

Institutional Ontology of Sustainability Principles Integration in Public-Private Partnerships (PPP) Infrastructure Projects: A Systematic Review

*Adebayo Abimbola¹, Olanrewaju Taiwo²

¹(Department of Governance and Technology for Sustainability (CSTM), University Of Twente, the Netherlands/
Department of Architectural Technology, the Federal Polytechnic, Ado-Ekiti, Nigeria).

²(Department of Architectural Technology, the Federal Polytechnic, Ado-Ekiti, Nigeria)

Corresponding Author: Adebayo Abimbola¹

Abstract: The objective of this paper is to determine the Institutional ontology of sustainability principles integration in Public-Private Partnerships (PPP) urban projects. The paper utilizes a literary analysis based methodology to collect data and analyze infrastructure cases through the use of guidelines and procedures of the Campbell protocol, we assessed 972 articles. Descriptive analysis of PPP infrastructure projects from best case practices result in recurring principles about connecting PPP and sustainability. Findings confirm that, value for money constitutes a key driver for PPPs. Intrinsic to this driver is strong and supporting regulatory framework that seek to establish, protect and incentivize partnerships between the public and private sectors for the attainment of sustainable development outcomes in PPP infrastructure projects. The paper suggests that operating regulations as regard the integration of sustainability principles in PPPs should constitute at least the following elements: conditions and criteria for entry of a private sector entity into PPPs; competitive bidding systems for PPP contracts; provision of autonomy of private partners and delineation of roles of partners; contract risk management and supervision of private sector partners. Also, these elements could serve as the evaluative criteria for more rigorous studies on the integration of sustainability principles in PPP infrastructure projects.

Keywords- infrastructure projects, institutions, public-private partnerships, regulatory framework, sustainability development

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I. INTRODUCTION

The aim of this paper is to propose a ‘lens’ for conceptualizing and understanding the institutional ontology of sustainability principles integration in PPP infrastructure projects (hereinafter, PPP-Ss) as reported in the academic literature. Our goal is to review the literature on PPP infrastructure projects and ascertain the ‘level of attention’ paid to sustainability principles in terms of social, economic and environmental sustainability. In particular, we aim to identify and classify institutional arrangements incentivizing private actors behaviour towards PPP-S as reflected in articles published until 2016, using guidelines and procedures of the Campbell Protocol of systematic review.

According to Colverson and Perera (2012), provided with the correct incentives, the private sector will take the risk to invest, innovate, and provide optimum solutions that will promote sustainable development. Also, private stakeholders do have a comprehensive understanding of environmental sustainability, especially when they need to respond to issues that are included as bidding parameters (UNECE 2008). However, private sector participation in PPP urban infrastructure projects does not automatically contribute to sustainability as private sector is often expected to focus on short-term financial return on investment whilst the sustainability performance of project can only be obtained from long-term perspective (Koppenjan and Enserink, 2009).

In order to reconcile private sector participation with sustainability, a theoretical exploration and an overview of international experiences as regards PPP infrastructure projects was studied by Koppenjan and Enserink (2009). The study of Koppenjan and Enserink reveals three major challenges: finding the right balance between private investors’ willingness to invest and public values in general and long-term sustainability objectives that are guarded by the government in particular; finding an incentive structure that substantiates economic and sustainability objectives; and establishing an institutional framework that combines economic, environmental, social, and financial regulatory regimes. However, the study of Koppenjan and Enserink (2009), failed to consider the institutional structure reconciling PPP-Ss with private actors. More so, giving the fact that PPPs are considered as a hybrid legal institutions with subtype variations.

In the midst of this gap in literature, the need to explicitly address the role of a strong and supporting institutional arrangements(regulatory framework) that seeks to establish, protect and incentivize partnership between the public and private sectors for the benefit of society was recognized, especially as they pertain to PPP and sustainability. From the foregoing, we assessed in this article, the recurrent principles/normative patterns incentivizing private entity towards PPP-Ss. By this, we enlighten the incentives, regulations should provide.

The rest of this paper is as follows. In the next section, we define sustainability in the context of PPPs; thereafter, we define institutions as they pertain to PPPs. Furthermore we, delineate our methodology. The penultimate section analyses and discusses our findings and outlines a classification of recurring principles/normative patterns based on the literature reviewed followed by the conclusions and suggestions for future research.

II. LITERATURE REVIEW

What are PPPs?

Despite the extensive literature which has developed since the second half of the 1990s (e.g. Grimsey and Lewis 2005; Akintoye et al. 2003; Osborne 2000; Rosenau 2000; Montanheiro et al. 1995) there is no universal accepted definition of PPP (Martin, 2009). Although definitions vary, some typical characteristics that distinguish PPPs from conventional (traditional) public procurement include: the allocation of certain risks to the private sector, a focus on the specification of project outputs rather than project inputs, and the integration or 'bundling' of different functions such as design, construction, financing, maintenance and/or operation into a single contract (EPEC, 2011; Grimsey and Lewis, 2004). Key developmental institutions employ definitions which best emphasize their interest and goals, and four of such definitions are presented in table 1.

Given the context of our review, we use the PPP definition from the OECD which define a PPP largely in terms of a contractual relationships as : "an agreement between the government and one or more private partners (which may include the operators and the financiers) according to which the private partners deliver the service in such a manner that the service delivery objectives of the government are aligned with the profit objectives of the private partners and where the effectiveness of the alignment depends on a sufficient transfer of risk to the private partners"(OECD 2008: 17).

Based on the OECD definition, definitions from key developmental institutions (such as ADB, UNECE, UNESCAP and World Bank) and analysis of EPEC (2011), Grimsey and Lewis (2004), we derive three key criteria for contractual PPPs. These are: bundling of different functions into a single contract Focus on output specifications; transfer of certain risks from the public partner to the private partner(s).

It is because of the specific characteristics of public-private partnerships, like bundling and the focus on output specifications, that they are often mentioned as vehicles for reaching sustainability goals (Grimsey and Lewis, 2004). Hence, in summary, in this research we will look at 'contractual' PPPs for the provision of public infrastructure-based services, in which different functions are bundled into a single contract that emphasizes on output specifications and in which certain risks are transferred from the public to the private partner(s).

Within this framework, there are several types of 'contractual' PPPs. On a scale from public to private we distinguish the following types (ADB, 2012): Service contract; Management contract; Affermage and lease contracts; Concession contracts (Build Operate and Transfers which includes: BTO, BOO, DBO, DBFO, DBFOM and Joint venture), see figure 1.

Understanding Sustainability in the context of PPPs

The most often cited and widely accepted definition of sustainability is creatively ambiguous: "Humanity has the ability to make development sustainable-to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Since then, many refinements to the original definition and additional definitions have been proposed. For instance, Rijsberman and Van de Ven (2000) argue that sustainability is not just about the needs of generations but also about the carrying capacity of supporting systems, and about maintaining ecological, environmental and hydrological integrity.

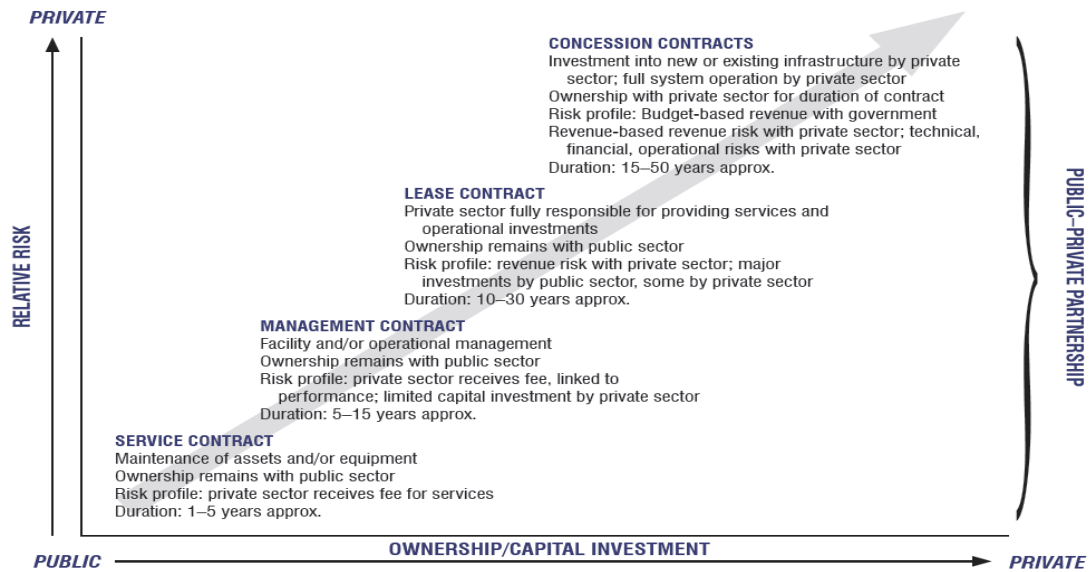


Figure 1: Public-Private Partnership Spectrum. Source: Asian Development Bank, 2012

Sustainability has found its way into many phrases across a variety of contexts. Well used phrases include: ‘sustainable development’, ‘sustainable societies’, sustainable communities, ‘ecological sustainability’, ‘sustainable growth’ and ‘strategic sustainability’; each use has its own flavor, placing a particular emphasis on one or other aspect of the concept (Vos, 2007). Vos further postulates that the concept of sustainability originated with biologists and ecologists who used it to describe the rates at which renewable resources could be extracted or damaged by pollution without threatening the underlying integrity of ecosystems (Vos, 1997).

According to (Vos, 2007), nearly all definitions of sustainability share core elements. The first is that they present a way of looking at environmental problems in relation to the economy and society. So neither social development nor economic growth should take ecological underpinnings for granted nor, from another angle, ecological preservation schemes should not take economic outcomes or public support for granted. The World Commission on Environment and Development (WCED), further identified the various elements of sustainability (See Table 1).

Institutional analysis and PPP Project outcomes

Policy makers, practitioners and academics alike realize that a favorable institutional environment is an essential pre-requisite for successful PPP programs (Matos-Castano et al., 2014). Institutions as the set of both formal and informal constraints that shape human interaction (North 1990); a widely understood rule, norm, or strategy that creates incentives for behavior in repetitive situations (Crawford and Ostrom, 1995).

Social	Economic	Environmental
<ul style="list-style-type: none"> • Human diversity (cultural, linguistic, ethnic) • Equity(dependence/independence) • Quality of life • Institutional structures and organization • Political structures 	<ul style="list-style-type: none"> • Money and capital • Employment • Technological growth • Investment • Market forces 	<ul style="list-style-type: none"> • Biodiversity • Materials • Energy • Biophysical interactions

Table 1: Elements of sustainability (Source: WCED, 1987)

Jooste et al. (2011) emphasize the importance of an enabling environment for the successful development of PPP programs. Several other studies highlight how shortcomings in the institutional environment can lead to poor outcomes in the case of PPPs. Mu et al. (2010) suggest that deficiencies in the performance of PPPs are a sign of institutional deficiencies, indicating the need to improve the institutional setting where projects take place. Beh (2010) uses the example of Malaysia and suggests that the lack of transparent procurement processes and regulatory safeguards leads to the privatization of profits and not societal value in the case of PPPs. Hayllar (2010) supports this view and points out that in the case of Hong Kong, the lack of institutions that support good governance of PPPs – specifically arrangements that foster meaningful societal participation – can lead to PPP projects not being able to fulfill their potential.

Taken together these and suchlike studies point to deficiencies in various aspects of the formal and informal institutional arrangements and how such institutional failure leads to suboptimal project and program outcomes. Creating an enabling environment for PPPs is therefore a combination of institutional creation and

institutional change, since existing institutions – both formal and informal – that relate to procurement of services must partially be amended to suit the needs of private procurement of infrastructure (Matos-Castano et al., 2014). Despite studies about the influence of the institutional environment in PPP project development and outcomes, there is a paucity of research on the reconciliation between institutional arrangements and private sector participation as it concerns PPP-Ss. This study attempts to fill this gap by suggesting the incorporation of a set of operating regulations that incentives the involvement of private actors in the PPP framework.

III. METHODOLOGY

This section provides a concise discussion on the methods and techniques used and how these were applied in this paper. In our systematic review we followed five research steps mentioned in the guidelines and procedures of the Campbell protocol for systematic reviews to find, select and analyze relevant studies. These steps are: keyword search; quick scan on title and abstract; assessing general characteristics of studies; check on quality; and in depth analysis of remaining studies. The following sections describes the steps.

Keyword search

The initial step involved the use of keyword search for scientific studies which were published between 2002 and 2016. We present the keywords we used to find relevant studies.

Keyword (Boolean operators)
“Public Private Partnerships*”AND Infrastructure Projects* AND Sustainability
“Public Private Partnerships*”AND Infrastructure Projects* AND Social outcomes
“Public Private Partnerships*”AND Infrastructure Projects* AND Environmental outcomes
“PPP”AND Infrastructure projects AND Sustainability
“PPP”AND Infrastructure projects AND Social outcomes
“PPP”AND Infrastructure projects AND environmental outcomes
PPP*AND Infrastructure projects* AND Sustainability
PPP*AND Infrastructure projects *AND Sustainable Development
PPP*AND Infrastructure projects *AND Economic sustainability

Table 2: Keywords used for finding relevant articles

We used the following data bases: Web of Science; Scopus; and Science Direct to find scientific studies published in peer reviewed scientific journals, working papers and dissertations. We concluded our search by checking websites from developmental institutions (such as ADB, AfDB, IISD, OECD, UNECE and World Bank). In table 3, we present an overview of all used sources.

Quick Scan Articles on Titles and Abstract

Our keyword search resulted in 972 articles published between 2001 and 2016. We first screened these studies on title and abstract and excluded articles that were not relevant for our review, see table 3.

Source	Articles	Title/abstract
1.Scientific literature		
Web of science	20	3
Scopus	30	4
Science Direct	886	10
2.Developmental Institutions		
Asian development bank	3	1
African development bank	0	0
International Institute of Sustainable Development	4	3
OECD	0	0
UNDP	10	5
UNECE	9	4
World Bank	10	5
	972	35

Table 3: Number of articles collected and remaining after check for relevance title/abstract.

From the analysis as derived from the above table, 35 articles out of 972 remained after quick scanning them for relevance on title and abstract. The studies were mainly excluded for the following reasons:

- Approximately 75% of the 972 studies were excluded because they clearly did not have anything to do with sustainability outcomes in PPP infrastructure projects. For instance, study about “Vulnerability evaluation method of infrastructure PPP projects”.
- Approximately 40% of the 972 studies were excluded because they were not about PPP infrastructure projects. For instance, studies about “Perspectives of local Public Private Partnerships towards urban sustainability in Greece”.

- Finally a substantial amount of the 972 studies (circa 35%) were excluded because they were not an evaluation of Public-Private Partnerships. For instance, a study about “Strategic environmental assessment: a tool for sustainable development”.

Assessing general characteristics of studies

Next, we filled in a list of general characteristics for the remaining studies, such as the year, country, and type of study.

Check on quality (6knock-out criteria)

Thereafter, we checked the remaining 81 articles on quality. A study which scored insufficient on one of the six criteria in Table-2 was excluded from our review. The six knock-out criteria are derived from the definition of key terms (‘contractual’ PPPs and sustainability principles as earlier described). After our quality check, 12 studies remained, of which are 5 case studies and 7 reviews, see table 4.

#	Quality criteria
1	Bundling of different functions into a single contract
2	Focus on output specifications
3	Transfer of certain risks from the public partner to the private partner(s)
4	Evidence of social sustainability outcomes
5	Evidence of environmental sustainability outcomes
6	Evidence of economic sustainability outcomes

Table 4: Quality criteria (knock-out)

In-depth analysis of studies

We concluded the systematic review with an in depth analysis of the remaining 12 studies. For each study we collected information on a number of characteristics, such as the results of PPP-S (social, economic and environmental), recurring principles incentivizing PPP-S, type of PPP, sub-sector.

	Title/abstract	Sufficient quality
1. Case study	10	5
2.Reviews of studies focused on recurring principles for PPP-S	25	7
Total	35	12

Table 5: Number of articles remaining after check on title/abstract and quality

IV. FINDINGS

Findings from the literary search as regards incentivizing private sector entity towards PPP-Ss are highlighted in tables 6-8. Table 6 is based on findings from the PPP infrastructure cases selected for the study while, table 7 include the opinion of authors as documented in scientific literatures. Analysis of the findings of the study are discussed in the next section, while a classification of the recurring principles identified from case studies and authors are presented in table 8.

Analysis of Findings and Discussions

From the case studies and assertions of authors documented in this literature review, we observe that the various recurring principles incentivizing the behavior of the private sector towards PPP-S can be broadly classified in terms of the different phases of the PPP project life cycle. According to EPEC (2011), the four phases of the PPP project are: project identification, detailed preparation, procurement and project implementation. A classification of the recurring principles (normative patterns) is presented in table 8.

Despite the sustainability considerations produced by the private partner in the Victorian Desalination plants, we observed that, it is the expertise, diligence, and objectives of the public sector that determine not only the outputs from a PPP agreement, but also the methods by which those outputs are achieved. Private consortium’s response to request for tenders issued by the government will generally be shaped in such a way as to maximize their own interests. Therefore, from a sustainability and environmental perspective, it is therefore incumbent on the government to protect those interests by building relevant and adequate measures into the PPP agreement.

This means thorough feasibility and impact studies, detailed contracts and specifications that define desired outputs and performance indicators, and a rigorous accountability mechanism. Unless public authorities accept and fulfil this responsibility sustainable and environmental factors will continue to be ignored, because such considerations are not inherent to PPP tools, design, intention or framework (Colverson and Perera, 2012).

All the hard work to mitigate sustainability risks and maximize the contribution of the project to sustainable development goals needs to commence at the planning and negotiations phases of the project, as it is always more difficult to retroactively adjust contracts and project priorities. This was highlighted in the

procurement of the public market for the city of Mandaluyong, Philippines and in the case of the Vancouver Landfill Project. Bid evaluation through a competitive and transparent tendering process coupled with an open interaction with bidders ensured sustainability outcomes from the two projects. Lastly, contract management with regard to risk transfer and compensation is a requisite for PPPs to serve effectively as tools for sustainable development.

Table 7. Institutional arrangements incentivizing private entity towards PPP-S (case studies)

Study/author and year	Project description	Sustainability evidences	Recurring principles incentivizing private entity towards PPP-S
Victorian Desalination Plant (Victorian Department of Sustainability, 2007, 2009, 2010)	The Victorian desalination plant is a PPP (DBFOM) project between the Victorian government and AquaSure and other consortiums. The project, located at Wonthaggi, state of Victoria, Australia, represents the largest water infrastructure in Australia's history and a major non-rainfall dependent addition to urban water supply.	Environmental: Minimized adverse impacts on the coastal and marine environment from construction activity, visual intrusion, noise and waste discharge and disposal; 100% renewable energy for desalination plant and associated infrastructure. Social: provision of 4750 full-time equivalent jobs during construction, flexibility with which the government can order water delivery each year according to estimated needs. Economic: \$1billion economic boost to state of Victoria during construction.	Output Specification (in-built environmental safeguards in PPP agreement); Bid evaluation criteria (environmental management, renewable energy credits); Innovative design freedom (based on the concept of a 'green line' featuring a modern living roof design that integrates the built form of the landscape and makes the desalination plant barely visible from all public viewing points providing also acoustic protection, corrosion resistance and thermal control to reduce maintenance needs and Compliance with EIA and SIA (existing environmental and social sustainability laws and policies strictly enforced).
The Pamir Private Power Project (World Bank, 2012).	A Concession PPP between the Government of Tajikistan, the World Bank Group, and the Aga Khan Fund for Economic Development (AKFED). Located at Gorno-Badakshan Autonomous Oblast, Tajikistan, the Pamir Private Power project worked to restore a reliable electricity supply to the poor and isolated inhabitants of Eastern Tajikistan.	Social: Electricity supply in the poorest region of Tajikistan has increased from three hours to 22–24 hours per day during the winter. An estimated 220,000 people, including more than half of which are women, have benefitted from improved electricity services. As a result of the project, schools, hospitals, and businesses can now stay open during the cold winter months. Environmental: affordable and clean hydropower displaced the use of high-polluting diesel generators and firewood as energy supplies. Economic: the collection of electricity bills has increased from 40% in 2002 to around 100% of sales in 2010 and previously subsidized state owned the Pamir Energy Company's operating income and cash flow became positive.	Project definition (A very important component of the project was the inclusion of a social protection scheme under which households accounting for 98% of all consumers pay reduced tariffs consistent with their standard of living; Risk mitigation (The planning and development of the Pamir Power Project was a success because risks were assessed initially and mitigated before the project was implanted. The IFC and IDA provided needed equity as well as the regulatory and legal framework. The affordability of electricity for the poorest households was ensured by a lifeline subsidy scheme funded primarily by a grant from the Government of Switzerland. As this subsidy was provided upon delivery of electricity services, the project also integrated the concept of output-based aid.
The Vancouver Landfill Project. (Colverso and Perera, 2012)	A DBFO PPP contract between the City of Vancouver, British Columbia and Maxim Power Corporation. Under the approved PPP structure, the private partner designed, financed and constructed a cogeneration plant, which uses the landfill gas as fuel to generate electricity, which is sold by the private partner to a local utility.	Environmental: Reduced greenhouse gas emissions by approximately 200,000 tons per year converting landfill gas into electrical power (56,000 megawatts per year). It captures approximately 500,000 GJ of energy a year, the energy requirements for 3,000 to 4,000 households. Economic: The PPP has transformed an expensive environmental programme into both a more effective environmental programme and a net revenue generation for the City. Vancouver will receive about \$300,000 a year in revenues from the project that offset operating costs. Social: The project supports approximately 300 jobs in Vancouver.	Project definition and Output specification (The power to prioritize environmental outcomes and specify environmental criteria rested entirely with the City of Vancouver's authority, and it was only after making such direction that the private sector was able to respond with all its ingenuity and resources); Risk mitigation (The City of Vancouver makes no payments to the private partner, but guarantees provision of landfill gases for the twenty-year duration of the agreement. The City thus assumes the supply risk associated with the project, but it minimizes this risk by retaining responsibility for the management and operation of the gas collection system); Selection of partner (Following a detailed and structured proposal evaluation and negotiation process, a 20-year Public-Private Partnership contract, based on the most highly evaluated proposal, was approved by the City Council in February 2002).

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<p>The Cross-Israel Highway Free-Flow Toll Road (UNECE, 2008).</p>	<p>The Cross-Israel Highway, is a 300km long PPP (BOT) Project constructed by Derech Eretz Group and included a fully electronic free flow tolling system. The road, connects Israel's northern and southern regions.</p>	<p>Environmental: Derech Eretz set advanced construction criteria in managing environmental awareness and landscape development along Road 6, investing US \$70 million towards this end. Since the two tunnels nearby the Moshav Hadid and Ben Shemen interchanges go under an archaeological site called the Tel Hadid, the system's tunnels were excavated to preserve and prevent damage to the site, which is of great cultural and historical importance to the nation. Social: This project has also led to an increase in the development of outer settlements, a decrease in road congestion – and a resultant reduction in the number of road accidents. Economic: a remarkable bill collection success rate of 97% resulting in a profit of 89 million NIS for 2005.</p>	<p>Innovative design freedom(The design and laying of Road 6 took into account the preservation of the environment and archaeological sites).Contract management: the project model is based on three key components: the concession contract with the State of Israel, a construction agreement with the construction joint venture(CJV) that the consortium established for the project and an operations and maintenance (O&M) agreement with the Derech Eretz operator(DEC-Op), which is based on transportation lessons learned from around the world. The contract management contributed immensely to the success of the PPP project.</p>
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<p>Public Market, Mandaluyong City, Philippines. (UNDP,2011)</p>	<p>City of Mandaluyong, Metro Manila State The main market of the city of Mandaluyong in Metro Manila was destroyed by a fire in 1991. The winning bid for the Peso 300 million seven-storey market project came from Macro Founders and Developers, Inc. (MFD). The bidder was awarded a BOT concession for 40 years to build, operate and manage the market. The project's financing structure was as follows: equity, 25 per cent; advances from shops, 25 per cent; debt, 50 per cent. Most of the project risks were taken by the concessionaire.</p>	<p>Economic: The project also helped to create about 600 new jobs and restored the livelihood of the displaced vendors. Stall fees were kept low, which helped vendors to keep their prices low for their low income customers; A gain of about 10 million pesos to 20 million pesos in annual business and entertainment taxes. Social: Improving living standards in this and neighboring communities due to a new sewage facility provided alongside with the market.</p>	<p>Output specification (to provide the low-income population with a viable and economically appropriate location for their shopping) ; Interaction with bidders (by transforming the concept into a multi-store, mixed-use retail / entertainment venue, the city achieved commercial viability and much greater benefit to the city and its citizens than a simple market would have provided); Appropriate risk allocation (had the risk been shared differently on this project, the Mandaluyong City government could have potentially faced a dire situation from the 50-per cent increase in project costs). Because of the effective structuring of the partnership, MFD was able to absorb the additional costs. If this had not been the case, the project might not have been completed.</p>
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Author	Institutional arrangements incentivizing private entity towards PPP-Ss
Patil et.al (2016)	Well-designed incentives and penalties system; monitoring and sanctions; and bidding criteria.
Grasman et.al (2014)	Create team of experts; specify outcomes and metrics; provide value incentives; introduce legislation; understand risk; and engage in competitive dialogue.
Colverson and Perera (2012)	Project definition; output specifications; tender evaluation; partner selection; monitoring and contracting functions.
UN-Habit (2011)	Bid evaluation criteria
Eversdijk (2011)	Bid evaluation criteria; minimum specifications; monitoring and sanctions; design freedom for private parties.
Koppenjan and Enserink (2009)	Choice of PPP contract; contract conditions; environmental and social regulations; rewards; stakeholders' involvement; and risk mitigation.
Ryan (2004)	Output specification: bid evaluation criteria; and contract award.

Table 8. Institutional arrangements incentivizing private entity towards PPP-Ss (authors.)

The Government of Switzerland recognized that standard business models would not be successful in bringing electricity to rural low-income areas of Eastern Tajikistan. It therefore needed to step in and subsidize the private partner in order to create a viable PPP. From the forgoing therefore, provided with the correct incentives, the private sector will take the risk to invest, innovate, and provide optimum solutions that will promote sustainable development. When given the correct balance of freedom and direction, the consortiums involved in the Vancouver Landfill Project and The Cross-Israel Highway Free-Flow Toll Road responded to environmental and social concerns with appropriate and inventive solutions.

PPP Phases	Project identification	Detailed preparation	Procurement	Project implementation
Recurring principles	Project definition; Output specification.	Procurement method and PPP design; Bid evaluation criteria; Stakeholder involvement; Private partner selection criteria	Interaction with bidders; Innovative design freedom; Risk allocation	Contract management; Monitoring and sanctions/rewards Compliance with EIA and SIA.

Table 9: Classification of institutional arrangements identified from case studies and authors.

V. CONCLUSION AND IMPLICATIONS

As we have seen from the earlier examination of case studies and theory, sustainability practices are present within PPP experience, but sustainable development principles are largely absent from the theory and frameworks that underpin and direct PPP action. For PPPs to be utilized as a vehicle for sustainability, the type of PPP should relate to contractual PPPs as highlighted in earlier section of this study. Extending the works of Koppenjan and Enserink (2009), Patil et al. (2016)) who have recognized that intrinsic to the accomplishment of value for money is a strong and supporting regulatory framework that seek to establish, protect and incentivize partnerships between the public and private sectors for the attainment of sustainable development outcomes in PPP infrastructure projects. We argue that institutional arrangements as they pertain to incentivizing sustainability behaviour by private parties (both potential candidates and the final contractual partner) should relate specifically to operating regulations imbedded in the PPP framework.

Finally, We suggest that operating regulations as they pertain to : (1) conditions and criteria for entry of a private sector entity into PPPs (project identification phase) ; (2)competitive bidding systems for PPP contracts (detailed preparation phase) ; (3) provision of autonomy of private partners and delineation of roles of partners(procurement phase); (4) contract risk managementand supervision of private sector partners (project implementation phase) could serve as the evaluative criteria for more rigorous studies on the integration of sustainability principles in PPP infrastructure projects

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