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NORMS OF ASSET DELIVERY PERFORMANCE FOR PPP+ INFRASTRUCTURE

Eisa A. Alsafran, Francis T. Edum-Fotwe [1♣],Francis T. Edum-Fotwe [1]

[1] School of Architecture, Building and Civil Engineering, Loughborough University, UK

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Abstract

Asset Delivery Performance forms an essential phase and an early indication of the overall performance for PPP+ schemes. This phase of the overall performance delivery particularly requires an effective intention from public and private sectors. Hence, there is limited research focusing on the efficiency of ADP norms which have been explored and provided to decision makers in PPP+. The norms would assist and determine the adoption of integrated projects. This paper explores the variations of emerging integrated projects for analysing cost and time norms of ADP of PPP+ in Kuwait to define new directions and new norms. The dataset was randomly collected by a paper-based and online questionnaire survey of 240 samples from public and private sectors. The integrated projects of PPP+ are PPP, BOT, BOOT and DB. The resultant performance of PPP+ projects provides the norms required for the public client enlightenment and, additionally, the private sector's involvement.

1. Introduction

The public-private partnership (PPP) scheme has been embraced by developing countries as a key development mechanism within construction procurement owing to the advantages of this scheme and the private sector participation at global level (Al-Azemi et al., 2014; Al-Azemi and Bhamra, 2014; Shen et al., 2002). Although PPPs can afford substantial long-term advantages for governmental initiatives and strategies (Helmy, 2011), some PPP projects in developed countries have been unsuccessful (Mutua, 2014). The PPP scheme has been advocated by Grimsey and Lewis (2005) to be the most suitable for ensuring project completion by the set deadline and within budget. Some PPP projects have indeed managed to abide by time and cost limitations and satisfy the required standards of quality, but there are also others PPP projects that have not, running into issues that had led to suboptimal results and even project cancelation (Amadi et al., 2014). According to Donkor (2016) the key success factors of overall PPP projects are related to the administration of the feasibility studies, negotiations, risk and reward sharing mechanisms in the

♣ School of Architecture, Building and Civil Engineering, Loughborough University, UK, ealsafran@gmail.com

course of procurement, or partnership mutuality and enforcement following procurement. It is often argued that PPP procurement of cost and time tends to be in greater certainty, whilst separated procurement methods may deliver better quality results (Al-Harthi et al., 2014 a). Out of 8 public sectors, there was a 22% cost overrun of PPP procurement, versus a 73% cost overrun of traditional procurement. Further, in PPP procurement only 24% are delayed in project delivery, compared to 70% in traditional procurement (Donkor, 2016). Significant causes of project overruns begin in the construction phase of the project, involving many unexpected factors (Chan and Kumaraswamy, 1997; Frimpong et al., 2003).

The Kuwaiti government has started using and implementing the PPP model and other integrated forms such as BOT, BOOT, DB and PFI in its variant forms, which shows they are keen to use PPP+ to attract the private sector and investors to public infrastructure projects and services. The implementation of several such schemes is the basis of the development plan and Kuwaiti vision 2035. Kuwait is a developing country and therefore it is eager to encourage the private sector to make investments and take on risks. However, the construction industry in Kuwait is faced with a wide range of challenges, especially suboptimal productivity due to projects exceeding deadlines and budgets as well as due to increasing construction costs (Jarkas and Bitar, 2012). Therefore, the development of the construction industry has been prioritised by the government of Kuwait alongside the oil industry (Sayed-Gharib et al., 2010).

There is a lack of attention to efficiency of ADP in PPP+. In view of the published papers, it has been proved that various results of publications have identified the factors affecting construction cost and time performance of projects (Bing et al., 2005; Doloi, 2012; Frimpong et al., 2003; Kaming et al., 1997; Lyons and Skitmore, 2004). Yet, the measuring norms of cost and time of ADP, for different integrated projects in PPP+, does still not exist for the success of overall performance delivery. It is essential to examine the efficiency of cost and time and their contribution to the overall performance delivery PPP+. An assumption of the key success of the integrated projects is based on the selection of the generated norms of the ADP in this paper. ADP has a level of expectation for each one of the integrated projects. Concessionaires can adopt this address by exploring the context of Kuwait where information for PPP+ is part of the government program. For economic growth, utilizing data from completed projects can be used to evaluate the norms required for the efficiency of ADP.

This study compasses a literature review, method of the investigation, data analysis discussion, conclusion and future work. A quantitative method was adopted to achieve the purpose of this study, using a paper-based and online questionnaire survey to gather primary data. This paper focuses primarily on ADP as an essential part of the PPP+ and investigates a literature review on infrastructure provision in Kuwait, with a specific focus on PPP+ in construction procurement and implementation of various integrated schemes. The abbreviation PPP+ has been formulated for this study which encompasses PPP, BOT, BOOT and DB projects. The exploration of the PPP+ infrastructure provision in Kuwait uses various implementations of emerging integrated schemes and examines two key factors: cost and time.

Providing norms of the influential performance of integrated projects would boost the private sector's interest and potential involvement. It will also help the Kuwait public-client in PPP+ to identify and to evaluate its project performance and show Kuwait's public-client expectations of PPP project outcomes, among other integrated projects, through the norms of ADP. This will lead

to a better understanding of dealing with private sectors in implementing the appropriate integrated schemes of the PPP+ system in Kuwait.

2. Asset Delivery Performance of PPP+

According to AGC (2004) cited in Ohrn and Rogers (2008, p. 1) a project delivery method is defined as "the Comprehensive process of assigning the contractual responsibilities for designing and constructing a project." Furthermore, according to The American Institute of Architects (2014, p. 2) the definition of the public-private partnership project delivery process, with regards to constructing public facilities, is: "a long-term performance-based approach to procuring public infrastructure where the private sector assumes a major share of the risks in terms of financing and construction and ensuring effective performance of the infrastructure, from design and planning, to long-term maintenance." However, ADP in this paper means the duration of PPP+ project construction, beginning immediately after the financial closing stage, to the operation stage (Lyons and Skitmore, 2004), where cost and time are the major elements of delivering the asset. During the construction stage, cost and time respectively represent the budget and the schedule. Assets can be defined as entities or objects that serve or benefit an organisation or individual (Rungratri and Usanavasin, 2008). Whether they are developed or attained, new assets can be employed to support new projects or improve current projects and increase serviceability (Malano et al., 1999). Figure 1 illustrates the asset delivery associated with PPP+ schemes and how overall performance delivery depends greatly on project delivery of the integrated schemes.

Figure 1: Phases of PPP+ Schemes

Cost growth given by the percentage discrepancy between the final contract amount and contract award amount determines how a project performs in terms of cost, whereas time growth given by the percentage discrepancy between the final contract time frame and the contract award time frame determines how a project performs in terms of schedule (McKim et al., 2000). Assessment of performance indicators, such as cost, time, quality or a mixture of the latter, is essential for establishing how efficient and effective an intended outcome is (Robinson et al., 2010). As Doloi (2012) observed, project-based factors have gradually come to supplant factors related to market or demand as the main determinants of PPP project selection. Mostafa et al.(2018) revealed that construction costs (32.2%) were the most vital factor in determining the strategy selected by builders, with customer preferences following slightly behind (28.6%). Hence, in the construction phase, the greatest importance is given to how project-based factors perform, such as time and cost management, while operational performance factors, such as completed construction usability, associated with the post-construction phase often become dismissed in the project assessment phase (Cheung et al., 2010).

Cost and time in project delivery are deemed factors, and can impact on the anticipated success of the project (Doloi, 2012). Also, the factors affecting cost and time overruns has turned out to be vital. These factors can be attached to various project stakeholders involved in construction development, including, government authorities, owners, contractors, consultants, and financial

services projects stakeholders (Kartam and Kartam, 2001). Design specifications are made more complex by customer preferences, completion deadlines, construction costs and the skill levels of labourers. Moreover, customer demands are ambiguous and can change quickly (Mostafa et al., 2018). Jayasuriya et al. (2020) found that in order to overcome the issues associated with PPP projects, effective stakeholder engagement strategies must be implemented. This is crucial in project development. On the other hand, these findings showed that conducting increased monitoring of stakeholders could cause further problems in PPP projects. Nonetheless, given the long-term nature of such projects, it is still important that the needs of stakeholders are monitored carefully throughout the PPP life cycle (Jayasuriya et al., 2020). The implementation of an effective stakeholder management strategy is crucial for ensuring that such projects will be successful and must be followed throughout the entire project lifecycle (not just in the delivery phase) (Jayasuriya et al., 2020). Garemo et al. (2015) point out that significant time and costs savings can be made if 3-5% of a project's total capital is invested into planning. Almarr (2017) found that time performance predictions were significantly enhanced when risks were transferred to the private sectors in the UAE and the UK. In terms of cost performance, the effective cost performances of PPPs in the UAE have been attributed to capacity building and the transferral of risks to the private sector. On the other hand, due to insufficient government resources and experience in the UK, PPPs are considered to be more beneficial (Almarri, 2017). Frimpong et al. (2003) mentioned that achievement of project technical performance, on schedule performance and being within budgetary costs, determines project success. Doloi (2012) stated that, although assessing achievement in project delivery is essentially based on the performance of cost and time, achieving general success through the consideration of operational performance, following the construction phase, is also fundamental to project success. Therefore, the asset delivery method (construction stage) depends greatly on cost and time, whilst it delivers an initial signal to the performance of the possible overall delivery (Cheung et al., 2010; Lyons and Skitmore, 2004).

The value of the Kuwaiti construction industry exhibited a decline in growth between 2008 and 2009 from 2.67% to 2.28%. Estimates suggested a further decline to 1.03% in 2010, followed by a rebound to 1.60% in 2013 (Global Investment House, 2009), when it came to amount to approximately 0.78 billion Kuwaiti dinars (KD). The Kuwaiti government's system of privatization basically intends to address the budgetary issues experienced by the public sector, through cost decrease to public financial obligation, which benefits the central economy of being a free market and improves the public facilities and services through involving the private sector in the development plan (Al-Azemi and Bhamra, 2014; Helmy, 2011; Kuwait Authority for Partnership Projects, 2012). Cost and time overrun for the overall project are responsible for most construction risks, perhaps because of technical problems, ineffective management or both. Time overrun of a project is possibly a consequence of unattainable income of a finished project. Likewise, cost overrun is possibly due to unprofitable investment in the project (Al-Azemi, 2012; Tiong, 1990). However, low productivity is the biggest issue due to a project's overrun budgets and schedules and increasing construction costs (Jarkas and Bitar, 2012).

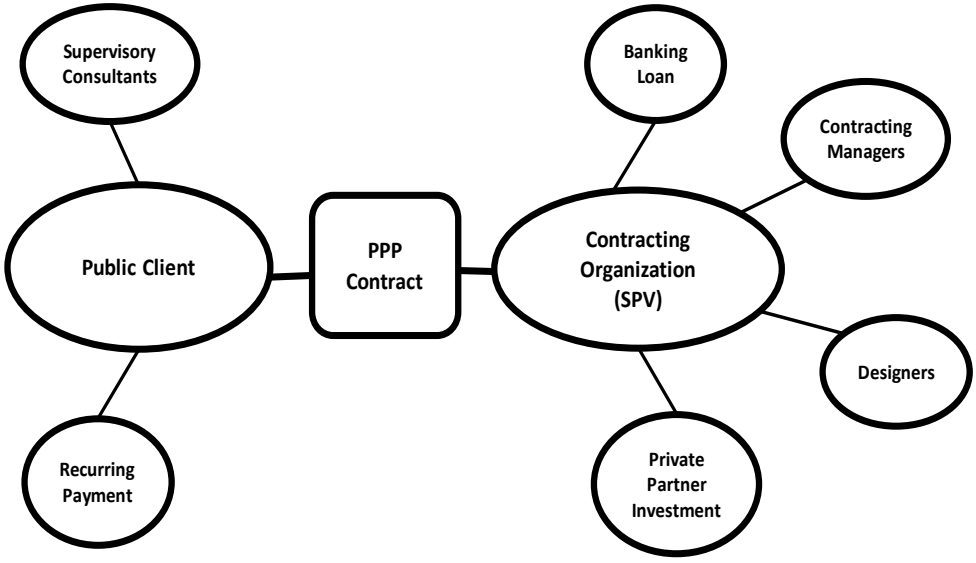
3. Public Private Partnership and its Variant

PPP essentially engages both public and private sectors for accomplishment of long-term public infrastructure arrangements (Al-Azemi et al., 2014; Al-Azemi and Bhamra, 2014; Helmy, 2011). Both parties of PPP schemes share risks and responsibilities according to their capabilities (Akbiyikli and Eaton, 2005). Jayasuriya et al. (2020) explain that the PPP procurement system can be used to harness the efforts made by both the public and private sectors in creating a public

facility. The engagement of the public and private sectors in the public private partnership is illustrated in Figure 2. Attracting and engaging private sectors with such projects would activate the economy and fund PPP (Al-Azemi, 2012). The most significant reason for which PPPs is favoured over traditional procurements is the skills and experience of the private sector. This thus suggests that the private sector has the skills and capabilities needed to deliver the project efficiently and effectively (Almarri, 2017). Thus, the previous traditional practice of public funds for infrastructure developments was shifted towards a long-term approach (Al-Azemi et al., 2014; Faisol, 2010). Nonetheless, the implementation of PPPs in the delivery of infrastructure projects has caused a number of political, social, environmental and legal problems in Australia (Jayasuriya et al., 2020). The lack of a standardised PPP framework and poor transparency and accountability have been highlighted as the key obstacles hindering private sector participation in PPP projects. At present, the risk-sharing mechanisms in place are ineffective due to bureaucracy issues and a lack of protection offered to private sector developers and financiers (Muleya et al., 2020). Consensus exists regarding the suitability of PPP scheme as long-term, sustainable strategies for social infrastructure improvement, increase of public asset value, and putting taxpayers' money to better use (Delmon, 2017).

Almarri (2017) explains that PPPs are more efficient and are thus more cost-effective than other traditional methods. In the UK, the potential of such scheme for enhancing public infrastructure has been proven by the success with which they have been implemented (Helmy, 2011). As highlighted by several studies, when both the public and private sectors are engaged, the organisational competence of the private sector can be harnessed more effectively, the private sector can be involved in the financing of public projects, the participation of public organisations can be diminished, and the demand for governmental funds and operational resources can be alleviated (Al-Azemi, 2012; Helmy, 2011). The PPP scheme is additionally advantageous because it is amenable to transfer from the government to qualified private partners (Grimsey and Lewis, 2002). PPPs are particularly extensively promoted by the UK, where capital from the private sector has been invested in infrastructure in massive amounts, with 717 projects attracting a total investment of around £54.7 billion (HM Treasury, 2012). Al-Azemi (2012) found from the World Banks' data (1998), that from 1990, developing countries with a low income, increasingly involved the private sector in public infrastructure projects. Nevertheless, the dissensions amongst the interests of the private and public sectors regarding some aspects are worrying some governments (Al-Azemi and Bhamra, 2014). McDermot et al. (2020) recommend that governments in developing countries think about establishing standard project management guidelines that should be followed during major infrastructure projects. This highlights how complex PPPs are as well as how important it is for governance institutional principles to be properly implemented before project commencement (Awortwi, 2004). Hence, in theory, PPPs are appealing, but their implementation shows just how complex they are and poses challenges and risks to most projects (Klijn and Teisman, 2003). In spite of this, PPPs are rooted in collaboration amongst the private sectors and the public sectors and are underpinned by the principle of value for price (Helmy, 2011).

Figure 2: Public Private Partnership



Source: [Adapted from (Alharthi et al., 2014, p. 7 b; Beck, 2010, p. 10)]

The Private Finance Initiative (PFI) is the most prevalent of the eight forms of PPPs acknowledged by the British government, although the others are sometimes adopted as well (HM Treasury, 2012). Introduced with the purpose of generating PPPs, the PFI funds projects of public infrastructure with capital from the private sector (Edum-Fotwe et al., 2003). Another purpose of the PFI is to promote private sector involvement in public infrastructure development, construction, funding, and operation to afford taxpayers adequate value for money with assets of exceptional quality and good maintenance (HM Treasury, 2012). Thus, PFIs are PPPs focused on development of projects or provision of services that were typically the remit of the public sector (Akbıyıklı, 2013; Robinson and Scott, 2009). Furthermore, despite being the main PPP form implemented in the UK, the PFI is wasteful, rigid, and non-transparent, which is why it it is perceived negatively. Unlike conventioal procurement, PFI projects display far greater complexity, necessitating lengthier preparations before construction can begin (HM Treasury, 2012). PFI projects are primarily geared towards funding and promoting long-term projects of public infrastructure and services (Akbıyıklı, 2013; Robinson and Scott, 2009).

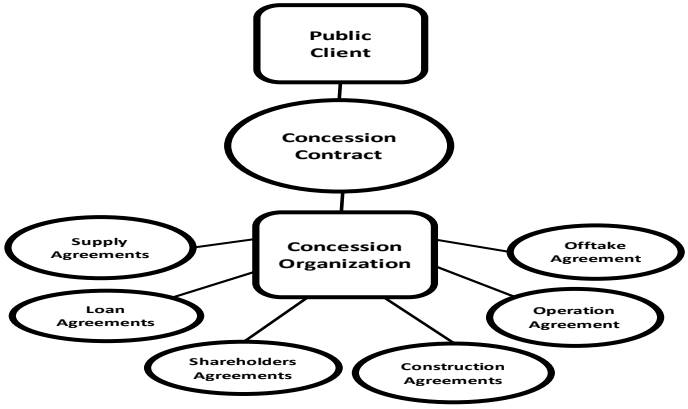
Over the last 20 years, the primary concern of the Kuwaiti government has been the development of infrastructure facilities. There are different techniques being discussed and assessed for developing infrastructure, but PPP is the government favoured strategy to enable quick and productive improvement of the infrastructure(Al-Azemi, 2012). Therefore, the decision was initially made to establish Partnerships Technical Bureau (PTB) under the Minister of Finance authority in Law No.7/2008 (Kuwait Authority for Partnership Projects, 2009). The argument highlighted by Helmy (2011) is that there are some obstacles confronting the advance of PPP projects regulated by the PTB (currently known as the KAPP), such as long documentation procedures between various partners and ministries engaged with any PPP venture, lack of familiarity with the private sector and citizens about the Law No. 7/2008, and the absence of in-

house understanding and education about PPP, in various public sector authorities. Later, the new PPP modified law No.116/2014 was subsequently promulgated by the government alongside KAPP, the entity responsible for these types of schemes (Kuwait Authority for Partnership Projects, 2009). The purpose of this law is to bring greater clarity to the legal issues surrounding PPPs in Kuwait as well as to rectify the shortcomings of the previous law. Nevertheless, acquisition of public land by the private sector continues to be banned (Biygautane et al., 2016).

4. Variety of Integrated Delivery

Emergent types of integrated projects are presented below to be included for the norms of ADP. Firstly, Build Operate Transfer (BOT) is a concession agreement which financially engages the private sector in participation with different infrastructure facilities and services (Al-Mubarak, 2003; Shen et al., 2002). BOT is not only a contractual agreement between a client and the private sector to implement the framework, but is considered an economic and financial concept (Al-Azemi, 2012; Shen et al., 2002). Al-Azemi (2014) asserted that, finance arrangements and contract arrangements, in supporting the project, are major favourable outcomes of a BOT project. Illustration of the structure and relationship between the client and the concession organization in a BOT concession contract, along with related parties to the concession organization, is shown in Figure 3. The implementation of the BOT scheme in the ratification of a concession with the Perrier Brothers in 1782 for water distribution in Paris, France, constituted the starting point of private sector involvement in the development of projects of public infrastructure. The scheme spread not only all through France but also through other countries in Europe (e.g. Belgium, Germany, Spain, Italy) by 1830 (Al-Azemi, 2012). The BOT scheme continues to be a preferred choice for a variety of integrated schemes (Al-Azemi et al., 2014). Nevertheless, BOT projects present some problems and risks for the concession organisation. These problems and risks are a significant part of BOT activities and due to the involvement of interrelated parties over such a long concession period and large amounts of investment, these issues would be problems for the contractors, suppliers and private investors to confront (Al-Azemi et al., 2014; Askar and Gab-Allah, 2002; McCowan and Mohamed, 2002).

Figure 3: Build Operate Transfer

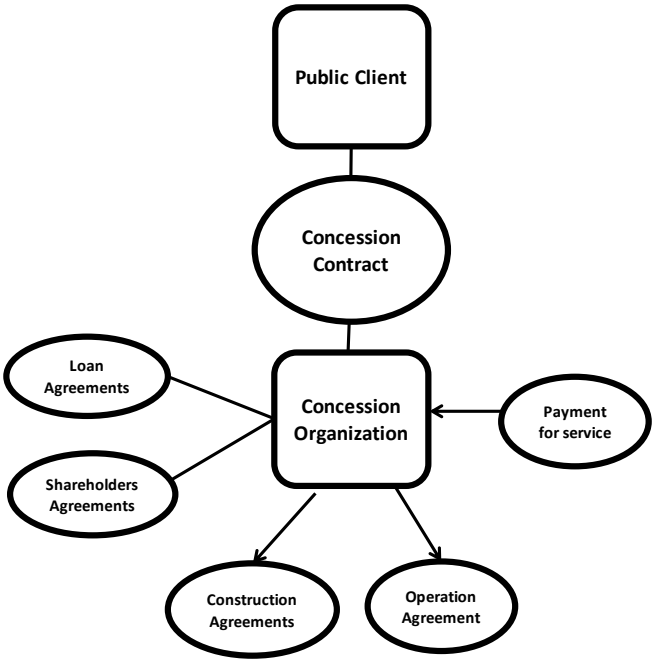


Source: [Adapted from (Al-Mubarak, 2003, p. 6; Masterman, 2002, p. 85)]

Over the last 20 years, in developing and developed countries, BOT has been a successful scheme in funding public infrastructure facilities and services (Al-Mubarak, 2003; Shen et al., 2002). Yang et al. (2010) outlined a statistical report regarding PPP projects in Taiwan, (updated to 31 July 2009), shows 44% of all projects (39 of 88 projects) select the BOT scheme as a delivery method. The effectiveness of BOT has been confirmed in China as it attracted overseas investments (Sharaffudin and Al-Mutairi, 2015). When proper contractual frameworks are in place, it is possible for the BOT scheme to encourage the private sector to invest in public projects in different ways (Sharaffudin and Al-Mutairi, 2015). However, it is uncertain whether this is feasible in the case of GCC countries owing to massive governmental surpluses and known reserves of oil (Sharaffudin and Al-Mutairi, 2015). Progressive utilization of the Build Operate Transfer (BOT) method in Kuwait is for financing power, real estate, transport and infrastructure projects. There are some recent successful projects in BOT such as the Sharq and Marina Mall, Marina developments, Sulaibiya Waste Water Treatment and the Reclamation Plant and Salmiya Market (Al-Azemi, 2012). However, investigation and verification of the BOT implementation process handling, by the State Audit Bureau, at the end of 2006, highlighted the need to review all BOT projects granted to the private sector and certain irregularities in the actualization of these projects (Al-Azemi, 2012; Kuwait State Audit Bureau, 2012). Based on assessment of the risks related to BOT projects, Bokharey et al. (2010) suggested that host governments should be more proactive and provide assurance for BOT projects developed in the interest of the public and that feasibility studies should be undertaken by both lenders and investors before any investments are made.

Secondly, Build Own Operate Transfer (BOOT) means to finance, build, operate, and own to make an anticipated profit of the public infrastructure and development project, through a specified concession to a private consortium (Levy, 1996; PPIAF, 2009). The significant distinction of BOOT is that it is purely financed by the private sector and the ownership of the facility or service is not perpetuity (PPIAF, 2009). The transfer of the public infrastructure facility or service, from the private to public sector, is on an agreeable ownership and operation period (Kirkpatrick et al., 2002). BOOT and BOT are distinguished by the extra "O" in BOOT, which stands for ownership. Through the ownership, the BOOT franchise is possibly allowed to grant more rights to construct and obtain rents/income from buildings for the specified locations and duration. On the other hand, the BOT franchise is merely allowed to build and gather tolls from a motorway (Kumaraswamy and Morris, 2002). However, the structure of the BOOT project is so complicated because numerous stakeholders are included in the legal bound (Akbiyikli and Eaton, 2005; PPIAF, 2009). The structure and relationship between parties in the Build Own Operate Transfer procurement is illustrated in Figure 4. According to PPIAF (2009), this type of integrated project requires characteristics of a large public infrastructure to finance it and a significant private investment and operation capability. BOOT scheme has been adopted recently throughout the world for the development of new infrastructure assets (Lianyu and Tiong, 2005). BOOT projects encompass ample private funds, more than one stakeholder, as well as lengthy concession, and all these aspects can be accompanied by varied and significant legal and political risks (Ng and Loosemore, 2007). The current delivery methods in infrastructure development, which have been implemented worldwide, include, "Build-Operate-Transfer", "Build-Operate-Own", "Build-Lease-Transfer", "Build-Own-Operate-Transfer" and "Build-Transfer-Operate." These project delivery methods must be able to motivate economic activity and generate significant overseas direct investment which may open doors for the local and international private sector and occupations (Al-Mubarak, 2003).

Figure 4: Build Own Operate Transfer

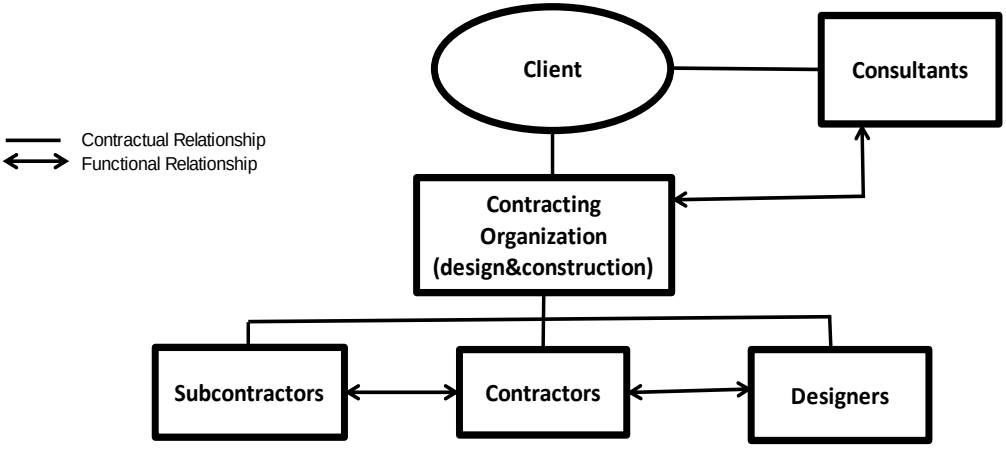


Source: [Adapted from (C McCarthy and L K Tiong, 1991; PPIAF, 2009)]

Due to difference of opinions between the government and the private sector, regarding current and anticipated BOT and BOOT projects in Kuwait, the first law (No.7 2008), intended to resolve, regulate and rule any issues related to these projects. In particular, BOOT contracts involve the private sector's rights to own properties for a certain period (Global Investment House, 2009). Additionally, the encouragement of private sector participation has been enforced by the government for infrastructure development and large states in BOT and BOOT projects (Kennedy, 2005). Despite the fact that such infrastructure projects are implemented and executed, not every one of these projects will deliver a reasonable, quantifiable profit (Al-Azemi, 2012). Due to the above considerations, the BOOT scheme is not a popular approach for project development in Kuwait, since it entails the concessionaire fully owning the land and the possibility of land mortgaging as a guarantee for the necessary debt finance (Akintoye et al., 2003). One instance in which the BOOT scheme was applied is the marina developed by the real estate developer La'ala Al Kuwait on the expansive Sabah Al Ahmad Sea City projects stretching for 4700 hectares in southern Kuwait (Fawaz Al Marzouq Real Estate, 2018). The project had a workforce of 2500 labourers from 20 countries who worked non-stop even under intolerable weather conditions (Summers, 2016). This project hinges on support from the community and residents as well as on the ongoing stability of the Kuwaiti economy, which is why it cannot be said whether or not it will be successful, despite the vast amounts of money injected into it (Summers, 2016). However, as attested by Summers (2016), there is hope that people will opt for Sabah Al Ahmad Sea City as their main residence owing to the major traffic issues affecting the city and the exodus may have already started.

Thirdly, Design Build (DB) procurement is a complete set of design and construction contracts through a design consultant agreement, from the initial design work to the supervision of the contractor and completion of the project (Kumaraswamy et al., 2000; Masterman, 2002; Walker and Rowlinson, 2008). The DB scheme is by no means a novel scheme and for a long time it was the sole method of procurement for construction projects. The fundamental explanation for the client selecting this procurement type is to come up with a construction scheme for the best delivery time and expense (Gransberg and Windel, 2008; Masterman, 2003). The structure and relationship between parties in Design Build procurement is illustrated in Figure 5. In Design Build the client assigns responsibility to a design consultant who acts as a contracting organisation and takes on the key role for design and construction (Kumaraswamy et al., 2000; Masterman, 2002; Smith et al., 2004; Walker and Rowlinson, 2008). However, communication of data from the client to the tenderers, which clarifies their requirements and reduces the risk of misconception, is crucial for the prospective contractor to estimate the project cost and plan feature designs for the project (Masterman, 2002; Walker and Rowlinson, 2008). The DB scheme is preferred by clients to make project execution smoother, especially during the period before contract implementation. In this period, the process can be accelerated by clients through various measures, including placing the project out to tender with no design papers, providing just a general overview of performance standards and specifications to interested parties (Kumaraswamy et al., 2000).

Figure 5: Design and Build



Source: [Adapted from (Alharthi et al., 2014, p. 4 b; Masterman, 2002, p. 70)]

Demirag et al. (2011) Stated that the Design-Build model enables construction organisations to provide specific contractual requirements of a definite project to the public-client, so the implementation of this model would serve particular project requirements in Kuwait. This model in general is beneficial to the public authorities as the constructing organization delivers both design and construction and is quickly spreading in the Middle East as well as globally. However, it may not work for specific projects which require investment (Al-Azemi, 2012). On the other hand, Design Build, to some extent, condenses project delivery time but the reduced time of the project life cycle requires payments for increased management competence. This form of

conventional contract makes designers more accountable to the public-client and are required to customise designs according to requirements. The building of a large mosque in Kuwait exemplifies this (Al-Azemi, 2012), whilst the highly accurate and massively complex design of Sabhan Labour City of essential importance to the strategic development plan of the Kuwaiti government constitutes a relevant case study as well. A number of DB projects have been completed with success in Kuwait, yet the ability of public-clients to request design changes or terminate the project altogether whenever they wish is seen as a problem with the DB scheme (Worldcentre Kuwait, 2017).

5. Method of investigation

A quantitative method was used for this paper, to ascertain the difference of norms implemented types of integrated projects in terms of cost and time performance. It was essential to identify appropriate organizations for this study, such as relevant public-client authorities as well as local and international private owners, investors, contractors, consultants and lenders. In 2016, the data was collected using a questionnaire survey and completed based on a stratified random sample selection of public and private sectors in Kuwait. The generated empirical data determined the selection of the survey questionnaire, whilst the choice of sampling strategy was influenced by the research aims and the possibility of separating the population into groups. The assessment of these types of projects is based on asset delivery performance of cost and time. The cost variable is the budget of the project, whether it overruns or remains within the budget, and the time variable represents the schedule of the project. The project should be on the budget and delivered on the time frame, to meet the requirements for success of a PPP+ project.

The data was collected based on types of (PPP+): Public Private Partnership (PPP), Build Operate Transfer (BOT), Build Operate Own Transfer (BOOT), Design Build (DB), initial and final cost of asset delivery performance in the Kuwaiti Dinar and initial and final schedule of asset delivery performance in duration. The size of these projects ranged from 500,000 to 2 billion Kuwaiti Dinar (KWD), which is approximately 2 million to 5 billion British Pounds (£). The schedule duration range of the projects was from 90 days to 19200 days. For the stratified random sample, the sample size was established based on the number of questionnaires returned by respondents from both the public and private sectors. The initial sample consisted of 240 collected, paper-based questionnaires (questionnaire survey) and an online-based survey (Survey Monkey). For the purpose of analysis, the numbers of aggregated surveys were divided based on the obtained data: 57 PPP projects, 131 BOT projects, 10 BOOT projects and 42 DB projects. The flow of (ΔC) in Figure 6 shows that 4 PPP missing projects were excluded from 57. Out of 131 BOT, three missing were removed. Out of 10 BOOT, two were excluded. Out of 42 DB, one missing was excluded. A total of 230 PPP+ (ΔC) projects comprise 53 PPP, 128 BOT, 41 DB and 8 BOOT. As is shown in Figure 7 the criteria of (ΔT) is as follows: out of 57 PPP, six missing were excluded. Out of 131 BOT, four missing were removed. Out of 10 BOOT, 0 missing were excluded. Out of 42 DB, one missing was excluded. The total of 229 PPP+ (ΔT) projects includes 51 PPP, 127 BOT, 10 BOOT and 41 DB.

Figure 6: Flow Chart of (ΔC)

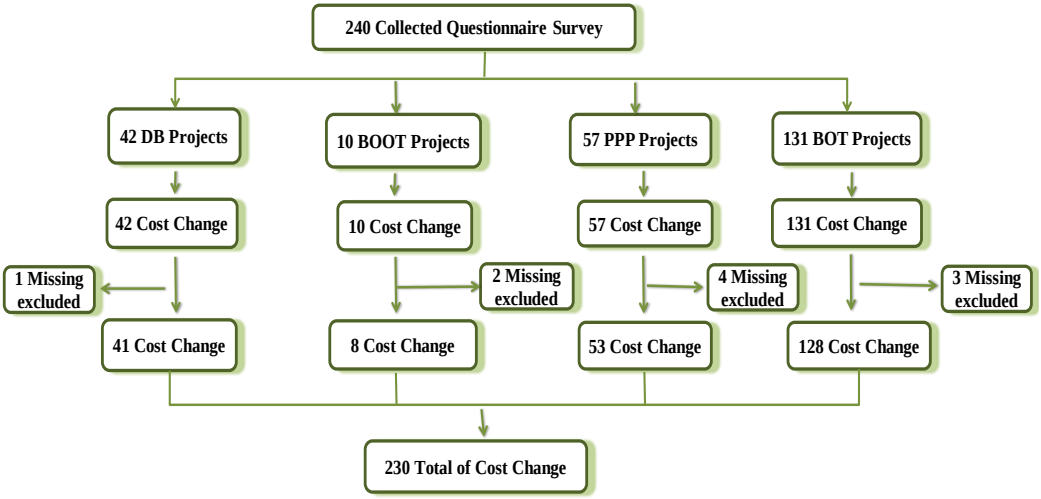
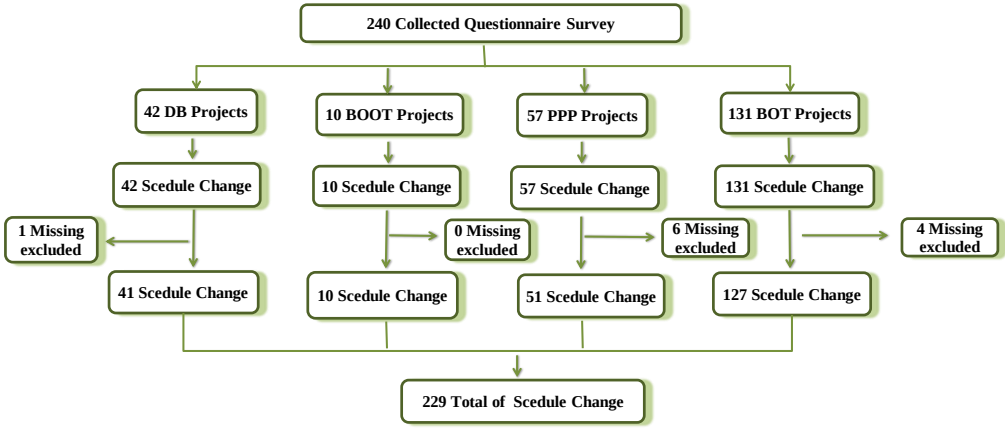


Figure 7: Flow Chart of (ΔT)



6. Data Analysis

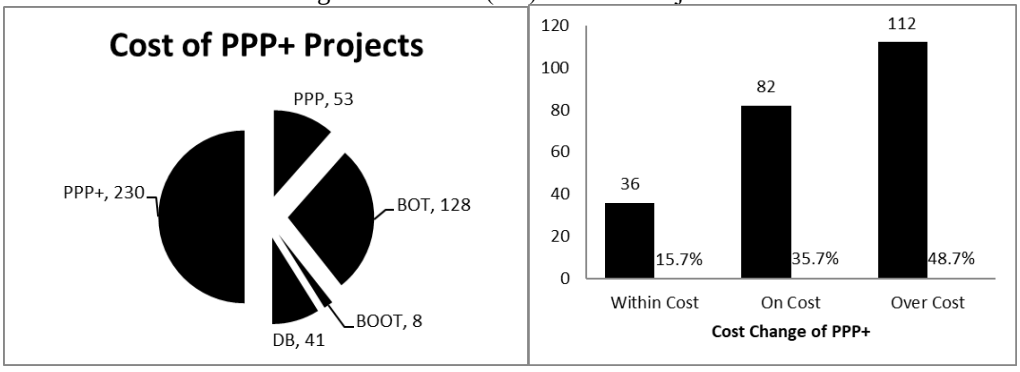
After collecting the required data, the next stage was the analysis of the participant's responses. 272 out of 375 public sector participants (72.5%) and 143 out of 181 (79.01%) private sector participants returned the questionnaire completed, so the response rate was highly satisfactory. A statistical analysis was employed to present the norms of integrated projects and their performance of cost and time. The adopted method used a spreadsheet in Microsoft Excel to analyse the variations of each project of the study. The data was gathered by surveys, either paper-based (Questionnaire Survey) or online-based (Survey Monkey). These projects were then segmented into four types of projects and the number of collected projects for each type was counted. Moreover, using the Relative Percentage Change equation (as shown in Eq. below) is to calculate the difference between initial and final cost and time of asset delivery performance to get (ΔC) and

(ΔT) in percentages. The initial and final cost and time of asset delivery performance were collected from participants. Graphs were produced based on the number of collected projects for representation and meaning.

$$RPC = 100 \times \left(\frac{\text{Final} - \text{Initial}}{\text{Initial}}\right)$$

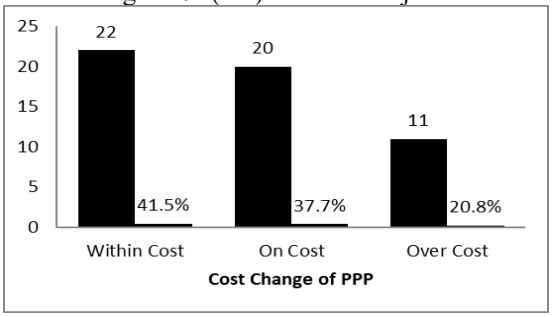
The data collection results of cost and schedule PPP+ projects measured the variations within the four projects. The cost and schedule of PPP+ performance projects divided into three states of project assessment: within, on, and over. The first set of analysis examined the (ΔC) of PPP+ projects. An overview of the pie chart (Figure 8) shows that 230 PPP+ projects segmented to U53U PPP projects, 128 BOT projects, 8 BOOT projects and 41 DB projects. Overall, the (ΔC) of PPP+ (bar chart) shows that, out of U230U projects, 112 are over cost (48.7%), which means that a significant number of projects are exceeding the budget, with 82 projects on cost (35.7%) and 36 projects within cost (15.7%).

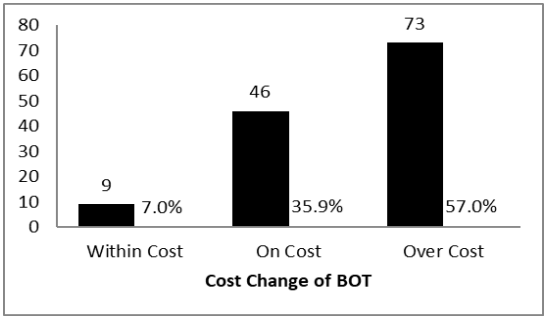
Figure 8: Overall (ΔC) of PPP+ Projects

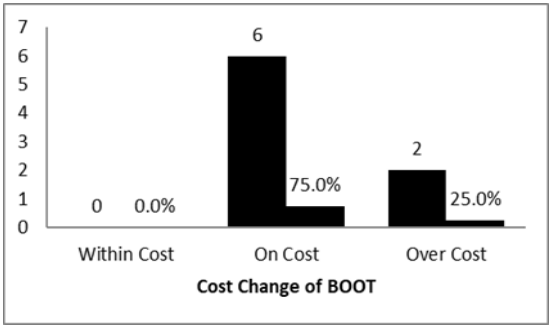


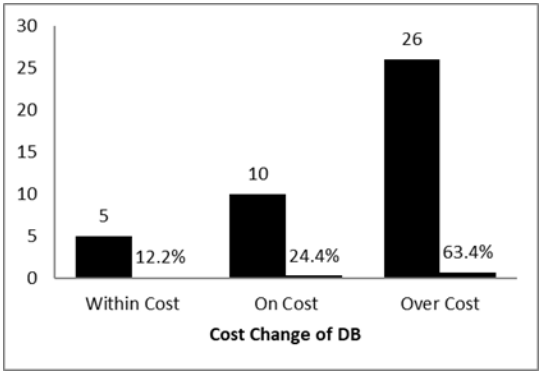
As shown in Figure 9, 22 out of 53 PPP projects were within cost (41.5%), 20 were on cost (37.7%) and 11 were over cost (20.8%). This clearly indicates that the most (ΔC) projects of PPP are within cost and on cost, with few over cost. BOT projects received 73 out of 128 for over cost (57.0%), 46 for on cost (35.9%) and 9 for within cost (7.0%). BOOT projects gained 6 out of 8 for on cost (75.0%), 2 for over cost (25.0%) and 0 for within cost (0%). The small size of the BOOT dataset shows that on cost projects is significant of all. DB projects gained 26 out of 41 for over cost (63.4%), 10 for on cost (24.4%) and 5 for within cost (12.2%). The interpretation of project performance in over cost shows that PPP has 11 projects (20.8%), BOT has 73 projects (57.0%), BOOT has 2 projects (25.0%) and DB has 26 projects (63.4%). This means that PPP and BOOT projects are the least likely projects to have over cost.

Figure 9: (ΔC) of PPP+ Projects









The second set of analysis examined the (ΔT) of PPP+ projects. A general review of the pie chart in Figure 10 shows that 229 PPP+ projects segmented to 51 PPP projects, 127 BOT projects, 10 BOOT projects and 41 DB projects. The bar chart shows that of PPP+ projects, 115 out of 229 projects are on-time (50.2%), meaning that most of the projects are completed to schedule. However, there is still a significant number of projects which are over time (93 projects or 40.6%) and the remaining 21 projects are within time (9.2%).

Figure 10: Overall (ΔT) of PPP+ Projects

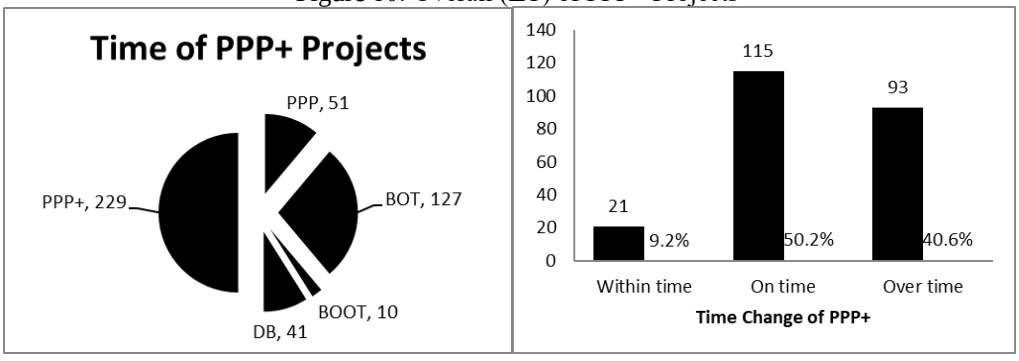
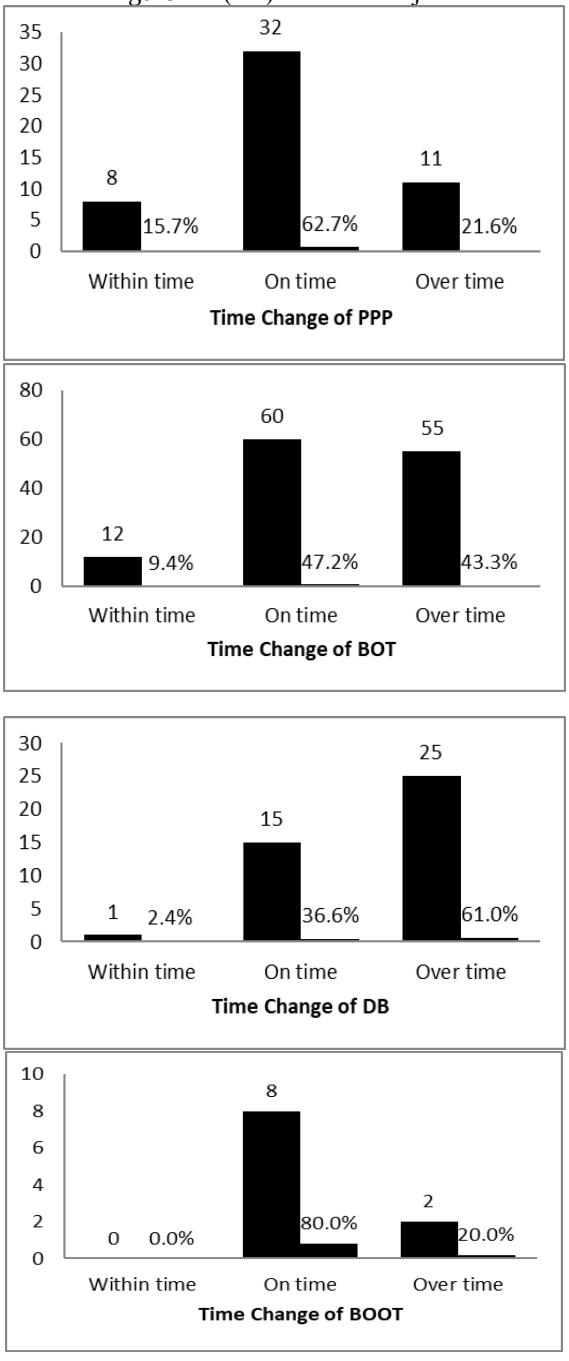


Figure 11 shows the (ΔT) for 51 PPP projects, 32 of which (62.7%) had on-time cost, 11(21.6%) recorded over time cost and 8 (15.7%) showed within cost. In a total of 10 BOOT projects, 8 (80.0%) were on-time, whilst 2 (20.0%) were over cost. None (0%) of the BOOT projects were within cost. Statistically, it should be noted that this is a very small population. In 127 BOT projects, 60 (47.2%) were on-time, 55 (43.3%) were over time and 12 (9.4%) were within time. In 41 DB projects, 25 (61.0%) were over time, 15 (36.6%) were on cost and 1 (2.4%) was within cost. The schedule performance of projects indicates that PPP has 11 projects (21.6%), 2 BOOT projects (20.0%), 55 BOT projects (43.3%) and 25 DB projects (61.0%). This means that PPP projects are the least likely projects to have over time nevertheless for the on-time performance is significant as well as BOOT. PPP and BOOT projects have the least over time and over cost performance of integrated projects. These results are particularly important for helping to enhance Kuwait's government stance, in attracting private sector for construction and infrastructure development in PPP form. It is interesting to note that in all four projects of this study, there is a significant number of on-time and on cost projects. This suggests that there is progress in implementing integrated projects, but a deficiency in project performance which needs to be addressed. Alongside other integrated schemes, PPP and BOOT schemes are therefore anticipated to make a notable contribution to consolidate not just the Kuwaiti market and private investment schemes, but also the general development plan of the country.

Figure 11: (ΔT) of PPP+ Projects



7. Discussion

The most interesting finding is that in overall (ΔC) of PPP+ 48.7% of projects were over cost which means that a significant number of integrated projects are exceeding their budget. Integrated projects should consider a new strategy to minimize the number of over cost projects and identify the cause of cost delay. However, there are 82 on cost projects (35.7%), which compares to 112 over cost projects (48.7%). Meaning there are a significant number of on cost projects, compared to over cost projects. PPP has 11 over cost projects (20.8%), and BOOT has 2 over cost projects (25.0%), BOT has 73 over cost projects (57.0%) and DB has 26 over cost projects (63.4%). Comparatively, the results indicate that PPP projects have the least over costs, closely followed by BOOT which only has 25% of projects over cost. PPP has a total of 53 projects, where the aggregated projects of BOOT are 8.

Furthermore, total (ΔT) of PPP+ showed that, 50.2% of projects are on-time, which means that most of the projects are completed to schedule. However, there is still a significant number (40.6%) which are over time which needs investigating further. Further details, PPP has 11 projects (21.6%), BOOT has 2 projects (20.0%), BOT has 55 projects (43.3%) and DB has 25 projects (61.0%). PPP projects were found to have the least over time, but it must be noted that BOOT had 2 over time projects.

Another important finding relates to (ΔC), Six BOOT projects were on cost (75.0%), 2 (25%) were over cost and none (0%) were within cost. In the case of (ΔT), 8 (80%) BOOT projects were on-time, 2 (20%) were over cost and none (0%) were within cost. Due to there being very few implemented BOOT Projects in Kuwait, the collected sample is notably very small. Therefore, the data of BOOT projects cannot provide a particularly reliable and valid result and it is difficult to confidently state that BOOT projects do have less over time and over cost than PPP projects. It can therefore be assumed that PPP projects are the least likely projects to be over cost and over time.

8. Conclusion and Further Work

The focus of this study is to explore integrated project performances. This research presented norms of (ΔC) and (ΔT) to be measured in three categories. The statistical data result of this study is beneficial to and supportive of the development plan of Kuwait. It provides public client practical solutions and boosts the private sector's interest and potential involvement.

The evidence from this study encourages the government of Kuwait to proceed with their development plan and invite the private sector to invest and engage with the public sector, particularly in PPP construction projects. The results also encourage private sector engagement with the forthcoming PPP projects for developing infrastructure facilities.

Further studies, regarding the role of PPP+ projects in Kuwait, would be worthwhile to explore rules and regulations, in dealing with the private sector. Also, collecting a significant number of integrated projects to address the deficiency in project performance will lead to further investigation and exploration around the topic, something which is strongly recommended.

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