural measurement model provided the analysis of the causal effect (impact) for the multiple constructs in the path diagram. First and foremost, the fitness indexes for the structural model which reflect how fit is the hypothesised model with the data at hand was observed as table 2 and satisfactory within the established acceptable level of fitness indexes (Awang, 2015 and Hair *et al.,* 2011). The standard regression weights indicated the estimate of beta coefficient, which measures the impacts of the main constructs; exogenous variables (formulation of public private partnership) and endogenous variable (success of infrastructure development).

Table 2: The Fitness Indices of structural model

Level of Acceptance	Index Value	Comments
Chisq/df ≤3	1.780	The required level is achieved
TLI ≥ 0.9 means satisfactory	0.914	The required level is achieved
CFI ≥ 0.9 means satisfactory fit.	0.924	The required level is achieved
NFI ≥ 0.80 suggests a good fit	0.844	The required level is achieved
GFI ≥ 0.80 suggests a good fit.	0.885	The required level is achieved
RMSEA ≤ 0.08 mediocre fit.	0.052	The required level is achieved
Model is accepted		

The output in Figure 2 showed the standardized regression coefficients with its R^2 equal 0.21. The Analysis Moment of Structures (AMOS) used for

the structural equation modeling in this research normally produced two types of text outputs: standardized regression weights and unstandardized regression weights for the path analysis. However, the standardized regression weight is adopted to explain the relationship among the entire constructs in the research framework and subsequently for testing the hypotheses in the research as it is recommended to be better as it is easier to interpret (Awang, 2015). The criteria for evaluating structural model include squared multiple correlations (R2) and path co-efficient (β) of each path. According to Cohen (1988, 2003) R^2 of endogenous can be assessed as substantial ($R^2 \geq 0.26$); moderate ($R^2 \geq 0.13$); and small ($R^2 \geq 0.02$). From figure 2 it is perceived that R^2 of the endogenous latent variable (project completion delay) is 0.21 which shows that developed model has moderate explaining power.

Hypotheses Testing
Hypothesis testing was conducted using boothstrapping technique on the structural model. The results of every hypothesis path are outlined in Table 3.

Table 3: results of hypotheses testing

Hypothesis Statement	P-value	Result
H₁: Formulation of project has significant impact on the success of PPP development	***	Supported
H₂: Governance has significant impact on the success of PPP development	***	Supported
H₃: Transparency has significant impact on the success of PPP development	0.078	Not Supported
H₄: Trust has significant impact on the success of PPP development	0.091	Not Supported

Key: *** represents P-value is less than 0.001

The results of hypothesis testing in table 3 indicate that only two of the hypothese are significant which formulation of PPP and governanace. However, transparency and trust seems not significant eventhough literature stated that the two are revelant to the success of PPP development. These generated results were based

on the data collected from the respondents and maybe the respondents were giving low rating to the factors in transparency and trust which resulted to insignificant relationships.
Formulation; Governance; Transparency; Trust success of PPP development

Conclusion

This article presented the development and evaluation of structural model of factors affecting the success of PPP project. These factors were identified through literature review and classified into four groups which are formulation; governance; transparency; trust. Data collected from questionnaire survey from the targeted respondents were used to develop the model usinf AMOS-SEM software. The model was assessed CFA technique at measurement components and found that the entire measurement model has achieved the criteria of goodness of fit. Then the model was assessed at structural level and found that it also achieved the goodness of fit criteria. Finally the model was undergone hypothesis testing using path analysis and found that only two out of four hypothese are significant which are the formulation and governance. This indicates that the respondents gave less priority to transparency and trust. Hopefully, the findings will benefit the stakeholder in PPP projects.

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