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Closing the Infrastructure Gap? The Role of Public-Private Partnerships in Water Sector Development and the Economic, Political, and Social Factors that Determine Project Success

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UNIVERSITY OF CALIFORNIA,  
IRVINE

Closing the Infrastructure Gap? The Role of Public-Private Partnerships in Water Sector  
Development and the Economic, Political, and Social Factors that Determine Project Success

THESIS

submitted in partial satisfaction of the requirements  
for the degree of

MASTER OF ARTS

in Social Ecology

by

Evgenia Nizkorodov

Thesis Committee:  
Professor Richard Matthew, Chair  
Professor David Feldman  
Professor Walter Nicholls

2017



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## **ABSTRACT of the THESIS**

Closing the Infrastructure Gap? The Role of Public-Private Partnerships in Water Sector  
Development and the Economic, Political, and Social Factors that Determine Project Success

By

Evgenia Nizkorodov

Masters of Arts in Social Ecology

University of California, Irvine, 2017

Professor Richard Matthew, Chair

Given the success of the Private Finance Initiative in the United Kingdom and the large-scale ideological shift to neoliberalism, supporters of public-private partnerships (PPPs) argue that the theoretical benefits of the management approach (innovative financial mechanisms, budgetary relief, increased economic and technical efficiency, and transfer of risk to the private partner) can allow governments in low-income nations to close the infrastructure gap in the water sector. Utilizing a Social Ecological framework, this Master's Thesis examines these claims by identifying the sources of supply and demand for Water, Sanitation, and Health (WASH) PPPs. Drawing from the World Bank Private Participation in Infrastructure database, the research discovers that the majority of projects are found in middle-income economies, with investment stemming primarily from public – rather than private – partners. The data also reveals that despite being touted as a panacea for development and growth, since the 1990s PPPs are responsible for

only 11.12 percent of gained water access. Given the high cost of project cancellation and distress in the water sector (20 percent of total investment), the thesis also explores the Critical Success Factors (CSFs) that determine project success. A thorough literature review based on both outcome- and output-based project metrics revealed a total 13 CSFs. The thesis concludes that given the high economic, political, and social requirements of these partnerships, in its present form, the management approach is not an appropriate solution for promoting WASH infrastructural growth in developing economies.

*“All of the evidence I have ever read on PPPs has been positive”*

- an Australian government minister, who recently sanctioned billions of dollars in public-private partnership investment (Hodge & Greve 2007, p. 551).

## **1.0 INTRODUCTION**

While definitions vary, in simplest terms, public-private partnerships can be thought of as joint collaborations between public and private actors to co-provide or co-manage goods and services. Project scale, along with political jurisdiction – local, municipal, national, and transnational – can vary. Goods can be either public (energy, transportation, water, sanitation) or club goods (greenbelts, charter schools, sports stadiums), while services can stem anywhere from social services (health provision, education) to policy formation. In the water sector, public-private partnerships primarily come in two forms: utility management and infrastructural development (Ameyaw & Chan 2016).

Since the early 1990s, an aggressive top-down push from organizations such as the World Bank, United Nations, and the International Monetary Fund have propagated PPPs as a vehicle of growth to both developed and developing countries alike. Enticed by the promises of increased efficiency, lower project costs, and a reduction of budgetary pressure (Hodge & Greve 2007), federal and local governments have embraced this phenomenon with little consideration of its long-term political, environmental, and distributional effects. Yet, findings and evaluations of PPPs over the last thirty years have been inconclusive at best. Academic discourse around public-private partnerships has been largely divided (Hodge & Greve 2010), with critics rejecting the management approach outright and proponents touting PPPs as a developmental panacea that overcomes the inefficiencies of public management. In the field, “balanced discussion is rare” (Hodge & Greve 2010, 9).

According to the World Bank Private Participation in Infrastructure Database (2016), since 1990, out of the 16,258 public-private partnership projects contracted out in low and middle income countries, 677 (4.16 percent) projects have been cancelled. This corresponds to 838.597 billion dollars, or 34.26 percent of total investment. The rate of cancellation is highest in the water sector: out of 1,043 projects, 66 projects (6.41 percent), or 20.21 percent of the total investment, have been cancelled; 14 projects (1.36 percent) are distressed (PPI 2016). Project cancellation or distress can have a number of negative impacts on government, including increased transaction costs, an indication of failed business acumen, and a reduction in overall social welfare. Additionally, a high rate of project failure establishes a precarious investment climate, preempting future much-needed collaborations in the provision of key resources (Pessoa 2010).

In low-income countries, only 65 percent of the population has access to improved drinking water source (PPI 2016). Given the promise of increased efficiency and decreased public costs, the UN has mandated the use of public-private partnerships to promote water sector growth and development in developing countries in both the Millennium (2000) and the Sustainable (2015) Development Goals. There are two primary questions of concern – (1) how successful have these partnerships been in achieving these water-provision goals? and (2) how can we increase the likelihood of project success?

The purpose of this research, therefore, is two-fold: (1) to evaluate the degree that public-private partnerships have been able to close the infrastructure gap in the water sector and (2) to identify the economic, political, and social factors that determine water sector public-private partnership success. This research will utilize a social ecological framework and will draw heavily on partnership, microeconomic, management, and new institutional economic theory. The primary methods of analysis will be an empirical analysis of water sector PPP distributional trends and an

extensive literature review of economic, public policy, management, and planning peer-reviewed articles. Fulfillment of development and growth will be assessed by comparing the demand for water sector infrastructure – as outlined in the Millennium (2000) and Sustainable Development Goals (2015) – to the supply of water sector public partnerships. PPP success will be defined using output- and outcome-based metrics: a project is successful if all proposed project goals are realized and the project partnership is one that produces long-term benefits or improvements to the ecological, regulatory, or social system. In other words, the project not only meets cost, project implementation time, capital gains, distributional benefits, and improvements in water conservation goals, but also yields high input and output legitimacy.

The thesis is structured as follows: Part One of the Master’s Thesis evaluates the degree of fulfillment and sets the context for the analysis of water sector PPP critical success factors (CSFs). Chapter 2 establishes a research framework, and outlines the definition and typology utilized for the study. Chapter 3 overviews the infrastructural needs of developing nations, outlines the primary motivations for entering into a public-private partnerships, and overviews the changing role of public-private partnerships throughout history. Chapter 4 draws on data from the World Bank Private Participation on Infrastructure (PPI) database to present PPP water sector trends on distribution, cost, and project type. Through the analysis of PPP research frameworks, a number of common misconceptions surrounding public-private partnerships are resolved.

Part Two identifies water sector critical success factors for public-private partnerships; the part builds on the analysis in Part One by exploring how the identified misconceptions and trends impact partnership success. Chapter 5 defines a successful public private partnership and provides a brief overview of critical success factors of public-private partnerships, emphasizing studies that focus on the water sector. The social, political, and economic critical success factors and their

causal mechanisms are explored in depths in Chapters 6, 7, 8, respectively. Finally, Chapter 9 concludes with policy implications and recommendations, as well as research questions for future inquiry.

Given the weight international organizations, governments, and public managers have given public-private partnership in development and growth, it is of utmost importance to assess the role of PPPs in providing key services and goods. This assessment seeks to provide balance in a heated debated, and to resolve misconceptions surrounding public-private partnerships that are prevalent in the field. This Master's Thesis also provides the theoretical foundation for future research on the effect of scale on water sector public-private partnership project success by identifying the potential economic, social, and institutional intermediate variables needed for the study. Through the presentation of theoretical and empirical findings, along with case studies centered on the water sector, the goal is to tease out common themes present in all water infrastructural PPP formation, development, and implementation for developing and emerging economies.

While a number of studies have examined critical success factors of public-private partnerships in general, very little research has been done specifically in the water sector (Ameyaw & Chan 2016). Project success varies by sector (Phua 2004), and due to the distinct nature of water and sanitation services (Ameyaw & Chan 2013), the sector requires further scrutiny. With increased uncertainty and stress from twenty-first century “wicked problems” such as climate change, these differences must be taken into account by public managers interested in pursuing partnerships, and must be incorporated in the Institutional Framework (IF) of PPP-supporting nations. Otherwise, nations run the risk of reducing adaptive capacity and resilience of resource provision.

## **Part 1: Closing the Infrastructure Gap? The Supply and Demand of PPPs**



## **2.0 WHAT'S IN a NAME? DEFINING PUBLIC-PRIVATE PARTNERSHIPS**

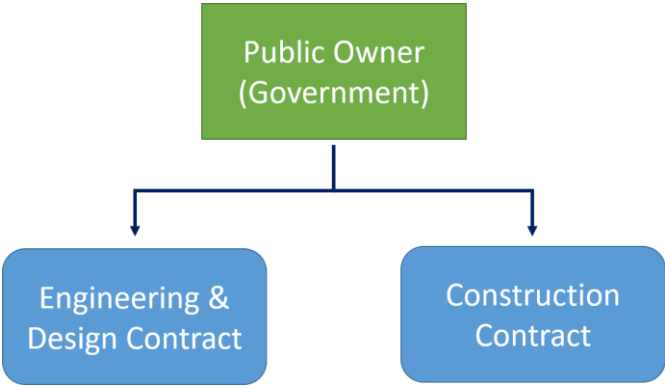
One of the challenges scholars and policy-makers face in the study of PPP processes and in evaluating the management tool's success is the lack of agreement on a universal definition and typology of PPP project types. This lack of agreement leads to scholars comparing research studies, methods, and project types in ways that may not be compatible (Hodge & Greve 2007; Weihe 2008, Greve & Hodge 2013). Ultimately, the ambiguity may contribute to not only inconclusive results regarding the effectiveness of PPPs, but also may decrease the likelihood of success of a PPP project. In developing a PPP, an agreed-upon definition of public-private partnerships is a critical success factor, as varying understandings of the definition will lead to conflicting expectations and obligations between partners.

Thus, in order to assess PPP effectiveness in closing the infrastructure gap and to identify factors that determine project success, it is first important to define them. This chapter summarizes the various types of PPP definitions in literature and presents the research framework, PPP definition, and typologies used for this study.

### **2.1 Distinguishing Between PPPs and Traditional Procurement**

PPPs can vary between levels of private sector involvement, stakeholder participation, and project purpose. Ambiguity and imprecision have led to a blurring of the lines between privatization, design-build practices, and public-private partnerships. Given the variety of definitions, it is most appropriate to first make the distinction between public-private partnerships and traditional procurement. Traditional public procurement involves a principal-agent relationship between public client (the principal) and the private contractor (the agent). The public partner bears financial and demand risk, and is held accountable to the public for the project (US Department of Transportation, n.d.). The public partner also retains ownership of the project

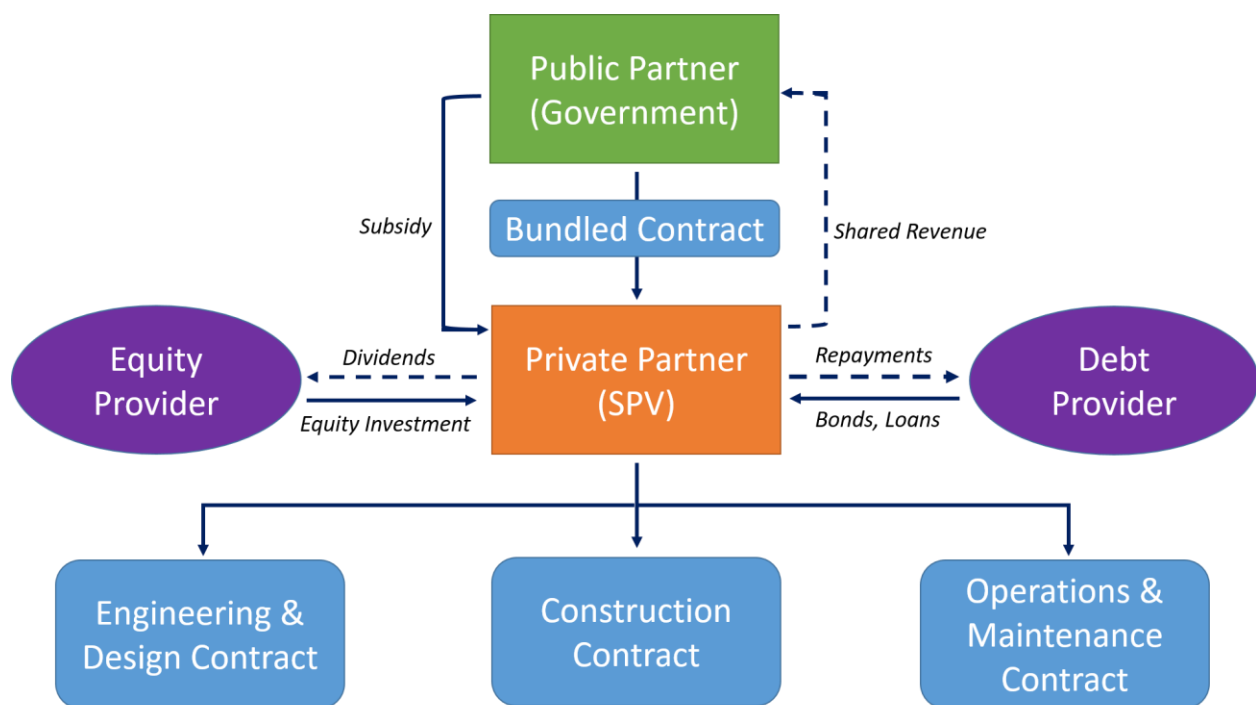
throughout the entire project life cycle. The most common form of traditional public procurement is the design-build model (Trebilcock and Rosenstock 2015), a project delivery method that combines two separate services – design and build – under one contract. The design-build entity can be either a single firm or a consortium (US Department of Transportation, n.d.). Figure 2.1 illustrates the project delivery structure. Payment flows in one direction, from principal to agent, and the relationship between the two actors is a vertical, rather than a horizontal one.



**Fig. 2.1** A standard public procurement project delivery structure, including cash flows into the project (solid line). The government contracts individually with each private entity. For design-build, one contract is signed for design and construction at a fixed fee. The public entity maintains responsibility of ownership, financing, and risk management of the project (adapted from US Department of Transportation, n.d.).

Public-private partnerships, on the other hands, are horizontal partnerships (Bovaird 2004; Miraftab 2004; Weihe 2008; Forrer, Kee, Newcomer, & Boyer 2010), where the public client and the private entity are working jointly to provide a good or service. Figure 2.2 presents an example of an infrastructure PPP project delivery model that could be found in the water sector. Payment flows between public and private actors, and both principals are actively involved in overseeing the construction and maintenance of the project. Public-private partnerships are “project finance” arrangements – typically, a consortium of key partners and investors with specialized expertise in project design, construction, management, and operation (Yescombe 2007) form a special purpose

vehicle (SPV) to contract with the government. Unlike with traditional privatization<sup>1</sup> or project sponsoring, lenders do not have the ability to repossess the project in the event of financial failure. That is, the government maintains ownership of the public-private partnership infrastructure in the event of project disruption or default (Trebilcock & Rosenstock 2015). Because of this difference with traditional procurement, lenders typically charge a higher risk premium for public-private partnerships than for other infrastructure projects, and may even provide greater scrutiny and oversight during the contract duration.



**Fig. 2.2** An example of a potential infrastructure PPP structure, including cash flows in (solid line) and out (dotted line) of the project. The public partner signs one contract with the SPV (the private partner). The SPV is composed stakeholders from engineering, construction, finance, and operations and maintenance private partners. Cost-saving measures from bundling of services, along with reductions in overall utility management costs become profits for the private firm. Revenue from the utility is passed to the public partner (adapted from US Department of Transportation, n.d.; NZSIF 2009).

<sup>1</sup> The definition of privatization varies within the literature, and is sometimes conflated with public-private partnerships (Borzel & Risse 2002), further contributing to the ambiguity and “language game” surrounding PPPs. Definitions range from the inclusion of private actors (NGOs and firms) in governance systems (Bruhl 2001) to a direct “transfer of enterprise ownership – in whole or in part – from state to private hands” (Savas 2000). For this research, privatization will refer to the transfer of state-owned enterprises to a private company.

## 2.2 Setting a Research Framework

There are a variety of research frameworks used to analyze public-private partnerships. Weihe (2008), for example, argues that there are four approaches in navigating the terrain of PPP literature: the urban regeneration approach, 2) the policy approach, 3) the infrastructure approach, 4) the development approach<sup>2</sup>. These approaches differ in context, actors, objectives, and formal structure of analysis. Due to these differences, Weihe cautions scholars about blending frameworks in public-private partnership types, as the findings of non-robust comparative cases can lead to false expectations or partnership/project outcomes for policy-makers and project managers. While there is merit in distinct categorization of research approaches and frameworks, rigid research lenses can lead to knowledge gaps. PPPs simultaneously encompass elements of policy (policy approach), economic theory (infrastructural approach), partnership development and growth (development approach), and social impacts. In order to minimize ambiguity, PPP scholars should take greater care to qualify the generalizability of their work, and to acknowledge the strengths and limitations of their chosen research frameworks.

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<sup>2</sup> The *urban regeneration approach* emerged in American urban governance literature in the '70s and '80s and can be seen as a natural continuation of New Public Management Theory. This approach strives to promote urban economic renewal and development and is typically initiated by private businesses in response to an urban crisis (e.g. high unemployment, high crime rates, deteriorating revenue base, etc.).

The *policy approach* is prevalent in American twentieth century literature. The approach focuses on the institutional set up of public-private cooperation in different policy fields, refers to PPPs as a phenomenon (as opposed to specific collaborative projects,) and seeks to examine the appropriate roles for the private and public sectors in various policy fields. In many cases, the focus is on federal or state level analysis, as opposed to the city-level (as in the urban regeneration approach).

The present-day research approach is primarily the *infrastructure approach*. The origin of the infrastructure PPP is believed to be the UK's Private Finance Initiative (PFI) in the early 1990s; however, some scholars argue that the infrastructure PPP existed long before the introduction of the PFI program (see Grimsey and Lewis 2004, Grimsey and Lewis 2005, Wettenhall 2005, Yescombe 2007). Literature focusing on the infrastructural approach places great emphasis on risk-sharing and relationship management in the formulation of policy guidelines.

Finally, the *development approach* was launched with the United Nations Global Compact in 2000, and strengthened at the United Nations World Summit for Sustainable Development in Johannesburg in 2002. The primary goal of the development approach is to achieve key development goals (reducing poverty, improving environmental conditions, etc.). Along with public and private parties, the P3 projects also feature national and international non-government organizations (NGOs) as key actors as facilitators that provide conducive environments for local partnerships.

Thus, rather than categorize by project type and historical context, Hodge and Greve (2013) characterize various approaches to PPP literature by broader research agendas. The scholars argue that there are two generations of P3 research. The first generation began in the early 70s and focused on the success of individual projects. The primary research goal was to determine whether the projects were a long-term success in efficiency and innovative relative to that of a traditional procurement. As PPPs began to evolve and to spread across Europe, the second generation of research focused on the phenomenon of the policy approach. These studies attempted to address the institutional and microeconomic factors necessary for project success within a particular nation.

Hodge and Greve (2013) argue that a third generation of research is needed – little research has been done to address common factors of PPP support at an international scale. In order to understand the cultural, historical, and political context surrounding public-private partnership project structure, output, and outcomes, research must take into account the “internationalization,” or the exogenous pressure on developing economies to adopt public-private partnership. The scholars propose that future research should account for this third “generation” by addressing not only governance schemes and the roles of partners and stakeholders, but also strive to address who (organizations, agencies, etc.) is determining current “best practices,” and how these practices have evolved over time to incorporate experience from various geographic regions.

This research utilizes a social-ecological framework<sup>3</sup>; the research is interdisciplinary, utilizes multiple levels of analysis (a nested approach), assesses the degree of congruency between

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<sup>3</sup> Stokols, Lejano, and Hipp (2013) identify four core principles of a Social Ecological. The research must:

1. highlight the “multidimensional structure”(p. 3) of environments; research should focus on physical and social components, objective and subjective qualities, and their scale and importance to studied groups. Studies can focus on individuals, small groups, organizations, or even populations
2. incorporate multiple levels of analysis and diverse methodologies. Environments are complex systems that are nested within greater cultural contexts and macro forces.

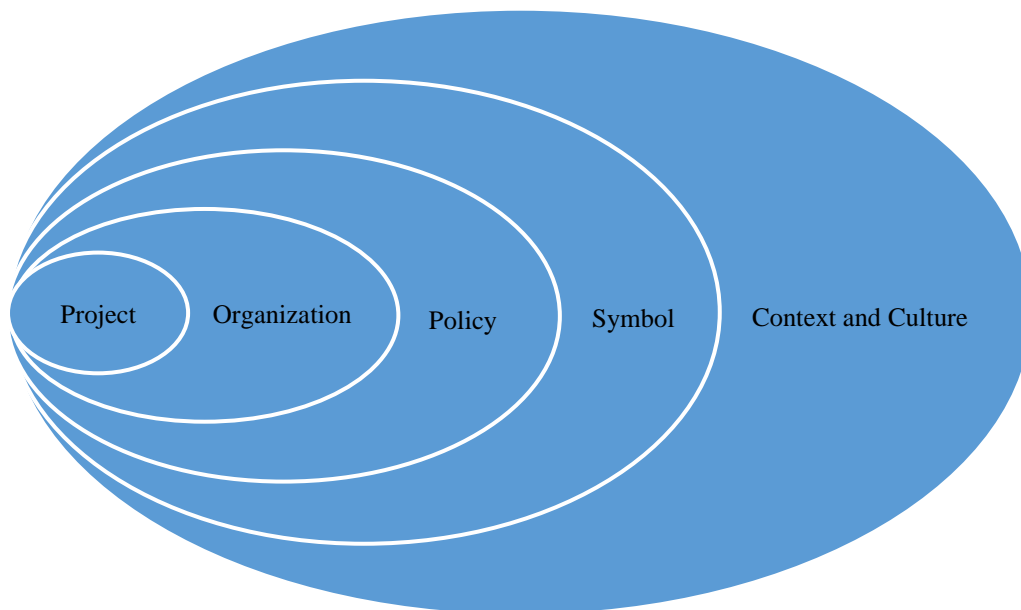
the environment/context and human behavior, and draws on systems theory and resilience literature to not only define a successful partnership, but to also identify critical success factors of PPPs. This research framework will not only allow for a more robust analysis of public-private partnerships, but will also directly address research gaps in current public-private partnership literature.

In their assessment of PPP literature, Hodge and Greve (2013) find that that despite the evolution of the research agenda, current public-private partnership research seems to be separated into two primary academic areas: 1) public policy and political science literature; and 2) economics, engineering, and project management literature. Little scholarship relates both areas, a fact that this research hopes to remedy. Failure to account for multiple disciplines with result in an incomplete understanding of the various feedbacks and the complexities of public-private partnership formation and management. By drawing on economic, management, engineering, public policy, and sociological literature, this Master's Thesis will present a rich and complete overview of public-private partnership critical success factors. The interdisciplinary perspective will allow for a definition of successful projects and partnerships that extends beyond outputs (realized goals) and focuses on outcomes (long-term consequences of projects such as legitimacy, transparency, and increased public trust in future public-private collaborations). Moreover, the interdisciplinary allows for greater consideration of social and environmental factors that not only determine project success, but also are *impacted* by CSFs.

In addition to an interdisciplinary approach, this research utilizes a multi-level analysis of PPPs. We agree with others who view PPPs as “(1) a specific project or activity; (2) a management

- 
3. include concepts derived from systems theory such as interdependence, homeostasis, feedback, and amplification. Special attention is paid to relationships between people and their environments and how these relationships create feedback and resilience within systems.
  4. emphasize a transdisciplinary action research approach.

tool or organization form; (3) a policy, or statement as to the role of the government in the economy; (4) a governance tool or symbol; or (5) a historical context and a cultural set of assumptions” (Hodge & Greve 2012, p.3) (see figure 2.3). Studying PPPs as an organization form (level 2) allows for the review of primarily infrastructural PPPs as a mechanism for providing public resources. Studying PPPs at the third level, as a policy implies that there are multiple types of PPP projects with various arrangements. These arrangements are nested in a variety of governance tools such as economic incentives for partnerships (level 4) and are influenced by historical relationships of public-private interactions (level 5). The consideration of all five levels is crucial in identifying CSFs. Project success is not only determined by technical and economic feasibility, but also is impacted by the country’s history with public-private partnership arrangement, the cultural and political context of resource provision, environmental sustainability, and meso-level and macro-level exogenous factors such the neoliberal push to privatize by international organizations, macroeconomic shocks, and natural disasters.



**Fig 2.3** The multiple levels of analysis of PPPs. Research of PPPs can be thought of as nested, with each layer influencing the other. Failure to account for all layers will lead to an incomplete understanding of a partnership’s political environment. (adapted from Hodge 2010)

Integrating multiple levels of analysis also allows for the incorporation of congruency and resilience into the thesis. Project outputs and outcomes must be in line with community needs; therefore great emphasis is placed on CSFs that lead to outcomes that minimize community perturbations. Emphasis is also placed on critical success factors that allow for flexibility, adaptability, and resilience in the face of “wicked” macro-level anthropogenic factors such as climate change. The incorporation of both congruency and resilience adds an additional social and environmental justice dimension that is lacking from current peer-reviewed literature.

Ultimately, this thesis utilizes a social ecological framework and draws upon Weihe’s (2008) developmental, policy, and infrastructure approaches – infrastructural P3 (infrastructure) will be studied as a phenomenon (policy), and emphasis will be placed on how P3s can address development goals (developmental). The research will consider factors such as risk-sharing and transaction costs (infrastructure), along with institutional and policy related work. The research will strive to address knowledge gaps in the field by placing emphasis on exogenous pressure to adapt the management approach, resolving misconceptions surrounding the supply and demand of public-private partnerships, and incorporating elements of social justice and environmental sustainability into the assessment of CSFs.

The next section will outline the various definitions utilized by the literature drawn upon for the study; the section will highlight the danger of conceptual flexibility and definitional imprecision in the field, and conclude by presenting recommendations for PPP definitions in academic literature.

### **2.3 Public-Private Partnerships – An Ambiguous Term**

The term “partnership” is used to describe a variety of types of relationships and involves a “potential for synergy” (McQuaid 2000, p.11) and mechanisms for co-operation. Its precise



meaning in policy varies depending on the specific research lens and discipline. However, an overview of partnership literature indicates that a true partnership must be one in which *voluntary* participants align with *mutual goals* and *clear benefits* from collaboration. In the context of public-private partnerships, partners enter into agreement, expecting that benefits of collaboration (profit-maximization, knowledge transfer, management development, innovation, increased efficiency, equity of allocation, and accountability) in the provision of resources will outweigh the costs of cooperation (monitoring, contract negotiation and enforcement costs) (Klijn & Teisman 2003).

The private sector participates to a certain degree in almost all infrastructure projects, creating a lack of consistent and common terminology on PPP among business, academia, and government (Miraftab 2004; Hodge & Greve 2007; Greve & Hodge 2013). Almost every scholar provides a variation of his or her own definition based on criteria that they consider to be vital components of PPPs. This imprecision results in inconsistencies in comparative studies and incomplete data banks in quantitative approaches. The definition of the term is also highly politicized, with slight variations playing a crucial role in promoting various agendas, either in favor or against the management approach.

Definitional imprecision can hinder public-private partnership project success. If definitions of P3s do not align between partners, then partner expectations and obligations will not be complementary (Weihe 2008). In theory, a partnership involves a clear division of partner roles. The public partner brings with it a long-term perspective, ensures that externalities are internalized, and addresses social equity concerns (Jensen 2016). It is the responsibility of the government to ensure that performance standards are met, and thus, safeguard public interests and welfare (McQuaid & Scherrer 2010). The private partner, on the other hand, provides management expertise, innovation, and efficiency (Jensen 2016). Firms are expected to adjust the organizational

structure and culture of resource providers to maximize efficiency and to better meet customer needs. They are also expected to close knowledge gaps, implementing the best available technology or spearheading new and innovative approaches for providing services or infrastructure. When definitions are simplified, politicized, simplified, or overly technical, these obligations may be obscured, and misconceptions emerge regarding partner's roles in PPP implementation and development. In fact, weakened public institutions with limited understanding of public-private partnerships have entered into agreements not fully aware of

This section, thus, explores three categories of PPP definitions - the practitioner's, the microeconomic, and the public policy definition – and their limitations.

### *2.3.1 Practitioner Definitions and the Language Game*

Organizations such as the World Bank, IMF, and OECD provide a “practitioner’s” definition that strategically frames public-private partnerships as vehicles for infrastructural development. These definitions are often vague and make it difficult to differentiate the management approach from traditional notions of privatization. For example, the International Monetary Fund (2007), defines P3 arrangements as instances where “private sector provides infrastructure, assets, and services that traditionally have been provided by the government” (p. 7). The National Council for Public Private Partnerships (NCPPP) (2015) has a similar definition, merely stating that PPPs are “contractual agreements between a public agency or governmental branch and a private sector entity (p. iii). The International Finance Corporation (IFC), a member of the World Bank Group that finances and provides advice for private sector project in developing countries, characterizes PPPs as “long-term contracts between a private company and a government agency for providing a public asset or service” (p.4).

No effort is made to indicate that PPPs are cooperative partnerships where both parties *mutually* work together to solve public problems and procure public goods. Thus, these definitions undermine the complexity of public private partnerships and create a false illusion that this phenomenon is merely an extension of previous private-public collaborations such as contracting out. They provide no indication that this management approach may require a different governance scheme than traditional public procurement, and may result in governments entering into partnership agreements that they do not have the institutional capacity to maintain. In fact, several scholars have argued that the ambiguity in the definition is generated by interested parties – merchants, neoliberal organizations, consultants, and legal firms – to cloak traditional notions of privatization and laissez-faire governance (Hall 2003; Hodge & Greve 2010). PPP definitions and PPP implementation are presented in a more optimistic light; for example, in its *Preliminary Review of Trends in Small-Scale Public-Private Partnership Projects*, the World Bank Group (2014) explicitly states that future research must focus on “small-scale projects that will get quick wins” along with “more embedded work focused on the larger environment for small PPPs (p.2).

The language of these reports report relies heavily on vague, “conflict-avoiding jargon” (i.e. stakeholders, sustainable development) that obscures the high levels of economic, political, and social inequality conflict that accompanies water privatization efforts (Swyngedouw 2013, p. 826). The UN World Water Development Report (2012), which places a strong emphasis on stakeholder inclusion, risk-sharing, and greater financial flow into the water sector through water valuation and privatization, provides a thorough overview of the science surrounding water quality and quantity measures, but fails to incorporate theoretical literature that is critical of a neoliberal approach to water management. Scholars have referred to this re-branding as a “language game.” A classic example of this game is the very use of the word “partnership” to describe large private

finance contracts, an institutional arrangement that promotes principal-agent interaction rather than the principal-principal structure that PPP projects conventionally employ (Wettenhall 2007). Hall (2003) argues that “the term (PPP) is not a real or technically exact phrase, but rather a replacement of the old general Thatcherite use of the word ‘privatization.’ The vast majority of PPPs [...] are not partnerships in any legal sense, but simply contractual relationships” (p. 2).

The language of PPP definitions and functions is designed to “cloud” other strategies and purposes such as the encouragement of private providers to provide public goods and services at the expense of government agencies (Hodge & Greve 2007). Most often, partnership classifications in a country correspond with its historic attitudes of towards government-business relationships. For example, the UK, a pioneer of Public Finance Initiatives a country that has strongly benefited from public-private collaborations, seeks to inherently connect PPPs to privatization. Australia, on the other hand, having an unfavorable history of private provision of public goods, seeks to distance PPPs from privatization, arguing that the two policies are distinct in their motives and execution (Hodge & Greve 2007). Policy-makers and international organizations are quick to carve out pieces of PPP policy in order to further their own – most often, neoliberal – agenda. Research that utilizes these definitions tends to be exclusive to the policy and development approaches and is often conducted by the very international organizations pushing these definitions on developing states. Great caution must be taken in utilizing definitions that reflect these policy narratives.

### *2.3.2 Technical Definitions – Microeconomics, Engineering, and Management*

Technical definitions on public-private partnerships often utilize an infrastructure research approach and are primarily concerned with project product (Liu 2014). That is, these definitions place great weight on project output and on elements of risk sharing, efficiency, and cost. For

example, Iossa and Martimort (2015) characterize PPPs with the presence of three features: 1) bundling – a grouping of design, building, finance, and operation within a consortium of private firms to minimize costs; 2) risk transfer – a greater share of risk must be transferred to a contractor than would be seen under traditional procurement; and 3) long-term nature of contracts – contracts typically last for 25 to 30 years. This definition applies to a narrow range of large-scale infrastructure projects that can be predominantly found in the developed world (i.e. sports stadiums, large-scale green belt initiatives, telecommunication centers).

The OECD has a similar definition, neatly situating public-private partnerships squarely between traditional procurement and full privatization, defining PPPs as an “agreement between government and one or more private partners (which may include operators or 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 objects of the private partners and where the effectiveness of the alignment depends on a sufficient transfer of risk to the private partners.” That is, the private sector designs and constructs, refurbishes, or expands existing infrastructure while simultaneously providing the necessary financing, asset management, and service support. While not explicitly stated in the definition, the language used by the OECD implies that the partnership must involve some form of bundling. The key characteristic of the PPP is asset ownership; any project that remains solely private at the end of the contract period is not considered a P3. In this way, rather than merely providing regulatory oversight, the public sector remains an active contract partner. Thus, accountability for the quality and price of the infrastructure remains largely with public sector while construction and management is transferred to the private partner. Theoretically, risks are shared, and the outcome maximizes economic efficiency. This definition is frequently cited by economists modeling behavior of firms under

public-private partnerships. The work of these economists focuses on infrastructural PPPs overall, but theoretical modeling scenarios frequently assume that institutional and governance schemes, while imperfect, are present. Thus, these definitions carry greater weight for developed economies and fail to capture the characteristics of local level grassroots PPPs that are primarily found in developing economies. These definitions, ultimately, would not be sufficient for the purpose of closing the infrastructure gap in the water sector.

### *2.3.3 Public Policy Definitions*

The most varied definitions can be found in public policy and management literatures. Definitions provided by public-policy and management scholars primarily depend on the research lens utilized. Authors fall into two categories: those that utilize the “practitioner’s” definition of public-private partnerships, and those that attempt to present their own, tailoring it to their selected cases and research scope. The lack of a universally accepted definition has, in part, led to inconclusive results regarding PPP success among policy scholars. PPP definitions can be structured based on sector, partnership type, or research lens.

Definitions in the public policy realm frequently reflect a greater emphasis on partnership management, political process, and partnership impact on the affected community. For example, Forrer *et al.* (2010), define PPPs as “ongoing agreements between government and private sector organization in in which private organization participates in the decision-making and production of a public good or service that has traditionally been provided by the public sector and in which the private sector shares the risk of that production” (p. 476). Unfortunately, while these definitions illuminate the varying levels of collaboration between PPPs and traditional procurement, the focus on outcome and process - as opposed to the technical factors - may lead to increased ambiguity in the field. In discussing the crucial success factors for environmentally and economically

sustainable partnerships, Koppenjan and Enerink (2009) use “PPP” and “Private Sector Participation” interchangeably. In infrastructure projects, private participation can vary from traditional procurement, where the state contracts with a private partner to build the asset, to full privatization, where the good is owned and operated by a private party. Over 25 terms have been used to describe models with various degrees of involvement (Delmon 2010). Thus, while variability of definitions within the discipline allows for the study of a variety of partnership types, the flexibility can lead to faulty comparisons and unrealistic expectations of project outcomes, particularly when a PPP partnership structure is conflated with the economic logic of public procurement.

#### *2.3.4 Narrowing the Scope - A Common Ground?*

Given the great variety of definitions in the academic and practitioner realm, this research will not strive to provide a universal definition of public-private partnerships. To do so would only add to the ambiguity and imprecision of the academic realm. Instead, this research will merely highlight elements present in all three - practitioner, economic, and public policy – definition types and propose recommendations for an effective definition.

In most academic articles, particularly public-policy ones, three factors are present in the definition: 1) the allocation of risk between public and private actors, 2) the long term nature of the relationship, and 3) the private sector participates in some capacity in both the decision-making process and the provision of the good and service (Hodge & Greve 2007; Schaferhoff *et al.* 2009; Forrer *et al.* 2010).

There are several factors that are necessary in order to produce an effective, yet encompassing, definition of PPPs. First, effort should be taken to present definitions that account for how policy-makers and public managers classify public-private partnerships. Utilizing a

definition that is more in line with the current PPP structure (rather than an ideal or theoretical representation of one) would allow for greater research dissemination and policy-transfer. Policy-makers and managers would be able to easily access additional peer-reviewed information on either a particular type of PPP or a PPP context, ultimately allowing for greater dialogue and application of research.

Second, a definition must also be able to apply to various research approaches, rather than be limited by the infrastructure approach, which tends to emphasize bundling costs and efficiency gains. Public private partnerships can arise in a variety of social and resource-based sectors. There is a growing recognition that PPPs can be utilized in the provision of healthcare, education, environmental abatement, research, and public engagement, and can even be used for national and transnational policy formation and implementation<sup>4</sup>. Therefore, a PPP definition must be clear that the management approach is capable of providing a variety of goods (public and collective) and services (social, knowledge-producing, and policy-oriented), and not merely serve as a vehicle for hard infrastructure.

Third, a definition of PPPs must strive to capture the unique relationship between government and private actors. In order to signal that this management approach differs from traditional procurement, definitions must stress the *joint* provisions of goods and services. A complete definition of a public-private partnership should reflect that the government and private agent cooperate in the decision-making process and act as *horizontal*, not vertical partners. The interaction is one that can be classified as a principal-principal arrangement, rather than a principal-agent one. It is important to note, however, that while the definition should capture the unique

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<sup>4</sup> The World Commission on Dams, for example, is a transnational PPP initiated by the World Bank in 1997 to formulate standards for the construction, operation, and shut-down of large dams. The guidelines were completed in 2000, and while informal, provide a useful framework for governments, international organizations, private firms, and NGOs for questions on operation and maintenance of hydroelectric projects (Schaferhoff *et al.* 2009).



relationship, it should not define the partnership in terms of effectiveness and in terms of mutual benefits. While the condition is an essential component of a successful public-private partnership, the inclusion of clauses that characterize only successful PPPs naturally excludes failed projects from the definition (Schaferhoff *et al.* 2009).

Finally, the definition must account for all non-public sector participants, particularly the non-government sector. In order to ensure PPP success, a variety of multiple stakeholders must be included in all phases of projects (Chen & Liao 2013). Non-government organizations and civic society play vital roles in contract formulation, information transfer, and accountability of the project to affected parties. This role is particularly crucial to small-scale, local projects, where public partners have limited resources and authority. However, costs (time, legal fees, contract negotiation) of managing partnerships are not accounted for in a proposed PPP budget. It is imperative that the definition reflects that these partnerships are often a long-term collaboration with third-party participants as well, and that the management of these relationships will require a great deal of dedication and resources by the public party. Thus, the inclusion of *multiple* stakeholders, rather than a strict emphasis on private corporations and firms, provides a hint to practitioners and policy-makers that the formation of these entities is a process that will require a different distribution of roles and responsibilities by public and private entities than is typically seen in traditional procurement.

Following these recommendations, this research will draw upon publications that perceive public-private partnerships as joint collaborations between public and non-government (either private or NGO) actors to provide goods or services. The partnership structure will be predominantly horizontal, rather than vertical in nature, but will allow for variation in the degree of government intervention in the project development. It is important to note that this definition

is purposefully ambiguous to allow for flexibility in the literature review. This approach allows for the capture of all types of water sector public-private partnerships, rather than merely focusing on infrastructural projects, while simultaneously creating the distinction between public-private partnership and procurement methods. Ultimately, the focus is on the nature of the partnership itself.

The next section outlines the typologies utilized in this research.

## **2.4 Typology**

Along with disagreement regarding the definition of public-private partnership, there is also imprecision in the types of PPPs studied and commonly referenced in practitioner literature and academic scholarship. Various attempts have been made to classify types of public-private partnerships. The most precise taxonomy of PPP types has occurred in the infrastructure PPPs, but even there, gray areas emerge.

Given that interaction varies on a case-by-case basis, literature on public-private partnerships has struggled in identifying a robust category for all project types. Scholars have proposed to classify various projects based on a number of ways: the degree of interaction between private and public entities (Loxley 2013); the degree of infrastructure ownership by the private entity (Jeffares, Sullivan, & Bovaird 2009); project purpose (McQuaid & Scherrer 2010); the policy objectives (Bovaird 2004); the partnership structure (Bovaird 2004); degree of transaction costs (Stoker 1998). The abundance of classifications creates flexibility for scholars, and allows for various comparisons and groupings in project evaluations. However, the various typologies further amplify the ambiguity surrounding public-private partnerships, and can lead to scholars or practitioners to provide false comparisons and to generalize across project types. Moreover, the imprecision of taxonomy may reduce accessibility of social science research to policy-makers.

This research will draw upon the World Bank Private Participation in Infrastructure (2016) typology. The primary limitation of this typology is that the research focus is heavily shifted onto infrastructural public-private partnerships. As seen in the various classifications of PPPs, this management approach can also be utilized for policy formation and research and development. However, since the primary focus of this Master’s Thesis is the role of public-private partnerships in the promotion of infrastructural development, this typology is well-suited for our needs.

The World Bank groups public-private partnerships in four categories: 1) Greenfield, 2) Divestitures 3) Concession, and 4) Management and lease contracts. In Greenfield projects, private partners build a new facility, and will operate and transfer it until the end of the contract period (PPI Glossary 2016). In divestitures, the private sector is introduced into the state-owned enterprise, either through stock market flotation or through a mass privatization program. In concessions and management and lease contracts, the private partner manages state-owned enterprises to provide public goods. The difference between the two lies in which party bears the majority of the operational risk. Table 2.1 shows the various types and sub-type of infrastructural PPPs.

<b>Type of PPI</b>	<b>Definition</b>
<b><i>Management and Lease</i></b>	<b><i>Private operator manages state-owned enterprise (SOE) for a fixed period of time. Ownership and investment decisions remain with public partner.</i></b>
<i>Management Contract</i>	The public partner pays private operator to manage a facility
<i>Lease Contract</i>	The public partner leases the assets to the private operator
<b><i>Concessions</i></b>	<b><i>Private partner manages state-owned enterprise for a fixed period of time and absorbs majority of investment risk.</i></b>
<i>Rehabilitate, Operate, Transfer (ROT)</i>	Private sponsor rehabilitates existing facility, then operates until end of contract period
<i>Rehabilitate, Lease, Transfer (RLT)</i>	Private sponsor rehabilitates public facility, leases it from public partner, and operates it until the end of the contract period,
<i>Build, Rehabilitate, Operate, Transfer (BROT)</i>	A private developer builds an add-on to an existing facility or rehabilitates existing assets and operates it until the end of the contract period

<i>Greenfields Projects</i>	<b><i>Private entity or a public-private venture builds and operates a new facility. At the end of the contract period, whether facility transfer to public sector depends on the contract type</i></b>
<i>Build, Lease, Transfer (BLT)</i>	Private sponsor builds a new facility, transfers ownership to public partner, and then leases the facility from the government
<i>Build, Operate, Transfer (BOT)</i>	Private sponsor builds a new facility, then owns and operates the facility throughout contract period. The facility is transferred to the public partner at the end of the contract period.
<i>Build, Own, Operate (BOO)</i>	Private sponsor builds new facility, then owns and operates the facility.
<i>Merchant</i>	Private sponsor builds a new facility. Unlike BLT, BOT, BOO, government provides no revenue guarantees.
<i>Rental</i>	Governments rent mobile power plants from private partners for a short period of time (1-15 years). Private sponsor places the facility at its own risk. Government compensates for risk by providing revenue guarantees.
<i>Divestitures</i>	<b><i>Private partner buys stock in state-owned enterprise through asset sale, public offering, or mass privatization program</i></b>
<i>Full</i>	Public partner transfers 100% of equity to private partner
<i>Partial</i>	Public partner transfers part of equity to private partner. Private stake in facility management is determined on a case-by-case basis

**Table 2.1:** Definitions of Types and Sub-types of PPPs (Adapted from World Bank PPI Database Glossary, 2016)

**2.5 Chapter Summary**

This chapter explored the taxonomy of water sector public-private partnerships and overviewed the research framework and typology utilized in this study. One of the primary misconceptions is that there is an agreement between academics, practitioners, and the private sector on the research frameworks, definitions, and typologies surrounding public-private partnerships. However, definitions are highly varied, and in some cases, may be purposefully vague in order to “cloud” neoliberal concepts of privatization. This imprecision has ultimately allowed for the exploitation of governments not fully prepared to address the insitutional and financial challenges that emerge with this management approach (Miraftab 2004; Hodge & Greve 2007; Weihe 2008). In order to address this misconception, and thus, strengthen the prescriptive power

of research, social science must strive to collaborate with policy-makers in order to create *applied* definitions that accurately reflect the terrain of present-day public-private partnerships.

This Master's Thesis will focus primarily on water sector public-private partnerships that strives to incorporate a horizontal partnership structure and will draw on the world bank typology for classification of partnerships. This research will strive to address research gaps in the PPP field by utilizing a social ecological research framework. The primary advantage of this approach is the interdisciplinary perspective that incorporates multiple levels of analysis. The critical success factors that determine project output and outcomes are nested in historical, political, social, economic, and cultural contexts. Accounting for these contexts in the analysis of CSFs will ultimately will lead to a more robust understanding of not only the supply and demand of PPPs, but also the process of partnership formation and project implementation.

The following chapter addresses the sources of demand for public-private partnerships by public managers and private firms. It explores the primary motivations public managers and private parties have in entering into PPP through a discussion of the infrastructure gap and the positive and negative claims regarding the merits of the management approach.

### **3.0 THE DEMAND FOR PPPs – the ROLE of GOVERNMENT, the INFRASTRUCTURE GAP, and PARTNER MOTIVATIONS**

The previous chapter established the research framework and typology used in this study. This chapter explores the factors driving demand for public-private partnerships. The chapter begins with a brief history of public-private partnerships, focusing primarily on the shifting roles of government and public managers. Next the chapter defines in the infrastructure gap in the water sector and the push for PPPs as a tool for development by the UN's Millennium (2000) and Sustainability (2015) Development Goals. The chapter concludes with the primary motivations and potential costs of public and private actors in entering into the management approach.

#### **3.1 PPPs, A History**

This section traces the history and the development of the present day public-private partnership management approach. The collaboration between government and non-government actors has existed since the formation of government (Wettenhall 2010); the relationship has evolved with the growth and development of nation-states and state capacity. Ultimately, the demand for PPPs is highly dependent on the role of government and the perceived efficiency of public provision of resources. Through their push of the management approach, international organizations proliferated this demand to developing and emerging economies.

The earliest recorded practices of contracting out, partnership building, and marketization dates back to the Imperial, China, and Rome roughly 2,500 years ago, with private tax and toll road collection (Forrer *et al.* 2010). Mentions of mixed public-private interactions were even recorded in the Bible, and re-surface again in religious texts around the Wars of the Crusades to describe the sponsorship of the Knights of Templar by various European kings.

The first PPPs, rather than mere collaborations or contracts, date back to the era of mercantilism with privateer shipping, mercenary armies, colonial expansion, the organization of events, and collection of treasury debt (Wettenhall 2010). The most notable example is the East India Company. The world's first transnational corporation, the East India Company was established by Queen Elizabeth I in 1600, and served as a force of expansion on behalf of the British Empire (Robins 2002). By the 1800s, the company had gained territorial control in the Indian sub-continent, and had expanded its commercial reach across the Atlantic and to China. A “monstrous combination of trader, banker, conqueror, and power broker” (Robins 2002, p.83), the company lay at the heart of the economy and the governance of Britain, and is considered to be one of the earliest, most successful PPP ventures in the world. The Company was disbanded in 1858, when the violent quelling of uprisings in Delhi led to outrage on behalf of British citizens and Parliament.

The disbanding of the East Indian Company was not a unique instance in the history of PPPs. In the eighteenth and nineteenth century, a wedge between public and private began to form as loose territories and states began to evolve into the modern day nation-state (Wettenhall 2010). For example, from the fifteenth to the seventeenth century – one of the critical moments in the formation of state capacity – mercenaries were recruited by lords and military entrepreneurs to serve various governments. The practice receded in the eighteenth century, when government established clearly defined, more cohesive territories and domestic armies to protect them. Thus, as the nation-state formed, the government centralized many functions such as the provision healthcare and security. The provision of resources, however, remained under the purview of private companies. For example, in the United States and in Canada, electricity, gas, water, and

transportation infrastructure were originally privately funded and supported through user fees (Baldwin 1989; Priest 1993).

In the twentieth century the scope and scale of resource provision by the state increased significantly - inflated prices, regulatory failures, the enforcement of the New Deal, and the strategic role of certain assets in the economy (particularly during World War II), led to increased public ownership of large-scale infrastructure projects (Trebilcock & Rosenstock 2015). Additionally, as population, and thus, demand for private goods increased, large capital costs and monopolistic conditions led to a more natural transition to public regulation and maintenance. Finally, it became clear that infrastructure was not a perfectly private good, as it was not entirely excludable or rival, leading to a greater demand of resource provision through public procurement and governance.

Public-private partnerships did not re-gain popularity until the late twentieth century, when theories emerged that the state, the market, and civil society must all act in tandem to manage the state, the economy, and society (Wettenhall 2010). Urban regime theory has long held that collaboration exists between public and private sectors, and that this collaboration is necessary to the achievement of important policy goals (Mossberger 2009; Stone 1989). The theory of New Public Management, developed in the late twentieth century, argues that traditional public services are ineffective in resource allocation and poor in management (see Hood 1991; Boston 1996; Minogue *et al.* 1998; Polidano 1999). Since the late 1980s, there has been skepticism that governments have the capacity to provide public services in an effective and efficient manner. Because of the lack of competition in the public sector (the sector is often the only provider of goods and services), there is limited incentive to improve quality, and that services or resource provision may deteriorate over time. For example, a USA and UK study of 234 observed cases



found that the private sector performed better than the public sector in terms of labor productivity, imposed tariffs, and equity returns (Hassanein & Khalifa 2007). Similar findings occurred in developing nations: a survey of 50 utilities in the Asian Pacific region found that the private sector is more efficient in water services delivery (Estache & Rossi 1999), whereas in Africa, a comparative study between private and public providers revealed that the private utilities performed better than their public counterparts, with no statistically significant differences in costs (Kirkpatrick, Parker, Zhang 2004). Thus, there has been a growing recognition that the private sector financing of traditionally public goods and the funding of infrastructure construction is a promising avenue for development.

Within the context of PPPs, this ideological shift began in the UK, with John Major's Conservative government (Wettenhall 2010). In 1992, the party introduced a new management approach – the Private Finance Initiative (PFI). The PFI was not initially conceived as a partnership, but as a consortium that would design, finance, and build infrastructure to public specifications at increased efficiency. This approach was initially opposed by the Labour party, and did not gain traction until Tony Blair reframed the concept as a Public-Private Partnership “to play down the Conservative origins” (Hall 2003, p.2) and to transform the role of the government (from a contractor to a partner) in infrastructure procurement. Thus, many scholars see the PFI and the early UK PPP model as an “ideological project” (p. 2).

Following a number of positive, albeit highly agenda-driven, evaluations of the UK's PFI/PPP projects, the management approach proliferated across Europe and was strongly encouraged as a policy mechanism by the European Commission. The notion was soon extended to developing economies, partially through pressure from international organizations (World Bank and the International Monetary Fund) that zealously pursued the “Washington Consensus”

principles of reorienting public expenditures and increasing privatization. Additionally, there was increased recognition that Official Development Aid (ODA) had failed to significantly improve infrastructural development through its loans for capital investment (Pessoa 2008). ODA, thus, reformed its policy to incorporate public-private partnerships as a mechanism for providing adequate infrastructure, improving welfare, and enhancing efficiency (United Nations 2002). Finally, in the developing world, there was a growing recognition that there is a greater need for financing than ODA and domestic public finances alone can provide. Policy-makers in developing countries invited greater private sector participation, turning to the “panacea” methods of public-private partnerships pushed through by ODA and the World Bank. Thus, while developing countries were themselves eager to embrace cost-reducing initiatives such as the PPP, the increased demand for public-private partnerships as a poverty-reducing approach was also an exogenous process. The next section will further explore the infrastructural needs in the water sector (endogenous demand) and highlight the role of the UN’s Development Goals in further promoting the PPP as a development tool.

### **3.2 The Infrastructure Gap**

Since the emergence of the UK’s PFI, proponents of PPPs have argued that management approach is the financial solution to closing the infrastructure gap. The infrastructure gap is the difference between available resources and the amount of investment required to meet a country’s core infrastructure needs (World Bank 2016). Infrastructure investment is a key component in economic growth and development is widely viewed as an urgent policy priority for developing countries. Growing populations and aging infrastructure are straining the capacity of most nations to deliver public goods. Globally, it will cost about \$2 trillion a year to modernize infrastructure (IFC 2016). In particular, the provision of water resources has been identified as a key development

goal by nation-states and international organizations. In low-income countries, only 65 percent of the population has access to improved drinking water source (Table 3.1) (World Bank WDI 2016). The most heavily affected regions are Africa and Latin America: only 55 percent of rural populations in Sub-Saharan Africa and 83 percent of rural Latin America and the Caribbean (Table 3.2). Eighty-three percent of countries have fallen significantly behind the national targets they have set for sanitation (UN Water 2012). Many cities, particularly those experiencing rapid urbanization, are struggling to address basic water and sanitation health (WASH) needs to due to budgetary constraints and limited institutional capacity.

Development Level	Total (%)	Urban (%)	Rural (%)
Low income	65.57	86.72	56.48
Lower middle income	89.57	94.00	86.74
Upper middle income	94.87	97.31	90.77
OECD members	99.30	99.53	98.42

**Table 3.1.** Percent of population with access to an improved drinking water source in 2014, organized by the World Bank classification of country development level. The improved drinking water source includes piped water on premises (piped household water connection located inside the user’s dwelling, plot or yard), and other improved drinking water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, and rainwater collection). (WDI 2016).

It is important to note that “improved access” does not meet the international engineering and health standards set forth by the World Health Organization; instead, it refers to the ability to obtain water from sources that are superior to traditional, unprotected ones (Montgomery & Elimelech 2007).

Region	Total (%)	Urban (%)	Rural (%)
Sub-Saharan Africa	67.59	86.78	55.87
Latin America & Caribbean	94.65	97.39	83.92
Middle East & North Africa	93.41	95.59	89.22
East Asia & Pacific	94.13	97.34	90.19
South Asia	92.40	95.35	90.92
Europe & Central Asia	98.49	99.41	96.07
<b>World</b>	<b>90.97</b>	<b>96.46</b>	<b>84.61</b>

**Table 3.2:** Percent of regional population with access to an improved drinking water source in 2014. (WDI 2016)

Inadequate WASH infrastructure profoundly impacts human systems. A lack of clean drinking water and sanitation can lead to exposure to pathogenic microbes including cholera, typhoid, amoebic and bacillary dysentery (Montgomery & Elimelech 2007). Inadequate water treatment and storage can also lead to toxic algal blooms that cause gastrointestinal and hepatic illness. Untreated water sources can also lead to the propagation of parasites and insects, and can lead to diseases such as dengue fever, malaria, and yellow fever. Nearly 60 percent of global infant mortality is linked to infectious diseases, most of which are water and sanitation related. Diarrhea is the sixth largest cause of morbidity (1 billion cases per year) and sixth largest cause of mortality (2.2 million deaths per year). Inadequate access to clean water has social costs as well. In many developing countries, women are the primary infrastructure for water access, dedicating hours to collecting and transporting water (Montgomery & Elimelech 2007; Koolwal & van der Walle 2013). The labor-intensive process reduces overall productivity by removing women from market-based labor activities, as well as from opportunities for healthcare, childcare, and education.

In order to bring attention to this issue, international organizations such as the United Nations have started a series of water and sanitation initiatives, including the implementation of the Millennium Development Goals (MDGs) in 2000. Goal 7, Target 10 of the MDGs is to “halve the proportion of people without sustainable access to safe drinking water and basic sanitation” by 2015 (Millennium Project 2006). At the UN Sustainable Development Summit in 2015, this goal was renewed in the Sustainable Development Goals; Goal 6 strives to achieve “universal and equitable access to safe and affordable drinking water” and “access to adequate and equitable sanitation and hygiene [...] paying special attention to the needs of women and girls and those in vulnerable situations” (UN 2016). Goal 6 also strives to implement integrated water resources, increase water efficiency across all sectors, reduce water pollution, restore water-related

ecosystems, and expand support for international cooperation as well as local communities in WASH management. Both the MDGs and the SDGs note that achievement through these goals should happen through a series of partnerships, including partnership with the private sector. While MDG Goal 8, Target 18 calls for cooperation of the private sector to “make available the benefits of new technologies” (Millennium Project 2006), SDG Goal 17 strives to “encourage and promote effective public, public-private, and civil society partnerships” in order to “share knowledge, expertise, technology, and financial resources” (UN 2016).

The World Health Organization estimates that the annual cost of meeting the MDG Target 10 is 11.3 billion dollars (Sanctuary, Tropp, & Berntell 2005). In developing regions, international aid has not been able to close the gap necessary for infrastructural development. It is estimated that with annual investment needs of \$93 billion dollars and only \$45 billion available through existing sources, Sub-Saharan Africa’s infrastructure gap is \$48 billion dollars<sup>5</sup>. Other low-income regions face similar needs: South Asia needs to invest between US\$1.7 trillion and US\$2.5 trillion (6.6 and 9.9 percent of GDP) to close its infrastructure gap (Andres, Gausch, Haven, & Foster 2008). In order to close the infrastructure gap in Latin America and the Caribbean, investment as a share of GDP would have to be increased from the current rate of 2 percent to 5.2 percent per year (Bhattacharya, Romani, & Stern 2012).

Large-scale events such as climate change are expected to widen the infrastructure gap. One of the biggest stressors of the planet, climate change is the result of the anthropogenic emission of greenhouse gasses (GHGs) such as carbon dioxide, methane gas, and nitrous oxide through the burning fossil fuels for electricity, heat, and transportation; deforestation; industrial

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<sup>5</sup> \$33 billion are required for operations and maintenance and \$60 billion required for capital expenditures. This value is double the current rate of investment. Currently, only \$45 billion are available through existing sources: public provision provides roughly \$30 billion (66%), private provides \$9.4 billion (21%), and foreign aid provides \$6 billion (13%) (Foster & Briceno-Garmendia 2010).

processes; and agricultural practices (EPA 2015; IPCC 2014). Atmospheric concentrations of carbon dioxide have increased by almost 40 percent since pre-industrial times, from approximately 280 parts per million (ppm) in the eighteenth century to roughly 400 ppm in 2013 (IPCC 2014; NOAA 2015). The global average temperature has increased by more than 0.8 degrees Celsius over the last century (IPCC 2014). If the emission pace of the last several decades continues, carbon dioxide levels will reach 450 ppm by the year 2040 (SIO 2015), resulting in a planetary warming of 2 to 3 degrees Celsius (OECD 2012a) and in significant disruptions to human and ecological systems.

The Intergovernmental Panel on Climate Change (IPCC) (2014) projects that for each degree of planetary warming, seven percent of the global population will face roughly a 20 percent decrease in renewable water resources. For two degrees of warming, the percent of the affected population rises to 14. Climate change is expected to alter hydrological systems by impacting precipitation patterns, snowmelt rates, and evaporation rates. By the end of the twenty-first century, meteorological droughts (less rainfall) and agricultural droughts (drier soil) are expected to become longer and more frequent through changes in both precipitation and evaporation. Effects will depend on the region and the magnitude of warming. Overall, renewable surface and groundwater resources will be reduced in dry subtropical regions, particularly in the Mediterranean, Mexico, Central America, southern Africa, and parts of Australia, intensifying competition for water and disrupting regional water, energy, and food security. At northern latitudes, particularly in India and parts to Central Asia, there is an increased risk of extreme rainfall events. Tropical Africa and northern South America are also expected to see an increase in the magnitude and frequency of flooding events. Climate change is also projected to reduce water quality due to increases in sediment, nutrient, and pollutant concentrations due to heavy

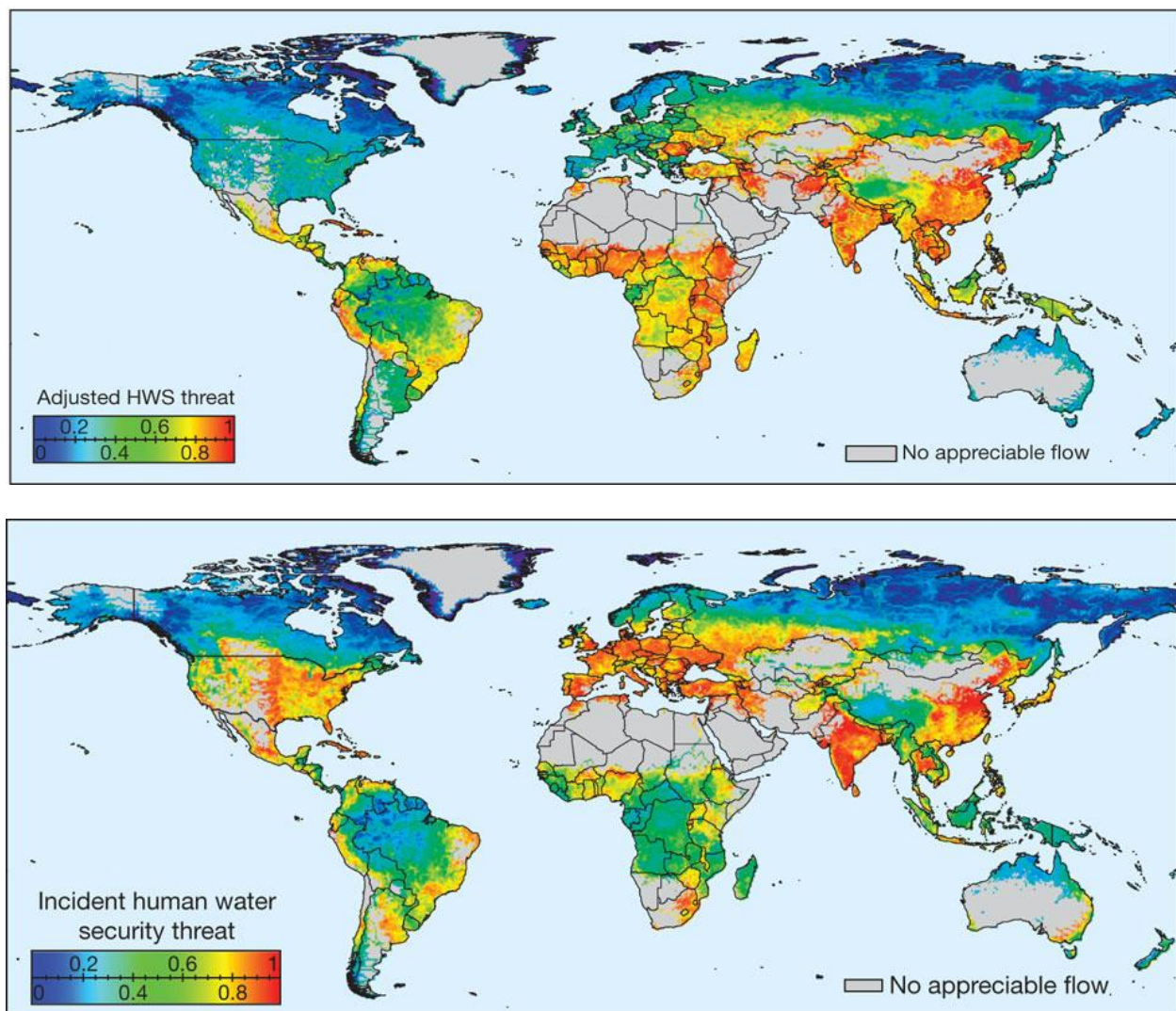
rainfall and runoff, reduction of pollutants dilution during droughts, and disruption of treatment facilities during floods.

The degree of impact will depend on the ability of a region to adapt to threats of water security. When adjusting for the role of technology in adapting freshwater availability and quality stressors, low-income countries face the greatest risk of increased water security stress due to resource constraints (see Figure 3.1) (Vorosmarty *et al.* 2010). When accounting for climate change effects, globally, the infrastructure to maintain water services at pre-climate change levels is estimated to cost 531 billion dollars (IPCC 2014). Future irrigation and reservoir demands will add an additional 225 billion dollars. In order to meet the Millennium Development Goals, average annual costs for one of the most affected regions, sub-Saharan Africa, are estimated to be anywhere between 1.1 to 2.7 billion dollars for current urban water infrastructure, along with an additional 1.0 to 2.5 billion dollars for the construction of new infrastructure.

Given these high costs of development and the limited budget of developing economies, public-private partnerships are seen as a viable solution to closing the infrastructure gap. Proponents of public-private partnerships argue that the management approach has the potential to provide additional funding, innovation, and efficiency in order to bolster water security resilience and mitigate the additional freshwater strain from climate change and population growth. Many PPP supporters have indicated that PPPs provide the perfect opportunity to meet the SDG Goal 6 (universal access to water and improved sanitation by 2030) through Goal 17 (the promotion of PPPs and other multi-stakeholder partnerships).

The inclusions of PPPs into the UN's Development Goals shifted the perceived role and increased the legitimacy of the management structure. This endorsement goes hand-in-hand with the changing perceptions of government efficiency and the realization that public managers do not

have adequate issues to address the infrastructure gap. As a result, demand for public-private partnerships in both developed and developing countries is high. The next section outlines the primary motivations and potential tradeoffs that policy-makers face when entering into a public-private partnership



**Fig 3.1** shows the Human Water Security Risk index, unadjusted (top image) and adjusted (bottom image) to account for the effect of technological investments on water infrastructure. The bottom image shows that areas with substantial technology investments have limited exposure to climate change effects whereas regions with little or no investment become the most vulnerable (Vorosmarty *et al.* 2010). Ultimately, when factoring in mitigation strategies, a North-South divide emerges.



### 3.3 Motivations for Pursuing Horizontal Partnership

Low water quality and high water scarcity, perceptions of government inefficiency, and the exogenous push by international organizations such as the World Bank and the United Nations have led to a high demand for public-private partnerships, particularly for developing countries. This section builds on these large-scale forces by exploring the individual motivations for public managers and private partners into entering into a PPP structure for water provision. Along with the potential to overcome budgetary constraints, public and private partners are enticed with the promise of increased efficiency, innovation, and risk transfer. These benefits and their hidden costs are briefly outlined below.

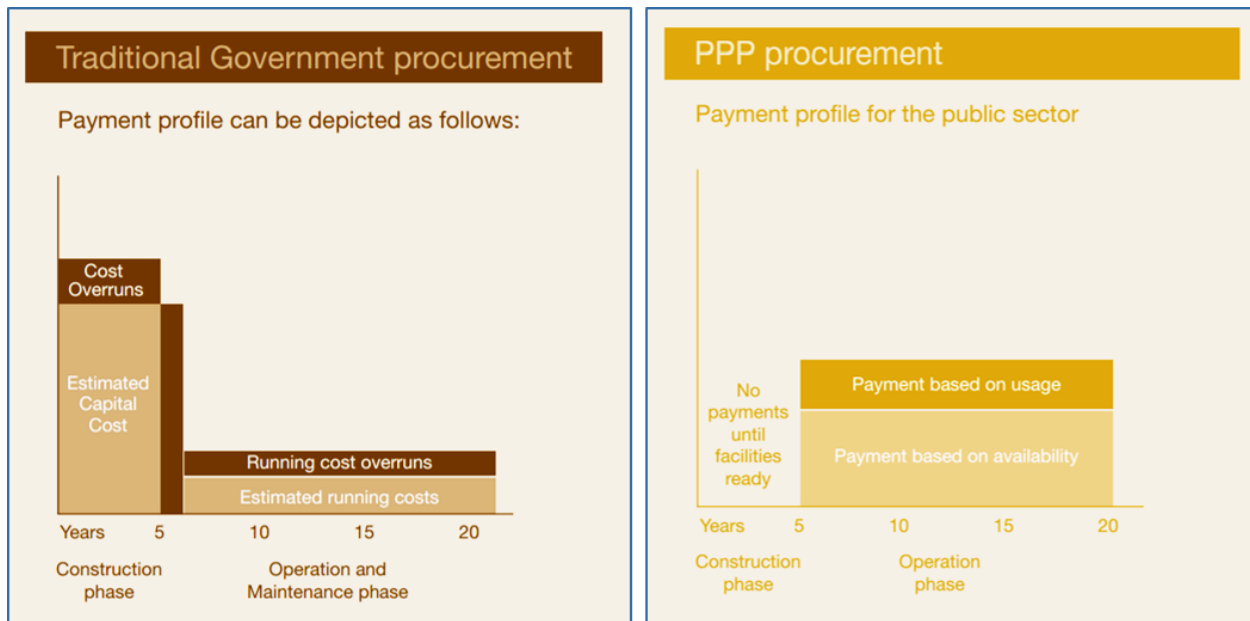
#### 3.3.1 *Arguments for PPPs*

Supporters of PPPs present several economic arguments to persuade governments and firms to pursue a horizontal partnership<sup>6</sup>. From a macro standpoint, P3s may be able to decrease debt and relieve shortage of funds (as governments free up budgets that can now be put towards debt spending). For certain types of PPPs such as greenfields or concessions, governments do not need to pay private contractors until after the facility is constructed (Fig. 3.2) (Davies & Eustice 2005). Additionally, levy user chargers (tolls) can reduce the pressure of taxation. Due to a reduction of maintenance and operation efforts PPPs can also help decrease the size of government, and thus, further free up the budget.

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<sup>6</sup> It is important to note that the discussion on the merits of horizontal partnerships moves beyond public-private partnerships. Brafman and Beckstrom (2006), for example, argues that a horizontal partnership structure produces more resilient organizations, and that this “decentralized” approach is transforming present-day industry. Ostroff (1999) underscores that the horizontal organization structure was critical in improving the performance of Occupational Safety and Health Administration (OSHA), and a key driver of General Electric’s increased productivity and efficiency. Rapid connections and technology are enabling the formation of these decentralized structures. While proponents of the approach suggest that the organizational structure will produce more efficient outcomes, there is a danger in applying horizontal partnerships as a blanket solution. As we see in the discussion of public-private partnerships there are steep tradeoffs to a horizontal partnership; additional research is needed on horizontal partnerships to assess where the method may be appropriately utilized.

The economic and social gains from the management approach can be substantial. According to the International Finance Corporation (2015), in 2015, as a result of public-private partnership infrastructure projects, 16.5 million people gained access to basic services such as water, energy, transportation, and telecommunications. The expected economic yield of PPPs to countries in the 2015 fiscal year is 50 million dollars. In total, private parties invested roughly three billion dollars in order to support current projects and implement future ones.



**Fig. 3.2** For traditional procurement, capital and operating costs are paid for by the public sector. For PPPs, the public sector may only pay for the services delivered, depending on the financing structure of the project. The private sector funds itself using debt through bonds or bank loans and shareholder equity (Davies & Eustice 2005).

On the micro side, supporters argue that the efficiency of the private sector in the construction, maintenance, and operation can reduce project timelines and can reduce life-time project costs due to bundling (Tahir 2007; Pessoa 2008; Ameyaw & Chan 2013; Beevers 2016). Poorly managed state-owned enterprises (SOEs) have imposed costs of 5 to 12 percent of GDP (Trebilcock & Prado 2011). In Africa, SOE inefficiencies in the form of overemployment, bill collection, water losses, and poor maintenance practices result in an annual cost of 12 billion dollars (Foster & Briceno-Garmendia 2010). As a result, SOEs particularly in developing

countries, have been turning to alternative forms of infrastructure delivery, financing, and utility management (Trebilcock & Rosenstock 2015).

Depending on the contractual arrangements, PPPs also transfer construction, financial, commercial, operating, and maintenance risks to those in the best position to handle it – the private sector (Tahir 2007; Pessoa 2008; Ameyaw & Chan 2013; Beevers 2016). Thus, PPPs enable governments to tap into the “disciplines, incentives, skills, and expertise that private sector firms have developed in the course of their normal everyday business, while releasing the full potential of the people, knowledge, and assets in the public sector” (McQuaid & Scherrer 2010, 29), all at a minimum risk. Supporters also argue that P3 formation provides a new dimension of capital market discipline and financing by creating new opportunities for investors (Loxley 2013). Finally, PPPs can reduce corruption by requiring transparency in infrastructure spending decisions.

### *3.3.2 Arguments against PPPs*

It is important to note that these macro- and microeconomic advantages are theoretical. In order to capture all benefits, market conditions must be near-perfect and governance systems must be able to cost-effectively address all opportunistic behavior. Removing these assumptions reveals that public-private partnership projects can accrue high hidden costs and decrease overall political and social resources. For example, budgetary relief, one of the most enticing benefits of PPPs will only yield a financial return when highly competitive financial bundles are managed by experienced private and public partners<sup>7</sup>. A weak institutional system or the use of a PPP as a “mega-credit card” opportunity may create a short-term budget advantage, but will lead to an overall increase in budgetary pressure in the long-term (Hodge & Greve 2011; Loxley 2013).

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<sup>7</sup> See Chapter 8 for unexpected PPP costs and accounting for the PPP budget.

Ultimately, while successful PPP projects may have realized increased efficiency, innovation, and even accountability, in reality, market forces and perturbations may lead to market failures and unexpected reductions of welfare. As a result, critics argue that there are extensive economic, political, and social justice tradeoffs in public-private partnerships. In developing countries, weak institutions may result in arrangements that are less effective than desired, can increase the possibility of cost overruns (especially with contract renegotiation), and can increase overall project costs due to limited bargaining power. For example, at least three PPP charter schools in the United Kingdom were closed due to declining enrollments, but the public partner is contractually obligated to make annual payments totaling 70 million pounds until 2035 (Loxley 2012). Another economic disadvantage is that limited accountability to weak public partners may provide opportunities for corruption, thus increasing costs further. These arguments are not acknowledged by PPP supporters. Figure 3.2 was taken from a PPP manual published by PricewaterhouseCoopers, a multinational company that provides tax and consulting services (PwC 2016). The figure does not include the costs that result from managing the bidding process, contract negotiation, and partnership maintenance. The figure also implies that cost overruns and project delays are not a risk for the public entity in a PPP, creating unrealistic expectations for public managers in the Value for Money of the project. Such depictions create the harmful illusion that a PPP is a “mega credit card” that can be used by developing economies to promote infrastructure development, and must be addressed in academic and practitioner literature.

An additional PPP disadvantage is that the typically long-term nature of PPP contracts reduces flexibility (Pessoa 2008; Hodge & Greve 2011; Loxley 2013), or the ability of governments to adapt to economic, environmental, or political changes. This “lock-in effect” limits resilience of human and ecological systems in facing environmental and socioeconomic challenges

such as climate change. Long-term contract negotiation inevitably limits governments' ability to respond to changes in demand, thus increasing the rate of failure for sectors with resource availability uncertainties.

From a social justice perspective, PPPs run the risk of creating inflating prices and creating "elite-focused consumer products" (Shambaugh & Matthew 2016, p.138). When opportunities for quality or quantity improvement are limited, the private sector may inflate prices to maintain profit. Moreover, with environmental goods, there is a greater risk to underperform and overcharge, as partners assume that customers will continue to pay for the good and service over time.

PPP provision of resources may also reduce transparency due to open record files now becoming private, thus limiting public participation and increasing information asymmetry between users and providers (Loxley 2013). In areas with weak institutions, substantial risk from the point of the view of the private sector will also drive up risk premiums and will result in adverse social effects: there is a fear partnerships may out-source local jobs to multi-national corporations and will pass along costs to consumers (Jeffares, Sullivan, & Bovaird 2009). Studies have found that in Africa, water sector private firms will either increase rates or will strive to reduce labor costs, decreasing job availability in the region (Loxley 2013). All of these arguments for and against PPPs, as well as how they affect to the likelihood of project success, will be explored in extensive detail in the second part of the Thesis.

### 3.3.3 *The Scarcity Trap*

The agenda-driven top-down push for adopting PPPs as a development policy, as well as the common misconceptions regarding the *realized* (rather than the theoretical) benefits of public-private partnerships has created unrealistic expectations for public managers in developing economies. It is of utmost importance to understand common misconceptions regarding public-

private partnership benefits and tradeoffs. For public managers, the provision of basic resources such as water is a top priority; when resources are limited, there is a danger that these public managers can fall into a “Scarcity Trap” (Mullainathan and Shafir 2013). Governments have limited bandwidth. When facing with scarcity, public managers may acquire “tunnel vision” – despite the long-term nature of public policy, pressing needs shift the focus to a short-run horizon and concerns about future budgetary constraints or institutional capacity are cast aside. PPPs are seen as an opportunity for governments to use a “mega-credit card,” receiving hard infrastructure investments now and paying for this resource provision (Miraftab 2004) with a high risk premium throughout the duration of the contract period. These costs are not accounted for in cost-benefit analysis calculations and can create additional budgetary strains in the long-run, especially when transaction costs are high.

The scarcity trap is particularly evident at the local level. Neither local governments nor small corporations have the resources to manage the complexity of high value projects and their contracts. As a result, local governments, hoping to relieve budgetary stress, enter into agreements with large-scale corporations with little understanding of the institutional and managerial demands a public-private partnership will bring. As private investors are sensitive to regulatory risk (Iossa & Martimort 2015), in cases of limited local authority and weak institutions, private partners will demand favorable market conditions and commercial risks are predominantly shifted to local governments, taxpayers, or users (Koppenjan & Enserink, 2009). Local governments can go to great lengths in order to persuade international parties to invest, promising subsidies, full-cost recovery guarantees, tax exemptions, soft loans, or regulations that establish private partners as monopoly providers. While these measures can lead to partnership formation and infrastructure

development, the result is often an uneven distribution of partnership power and opportunistic behavior on behalf of firms.

### **3.4 Chapter Summary**

This chapter explored the macro-, meso-, and micro forces that impact demand for public-private partnerships. A brief history of the public-private partnership revealed that the role of the public-private partnership in development and infrastructure has varied based on government needs and perceptions of government efficiency. While collaborations between public and private actors have existed since the formation of government systems, it was not until the development of the Urban Regime and New Public Management theories that the PPP phenomenon gained traction. Tony Blair's "rebranding" of the PFI in the 1990s catalyzed adoption of the management approach throughout Europe (Wettenhall 2010) and developing countries by international organizations such as the World Bank and the International Monetary Fund (Pessoa 2008).

In developing countries, the push to adopt these partnerships is both an endogenous and an exogenous process. Given the perception of government inefficiency in infrastructure development and resource provision, supporters heralded the management approach as a means to close the infrastructure gap for the water sector; as a result, PPPs have been highlighted by both the Millennium (2000) and Sustainable (2015) Development Goals as a method of development, gaining legitimacy and popularity among public managers in developing nations. For the water sector, the needs are dire – only 65 percent of people in low income countries have access to improved drinking water sources (PPI 2016). Climate change will exacerbate water scarcity, requiring 531 billion dollars (IPCC 2014) of capital in order to adapt to the changes in precipitation, evaporation, and snow melt – and infrastructure.

The microeconomic – albeit theoretic - benefits of public-private partnerships have further increased demand for the management approach. Supporters of public-private partnerships argue that the method is a panacea, providing budgetary relief, increased efficiency, opportunities for innovation, and public welfare (Loxley 2013). However, a brief overview of the criticisms of public-private partnerships has revealed a significant misconception surrounding public-private partnerships; while the method is touted as a “mega credit card” for governments, hidden costs and potential market failures can result in unexpected cost-overruns and tighter budgets than under traditional public procurement. The unyielding support of these benefits from powerful international organizations, despite the debunking of the budgetary relief claim, can be interpreted as a strategic framing device, much like the one utilized by practitioners to simplify and “cloud” the PPP definition. Such misconceptions can lead public managers, particularly at the local level, to fall into a scarcity trap. Due to the desperate need for infrastructure development, public partners may enter into agreements with private companies with limited market power, signing contracts that transfer high risk and costs onto the entity with the lowest capacity to address it – the public partner.

Ultimately, this chapter has demonstrated that the demand for water sector stems from (1) the perceived inefficiency of government in the provision of resources, (2) poor water quality and quantity conditions in developing countries, (3) a strong push from international organizations to adapt neoliberal policies thus exacerbating environmental justice concerns , and (4) the perceived economic benefits of partnerships, particularly in the form of budgetary relief. The following chapter examines the supply of partnerships through an analysis of the World Bank Private Participation in Infrastructure Database.



#### **4.0 PPP SUPPLY - TRENDS and DISTRIBUTIONS of WATER SECTOR PPPs**

While the previous chapter outlined factors that influence the demand of water sector PPPs, this chapter determines the primary forces that drive the supply of public-private partnerships in the water sector. Following an assessment of the two primary databases for PPPs- the World Bank PPI and the Global Water Intelligence PSP, the chapter presents various trends and distributions for water sector public-private partnerships. Due to ease of access, this research utilizes data from the World Bank Private Participation in Infrastructure (PPI) database. Data was tabulated in Stata 13. A comparison of water sector PPP contract frequency, annual investment, project location, contract type, and project status to energy, telecommunications, and transportation trends clearly illustrates that the water sector faces unique challenges for PPP management: water sector PPPs are (1) primarily local, (2) have a low rate of investment by private sponsors, (3) have a high rate of failure, and (4) rely on pre-existing technology rather than the construction of new infrastructure. Given these unique characteristics, empirical findings and theoretical frameworks, from other PPP sectors therefore, should be applied to water sector PPPs with great caution. Moreover, given the low contract frequency, high investment gap between public and private partners, the number small percentage of the population served in low-income economies, the method should not be touted as a panacea for development and growth; on its own, the PPP approach cannot feasibly close the infrastructure gap.

#### **4.1 PPP Datasets – The World Bank PPI and The Global Water Intelligence PSP**

There are two fairly complete and reliable databases for water sector public-private partnerships: the World Bank Private Participation in Infrastructure (PPI) Database and the Global Water Intelligence Private-Sector Participation (PSP) database. The World Bank PPI database is an open-access database that covers only developing nations (PPI 2016); the GWI PSP database

is available via subscription and covers private participation in infrastructural projects for both developed and developing countries (Jensen 2016). Both databases define PPPs as projects in which contracts transfer full or partial ownership or decision rights to the private sector. Datasets include data on sector, project type, projects status, political jurisdiction, investment year, investment amount, and project location. PSP also includes additional data on population served.

Because of the open-access nature of World Bank data and the strong focus of this research on closing the infrastructure gap in developing nations, the overview of PPP water sector trends has been compiled using the World Bank PPI database. It is important to note that while the database does provide a strong sense of public-private partnership trends since 1990, there are a few limitations. First, the database only features data on low- and middle-income economies<sup>8</sup>. The omission of high-income economies, thus, results in a gross underestimate of total PPP contracts and investment. As data indicates that the majority of public-private partnerships are found in upper-middle income countries, rather than low income ones (PPI 2016; Pessoa 2010), the omission poses a significant challenge in characterizing overall PPP trends.

Secondly, there is an issue of validity. Data is highly dependent on the definitions and categorization utilized by the World Bank<sup>9</sup>. Moreover, the World Bank provides data using commercial news databases such as Economist Intelligence Unit, Business News America; financial companies such as Global Water Intelligence, Pisent Masons' Water Yearbooks;

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<sup>8</sup> The World Bank (2016) defines middle-income economies as those with a gross national income per capita of more than \$1,045 but less than \$12,736. Lower-middle-income economies and upper-middle income economies are distinguished at \$4,125 (i.e. lower-middle income are those that have a per capita GNI of greater than \$1,045 and less than \$4,125 and upper-middle income are those with a GNI per capita of greater \$4,125 and less than \$12,736).

<sup>9</sup> The PPI defines a private sponsor as a company "controlled and majority owned by private parties" (PPI 2016). State Owned Enterprises and their subsidiaries are only considered private investors when they engage in projects in *foreign* countries. Entities that remain majority-owned by government, but still entail a degree of cooperation between public and private entities, are not considered private sponsors within their own countries, despite the fact that the projects are considered PPPs. This classification creates discrepancies in countries with a heavy emphasis on state-owned enterprise project ventures. For example, the PSP Water database recorded 1,086 PPP contracts in China whereas PPI only counted 409 contracts during the same time-frame (Jensen 2016).

government websites, regulatory agencies, and annual reports. The difficulty of using public sources is that these sources may not be accurate or may not contain all required information. For example, while most projects list data on location, total investment, and sector, few contain data on the bidding strategy, sponsors, or even the percent the project is considered “private.” Thus, informal PPPs and small-scale projects are not included in the data set due to a lack of publically available information (PPI 2016). This limitation is particularly apparent in the water and energy sectors, where small scale providers play a crucial role in the provision of resources (PPI 2016). As a result, even within the low and middle-income economies, the total number of water sector PPPs is underestimated. Finally, it is important to note that data depends heavily on the infrastructure and institutional capacity of project locations and reporting news and government agencies. Countries that do not want to signal that markets are immature and institutional capacity is weak will under-report the number of cancelled or distressed projects.

Despite these issues of validity, the World Bank PPI database does provide enough information to create a rough sketch of trends in the water sector for low- and middle-income economies. This information is useful in understanding not only the scope of PPPs, but also in highlighting potential challenges that may emerge in project design and implementation for the water sector. Moreover, the primary focus of this study is on the impact of water sector PPPs on developing countries, rather than developed one. The lack of data on high-income states will not deter the assessment of PPP’s role in closing the infrastructure gap. The remainder of this chapter will outline the supply-side trends and distributions revealed through the PPI database.

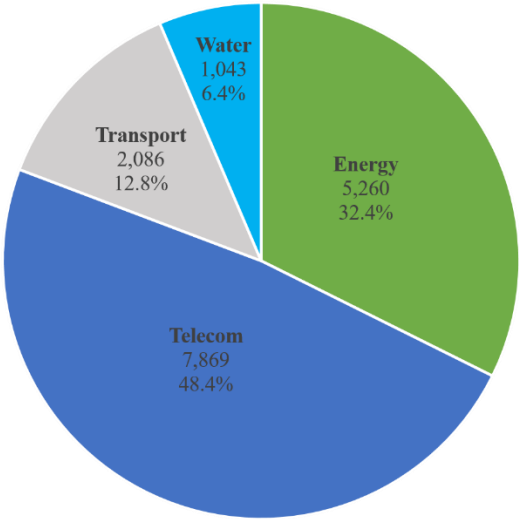
The data indicates that: 1) the management approach is highly prevalent throughout the globe and lends itself well to high capital high-profit technologies and infrastructure; 2) despite the high demand for water infrastructure in low-income countries, investors predominantly

gravitate towards upper-middle income economies rather than low-income ones; 3) public – rather than private- partners are primarily bearing the risk of partnership; 4) unlike other sectors, the primary government granting agency is local, rather than national; 5) and finally, while cancelled and distressed projects are rare, project failures are costly, representing roughly one-fifth of all water sector PPP investment (PPI 2016). An assessment of contract frequency, total investment, the number of population served, and levels of water stress in developing economies reveals that the PPP is not a realistic approach in closing the infrastructure gap.

**4.2 Distribution by Sector**

Figure 4.1 shows the distribution of PPP projects by sector. In total, between 1990 and 2015, 16,258 contracts have become legally binding (signed by both public and private parties) in the energy, telecom, transportation, and water and sewerage sectors. The most contracts have been granted in telecommunications (48.4 percent of contracts and 42.52 percent of total investment) (PPI 2016), due to the high profitability of the technology transfer to developing countries (Pessoa 2008; Loxley 2013).

**Distribution of PPPs Projects by Sector, 1990-2015**



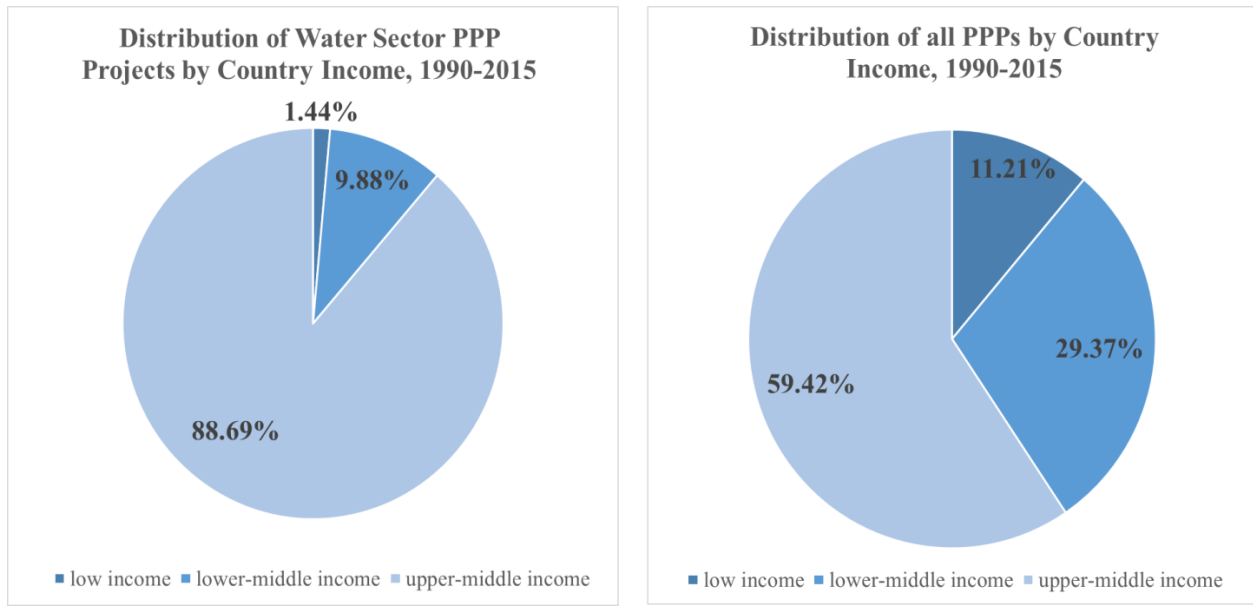
**Figure 4.1** The distribution of public-private partnerships by sector, 1990-2015. (Adapted from PPI 2016).

For the water sector, since 1990, in developed and developing countries, 3,310 water sector contracts (including contract renewals) have become legally binding (GWI 2016). In lower- and middle-income countries, 1,035 projects have been contracted between 1990 and 2015 (PPI 2016). Out of these, 538 (51.98 percent) are treatment plants and 491 (47.44 percent) are utility companies. Only a handful (6 contracts) are water transfer systems

While the sector represents only 6.4 percent of all public private partnerships, the sector is deserving of scrutiny; the necessity of water and sanitation for ecological and human system health and well-being cannot be understated. The sector also presents unique infrastructural challenges, such as high initial fixed costs, low rates of return, high degrees of political interferences, diverse range of consumers, and externalities that are not reflected in tariffs (Clough *et al.* 2004). Moreover, the provision of the public good is politically charged, and requires not only a high degree of public acceptance (Hall, Lobina, & de la Motte 2005), but also the collaboration of multiple government agencies such as water, land, environmental protection, health, and natural resources (Ameyaw & Chan 2014). Thus, due to its unique distributional trends (as seen below), and its high degree of technical, political, and management challenges, the water sector public-private partnership warrants additional study.

#### **4.3 Distribution by Country Income**

Public-private partnerships can be found in every single low- and middle-income country around the globe. Water sector PPPs are present in 65 (47.1 percent) out of the 139 low- and middle-income countries. Water sector PPPs are found primarily in East Asia and Pacific (51.94 percent) and Latin America (33.98 percent of projects). China alone has 446 projects (43.30 percent) since 1990, whereas 153 (14.85 percent) water sector PPPs have been implemented in Brazil since 1990.



**Fig 4.2** Distribution of water sector (left) and all PPPs (right) by the World Bank classifications of country income for contracts signed between 1990 and 2015 (adapted from PPI 2016). Low-income economies are those with a per capita GNI less than \$1,045; lower-middle income are those greater than \$1,045 and less than \$4,125; and upper-middle income are those greater than \$4,125 and less than \$12,736 (World Bank 2016).

Figure 4.2 shows the distribution of water sector PPPs by the World Bank classification of country income. Public-private partnerships in the water sector are highest in middle-income countries, with over 88 percent (925 projects) of all water sector contracts signed in upper-middle income. Only 15 projects have formally been implemented in low-income countries. The number of low-income PPPs is most likely an underestimate due to the issues of reporting and validity.

From this data, it becomes readily apparent that PPPs are “supply-driven” (Schaferhoff, Campe, Kaan 2009, p. 456): despite the demand for infrastructure in low-income countries, the majority of PPP projects (59.42 percent) are implemented in upper-middle countries. The region with the greatest need for investment in water infrastructure, Sub-Saharan Africa, has only had 42 water sector PPP projects implemented since 1990, and the majority of these (26.19 percent) of projects have occurred in South Africa, an upper-middle income economy. This results aligns with the findings of Andonova and Levy (2003) and Hoering (2003). Both sets of studies find that the

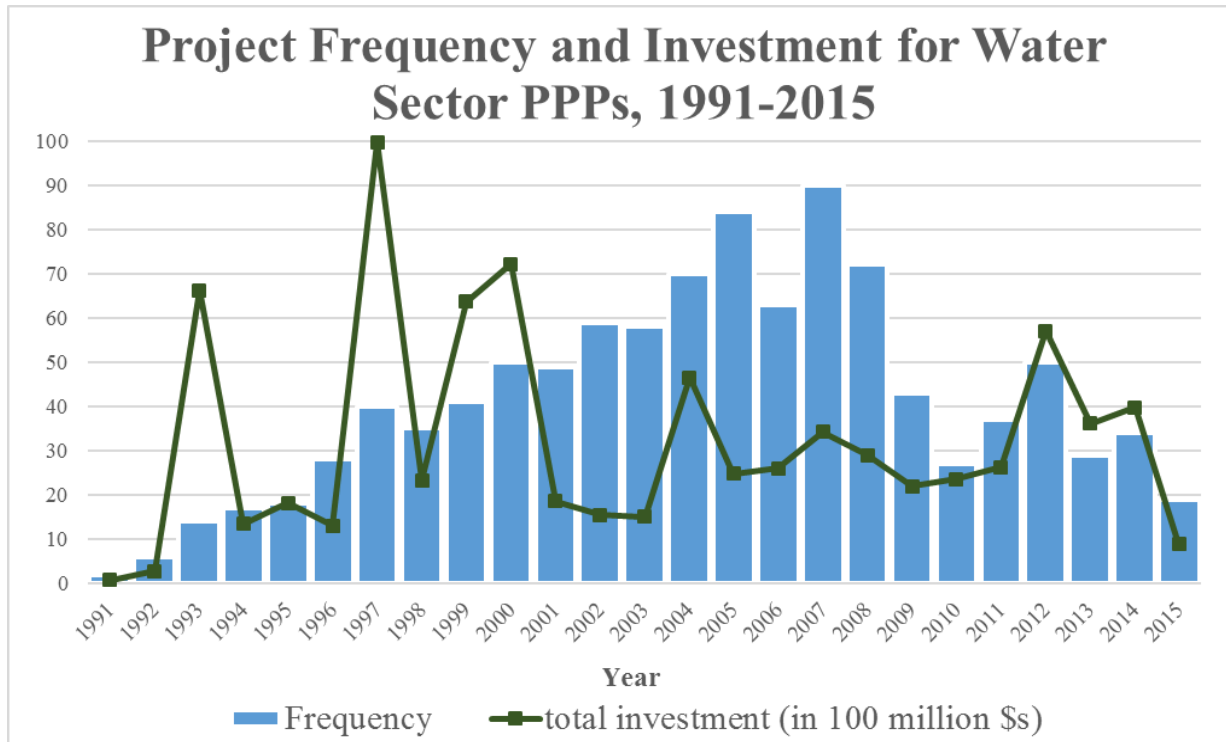
partnerships initiated by the World Summit Sustainable Development PPP program and the German Development Agency (GTZ) are primarily located in developing countries that provide a conducive financial market for water privatization, rather than those in the need of innovative management approaches.

The explanation for this discrepancy between the supply and the demand is an economic one: due to the low profitability of the water sector, the division between low- and middle- income economies is more pronounced in the water sector than other sectors (see Figure 4.2). Because of limited technological innovation in the water sector, firms are reluctant to enter into partnerships where incentives for further cost-cutting measures are low (Loxley 2013). There are high costs providing to poor rural areas; rural locations are often difficult to access, have ambiguous property rights, and cannot afford the full cost of services without additional subsidies (water has been heavily subsidized at a rate of 70 percent). With P3 formation, rates have increased, resulting series of dramatic protests over rising costs of water and sanitation, along with an increased frequency of non-payment of bills and disconnection of services (Bond 2010). Cases where rates for water provision fell only resulted when the public sector had deliberately raised tariffs prior to the PPP formation. Firms are thus reluctant to enter into these sectors due to high risk and social conflict, especially when they have only been successful in producing profit and increasing efficiency by reducing water losses, raising collection rates, and laying off workers (Jensen 2016).

#### **4.4 Annual Investment and Project Frequency**

Figure 4.3 shows the frequency (in number of contracts signed) and annual investment (in 100 million dollars) for 1,035 water provision and sanitation public-private partnership projects in low- and middle- income economies (PPI 2016). Contracts were signed in 65 countries. Only eight public-private partnership projects were contracted between 1949 and 1990, and therefore, were

not included in the data. While project investment peaks in 1997, the number of contracts peaks in 2007, and starts to sharply plummet during the Great Recession (2007-2009), from 90 projects in 2007 to 27 projects in 2010.



**Figure 4.3** The frequency (number of contracts signed) and annual total investment (in 100 million dollars) for water sector PPPs, sorted by investment year (adapted from PPI 2016). The total investment for a project is the sum of the investment in physical assets and payments to the government by a private partner. The investment year is the year in which investments are committed to a project or in which transactions (trade of shares) take place for divestitures (PPI Glossary 2016).

The total investment for water sector projects between 1991 and 2015 is 79.819 billion dollars, corresponding to roughly 3.26 percent to total investment for all PPP projects (PPI 2016). Total investment is the physical capital or payment by the private partner to public companies (PPI Glossary 2016); a low total investment value indicates that the public provider is providing predominantly the funding for maintenance, rehabilitation, or construction. Private companies, then, are providing management expertise and potential for innovation in the partnership. The data reflects that unlike the “standard” public-private partnership - the public, rather than the private -



partner bears all of the financial risk for the partnership. For example, a 2010 study by the World Bank conceded that between 2001 and 2006 in sub-Saharan Africa, an average of 1.06 billion dollars was annually invested by the public sector and capital expenditure, whereas the private sector invested, on average, less than 0.01 billion during the same time span (Foster & Briceno-Garmendia 2010). This sum is on top of the annual 3.06 billion dollars that the public sector pays to the private sector for operations and management of facilities. The ODA provides only 15 percent of the finance for infrastructure development, operation, and maintenance; overall, roughly 80 percent of finance, excluding household spending, for PPI projects in non-OECD countries comes from the public sector (Hall & Lobina 2012).

It is important to note that overall, PPP financing, and thus, project activity have drastically declined following the market crash (Loxley 2012). Because many of the “wrapped” bonds<sup>10</sup> were tied to US mortgages, the collapse of the housing market led to a sharp decline of PPP financing. Simultaneously, international banks withdrew from foreign operations whereas domestic banks reduced credit availability, raised rates, and reduced the number of years for which they were prepared to lend. Due to the long-term nature of public-private partnerships projects, many PPPs lost financing. Ultimately, the immediate result of the GFC was the sharp decline in new and especially large PPP projects in 2008, and an overall reduction in financing for future PPPs. Given the already high investment gap between public and private partners in low-income countries, this decline in total investment will most likely place an even greater portion of the financing burden on the public sector.

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<sup>10</sup> There are two major sources of long-term funding for PPPs: bond financing and bank debt financing. Bond financing involves insurance companies “wrapping” (Loxley 2012, 8) the bonds of project companies to improve their credit rating by pre-packaging these long-term bonds along with other bundled debt and loans. By going through the insurance companies, the bonds carried the same rating as the insurance provider (usually a rating of AAA), thus masking the high of the bond.

#### 4.5 PPP Contract Type and Subtype

<b>Water PPP Contract Type and Subtype</b>	<b>Frequency</b>	<b>Percent Type</b>	<b>Percent Subtype</b>
<b>Management and Lease Contract</b>	<b>170</b>	<b>16.30</b>	<b>100.00</b>
<i>Management</i>	69	6.62	40.59
<i>Lease</i>	101	9.68	59.41
<b>Concession</b>	<b>428</b>	<b>41.04</b>	<b>100.00</b>
<i>Rehabilitate, Operate, Transfer (ROT)</i>	213	20.42	49.77
<i>Rehabilitate, Lease, Transfer (RLT)</i>	5	0.48	1.17
<i>Build, Rehabilitate, Operate, Transfer (BROT)</i>	210	20.13	49.07
<b>Greenfield Projects</b>	<b>376</b>	<b>36.50</b>	<b>100.00</b>
<i>Build, Lease, Transfer (BLT)</i>	-	-	-
<i>Build, Operate, Transfer (BOT)</i>	349	33.46	92.82
<i>Build, Own, Operate (BOO)</i>	27	2.59	7.18
<i>Merchant</i>	-	-	-
<i>Rental</i>	-	-	-
<b>Divestitures</b>	<b>56</b>	<b>5.44</b>	<b>100.00</b>
<i>Full</i>	9	0.86	16.07
<i>Partial</i>	47	4.51	83.93
Uncategorized	13	1.25	-
<b>TOTAL WATER SECTOR PPPS</b>	<b>1,043</b>	<b>100</b>	<b>-</b>

**Table 4.1** Distribution of water sector PPPs by contract type and sub-type (Adapted from PPI 2016). Organization of sub-type is characterized using the PPI glossary and PPI definitions. 13 PPPs do not have data on contract type or sub-type.

Table 4.1 shows the distribution of project type and subtype for water provision and sanitation public-private partnerships. The distribution of project types differs from trends seen for all PPP sectors. For all sectors, greenfield projects – projects such as BLT, BOT, and BOO, where private partners build a new facility (PPI Glossary 2016) - are the most common project type. Between 1990 and 2015, greenfield and divestiture projects represent 62.59 percent of the total number of PPIs and 58.1 percent of the total investment (PPI 2016). Typically, these projects face the lowest opposition due to the economic stimulus a region receives from job creation in the construction and management phases. Additionally, because greenfields are designed and built by private partners, it is the private party that should [theoretically] bear the commercial risk. Finally,

local and national governments are eager to prove their venture capacity by undertaking such large projects (Pessoa 2010).

For water sector PPPs, concession projects – projects where the private partner rehabilitates and manages facilities, and then returns ownership back to the public partner at the end of the contract period (PPI Glossary 2016) – are the most common types of projects. Roughly 41 percent of all water sector PPPs are concessions. Management and lease contracts are the third most common type of PPP, with only 16 percent of contracts. Management arrangements are used in situations of uncertain political and environmental conditions, such as in the case of water availability in aquifers (Pessoa 2010). In management and lease options, the public entity remains responsible for investments while risk is borne by the private sector; asymmetry of information and the high transaction costs of monitoring and enforcement frequently disincentivize such a partnership structure.

#### **4.6 Distribution by Government Level Granting Contract and by Award Type**

Table 4.2 shows the government level granting the contract (the political jurisdiction) and the primary award method for projects. The primary political jurisdiction for water sector PPPs is local; 663 projects (63.56 percent), corresponding to 31.08 percent of total investment for the water sector, were granted at the local level. The majority of these (93.67 percent) were contracted in upper-middle income economies (PPI 2016). This trend sharply contrasts from other sectors: for all PPPs, only 7.53 percent of contracts are granted by the local level, whereas 42.74 percent are granted at the federal level.

For countries with weak, yet present institutional capacity, the primary motivation for a local-level public-private partnership is the opportunity to price-control water services. Mixed ownership provides a way for the government to regulate water provision and control firm

behavior in an environment with few dedicated water agencies and even fewer decision-making powers (Jensen 2016), without additional financial constraint. For example, in the majority of South Asian countries, local governments are responsible for setting tariffs and monitoring performance, but have limited resources and authority to do so. As these tasks are easier to perform as an equity holder than as an outside agency, there is a greater push to pursue partnerships, despite risks of opportunistic behavior and economic inefficiency. As a result, in China, 428 out of 446 water sector PPPs have been established at the local level between 1949 and 2015 (PPI 2016).

	<b>Federal</b>	<b>Provincial</b>	<b>Local</b>	<b>Uncategorized</b>	<b>Total</b>
<b>Competitive bidding</b>	97	62	333	14	<b>506</b>
<b>Competitive negotiation</b>	2	0	6	0	<b>8</b>
<b>Direct negotiation</b>	8	7	118	0	<b>133</b>
<b>Unsolicited proposals</b>	4	0	2	0	<b>6</b>
<b>Uncategorized</b>	26	58	204	102	<b>390</b>
<b>Total</b>	<b>137</b>	<b>127</b>	<b>663</b>	<b>116</b>	<b>1043</b>
<b>% of Total Investment for Water Sector</b>	40.89%	19.31%	31.10%	8.70%	<b>100%</b>

**Table 4.2** The distribution of 1,043 PPP projects by government level granting the contract (federal, provincial, local) and award method (competitive bidding, competitive negotiation, direct negotiation, unsolicited proposals), 1949 through 2015 (adapted from PPI 2016). Political jurisdiction is also broken down by percent of total investment within the water sector. Due to incomplete data, 116 projects were not categorized by political jurisdiction and 390 projects were not categorized by award method. 102 projects are missing a categorization for both political jurisdiction and award method.

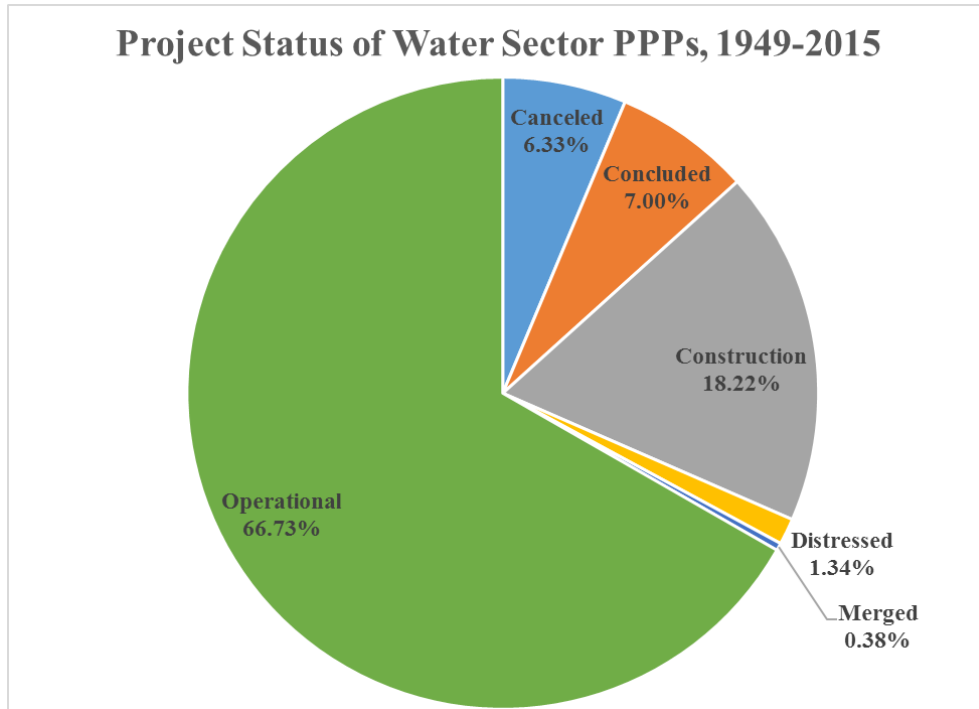
The primary award method for water sector PPPs is competitive bidding. Five-hundred and six contracts (48.51 percent) of all water sector PPPs are awarded through this procurement process. Unsolicited proposals are rare, with only six contracts being awarded contracts through this method between 1949 and 2015. These findings align with trends for all sectors, where roughly 79.24 percent of all contracts are awarded through competitive bidding (PPI 2016).

Contract length for the water sector is predominantly long-term, with roughly one third of projects granted a contract of 30 years, and one-fifth granted a contract duration of 25 years. Only

a handful of contracts (less than five percent) are awarded to short-term projects (less than five years). The standard contract for PPPs is considered to be thirty years; roughly twenty percent of all PPPs have a contract duration of 30 years (PPI 2016).

#### **4.7 Distribution by Project Status**

Figure 4.4 shows the distribution of project status for water sector PPPs between 1949 and 2015. This research considers a project a failure if the project is either canceled or distressed. Canceled projects (are projects where the private sector has exited by either transferring or selling its shares back to the public partner prior to the fulfillment of the contract terms, removed all management and personnel from the project, or ceased operation, construction, or service provision following the revocation of the license or repudiation of the contract (PPI Glossary 2016). That is, the private partner leaves the partnership prior to fulfilling contract obligations. Only 66 projects (6.73 percent), corresponding to 20.21 percent of total water sector investment, have been cancelled. Project cancellation will occur if the partnership results is not economically efficiency for private partners, and the penalty for failing to fulfill the contract is lower than the profit-loss the company faces. This value is similar to the rate of cancellation for all PPPs (4.16 percent of projects), but is higher than loss of total investment; canceled projects for all sectors only encompasses 3.96 percent of total private sector investment in PPPs. Therefore, while cancellation rate is similar across all sectors, cancellation within the water sector comes at a much steeper cost to public partners than for other sectors.



**Fig 4.4** Project status for water sector PPPs, 1949-2015 (adapted from PPI 2016). Canceled projects (light blue) are projects where the private sector has exited by either transferring or selling its shares back to the public partner prior to the fulfillment of the contract terms, removed all management and personnel from the project, or ceased operation, construction, or service provision following the revocation of the license of repudiation of the contract (PPI Glossary 2016). Concluded projects (orange) are those for which the contract period has expired and was not extended by either partner. Construction (gray) indicates that the project is currently in the process of being constructed. Distressed projects are those in which either partner has requested contract termination or has submitted a claim for international arbitration. Merged (dark blue) is a project that has been merged with another project. Finally, operational (green) refers to a project that is operating within contract obligations and duration period.

Distressed projects are projects where either then public or private partner has requested contract termination or has filed for international arbitration, a method of resolving disputes for legally binding agreements. Only 14 (1.53 percent) projects, corresponding to 5.63 percent of total water sector PPP investment, are distressed. However, this value is a gross underestimate, as economically inefficient projects are bailed out by the government rather than terminated. Contract termination is often a “last resort option” as public partners do not want to cancel projects that are “too important” or “too big to fail” (Ho & Tsui 2009). For water sector PPPs, the early termination

of a project means that the public partner must incur additional costs in reclaiming ownership and management of utilities.

The number of failed projects is highest in upper-middle income countries, with 55 projects cancelled and 14 distressed. However, the rate of failure is highest in lower income countries (16.67%) and the lowest in upper-middle income (5.99%). The majority of cancelled or distressed projects are in the East Asia and Pacific (EAP) and Latin America and the Caribbean (LAC) regions, with 27 (40.91%) and 32 (48.48%) projects cancelled, respectively (PPI 2016).

#### **4.8 Assessing Supply and Demand: the Role of PPPs in Closing the Infrastructure Gap**

Several measures can be used to assess the degree to which PPPs have been able to close the infrastructure gap: number of contracts, investment amount, the population served, and the degree to which the project type alleviates water stress in a particular region. Extensive data from the World Bank PPI database has indicate that public-private partnership projects are primarily implemented in middle-income countries rather than developing ones due to the low profitability and high risk of investment in the water sector (Schaferhoff, Campe, Kaan 2009). Moreover, funding is primarily provided by the public, rather than private sector for both low- and middle-income countries. PPI financing between 2001 and 2006 contributed an annual average of 0.01 billion dollars to capital expenditure in Sub-Saharan Africa (Foster & Briceno-Garmendia 2010).

Another measure of the ability of PPPs to close the infrastructure gap is the population served. Marin's (2009) assessment of public-private partnership project efficiency in the water sector indicates that between 1990 and 2007, roughly 205 million people in developing and emerging countries have at some point received water and wastewaters services from a public-private partnership project. Of these, forty-five million people were served by utilities with contracts that were terminated early or not renewed (e.g. cancelled or distressed). Jensen's (2016)

analysis of PPP activity, focusing primarily on South-East Asia, indicates that the population served by PPP contracts between 2006 and 2013 has increased globally by 17 percent, from 247.92 to 289.15 million. This growth is primarily driven by the Asia-Pacific region, increasing the population served by roughly 30.4 million people served over the 7 year time span. It is important to note that the regions with the most dire need for water services, the Middle-East and Sub-Saharan Africa experienced a 17 percent decrease (from 17.36 to 14.34) million. Since 1990, roughly 2.6 billion people have gained access to improved drinking water (World Health Organization 2015). In Sub-Saharan Africa, roughly 427 million people gained access to drinking water since the MDGs were implemented. Thus, PPPs projects are responsible for 11.12 percent of the gained access globally, and 3.34 percent of the gained access within Sub-Saharan Africa. Despite the framing of PPPs as a development tool, the management approach is not the primary driver in increasing access to drinking water in low-income countries.

A final assessment of the PPP's role in closing the infrastructure gap is an analysis of how environmental demand aligns with supply of water PPP provision. An assessment of water re-use PPPs by Owen (2016) indicates that contracts were primarily awarded in regions with high levels of water-stress<sup>11</sup>. Out of 72 water re-use PPP contracts, 51 (70.83 percent) were awarded in regions with high or very high water stress. Project capacity was also higher in water-stress regions: high stress regions had an average capacity of 129,000 cubic meters of water per day, whereas contracts in low-water stress regions had an average capacity of 52,000. This measure indicates that PPP contracts are indeed implemented in areas with the greatest need for increased water resource use. However, it is important to note that water reuse PPPs emerged earlier in high-income countries;

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<sup>11</sup> Water stress occurs when demand for water exceed the available amount available in a certain period. Water stress can result from either resource extraction or poor water quality (European Environment Agency 2016).



in low-income economies, water access through re-use only provided 0.89 million people access to water from 2005 to 2014.

Ultimately, given the low contract rate, low volume of investment, limited population access to water, and an inability to address water stress in developing countries, public-private partnerships have not been able to successfully close the infrastructure gap in the water sector. While projects in low-income economies had, in some cases, reduced water rationing measures, decreased water losses, improved bill collections rates, and increased overall labor productivity (Marin 2009), the potentially high cost of project failure in developing countries eliminates this methods as a sustainable means of promoting development.

#### **4.9 Chapter Summary**

This chapter explored the factors that influence the supply of water sector public-private partnerships and examined the trends and distribution within the sector. One of the primary misconceptions surrounding public-private partnerships is that the prevalence of the management approach is demand-driven. Given the strong focus on public-private partnerships in the Millennium Development Goals (2000) and the Sustainable Development Goals (2015), one would expect to find public-private partnerships in regions in the greatest need for water infrastructure. An assessment of contract frequency, total investment, population served, and the extent to which PPPs addressed water stress in low-income countries revealed that the distribution of public-private partnerships is supply-driven, with partnerships primarily formed in upper-middle income economies, rather than low income ones. Private partners will partake in partnerships in regions with low regulatory risk, or the risk of project cancellation or renegotiation by the public partner (Bond 2010), in regions with profit potential, and in regions with high market growth (Loxley 2013). Low income economies do not have the institutional capacity and the level

of infrastructural development conducive to water sector public-private partnerships. Thus, despite the high demand and strong push for water sector public-private partnerships, the management approach is not an effective or a sustainable method of addressing the infrastructure gap.

Furthermore, a review of these above trends has revealed that while project cancellations or project distress are rare, the effects are quite costly, with roughly one fourth of water sector PPP investment affected by project failure (PPI 2016). It is of utmost importance to not only minimize the likelihood of these failures, but also understand the conditions under which a public-private partnership is the best management approach to water provision. Thus, Part Two (Chapters 5 through 8) of this research explores the social, political, and economic factors that determine public-private partnership project success in the water sector.

**Part 2: Critical Success Factors of Water Sector Public-Private Partnerships**

## **5.0 CRITICAL SUCCESS FACTORS – An OVERVIEW**

Part One of the Master’s Thesis 1) established the research framework, 2) highlighted taxonomic ambiguity within the field, and 3) reviewed the factors that impact the supply and demand of water sector public-private partnerships. Data from the World Bank PPI database revealed that despite being heralded as an effective method for development and growth, the management approach is responsible to providing only 3 percent of the gained access to drinking water in Sub-Saharan Africa. The data also highlighted the unique nature of water sector PPPs: the investment gap between public and private partners is high, with public partners bearing the bulk of the financial burden; while rare, cancellations and distresses projects are highly costly; and a high proportion of projects (31 percent) are implemented at the local scale.

While the management approach is not a feasible method for closing the infrastructure gap, it is still essential to ensure that project success is high, particularly when local governments in emerging economies may be bearing the cost of failure. Thus, Part Two of the Master’s Thesis strives identify to the Critical Success Factors (CSFs) and their causal mechanisms for water sector PPPs, drawing on literature in engineering, microeconomics, management, and public policy. This chapter defines a successful PPP project, drawing on both output- (“narrow”) and outcome-based (“broad”) methods of evaluation. The chapter also briefly identifies social, political, and economic factors that determine the success of WASH PPPs, the causal mechanisms for which will be explored in chapters six, seven, and eight, respectively.

### **5.1 Definition of a Successful Public-Private Partnership Project**

There are a number of ways to define a successful public-private partnership. These definitions are often disciplinary-dependent, and can stem from simple cost-benefit analyses to theoretically-bounded “performance domains” (Hodge & Greve 2011). A “narrow” definition of

success is one that attempts to evaluate the partnership using output measures<sup>12</sup>. This method does not imply a simplistic evaluation; in fact, issues of access, along with data verification and interpretation makes the process of robust “narrow” evaluation highly technical and time-sensitive (Jeffares, Sullivan, & Bovaird 2009). For example, in their analysis of critical success factors of public-private partnerships in China, Meng *et al.* (2011) defined a successful project as one in which the conflicting objectives between government (the public utility), consumer (the public), and private entity are realized. In order to so, projects must simultaneously maximize social welfare, provide improved water delivery and sanitation services, increase the project profit margin, and reduce private entity risk while avoiding renegotiation, hold-up problems, or cancelled and distressed contracts (Harris *et al.* 2003, cited in Meng *et al.* 2011).

Recently, scholars, particularly network analysts, have argued that output-based metrics that compare expected and realized performance measures are not enough – there is a greater need for “wider” definitions of success that evaluate partnerships more broadly by including a series of long-term, theoretically-bounded “performance domains” (Skelcher & Sullivan 2008; Jeffares, Sullivan, Bovaird 2009; Hodge & Greve 2011). For example, Jeffares, Sullivan, and Bovaird (2009) Huxman and Hubbert (2009) identify five types of success: 1) achieving outcomes, (2) getting the process to work, (3) reaching emergent milestones, (4) gaining recognition from others, and (5) acknowledging personal pride in championing a partnership. To operationalize these metrics, the scholars propose six domains: democracy, policy, transformation, connectivity, coordination, and coalitional. Table 5.1 presents the definition and the relevant theoretical framework for each domain.

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<sup>12</sup> Koontz and Thomas (2012) define output as “products and services delivery by a [...] program” (p. 771) whereas outcomes are defined as “events or conditions that occur outside of the program.” Outcomes, therefore, follow outputs: while these factors result from a PPP project (i.e. improved governance, local community input, etc.), they were not the intended goals of the program.

<b>Performance Domain</b>	<b>Definition/Focus</b>	<b>Theoretical Framework</b>
Democracy	Does the partnership meet democratic principles? i.e. the degree of input legitimacy	Democratic Theory
Policy	Does the partnership achieve its goals? i.e. output legitimacy	Network Theory
Transformation	Does the partnership produce radically new ways of achieving outcomes?	Institutional Theory
Connectivity	Does the partnership stimulate innovation through the interactions of actors?	Innovation Theory Network Theory
Coordination	Does the partnership achieve synergies of inputs, processes, outputs or outcomes? i.e. are <i>both</i> product and project management success achieved?	Exchange Theory Power-dependency theory
Coalitional	Is the partnership sustainable over time? i.e. the degree of [healthy] trust and confidence building?	Discourse theory

**Table 5.1** Performance domains, definitions, and schools of theory for an outcome-based evaluation of public-private partnerships (adapted from Skelcher and Sullivan 2008). This list is not all encompassing and is meant to provide an example of one of the ways in which a theory should be incorporated into the evaluation of projects.

This research takes on an output-based (“narrow”) and an outcome-based (“broad”) level of evaluation. A project is a successful public-private partnership when proposed project goals (cost, project implementation time, capital gains, distributional benefits, and improvements in water conversation) align with realized outcomes. Projects that are distressed, cancelled, or do not yield a positive value for money calculation, are thus, considered to be not successful. For long-term “performance boundaries,” successful PPPs are those that are transparent, have high degrees of cooperation and joint co-management or co-production of resources, are inclusive to civic society (democratic), and produce innovative management strategies and technologies. Additionally, partnerships are sustained for a long period of time and are in synch with ecological systems.

Thus, this research considers projects to be successful if 1) all proposed project goals are realized and 2) the project establishes a truly horizontal partnership that is socially just,

economically efficient, and is ecologically sustainable. This entails that a project satisfies the output-based criteria of meeting cost, project implementation time, capital gains, distributional benefits, and improvements in water conservation goals, as well as outcome-based performance-boundaries – the partnership has both input and output legitimacy, is innovative, stimulates dialogue between partners, and presents opportunities for collaboration and partnership growth. A failure in one element will result in distortions in the other two. PPPs with high hidden costs are inefficient, lead to project delays, and will result in decreased social welfare due to increased consumer costs. If a firm is unable to reduce hidden costs of management, there is often a reduction in labor costs or an increase in water prices. High hidden costs can also lead to environmentally unsustainable water management practices, as incentives for maximizing quality of infrastructure is low. The result is an unsustainable system with a high likelihood of reduced water extraction and transport. Utilizing these metrics of success, the next section will briefly identify the critical success factors for PPPs.

## **5.2 A Literature Review of PPP Critical Success Factors (CSFs) in the Water Sector**

This section provides a broad overview of key findings in economic, management, public policy, and political science literature. Due to the unique nature of the water sector (Ameyaw & Chan 2014), special emphasis is paid to studies focused on WASH CSFs (Tsitsifli-Kanakoudis 2008; Meng *et al.* 2011; and Ameyaw and Chan 2014).

Initially implemented in management literature, critical success factors (CSFs) in infrastructural projects are defined as “events or circumstances that require the special attention of management because of their significance. “Special awareness” to these issues allows managers to “avoid unpleasant surprises or missed opportunities” (Ferguson & Dickinson 1982, p. 15). In the context of PPPs, CSFs are internal or external social, economic, political, or project-related

characteristics that must be present and acknowledged by public managers in order to maximize the likelihood of project success. CSFs must be upheld at all phases of the project (Jefferies *et al.* 2002), but are particularly crucial at early stages, as studies have found that the strategies linked to increasing the likelihood of project success are the most effective in the developmental phase of a project (Li *et al.* 2005).

Table 5.2 presents a summary of economic, political, social, and environmental cross-sector public-private partnership CSFs; a complete table that also includes the geographic region studies, the type of PPP assessed, and the primary research method can be found in the Appendix. The literature review of CSFs in all PPP sectors reveals that findings are highly varied, particularly regarding the ranking and impact of CSFs. While, CSFs can vary by location, PPP type, and perspective, the studies repeatedly revealed that technical experience of consortium, stable political commitment to the project, appropriate risk allocation, sound financial package, effective regulatory and legal frameworks, and public support are crucial to project success. The majority of findings primarily focused on economic factors and conditions: out of the 152 critical success factors identified by the 23 studies, 58 (38.1 percent) were economically oriented. Environmental impact received the lowest consideration out of studies, with only Tiong (1996) and Zhang *et al.* (2013) referencing the importance of environmental impact assessment in relation to technological limitations and public support constraints.

It is also important to note that studies noted variation of CSF preference between private partners and government agencies. For example, Babatunde *et al.* (2012) identified that while the private sector valued an experience public agency, social support, technological feasibility, and political commitment, the public partner placed a stronger emphasis on transparency, shared authority, clear understanding of partner obligations and responsibilities, and appropriate project



identification. Given these differences in priorities, greater care must be taken to build relationships between project partners.

	Tiong (1996)	Gupta & Narasimhan (1998)	Qioa <i>et al.</i> (2001)	Jefferies <i>et al.</i> (2002)	Askar & Gab-allah (2002)	Jamali (2004)	Lier <i>et al.</i> (2005)	Zhang (2005)	Jefferies (2006)	Chen & Dotoi (2008)	Tsitsifli & Kanakoudis (2008)	Chen (2009)	Chan <i>et al.</i> (2010)	Dulaimier <i>et al.</i> (2010)	Meng, Zhao, & Shen (2011)	Babatunde <i>et al.</i> (2012)	Cheung <i>et al.</i> (2012)	Hwang, Zhao, Gay (2012)	Zhao <i>et al.</i> (2013)	Ismail (2013)	Ameyaw & Chan (2014)	Osei-Kyei & Chan (2015)	Osei-Kyei & Chan (2016)	Total
<b>Economic</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sound financial package	X	X	X	X	X			X								X	4				2		X	10
Stable Economic Conditions			X				X					X	X		X					X				6
Acceptable Toll/Tariff Levels	X		X							X	X		X											5
Appropriate Risk Allocation							X	X		X	X	X	X		X	X	5	2		X	13	1		13
Competitive Procurement Process					X	X		X	X	X	X		X		X	X		4			11	5		11
Available Financial Market				X		X	X												X	X				5
Project Profitability	X						X								X				X		12		X	6
Low Barriers to Entry										X														1
Low Start-up Cost										X														1
<b>Technical</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Short Construction Period		X																						1
Technical expertise of consortium	X	X	X	X	X	X	X	X		X			X			3	3	X			4	2	X	16
Appropriate Project Identification	X		X	X			X		X						X	X			X					8
Technology Transfer			X									X												2
Training Public Personnel	X																				9			2
Local Knowledge and Expertise										X											10			2
Use of Professional Advisors														X										1
<b>Political</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stable Political Support/Commitment			X	X		X	X		X	X		X	X		X			X	X		1	3	X	14
Efficient Approval Process				X				X			X													3
Strong Legislation & Regulatory Systems				X			X		X	X		X			X	1	6	X	X		5			11
Strong and Capable Public Partner								X									1				6			3
National PPP Policy & Supporting Unit																					7			1
High Degree of Internal Coordination																					14			1
<b>Social</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clear project goals								X																1
Entrepreneurship and Leadership	X																							1
Partner Commitment	X	X			X					X						2					8			6
Public Support	X		X			X				X	X							X			3	4	X	9
Openness and Communication					X																		X	2
Trust				X	X																			2
Shared authority						X					X					5	7							4
Compatibility					X		X																	2
<b>Environmental Impact</b>	X																	X						2
Total	9	5	8	9	4	6	10	6	5	7	8	5	6	4	5	7	5	7	8	5	14	5	5	-

**Table 5.2** Twenty-three peer-reviewed studies in transportation, water, telecommunication identified a total of 152 critical success factors for public-private partnerships. The table identifies studies that ranked CSFs by including their numerical order.

Studies have shown that factors that determine project success vary sector by sector (Phua 2004). As seen in assessment of PPP supply, the water sector PPP does not follow traditional public-private partnerships trends and distributions – rather than national projects, most public-private partnerships are contracted by the local government (PPI 2016), and have a higher rate of failure than other sectors. The sector is highly complex, and faces a set of unique challenges: public acceptance to privatization of a traditionally public good is low (Hall *et al.* 2005), and costs of service delivery to rural areas is high, resulting in a high risk of non-payments and a need for high government subsidies (Bond 2010). The sector also faces high degrees of political interference, with various government regimes shifting attitudes towards private sector participation, resulting in a high degree of regulatory risk for the private partner (Pessoa 2010; Iossa & Martimort 2015). Additionally, despite a stable demand (Iossa & Martimort 2015), the sector usually has a low profit margin: most profits are the result of labor cost reductions and increased government subsidies, rather than technology-based cost-saving measures (Loxley 2013). Finally, the sector requires a high degree of collaboration between various government agencies – water, health, environmental protection, lands, natural resource use, and procurement management (Ameyaw & Chan 2014) – that creates the high possibility of inefficiency and conflicting project goals. Thus, due to its unique economic, political, and social challenges, the sector is in need of greater scrutiny public-private partnership scholars. The remainder of this Masters Thesis will focus on WASH-specific CSFs.

Three studies examined water sector CSFs: Tsitsifli and Kanakoudis (2008) examined three PPP case studies in Senegal, Ghana, and South Africa; Meng, Zhao, and Shen (2011) conducted a case study of four transfer-operate-transfer water projects in China; and Ameyaw and Chan (2014) performed a Delphi survey and factor analysis of 14 CSFs identified through an extensive literature review. The comparative case study analysis by Tsitsifli and Kanakoudis (2008) revealed that for

all three sites, the project provided better water quality to more people (than under traditional procurement), increased financial health of the sector, and increased tariff collection for poverty-stricken areas. CSFs varied based on project characteristics and political jurisdiction, but for all three sites political commitment (and limited interference) to the project, public acceptance, the devolution of authority, stakeholder involvement, and strong leadership were key to project success. Legislative and regulatory systems (along with appropriate tariff and subsidy levels) were essential for the national-scale partnerships in Senegal and Ghana, but were not crucial factors for the local-level partnership in South Africa. For the local-level project, the contract structure was instrumental in overcoming the low profit margin, the high risk of public partner non-payment, and challenges in securing funding.

For transfer-operate-transfer partnerships in China, Meng, Zhao, and Shen (2011) found that the important factors in project success are project profitability, asset quality, fair risk allocation, competitive procurement process, internal coordination within the various government agencies, employment of professional advisors, and government supervision of project development. The primary limitation of the study is the focus on product, rather than project management success (Liu 2014), omitting CSFs that lead to satisfied and cooperative stakeholders. A failure to incorporate both product and project management success limits the ability of managers to effectively meet the needs of various stakeholder groups, and can lead to inefficiency and low public acceptance of a project.

Ameyaw and Chan (2014), therefore, build off of Meng *et al.*'s findings, by capturing both product and project management CSFs in their extensive Delphi survey and empirical analysis of water sector CSFs. The authors find 14 CSFs relating to the water sector, which were sorted into five CSF groups using factor analysis. The study identified government commitment (i.e. a stable

political climate and attitudes towards a PPP project) as an “extremely important” factors, whereas the remaining thirteen were all found to be “very important” (see Table 5.2 for the full ranking). The primary contribution of the study is the incorporation of critical success factors during the early stages of project formation. Moreover, the factors analysis allowed to account for interdependencies between CSFs, providing theoretical and empirical linkages for critical factors and predicting their collective power in determining project success.

<b>Critical Success Factor</b>	<b>Category</b>
Mutually Agreed Upon Definition of PPP	Social
Stakeholder Management <ul style="list-style-type: none"> <li>- explicitly stated agreement on project goals</li> <li>- ensuring commitment of both partners</li> </ul>	Social
Public Acceptance/Support	Social
Stable Political Government	Political (IF)
Effective Regulatory and Judicial System	Political (IF)
PPP-Supporting Units	Political (IA)
Efficient Risk Allocation	Political (IA)
Flexible Contract Structure	Political (IA)
Appropriate Project Identification <ul style="list-style-type: none"> <li>- Innovative Financial Arrangements</li> <li>- Project Profitability</li> <li>- Positive Externality</li> <li>- Stable Demand of Resource</li> <li>- Technological Feasibility</li> </ul>	Economic
Transparent and Robust Procurement Process <ul style="list-style-type: none"> <li>- Value for Money Evaluation</li> </ul>	Economic
PPP Accounting – Hidden Budget Sheets	Economic
Experienced Private Consortium	Economic/ Technical
Transaction Cost Minimization	Economic

**Table 5.3:** Through an extensive literature review, this research identified 13 Social, Political and Economic water sector PPP critical success factors.

This research builds off of the findings of Ameyaw and Chan (2014), Meng *et al.* (2011), and Tsitsifli and Kanakoudis (2008) by examining the causal mechanisms underlying project-specific, economic, political and social exogenous and endogenous factors that determine the success of water sector public-private partnerships. Through content analysis of theoretical and

case-study peer-review literature, this research has identified 13 critical success factors for WASH PPPs (Table 5.3). Unlike previous PPP studies, CSFs include factors that are related to both the product and the project management success. It is important to note that these factors are not mutually exclusive, and often feedback on each other throughout various partnership stages. Additionally, this research does not attempt to weigh the various factors, but merely provides an overview of the causal mechanisms of CSFs frequently discussed in peer-reviewed literature. The analysis begins with an overview of social factors (Chapter 6), namely the process of partnership formation and the development of input and output legitimacy through confidence building and stakeholder inclusion.

## **6.0 SOCIAL FACTORS – STAKEHOLDER MANAGEMENT and PUBLIC**

### **ACCEPTANCE**

This chapter addresses the social critical success factors surrounding public-private partnerships – stakeholder management and public acceptance/support – through a framework of confidence building. Management of stakeholders is particularly crucial during the early stages of partnership formation, as it maximizes the likelihood of partner commitment to the project, increase project efficiency and product delivery quality, and limits opportunistic behavior (Jamali 2004; Jeffares Sullivan & Bovaird 2010; Ameyaw & Chan 2014). Additionally, inclusion of civic society through the dissemination of project design and finance information and opportunities for “voice” at public forums is important throughout the project lifetime, but is considered to be a critical success factor during the stages of project design and construction. Traditionally, opposition to water sector public-private partnerships is high, particularly for foreign sponsored projects (Rebeiz 2012) and can result in project delays, or even cancellations (Hall, Lobina, & de la Motte 2005). Thus, a successful public-private partnership requires not only diligent management of the partnership relationship, but also a supportive community (Gupta & Narasimhan 1998; Jefferies *et al.* 2002; Hall *et al.* 2005; Li *et al.* 2005; Tsitsifli & Kanakoudis 2008; Chan *et al.* 2010; Zhao *et al.* 2013; Ameyaw & Chan 2014; Osei-Kyei & Chan 2015; Osei-Kyei & Chan 2016; Feldman 2017).

### **6.1 Stakeholder Management and Partner Project Commitment**

Partnership development allows for opportunities to strengthen partner commitment to the project. Because skill sets of parties are complementary (Jamali 2004), the commitment of highest quality resources, expertise, and effort is required from both public and private partners. Public commitment creates a stable political climate, increasing investor confidence, whereas private

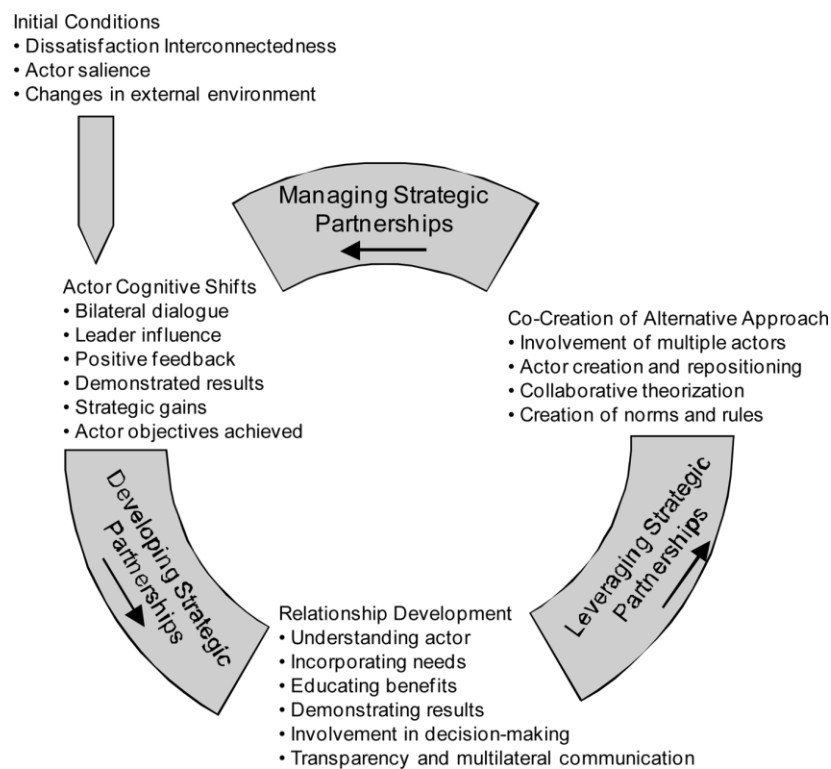
commitment decreases moral hazard while increasing quality of service provision, leading to an overall reduction of project lifetime costs and a lower likelihood of contract renegotiation or project distress. Ultimately, the process of partnership formation plays a key role in the power dynamics and degrees of opportunism that develop throughout the duration of contract period.

In infrastructural PPP projects, private partners bid on contracts to enter into partnerships. Negotiation and contract formation is often done behind “closed doors” and is often seen as a messy process that primarily guards against risk and opportunism (Valente 2010). However, due to issues of accessibility, little is known about the actual process of partnership formation. Partnership theory and a framework of confidence-building allow us to identify critical factors in the early stages of PPP formation that minimize power imbalances in project management. Confidence-building is the process of establishing and building of trust between various partners (Feldman 2017). Effective confidence-building requires a clear and explicit set of desired goals and outcome, tangible mutual benefits, and finally, mechanisms of deterrence (limiting moral hazard) and independent verification that parties are fulfilling their agreed-upon obligation.

Partnerships formation can only be successful if there are mutual motivations in pursuing a public-private relationship. Partnerships are, thus, primarily triggered through the dissatisfaction with the status quo or as a response to a crisis (Valente 2010). While the source of discontent can vary (clashing of individual values; firm- or sector-level dissatisfaction with institutional barriers, market factors, and certification bodies; local public actors with discontent towards private sector or current institutional practices, etc.), there must be a general agreement that the status quo is not sustainable.

Once a need to alter the status quo is identified by both parties, three stages of partnership formation are used to establish mutual goals, benefits, and mechanisms (see Figure 6.1). In the

first stage, the private firms research and assess causes of dissatisfaction by engaging with the public sector. A comparative case study of 6 successful and 6 unsuccessful public-private partnerships revealed that confidence-building increases if the private firm takes initiative, as historically, confidence in the private sector to provide goods and services with a consideration to social welfare is low (Valente 2010). It is important to note, however, that the method of engagement will vary depending on the procurement process and award method of the government.



**Fig 6.1** The three stages of grass-roots partnership formation (Valente 2010).

In the second stage, both private and public partners attempt to understand each other's priorities, values, goals, and limitations (Valente 2010). Both parties have radically different cultures (Jamali 2004) and, as seen in the overview of CSF factors, prioritize different factors as key determinants of project success (Babatunde *et al.* 2012). Firms, which predominantly operate in the realm of certainty and short-run time horizons must engage with public actors to understand



their long-run goals and priorities, and to incorporate these priorities into their business model and operations (Valente 2010). The public actors, in turn, must be educated on the day-to-day operations of the firms, their technological and economic limitations, and their current short-term priorities. Both parties must demonstrate how the partnerships will lead to mutual benefits in the long run. If benefits are not clear, the incentive for meeting established obligations will be low. Armed with the knowledge of each partner's potential contributions and limitations, parties establish mutual goals and performance standards (Jefferies 2006). Setting clear expectations in advance, particularly through formal channels (i.e. contract negotiation), will decrease future costs of partnership management. Vague expectations will allow for loopholes to emerge, and may decrease the overall quality, efficiency, or financial stability of a project (Ameyaw and Chan 2014).

While expectations are goals are being established, key stakeholders (public actors, civic society, PPP-supporting units) must be implemented in the decision-making process. Early inclusion of multiple stakeholders will maximize transparency and establish mechanisms of verification, thus increasing the likelihood of long-term multilateral communication (Valente 2010). Only then can contract negotiation take place. In the third stage, partners must build institutions that ensure long-term project maintenance and success; these institutions will be discussed in great detail in the next chapter.

Overall, three factors are necessary in order for a horizontal partnerships to be successful; these can be classified as CSF sub-factors. First, stakeholders must be diverse and must be engaged voluntarily (Valente 2010). Firms are not experts on the local social and ecological issues, and thus, cannot proceed in the planning and execution of the project on their own; in order to increase the likelihood of success, projects requires actor collaboration from a variety of fields.

Incorporation of local knowledge increases innovation, efficiency, and accountability (Hossain & Ahmed 2014). Furthermore, involving local organizations in resource provision will develop feelings of ownership in the new infrastructure, resulting in a greater likelihood of more environmentally efficient outcomes (Koppenjan & Enserink 2009). As commitment to projects will be highest when stakeholders are willingly engaged, enthusiastic partnerships will limit knowledge gaps and reduce imperfect information during project development.

Second, capabilities must be complementary (Jamali 2004). A crucial aspect of identifying key benefits is understanding how partners can gain from each other's participation. Thus, both private and public partners must understand each other's priorities, values, goals, and limitations (Valente 2010). Firms, which predominantly operate in the realm of certainty and short-run time horizons must engage with public actors to understand their long-run goals and priorities, and to incorporate these priorities into their business model and operations (Jamali 2004). The public actors, in turn, must be educated on the day-to-day operations of the firms, their technological and economic limitations, and their current short-term priorities. In an ideal horizontal partnership, short and long-run, along with welfare-enhancing and profit-maximizing perspectives are combined to identify mutual benefits, goals, and complementary capabilities. Thus, partner roles must be identified early on and explicitly stated. This maximizes efficiency and minimizes cost and redundancy.

Third, the process must be dynamic (Valente 2010). These three steps must undergo multiple iterations with feedbacks from stakeholders in order to establish a management system that is most appropriate for the environment and the individuals in it. This design is amended throughout the project's lifetime in order to increase its effectiveness and to become the most appropriate management approach for the environment and affected individuals. The

establishment of common expectations, goals, and working processes through multiple iterations ultimately allows for increased trust and transparency in project management and implementation (Jamali 2004). Thus, through confidence-building, mutual priorities become engrained in the cultural fabric for both firms and public actors, increasing the likelihood of a sustainable partnership and overall project success (Valente 2010).

## **6.2 Inclusion of Civic Society – the Importance of Public Acceptance/Support**

Confidence-building is also a crucial process in managing the role of civic society in PPP projects. Inclusion of citizens in PPP decisions throughout various stages of project will increase the likelihood of project success (Hall, Lobina, de la Motte 2005; El-Gohary, Osman, & El-Diraby 2006; Chen & Liao 2013; Beevers 2016) by strengthening public support/acceptance for the PPP. Public opposition can result in the non-payment of bills (Bond 2010), increased pressure on policy-makers to cancel the project (leading to an overall reduction in public sector commitment in the project), and increase risk premiums for financing arrangements (Hall, Lobina, de la Motte 2005).

Despite varying degrees of privatization throughout history, water has traditionally been considered a “public good” because of “its fundamentality in life and its non-substitutability for many applications” (Khlon 2010, p.383). In the nineteenth century, private firms had provided water resources, but as population and demand grew and Keynesian economic policies were adopted, the service came under the purview of the public sector (Swyngedouw 2005). It was not until the 1980s when privatization of water resources became a common practice. In developing countries, the participation of the private sector, in any capacity, raises concerns that the traditionally subsidized water costs will increase, and the good will be inaccessible to low socio-economic status individuals. Moreover, there is a high risk of “dispossession,” or the forced relocation of indigenous communities to accommodate private water utilities and vendors.

In order to increase public support, it is of utmost importance to disseminate information surrounding the nature of the partnership and the project in the first stages of the project. When the public is either unaware of the concept of a PPP, does not have a sufficient understanding of how it works, or is denied access to details of a consortium's PPP Proposal (Levy 1996, cited in El-Gohary, Osman, & El-Diraby 2006), public opposition to the project will be high, as this information asymmetry will lead to an overall reduction of project transparency, public participation, and public confidence in the government's capacity to conduct business with private entities (Bloomfield 2006).

For responsive governments, stakeholder involvement is a way to hold government accountable to service provision (Chen & Liao 2013). According to Hirschman (1970), citizens hold providers of public service accountable by engaging them in two broad ways: 1) making their views and needs known (voice) and 2) choosing whether to utilize or boycott a particular good or service (exit). Traditionally, "voice" is most common in operational phase, where citizens will actively voice opposition to a project if their direct interests or rights are encroached upon. Likewise, voice is least common during the planning stage, where there is limited information on the project, and thus, no direct individual gain from the citizen in giving voice (Chen & Liao 2013). In current top-down systems, consultation with citizens is often limited to "willingness-to-pay" surveys to gauge acceptable prices for service provision, and does not provide opportunities for voice in the planning and procurement stage of the project. If governments are not responsive to stakeholder input, then "exit" in the form of non-payment of bills will undermine the profitability of the project. Thus, in order to increase project success, stakeholder involvement must begin in the design and planning stages of the project; the public must be confident that their input and

opportunities for “voice” on long-term project effects will influence decision-making process (El-Gohary, Osman, & El-Diraby 2006).

Public support and participation has been identified as a critical success factor for waters sector PPPs both through mean ranking (Li *et al.* 2005; Chan *et al.* 2010; Zhao *et al.* 2013; Ameyaw & Chan 2014) and through case study research (Gupta & Narasimhan 1998; Jefferies *et al.* 2002; Hall *et al.* 2005; Tsitsifli & Kanakoudis 2008; Osei-Kyie & Chan 2016). Ameyaw and Chan (2014) rank public support as the third most important critical success factor, after strong government commitment and adequate financing arrangement. A case study of a Build-Operate-Transfer national sewerage system in Malaysia by Abdul-Aziz (2001) clearly demonstrates the danger of high information asymmetry and low public support. In 1993, a RM6.2 billion (1.6 US billion equivalent), 28-year concession agreement between the Malaysian government and the Indah Water Consortium (IWK) was signed in order to upgrade existing sewerage systems. While legislation was signed to permit the transfer of sewerage treatment responsibilities from 144 local authorities to the concession company, the transfer was unknown to the public. The lack of transparency in the infrastructure transfer led to allegations of “cronyism.” Moreover, it became apparent that the financing structure had a debt-equity ratio of nearly 20:1, indicating that the equity holders were receiving steep payoffs while taking on little risk, and that the “safety net” guarantees surrounding water rate payments was “rent-seeking” and “over-generous” (p. 458). Public opposition increased further when consumers realized that water rates had drastically skyrocketed over the first five years of the partnerships, without any tangible benefits from the private operator, especially since commercial and industrial users received a discount of over RM300 million over the first three years of the agreement.

With limited avenues to “voice” opposition to the project, the public pursued an “exit” strategy; public outrage led to such a high rate of non-payment, that the government was forced to relieve consumers from payment for charges before 1997, leading to a revenue loss of roughly RM180 million. Despite adjusting IWK’s commercial rates twice, public opposition remained high, and the government was forced to buy back the sewer system from RM200 million in 2000 with a debt of roughly RM700 million. While the risk allocation and the financial arrangement were flawed, Abdul-Aziz (2001) also credits the lack of transparency in the selection of the concession company and the poor dissemination of information to the public surrounding the award method and charge structure reasons for failure. The failed BOT contract had not only high monetary costs, but also tarnished the public’s perception in the national privatization program and led to overall political and public opposition to future privatization schemes. Some officials even called for a return to all privatized projects to public-operated enterprises.

Ultimately, public inclusion goes hand-in-hand with a bottom-up approach to public-private partnerships. A closed and top-down planning increases risks of planning errors, provides minimum opportunities for effective “voice,” and shifts costs towards underrepresented users and citizens (Chen & Liao 2013). The inclusion of citizens early on - through public examination of proposals, openness of contracting procedure (El-Gohary, Osman, & El-Diraby 2006), and increased responsiveness of decision-makers (Chen & Liao 2013) - can avoid costly mistakes and conflict in the future. Accountability then becomes a question of managing *mutual* expectations, a key factor in long-term horizontal partnership success.

### **6.3 Chapter Summary**

Partnership theory and a confidence-building framework allow us to identify critical factors in the early stages of PPP formation that minimize power imbalances in project management. First,

a successful project requires the establishment of mutual goals and expectations (Jamali 2004; Jefferies 2006), as well as the mutual understanding of what committing to a private-public partnership (rather than traditional procurement) entails. Failure to establish expectations early will lead to the exploitation of loopholes and increased transactions in the later stages of the project (Jefferies 2006). In order to ensure effective confidence building, or the process of setting clear and explicit goals and outcome, tangible mutual benefits, and mechanisms of deterrence (Feldman 2017), partnership formation must 1) include a diverse set of voluntary actors, 2) ensure roles are complementary, and 3) undergo multiple iterations (Valente 2010). As a result, trust is established, and institutional frameworks and arrangements that support the partnership are developed. Both serve as mechanisms of deterrence. The second factor identified through the literature review is public support (Hall, Lobina, de la Motte 2005; El-Gohary, Osman, & El-Diraby 2006; Chen & Liao 2013). As seen in the case study of Malaysia's BOT, failure to 1) disseminate information regarding the nature of the partnership and potential impacts to consumers and 2) provide formal and informal channels for civic society participation in project design and implementation will lead to high rates of non-payment, and inevitably, project failure.

The two social CSFs – establishing mutual expectations and public participation/support – are essential pre-requisites to project success. These CSFs, however, require robust institutional frameworks and arrangements in order to ensure that partners can formalize expectations, have official channels of monitoring and verification, and that governments provide opportunities for citizen “voice.” The next chapter, therefore, explores the political critical success factor for the PPP water sector.

## **7.0 POLITICAL FACTORS – INSTITUTIONAL FRAMEWORKS and ARRANGEMENTS**

Once the process of confidence building is underway and partnership expectations are clear, partners utilize institutional frameworks and arrangements to assist in partnership and project management. Thus, using new institutional economics, this chapter explores the five political CSF factors: stable political climate/commitment, an effective regulatory and judicial system, the presence of PPP supporting units, appropriate risk allocation, and a flexible contract structure.

New institutional economics (NIE) strives to explain the role of institutions in social, political, and commercial life by assessing the institutional environment/framework (formal and informal rules that dictate human behavior) and institutional arrangements (governance structures that mediate economic relationships – firms, contracts, bureaucracies, non-profit organizations, etc.) (Klein 1998). NIE posits that political and economic institutions, through their influence on human behavior, underlie economic growth and development (Schoemaker 2014). A number of empirical studies have found that democratic institutions, a developed rule of law, and sound governance structure have a positive relationship with GDP growth and Foreign Direct Investment (FDI). In the case of public-private partnerships, the strength of state institutions, along with the government's capacity to effectively and equitably negotiate and enforce agreements can have a profound effect on the success of P3s (Beevers 2016) Institutions are instrumental in limiting transaction costs through the provision of mechanisms of deterrence and legal frameworks, creating an environment conducive to investment, and signaling the maturity of their markets for additional international investment and aid (Schoemaker 2014). In fact, there is a statistically significant correlation between governmental support activities and the value of PPP in relation to GDP and the number of projects (Verhoest, Peteresen, Scherrer, & Soeipto 2015). Therefore,



given their importance in development, market availability, and partnership formation, this chapter will focus on both the institutional frameworks and institutional arrangements required for PPP project success.

## **7.1 Institutional Frameworks**

This section overview the three Institutional Framework CSFs: stable political climate/commitment and an effective regulatory and judicial system. Institutional PPP Frameworks are rules, formal (i.e. regulations) and informal (i.e. norms), that dictate the behavior of both public and private actors (Schoemaker 2014). These rules can be defined by governments prior to partnership formation, or can evolve more naturally overtime as confidence-building grows (Valente 2010), and PPP mechanism and culture are institutionalized (Skelcher 2010). The role of a PPP IF is to protect the state, public interest, and overall social welfare by reducing the possibility of opportunistic behavior. Simultaneously, an IF places constraints upon the state by enabling PPPs to pursue innovative strategies that are not typically under the purview of the state's bureaucracy. That is, Institutional Frameworks promote opportunities for "third party government" (Wettenhall 210, p.20) and governance by promoting public activity *through* private actors. As a result, a natural tension emerges between a desire to protect public interests and a relaxation of governance in order to encourage risk-taking and innovation.

Institutional Frameworks will vary from country to country, and will depend on the country's history of addressing the partial or full-privatization of public goods, as well as the nation's attitude towards public-private partnerships (Skelcher 2010). Overall, scholars have found two critical success factors that impact WASH systems. First, policy must express clear political support for PPPs by the main political parties and must be stable over time (Verhoest *et al.* 2015). Stable government support is a crucial element for project success (Qiao *et al.* 2001; Jefferies *et*

*al.* 2002, Jamali 2004; Li *et al.* 2005; Chen & Doli 2008; Tsitsili & Kanakoudis 2008; Chan *et al.* 2010; Dulaimi *et al.* 2010; Babatunde *et al.* 2012; Zhao *et al.* 2013; Ismaili 2013; Ameyaw & Chan 2013), and in a mean-survey ranking of water PPP experts, was considered to be the most important factor in determining project outcome (Ameyaw and Chan 2014). Commitment to a project by explicitly setting economic pricing, collection policies, and partnership obligations bolsters private sector confidence even in conditions when legal and regulatory structure are not fully developed (Dualimi *et al.* 2010). Overall, private participation in the provision of public goods is more prevalent in countries with less corruption and with stable governance (Verhoest *et al.* 2015). Regulatory risk, or the government's failure to honor contracts, discourages potential investors and increases the cost of capital due to a higher risk premium (Pessoa 2010). For example, between 1989 and 2000, in five Latin American Countries, 79 percent of the 307 transport and water projects had government renegotiation occur after an election (Iossa & Martimort 2015). Ultimately, unstable conditions such as the ones seen in Latin America can increase overall project costs due to higher interest rates or force the public partner to bear a greater proportion of the technical and economic project risks in order to attract private investors, increasing the overall likelihood of costly project failure.

A stable political climate and project dedication is also crucial for public actors. To ensure long-term success, the government must maintain an active role in the project, both as a partner and as a regulator, by setting standards, monitoring quality, and verifying citizen resource and service access is adequate and reasonably priced (Jamali 2004). This active role is particularly important for long-term contracts, for contracts with a poor division of risks, or for projects with low public support. A stable climate should not be interpreted as one in which there is "less government," but one in which the public partner maintains project support through its efforts to

maximize input and output legitimacy and to monitor quality of services. In many cases, navigating such a role requires an experienced public manager and fully developed policies that support project development and implementation.

The second CSF, therefore, is an effective regulatory and judicial system (i.e. one that establishes and promotes clear and realistic monitoring, verification, and conflict-resolution strategies). For private partners, regulation provides that contracts will be honored, partners will be protected from expropriation and commercial disputes, and that costs and risks will not be arbitrarily shifted (Jamali 2004). That is, clear and effective regulation signals not only a stable political climate, but also a public partner's willingness to appropriately allocate risks and costs. For the public partner, a sound regulatory framework allows for the project to align with broader policy objectives while simultaneously protecting affected citizens and the public organization from moral hazard.

Scholars have found that five sub-factors are necessary in order to ensure an effective PPP regulatory system. First, like the process of confidence building, the project design should be deliberative, and should engage the parties affected by the regulation (Skelcher 2010). By consulting with a variety of groups, agencies, and stakeholders, the governance form will be best suited and realistic for the economic, social, and political context of the region. Second, the governance system should be proportional to the tasks, responsibilities, and risks of the partnerships. For large-scale PPPs that have profound impacts on the community (i.e. a national restructuring of water provision), greater oversight is needed. Third, an IF should strive to balance the needs of PPP projects with regulatory conditions – regulation should be set in place to disincentivize moral hazard, but should not hinder the PPP's performance and potential for innovation. Legitimacy of PPPs is fostered by a supportive political environment with clear

policies and transparent procurement procedures (Verhoest *et al.* 2015). Clear regulations and the explicit division of roles between public and private actors prior to project implementation fosters trust between partners, thus reducing risk premiums and the overall cost of partnership management.

Fourth, the regulation should strive to facilitate “third party government” by adding legitimacy to PPPs and other forms of mixed government (Skelcher 2010). By doing so, policies often define PPP in comparison to other methods of procurement and to clearly articulate the primary motivations and expectations of the partnership (Verhoest *et al.* 2015). This is particularly important in the water sector, where water is traditionally thought of as a public good; adding legitimacy through endorsement of water sector PPPs may help mitigate the social unrest surrounding the partial privatization of water.

Finally, governance must articulate clear mechanisms for accountability (Skelcher 2010). Information regarding intentions, decisions, and actions of a PPP must be disseminated regularly to both the public partner and civil society, and both must have opportunities to voice any objections or to propose amendments. Studies of water sector PPPs in the context of input legitimacy, or the confirming of governance processes with democratic norms, show that the representation of stakeholders and engagement with civic society increases overall democratic control through increased accountability, transparency, and discursive quality (Dellas 2011). Resource provision through PPPs cannot be solely dictated by policy-makers, but must also take account the interests of affected parties (Skelcher 2010).

Ultimately, an institutional framework that maximizes the likelihood of project success is one in which the 1) public partner is actively committed to the partnership and the project and 2) establishes a clear and effective regulations that limits private partner moral hazard, barrier to

entry, and increases overall project legitimacy. The next section will overview the institutional arrangements that are critical for a PPP-supporting institutional framework.

## **7.2 Institutional Arrangements**

Institutional arrangements are governance structures that support the institutional framework. For public-private partnerships, the presence of effective PPP-supporting units and a flexible contract structure that reasonably allocates risk will increase the likelihood of project success.

### *7.2.1 PPP-Supporting Agency*

A primary IA structure is the PPP-supporting unit/agency (Chou et al. 2015). A PPP-supporting can be defined as “specialized public agencies working towards the development of PPPs through the provision of key functions and services such as policy guidance, capacity building, project promotion, assuring finance, and green-lighting of projects” (van der Hurk *et al.* 2015, p.3). These units are typically established at the federal level, but can differ in terms of statute, size, function, and the type of institutional framework they provide for P3s. These units act as knowledge centers, disseminating knowledge and information on PPP-formation to local governments; provide communication channels to investors; monitor and support public partners in establishing mechanisms for verification; and overall, play a key role in controlling the process of PPP formation (Verhoest *et al.* 2015). PPP-units can be aggressive, such as the UK’s PPP Treasury Taskforce division, and strongly promote a top-down a policy approach, or can merely serve as a resource that minimizes project-failure risk. Theoretically, if properly utilized, a PPP unit can lead to a reduction of the likelihood of PPP failure by providing another level of evaluation of project risk and partnership integrity.

It is important to note that despite being identified by PPP experts as a CSF in the water sector (Ameyaw and Chan 2014), findings on PPP-supporting units have, however, been inconclusive. For example, a qualitative analysis of 19 European PPP-supporting units found that the relationship between PPP-supporting units and PPP activity is not clear-cut. While these forms IA may be a precondition of a high degree of PPP activity, there are cases with well-developed units in countries with limited PPP activities (van der Hurk 2015). These findings are similar to other institutional evaluations of the PPP IA and IF environment. Verhoest's *et al.* (2015) analysis of PPP policy, legal frameworks, and supporting units reveals that government support in the form of PPP-units may be a necessary factor in project success, but its presence does not explain the level of PPP activity in a country. Additional research is required to evaluate the full weight of this CSF.

### 7.2.2 *Contract Structure*

Contract structure can also impact the success of a public-private partnerships by limiting opportunities for moral hazard, decreasing overall transaction costs, and maximizing project resilience (Ameyaw & Chan 2014; Johanssen 2014; Iossa & Martimort 2015). The literature review on CSFs has revealed that in order to increase the likelihood of project success, contract structure must (1) reasonably allocate risk between public and private partners and (2) be flexible, and provide opportunities for governments to respond to changing public needs and opportunistic private partner behavior.

#### 7.2.2.1 Reasonable Risk Allocation

Early on, typically in the concession period of a contract, both public and private partners must evaluate all of the potential risks that might occur throughout a project's lifetime. The complexity, large-project scale, long concession period, and social opposition towards private

sector participation in the provision of public goods makes robust risk assessment and reasonable risk allocation a crucial factor for public-private partnership success (Li, Akintoye, Edwards, & Hardcastle 2005; Zhang 2005; Chen 2009; Ke, Wang, & Chan 2010; Chan *et al.* 2010; Meng *et al.* 2011; Ameyaw & Chan 2014). When risk allocation is reasonable, and clearly incorporated into the contract, costs are minimized, project efficiency is increased, and the project achieves the highest Value for Money possible (Ke, Wang, & Chan 2010; Ameyaw & Chan 2016b). Moreover, a reasonable distribution of risk increases the likelihood of securing private sector financing, as a sound contract is a clear indicator to lenders and investors that both partners are equipped to bear unexpected costs and system shocks (Delmon 2009). Overall, inefficient risk allocation can lead to expensive contract renegotiation or project failure. In Chile, for example, 147 renegotiations in 50 PPP contracts resulted in an additional project cost of \$2.8 billion. In the water sector, renegotiations are frequent after contract signing, most typically as a result of poor risk allocation and government corruption (Gausch & Straub 2009). In the Latin American water sector, 76 percent of concession contracts have been renegotiated on average 1.6 years after the contract signing.

A risk-taking party must be able to foresee and assess relevant risk factors (i.e. a change in water demand or supply) and bear the full costs and the impact of risk (minimize third party impacts) (Ameyaw and Chan 2016b). Risk allocation, therefore, should be based on partners' level of commitments, contingency mechanisms, degree of uncertainty, and prior experience in horizontal partner cooperation (Jin and Doloi 2008). For example, a comparative analysis of macro, meso, and micro<sup>13</sup> risk allocation between Hong Kong, China, UK, and Greece revealed

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<sup>13</sup> Macro risks refer to those outside of the project boundaries (i.e. political factors, economic shocks, or environmental perturbations). Meso-level risk factors are concerned with the nature of the project, and include financing, design, construction, and management risks. Micro risks are those associated with the project partners themselves (i.e. relationship management risk) (Li *et al.* 2005).

that despite differences in economic and institutional factors of their home country, academics, public managers, and PPP experts indicated that meso-level risk for construction, design, operation, and project finance should be borne by the private partner, whereas political risk related to government stability, political opposition, and the decision-making process should be borne by the public partner (Ke, Wang, & Chan 2010). All respondents indicated that force majeure, or an unexpected macro-level event that prevents the fulfillment of a contract, along with relationship management risk, should be borne by all parties.

The study also found that risk management is dependent on the strength and experience of the private partner (Ke, Wang, & Chan 2010). For example, Chinese academics and experts indicated that 22 out of 46 risks at the macro- and meso-level should be borne by the private sector, including national industrial regulation changes, extreme weather events, cost overrun, subcontractor default, quality control, and material provision. In the UK, a country with high level of experience in public-private partnership management, respondents assigned 29 out of 46 risks to the private sector (Li *et al.* 2005). This speaks to the confidence that experts have in private sector participation in public-private partnership projects. The UK also preferred the sharing of legal risks (rather than deferring solely to the public partner), as it increased the profit margin of infrastructural projects; countries with a lower level of private sector experience assigned these risks to the public sector (Ke, Wang, & Chan 2010).

Risk-allocation is the direct result of the bargaining process between participating parties (Chung *et al.* 2010). While an ideal distribution is one in which allocation of risk to those best equipped to handle it without additional costs to partners or to third party members, commercial and negotiating strength allows the stronger party to transfer additional risk to the weaker one. Equitable allocation is, thus, highly related to the social, economic, and legal capacity of a



government (Adednego & Ogunlana 2006). In theory, contracts that commit private partners to specific results through performance guarantees and the specification of termination provisions are the key to successful risk allocation (Bloomfield 2006). In practice, for weak institutions, risk is transferred predominantly to the public sector, limiting non-performance liability throughout project duration (Bloomfield 2006).

The Bujagali Hydroelectric Project in Uganda, a BOOT facility, is a prime example of the how poor contract structure, along with an ineffective regulatory system can lead to high long-term costs. Initially negotiated with the World Bank and the AES Nile Power company in 1999, the project would established a 30-year contract in which the private partner would construct and operate the damn. The World Bank Inspection Panel observed that the contract structure forced the public partner to bear a disproportionate portion of the economic risk, forcing the Ugandan Energy Board to purchase the maximum energy supply, regardless of energy demand levels or actual energy production (Kangave 2013). Thus, even if the company operated below the capacity level, AES would be still be paid a pre-determined fixed price. Given allegations of corruption, both the World Bank and the private partner pulled out of the project in 2003. By 2008, the project resurfaced with Bujagali Energy Limited implementing a similar purchasing power agreement. Despite this skewed PPA structure, the World Bank recommended that the government agree to the project terms, claiming that interest rates would remain low and that project delay costs would be borne by the private partner. Neither would actually be the case.

The contract structure resulted in high social and economic costs. First, the capital costs of the project were overpriced: while initially negotiated to cost \$800 million, the final project cost was over \$1.3 billion (Mdone 2015). Moreover, the agreement led to an additional 200 million in additional maintenance and operation costs. The PPA provisions transferred cost and risk to

Ugandan users, with electricity prices increasing 151 percent between 2010 and 2012. Additionally, the project required the involuntary resettlement of communities. While resettled populations were promised compensation, project borrowers did not adhere to the resettlement policies of the World Bank, the Ugandan government, or the lenders. Ultimately, the establishment of a project in collaboration with an inexperienced government system, with poor advice from an agenda-driven third-party and limited channels of enforcement, resulted in a contract structure with unexpected hidden costs and impacts on third-party members. Successful partnership require either an experienced government or the expertise of third-party invested in ensuring public and civic society interests in order to ensure appropriate risk allocation.

#### 7.2.2.2 The “Lock-in Effect”

For long-term partnerships, uncertainty (Williamson 1975), the presence of information asymmetry, as well as opportunism (Ayres & Gertner 1989), result in complex contracts that are inevitably incomplete and in many cases, maladaptive (Williamson 1985). While private partners are accustomed to managing business risks, many have short-term time horizons and have not incorporated long-term risk such as climate change into their strategies (Johanssen 2014). This short-term perspective is often reflected in the contract structure, with governments committing to particular technology or utility management methods that are not the best available technology. Ultimately, with long-term infrastructural contracts, the decision to enter into a public-private partnership may reduce the ability of governments to adapt to changing environmental, economic, and social conditions. Unless direct steps are taken to account for uncertainty during the contract negotiation process, this “lock-in effect” (Hodge & Greve 2007, p. 552) leads to an overall reduction of flexibility and resilience of management systems (McQuaid & Scherrer 2010; Loxley 2013; Iossa & Martimort 2015; Ross & Yan 2015). Additional transaction costs, particularly from

contract renegotiation are required in order to respond to changing needs. Ultimately, a tension emerges between flexibility (the government's ability to adapt to changing conditions and public needs) and the need for monitoring and accountability of an essential public service. This tension has led to a series of ideological conflicts and has led to a cyclical process of supportive and restricting public policy for PPPs in the water sectors, and has even resulted in a series of project cancellations. Preliminary findings have found that this tension can have a profound impact on local-level water sector PPPs (Jensen 2016). In South Asia, local government that did not have the economic and institutional resources to adapt to changing hydrological conditions have terminated contracts with private providers or renegotiated contracts with lower payments and rates.

This section has shown that in order to minimize unexpected costs, provide disincentive for moral hazard, and maintain a supportive political climate, contracts must provide opportunities for flexibility and adaptation in addressing unexpected macro-scale shocks and technological breakthroughs. Additionally, contracts must commit to key performance guarantees and ensure that costs are not borne by third party members (Bloomfield 2006). Given their commercial experience level, private partners frequently have an advantage in the process of contract negotiation (Jeffares, Sullivan, & Bovaird 2009). For governments with weaker regulatory systems or low experience with PPP contracts, utilizing the knowledge and expertise of third-party legal consultants is crucial (Ameyaw & Chan 2014). An additional avenue of support is regulatory oversight from a third-party, such as a PPP-supporting unit. Institutional arrangements, thus, must operate in tandem in order to minimize unexpected costs and moral hazard.

### **7.3 Chapter Summary**

Using new institutional economics theory, this chapter identified five political critical success factors for the WASH sector: 1) the political climate must be stable, with the public partner

*actively* supporting the project by maximizing input and output legitimacy, 2) the regulatory framework must formally articulate the role of the PP in resource provision, incorporate affected parties into policy-formation, promote innovation, limit barriers to entry, and be able to ensure private partner compliance, 3) PPP supporting units must be developed, providing connections and expertise to governments, 4) risks must be shared or allocated to parties that can fully absorb costs and potential-third party impact and 5) contract structure must account for unexpected circumstances and system shocks. As seen in the case of the Ugandan Bujagali Hydropower Project, these institutional frameworks and arrangements are highly interdependent: active public partners, with a limited regulatory framework or a poor contract structure will not be able to preempt moral hazard, unless partnership commitment and project profitability are high. Likewise, an effective contract in which risks are allocated effectively and performance guarantees are put in place, cannot be enforced without a highly involved public actor and methods of deterrence.

It is important to note that these political CSFs feedback on the economic and social factors: institutional frameworks allow for the incorporation of civic society, the strengthening of partnerships, and the selection of an experience private partner through a robust procurement process. Institutional arrangements, on the other hand, allow for a contract structure with the highest value for money (project profitability) and limits opportunities for moral hazard. The next chapter, therefore, explores the economic critical success factors in WASH sector PPPs.

## **8.0 ECONOMIC FACTORS – PROJECT CHARACTERISTICS, the PROCUREMENT PROCESS, PPP ACCOUNTING, and TRANSACTION COSTS**

The previous chapter explored the role of institutional frameworks and arrangements in determining project success. Institutional frameworks and arrangements are essential in ensuring not only that partnership formation leads to balanced power dynamics, but also in maximizing economic efficiency. While there is extensive economic literature on the benefits of public-private partnerships relative to traditional public procurement, it is important to note that market failures (externalities, monopolies, transaction cost, information asymmetry, etc.) may result in inefficient and costly outcomes (Iossa & Martimort 2015). Therefore, this chapter examines the economic critical success factors in WASH project design and implementation: 1) appropriate project identification (project profitability), 2) robust procurement process, 3) technical expertise of the private consortium, 4) transparent PPP accounting process, and 5) minimized transaction costs. All five factors and their causal mechanisms are described in detail below.

### **8.1 Appropriate Project Identification - Project Profitability**

This section overviews the importance of appropriate project identification. External and internal project characteristics play a key role in determining the success of a public-private partnership (Zhang 2005). External characteristics include the political and economic risks of pursuing the project, the overall project cost, site location, and potential effect on the surrounding public (Chua *et al.* 1999). Internal characteristics are related to the technical aspects of the project and include the complexity of the technology, the project size, and overall constructability. In a mean-ranking analysis of water sector critical success factors, scholars and PPP experts indicated that project profitability is a key components in ensuring project success (Ameyaw & Chan 2014).

Project profitability incentivizes private partners to provide high quality infrastructure with low cost overruns and project delays. Thus, selecting an appropriate project will limit overall transaction costs and decrease the overall burden of verification and deterrence on behalf of the public partner. Microeconomic modeling has found that infrastructure public-private partnerships are more effective and provide a greater benefit to welfare than traditional procurement when: 1) there are opportunities to bundle costs, 2) there is a positive construction externality, 3) infrastructure quality has a high impact on demand and on the quality of services, and 4) when demand of a resource is stable (Iossa & Martimort 2015).

Bundling is the process of combining design, building, finance, and operation costs to a consortium of private firms, rather than contracting each firm under separate contracts (Iossa & Martimort 2015). Because profit of private partners is realized from cost-saving measures, bundling boosts effort of builders. Moreover, an increase in the profit risk borne by the operator leads to an increase in cost-reducing effort. Thus, bundling costs go hand-in-hand with risk transfer. These innovative financial arrangements are desirable with a positive externality (benefits realized at the management stage as a result of the building process) and with long-term contracting (Iossa & Martimort 2015). When an externality is positive, contractors have a greater incentive to look at long-term performance and to invest in higher quality infrastructure and services. Thus, the stronger the effect of infrastructure quality on revenue, the greater the benefits of bundling. Bundling in a long-term contract allows for efficient long-term incentives, especially if these incentives are increased with time, rather than presented at the beginning. This prevents cost-overruns, provided that the public partner has a high negotiation and market power.

When construction quality has a high impact on the quality of service or the demand of the good, private partners have high incentive to maximize effort (Iossa & Martimort 2015). For

example, in prison construction, government policies, not users, determine demand changes; because contractors' efforts have little effect on demand levels, minimal effort will be taken to ensure high quality infrastructure. For a leisure center or a green space, on the other hand, the private party's efforts will have an effect on demand levels. The relationship between construction quality and demand of the good determines who should bear the primary demand risk. In cases where construction quality is not dependent on consumer demand, the public partner must bear the demand risk. However, when infrastructure quality has a high impact on service demand (such as the green space), transferring demand risk to the contractor will increase private partner even further. That is, P3s deliver efficiency gains when whole-life project costs yields cost-saving measures (in management stage) and when risk is transferred to the private operator, provided that risk is dependent on changes in demand.

Finally, private partner incentive is high when demand of a good is stable (Iossa & Martimort). As a result, microeconomic theory argues that, in perfect market conditions, projects and in the transportation and the water sector are well-suited for public-private partnerships; demand for goods remains stable, despite other economic, social, or political factors. It is important that this finding assumes perfect market conditions. In developing countries, the high rate of non-payment and the low profitability of WASH infrastructure provision may obscure any economic benefits gained from the stable demand of the resource.

Appropriate project selection goes hand-in-hand with a robust-procurement process. The next section will explore the importance of competition in contract bidding, the valuation of PPP projects, and accounting for PPP costs.

## 8.2 The Procurement Process

A transparent and robust procurement increases the likelihood of project success by promoting competition, thus, allowing for the selection of the strongest and most competent firm while minimizing opportunistic behavior (Tiong 1996; Jefferies et al. 2002; Li et al. 2005; Ameyaw & Chan 2014). A strong and competent private partner is considered to be a key CSF on account of their ability to bring in finance, increase efficiency, and maximize quality. Thus, an inefficient bidding process may result in time and cost overruns of a project: the selection of a partner that is a poor technical, social, or political fit can result in decreased service or product quality, increased likelihood of contract renegotiation, and high transaction costs (costs of partnership management, monitoring, and verification) (Liu *et al.* 2014). Thus, the procurement process and the strength of the consortium are highly interrelated. While it is possible to partner with a strong consortium without bidding, the lack of competition will lead to a high bargaining disadvantage for the public partner, resulting in compromises that can impact the social welfare of the project (Ross & Yan 2015). Moreover, a lack of competition will decrease incentive for private partners to maximize quality while minimizing construction costs (Iossa & Martimort 2015). A competitive bidding process, therefore, is crucial for a high Value for Money calculation.

In the water sector, a competitive procurement process is difficult to achieve. In low and middle-income countries, less than half of WASH contracts were the result of the competitive process, whereas 133 (12.75 percent) were the result of direct negotiation. The ability rests not only on the strength and experience of the public partner, but also on the financial strength of consortium and the degree of monopolistic behavior in the market. For many water provision or wastewater treatment options, infrastructural needs require highly specialized, large-scale partners (Bloomfield 2006). Proposals that require up-front financing and costly analysis of available



infrastructure and water resources eliminates small-scale, local companies, especially when transaction costs from bidding process can be 5-10 percent of capital cost of a project (Iossa & Martimort 2015). For example, a water and sewer commission project in Lynn, MA received only two project proposals, both of which were submitted by companies owned and controlled by the same corporate entity (Bloomfield 2006).

Critical sub-factors of a competitive procurement process are sound economic policy, available financial markets, low barriers to entry, robust feasibility studies (value for money and cost-benefit analysis), and appropriate risk allocation (Li *et al.* 2005). Factor analysis indicates that competitive procurement is also highly related to public acceptance and the degree of government support to the project. The remainder of this section will focus on robust feasibility studies and accounting for public-private partnership budgets.

#### *8.2.1 Glitz and Glamour – Value for Money Calculations*

Scholars strongly recommend that the key criterion that public managers should use in selecting a private partner is previous successful project experience (Ho & Tsui 2009; Iossa & Martimort 2015). An alternative method often used to attract public managers is high value for money calculations. Focusing on these calculations, rather than the technical strength of the consortium, can lead to lower quality services and higher long-term costs.

A value for money (VfM) calculation is a decision tool used by policy-makers to determine whether a project will be cost-efficient relative to alternative methods. In a PPP VfM, the discounted lifetime cost of PPP projects are compared with those of traditional public procurement (Loxley 2012). If the costs of the PPP projects are lower than those of the public alternative, then the PPP offers “value for money,” or a net economic benefit. This calculation is often expressed as a percentage saving on the traditional public procurement method.

A value for money calculation can be a useful metric when deciding whether or not to pursue a public-private partnership project. However, policy-maker should apply the results of this calculation with caution, as the method utilizes a discount rate that is subjective and is often contradictory to theoretical and empirical recommendations. Value for Money calculations often yield results indicating that the PPP option is superior to traditional methods; these results are based on the notion that risk is transferred predominantly from the public to private sector (Loxley 2012). When risk transfer is high, Value for Money is maximized. Thus, the calculation presents a short-term gain without incorporating the potential hidden costs of contract re-negotiation and partnership management, two possibilities that are highly likely in cases of inappropriate risk allocation. Thus, Value for Money, can lead to arbitrary and often misleading expectations for policy-makers. To minimize cost-overruns, a PPP project budget should include room for legal fees, transaction costs, and unexpected project delays (Bloomfield 2006). Moreover, expectations for project revenue must be reasonable so cost-saving measures do not come at the expense of consumers and local labor.

### *8.2.2 Accounting for Public-Private Partnerships – Off Budget Sheets*

Along with robust value-for money calculations, an effective procurement process requires transparent accounting of PPP costs (Bloomfield 2006; Loxley 2012, 2013). One of the most compelling arguments for pursuing a public-private partnership is budgetary relief (Loxley 2013). This argument, however, is based off of the premise that public partner costs are not accounted for in government budgets. Instead, annual payments are placed “off-budget” and PPPs are virtually treated as “mega-credit card” purchases (Loxley 2012).

Critics of PPPs such as Loxley (2012, 2013) argue that PPP financing is almost always more expensive than direct borrowing by governments if the full duration of the contract is

accounted for. Due to the fact that payments for contracts are annual, only annual costs and not cumulative ones are included in government budgets. Savings are primarily the result of “hidden budget sheets” rather than actual reductions in operating cost (Hodge & Greve 2007; 2010). For example, under a lease-purchase agreement, lease payments are treated as operating expenses rather than capital expenditures; local government, therefore, can enter into LSAs without voter-approval and overcome statutory debt imitations (Bloomfield 2006). Ultimately, the agreement is categorized as a lease rather than a long-term debt. This “buy now, pay later” (Hodge & Greve 2010, p. 15) option, combined with a misleading VfM calculation, may incentivize governments with limited budgets to rush into agreements. As seen in Chapter 3, the exogenous push for pursuing PPPs and the misconceptions surrounding budgetary relief can lead to high compromises at the local level that transfer risk primarily to public partners or third-party members and yield a contract structure that allows for opportunistic behavior on behalf of firms (Koppenjan & Enserink, 2009).

### **8.3 Transaction Costs**

This section explores the fifth economic critical success factor: minimizing transaction costs. Transaction costs are costs of maintaining the partnership and include advisory costs for legal, financial, and technical matters’ costs of organizing and participating in the bidding process; negotiation; monitoring and contract management’ and renegotiation (Ho & Tsui 2009). When comparing public-private partnerships and traditional public procurement, negotiation, monitoring, and additional risk costs are often not included in typical cost-benefit analyses, resulting in over-estimates of the monetary benefits of a PPP. If care is not taken to minimize hidden costs, governments find their budgets stretched. Ultimately, the result of this accounting approach is a short-run spike in infrastructure investment followed by a long-run stagnation of

development, as governments scramble to pay off existing projects rather than sponsor new ones. Thus, one way to lower the likelihood of distressed and cancelled projects, is to minimize transaction costs throughout the contract period. Table 8.1 presents the various project and institutional factors that may drive up transaction costs throughout the lifetime of the project. The three mechanisms through which these factors operate – principal-principal problems, renegotiation and hold-up, and soft budget constraints -are described below.

<b>Project Factors</b>	<b>Institutional Factors</b>
<ul style="list-style-type: none"> <li>• Project scale: too large to fail</li> <li>• Project nature: too important to fail</li> <li>• Project complexity: too difficult to replace the incumbent firm</li> <li>• Profit structure: large construction contract returns, slow equity return</li> <li>• Composition of shareholders: the lack of major shareholders who are interested in the returns of operation contracts</li> <li>• Information asymmetry: high</li> </ul>	<ul style="list-style-type: none"> <li>• PPP policies: immature and not effective</li> <li>• PPP administration: inexperienced and inconsistent</li> <li>• Financial markets: immature</li> <li>• Budget constraint: soft</li> <li>• Legal system: immature</li> <li>• Political environment: unstable and immature</li> </ul>

**Table 8.1:** Project and institutional factors that increase PPP transaction costs (Ho & Tsui 2009)

Principal-principal problems are conflicts between the firm’s controlling shareholders and minority shareholder (Ho & Tusi 2009). In these kind of problems, the controlling principal, who appoints the major directors of the board and the top managers of the firm, might exploit his or her private information and dominant position to appropriate from minority shareholders. These kinds of problems can jeopardized project funding and lead to an overall reduction of economic efficiency: public partners must decide between accepting higher risk premiums (discount rates) or shouldering additional economic risks to ensure project success to potential investors. Critical determinants of principal-principal problems are information asymmetry, project structure (large portions of returns for promoters), and the composition of the controlling shareholders.

Institutional factors are also at play, with mature legal systems and specialized PPP agencies better suited for minimizing opportunistic behavior of primary shareholders.

The second cause of increased transaction costs are renegotiation or hold-up problems. Renegotiation occurs when either public or private partner demand to change elements of the contract prior to the end of the contract period (Ho & Tsui 2009). Hold-up problems occur when projects are stalled on account of renegotiation efforts. As seen in the discussion of stable political climate, flexible contract structure, and appropriate risk allocation, these issues can arise as a result of either private party or government action; when the political environment is not mature and the government has little to lose by violating the contract or promise (i.e. institutional/regulatory risk), public agents will fail to honor a PPP agreement.

In general, the actor that can hold up the other party will dominate the renegotiation and will obtain relatively better payoffs (Ho & Tsui 2009). In the case of PPPs, re-negotiation will increase transaction costs when: 1) there is a high opportunity cost (procurement process and legal arrangements) of replacing the incumbent concession firm, even in the early stages of contracts; 2) high enforcement costs of taking over the project may preclude the government from exercising contractual rights; or 3) the long-term nature of a contract weakens overall resilience of public service provision, forcing the government to renew the contract despite poor private firm output. Additionally, firms exploit monopoly power by charging high for extra services beyond the original contractual requirement or insisting upon an extension of the original contract (Parker & Hartley 2003). Thus, in order to minimize transaction costs, public-private partnerships projects should only be pursued when the likelihood of a project change is small, and the economic gains through project redesign are minimal (Ross & Yan 2015).

The final mechanism that increases transaction costs is a soft budget environment. In such an environment, firms can always expect to be bailed out in the event of a financial failure (Ho & Tsui 2009). Conversely, if firms spend only as much money as they have and are forced to declare bankruptcy, budget constraints are “hard” (Kornai 1979). Governments bail out poor projects to: 1) to avoid spillover effects, where a project is “too important to fail,” or 2) when it is costly, either economically or socially, to liquidate a project (when a project is “too big to fail”) and 3) under a system of fiscal centralization. As PPP projects, particularly in the water sector, have significant influences on public interests, public managers refer to a framework of soft budget constraints. The failure of infrastructural projects may lead to chain reactions of bankruptcies, mass redundancies, and even recession. As a result, governments frequently grants subsidies or tax exemptions, lengthens contract duration for failed or inefficient enterprises, and bail out distressed projects (Ho & Tsui 2009).

Despite the potential benefit of minimizing social or economic costs to third-parties, a soft budget framework decreases economic efficiency in the long-run. When firms expect future renegotiations to favor them, either due to monopoly power and/or soft budget constraints, they have weak incentives to perform at a high standard, reduce costs, and improve quality of service (Ho & Tsui 2009; Iossa & Martimort 2015; Ross & Yan 2015). Firms will often make aggressive investments at the outset of the project, use costly efforts in project operation, and exceed production capacity, fully expecting to be assisted by the government when the projects are faced with financial difficulties (Ho 2006). This behavior increases not only transaction costs, but impacts the public sector’s reputation, reducing the incentive power of future contracts and distorting competition in future PPP negotiations (Iossa & Martimort 2015).

Ultimately, these three mechanisms can have profound impacts on transaction costs throughout the lifetime of a PPP project. These mechanisms are highly dependent on the degree of confidence building, mechanisms of verification and deterrence, effectiveness of regulatory and judicial framework, and the procurement process. When bargaining power is low, and the public manager cannot minimize opportunistic behavior, transaction costs will be high. To combat these issues, greater emphasis must be placed on verifiable information such as firm track records, rather than the “glossiness” of the proposal. Furthermore, greater care must be taken in building partnerships that allow for information verification. When information asymmetry is so severe that it prevents governments from monitoring performance and fully understanding goals of the private partner, traditional procurement should be applied (Ho & Tsui 2009).

#### **8.4 Chapter Summary**

Using the results of microeconomic modeling, this chapter identified five economic CSFs in the water sector. First, to ensure high private firm incentive, project profitability must be high. Second, a robust procurement process is necessary in order to increase overall bargaining power of the public agent, ensure that the most technically competent private partner is awarded the contract, and maximize Value for Money of the project. Third, the private partner must be economically and technically competent. A competent private partner will allow the public partner to shift greater risks to the private firm while also increasing the likelihood of securing external financing. A competitive procurement process goes hand-in-hand with the fourth CSF –transparent project accounting. Failure to incorporate legal, partnership management, or project delay costs in the budget, and to keep the budget “on the books” may stress overall government budgets and decrease their overall resilience in the long-run. Finally, public and private partners should strive to minimize transaction costs, as these costs can stress the budget even further, decreasing the

overall Value for Money of the project and reducing service quality. Overall, the degree of transaction costs is dependent on the project structure, the degree of confidence-building, and institutional capacity. Both private and public partner must take active steps to minimize information asymmetry; public partners must also ensure that they maintain bargaining power and clearly specify the *rare* conditions under which contract re-negotiation or financial support may occur. Weak institutional capacity or a relying on private partners will lead to conditions of economic and environmental inefficiency and overall reduction of social welfare. These factors all feedback on each other: without a strong private consortium, even an appropriately selected project and transparent accounting procedure, may lead to additional transaction costs and a low value for money. Likewise, without project profitability, a strong private consortium would not be able to ensure project success without renegotiation/hold-up problems or a decrease in overall product quality. The next chapter provides concluding remarks and avenues for future research.



## 9.0 CONCLUSION

For low-income countries, only two-thirds of the population has access to improved drinking water sources (WDI 2016). Inadequate access to Water, Sanitation, and Hygiene (WASH) infrastructure is the sixth largest cause of mortality, resulting in roughly 2.2 million deaths per year (Montgomery & Elimelech 2007). Along with the exposure to gastrointestinal, hepatic, insect-borne, and parasitic diseases, failure to meet basic water needs has steep economic and social costs: in many developing countries, women are the primary form of water-service infrastructure, dedicating hours to collecting and transporting the resource (Montgomery & Elimelech 2007; Koolwal & van der Walle 2013). In an effort to close the infrastructure gap in the water sector, the United Nations has implemented the Millennium (2000) and Sustainable Development Goals (2015), promoting partnerships with the private sector (Goal 17) to “halve the proportion of people without sustainable access to safe drinking water and basic sanitation” (Goal 7, Target 10, Millennium Project 2006). Without factoring in the cost of future anthropogenic disruptions to ecological systems such as climate change, the current estimated cost of meeting Target 10 is roughly 11.3 billion dollars (Sanctuary, Tropp, & Bertnell 2005).

Supporters of public-private partnerships, or joint collaborations between public and non-government actors (private firms or NGOs) to provide goods or services, argue that the innovative financing mechanisms, budgetary relief, increased economic and technical efficiency, and transfer of risk from public to private parties of PPPs will allow local governments in low-income nations to close the infrastructure gap at a lower cost than traditional procurement measures (Jamali 2004; Loxley 2012; 2013). Starting from the 1980s, a two-pronged approach has been launched to promote PPPs: first, theoretical frameworks such as New Management Theory and empirical studies reveal the perceived failure of the public sector in the provision of goods and services

(Swyngedouw 2005). Simultaneously, neoliberal economists and international organizations such as the World Bank and International Monetary Fund present free market practices and private ownership as a solution to meeting infrastructure needs (Swyngedouw 2005; Pessoa 2008). However, while there is a strong push to adapt these partnerships, few analytical tools have been able to adequately assess PPP development impacts and their contribution to UN MDG and Sustainability Goals (Utting & Zammit 2009).

The primary goals of this Master's Thesis, therefore, were to identify 1) the role of public-private partnerships in water sector infrastructure development and 2) the economic, political, and social mechanisms that determine PPP project success. Utilizing a social ecological framework, and drawing primarily from economic, management, public policy, and engineering literature, findings reveal that despite the strong exogenous push to embrace PPPs, the management approach has been unable to close the water sector infrastructure gap in developing countries. Data from the World Bank Private Participation in Infrastructure Database (2016) indicated that water sector PPPs make up a small portion (6 percent) of all public-private partnership agreements, that investment for project stems primarily from public – rather than private – partners, and that only 11 percent of water sector public-private partnerships are implemented in low-income countries. Moreover, despite 2.6 billion people gaining access to increased drinking water since 1990, PPPs are responsible for only 11.12 percent of gained access, with the most-poverty stricken regions experiencing a 17 percent decrease in population served from PPP contracts between 2006 and 2013 (Jensen 2016). Data also revealed that that project failures, while rare, correspond to roughly 20 percent of total water sector investment (PPI 2016). The highest rate of project cancellation or distress is in low-income countries.

A thorough literature review revealed that for water sector PPPs to realize proposed project goals (cost, project implementation time, capital gains, distributional benefits, and improvements in water conversation) and to establish a horizontal partnership that is socially just, economically efficient, and is ecologically sustainable, 13 critical success factors are required:

- (1) both public and private partners must agree on the definition and of the very definition and the mutual expectations of a public-private partnership management approach
- (2) partnership formation through confidence building must i) include a diverse set of voluntary actors, ii) ensure partner roles are complementary, and iii) undergo multiple iterations
- (3) public acceptance and support for a project must be high
- (4) political climate must be stable, with the public partner actively supporting the project by maximizing input and output legitimacy
- (5) the regulatory and judicial framework must (i) provide mechanisms of deterrence while simultaneously (ii) promoting innovation, (iii) limiting barriers to entry, (iv) incorporating affected parties in PPP policy-formation, and (v) formally articulating the role of the PPP in resource provision
- (6) PPP units must be fully developed as an effective resource for consultation and providing connections to potential partners
- (7) Risks must be allocated to partners that are best able to fully absorb potential costs or shocks without transferring the impacts to citizens
- (8) Contract structure must be flexible, allowing both public and private partners to adapt to unforeseen circumstances and shocks while limiting moral hazard

- (9) Projects must be appropriately selected (high profitability, opportunities for bundling, stable demand for resource, technical feasibility)
- (10) Procurement process must be robust, (i) promoting competition between potential bidders and (ii) incorporating legal, partnership management, and project delay costs into the Value for Money calculation
- (11) Private partner must be technically and economically competent
- (12) Accounting of PPPs should be transparent, and not be treated as a “mega-credit card”
- (13) Transaction costs through principle-principle problems, renegotiations and hold-ups, and soft budget constraints must be minimized.

These CSFs are interrelated and feedback on each other at various stages of partnership formation. For example, when partners have a mutual agreement of the primary goals of the PPP and the technical and economic limitation of each partner, risks are allocated appropriately, and institutional frameworks and arrangements can effectively provide mechanisms of deterrence and verification. Likewise, strong institutional frameworks and arrangements allow for greater ease in the development of trust through confidence-building and increase overall project legitimacy, as high political commitment and a robust contract structure reduce information asymmetry and opportunistic behavior.

Ultimately, despite the strong push to adopt PPPs, this Master’s Thesis has shown that the management approach is not an appropriate mechanism for closing the infrastructure gap in developing countries. In fact, the propagation of PPP as a development approach can be seen as a framing device utilized by neoliberal institutions, legitimized by the endorsement of the UN and the Millennium Development Goals. While the management approach has merit, the rigorous economic, political, social requirements (a minimum of 13 CSF factors) indicate that local

governments with weakened institutions should not adopt PPPs in their current state. Otherwise, public partners will be forced to accept low value for money projects with high long-term costs of partnership management, opportunistic behavior, and inappropriate risk allocation. Alternative arrangements, such as “non-conventional PPPs,” or NGO-led partnership, should be considered for governments with limited budgets and minimum abilities to monitor output.

This “non-conventional” approach already been adopted by the Dhaka Water Supply and Sewage Authority (DWASA) to increase access to water resources in slum-dwellers (Hossain & Ahmed 2014). In partnership with Dustha Shasthya Kendra (DSK), a national NGO in Bangladesh specializing in community-based water supply and sanitation programs, the project established community based organizations (CBOs) to serve as an intermediary between slum-dwellers and DWASA. In exchange for water provision, slum-dwellers build their CBOs and are expected to enforce regular payment of bills by its members as well as monitor infrastructure quality by reporting leakages, thus ensuring project profitability. DSK plays a crucial role in confidence-building between the CBOs and DWASA by overseeing initial interactions between civic society and public agents and providing technical knowledge to communities. Its status as a third-party expert legitimizes the PPP structure, providing reassurance to donors of the projects success. Overall, the tri-partnership between DWASA, DSK, and slum-dwelling citizens has allowed an additional 100,000 poverty-stricken individuals to gain legal access to water supply systems. Members of the CBOs significantly benefited from the partnership – rather than having to purchase water from illegal vendors, members who signed the CBO agreement would have guaranteed stable access of the resource. Moreover, due to the opportunity for direct “voice” of water-related concerns, the slum-dwellers within the agreement felt more empowered. For women, overall anxiety was reduced, as they no had to wake up early in the morning for water collection. In

contrast, slums that were not part of the partnership agreement were able to fulfill only 50 to 60 percent of water-based needs at inflated prices from illegal vendors; over half of non-member individuals were unaware of the functions of DWASA, or assumed the service was only for rich individuals. Thus, while the approach differs from a traditional PPP approach in its overall social, institutional, and financial structure, it has allowed for a low-risk and low-cost provision of water resources and an overall increase of social welfare. The project may serve as a model to future DWASA expansions, and can be an alternative approach to a formal PPP structure.

Specialized non-government organizations may play a key role in future development efforts, particularly in bolstering resilience of communities to large-scale anthropogenic shocks such as climate change. Another key party in increasing local government resilience is the academic community. The next section explores the role of academia in PPP research and implementation.

### **9.1 PPPs and the Role of Social Science**

Within the context of PPPs, the role of social science is to 1) reduce conceptual ambiguity, 2) resolve misconceptions surrounding public-private partnerships, and 3) provide research with a high degree of practical application.

While there is an abundant literature on defining public-private partnerships, “few people agree on what a PPP actually is” (Hodge and Greve, 2009, p. 33). Ambiguity in the classification of PPPs has led to project comparisons that do not account project types, contexts, participating actors, and goals (Hodge & Greve 2007, 2010, 2011). This imprecision creates false expectations for policy-makers in partnership obligations (Weihe 2008), as this non-rigorous generalizability of projects obscures the institutional, economic, and social requirements that must be tailored to each project. Thus, a key role of social scientists is to clarify the definition of PPPs by consulting

directly with private and public managers. While literature has started to address the notion of ambiguity of the definition and the idealized notion of a horizontal partnership (Hodge & Greve 2011), research must be targeted to address real-world partnerships rather than perfect-market definitions.

The second limitation of current literature is the misconception of PPP superiority to traditional methods of procurement. Along with identifying CSFs, this research highlights the importance of careful consideration of a PPP commitment. Where private partner incentives are low, information asymmetry is high, or the public partner has limited mechanisms of enforcement or deterrence, traditional procurement is more appropriate than a public-private partnership (Ho & Tsui 2009; Iossa & Martimort 2015; Ross & Yan 2015). However, given misleading value for money calculations and the ability to use the management approach as a mega-credit card, there is high incentive for weak government systems to commit to a PPP partnership. Greater care must be taken to resolve misconceptions surrounding budgetary relief, value for money calculations, and hidden projects costs. This information must be disseminated to policy-makers in an accessible manner that clearly expresses the degree of generalizability of a study.

Finally, there is a danger in providing the illusion that a few modifications in government structure or market barriers to entry can lead to a stable partnership. In order for partnerships to succeed, social scientists must move beyond mere output measures, incorporating long-term outcome-based objectives in partnership and project structure. Public-private partnerships, thus, must be seen by academia and opportunities as opportunities to strengthen institutional and ecological systems, rather than merely promote economic efficiency. To do so, there must be a greater emphasis on practical application. At the end of the day, theory must be prescriptive (Taleb 2014). Future social science research must take care in providing realistic expectations and

guidelines that allow policy-makers to navigate the complexities of resource provision, even at the expense of admitting that their research is not appropriate in particular contexts. Moreover, theory must not strive to capture every facet and every dimension of a phenomenon, but must provide a general overview of causal mechanisms and behaviors (Parker 2016). In the context of public-private partnerships, this means that theory must be widely accessible, provide a clear definition of the management approach, and be presented in a way that allow for flexibility

Simply put, social scientists must partner with local experts and policy-makers, to answer questions regarding resource provision that are desperately needed – for example, how, in the face, of limited budgets and resources can we provide water, energy, healthcare, education, telecommunication, and transportation to our citizens? What are the possible alternatives, and which possibility is the one *best suited* for our region, and is best able to provide additional avenues for support and for growth? To answer these questions, social scientists must communicate with not only affected individuals, but also physical scientists. Collaboration with engineers may provide innovative solutions for resource provision, utilizing the knowledge gained from the study of the complementary roles of private and public partners to produce efficient, sustainable, and adaptive management systems and technologies.

## **9.2 Future Research**

The PPI dataset and literature review revealed two avenues for future research. First, studies should focus on establishing the weight of CSFs within sectors and to explore the interdependencies between various factors – which factors are the most important ones in determining project success? How do these factors feedback on each other during various stages of the project? While a few provided mean-based rankings of critical factors (see Ameyaw & Chan 2014), few could identify the process of how factors are prioritized in PPP partnerships. For



example, Tiong (1996) argued that, theoretically, with a competitive procurement process, other factors such as a strong private consortium, appropriate risk allocation, project identification, and tariff levels fall into place. In order to bolster resilience for governments, and to realistically assess the feasibility of a partnership, the government must

A second avenue for future research is the role of political jurisdiction in impacting project success. For the water sector, 31 percent of contracts are implemented at the local scale. Little research has been conducted on how scale impacts critical success factors and the overall likelihood of project success. Scholars hypothesize that given limited resources and weakened institutions, confidence building and enforcement are lower at the local scale, thus resulting in less cost-efficient project outcomes (Kopenjan & Enserink 2009). While comparative studies such as Robert and Chan's (2016) assessment of local and national-level transportation and water-sector partnerships in Ghana, the comparison across both sectors and political jurisdictions, along with the focus on the communication between local and federal governments in project implementation fails to address the literature gap of political jurisdiction. Studies that focus primarily on the comparisons within the water sectors will provide an additional dimension in examining the interdependencies and the generalizability of critical success factors for WASH PPPs.

Given the vast infrastructure gap in the water sector, and the anthropogenic large-scale disruptions to both human and ecological systems, it is imperative that steps are taken to ensure that resource management and provision strategies are amended to increase overall political, social, and economic resilience. In middle-income countries, PPPs may provide the key to future growth and development, injecting innovation, funding, and technological capacity into antiquated infrastructure systems. However, this management approach must be carefully studied and evaluated; partnerships should be built with care, and must be tailored to geographic scale and the

region's specific environmental, economic, social, institutional limitations. PPPs must be viewed in not only the context of global structures and policy regimes, but also the power dynamics that drive them (Swyngedouw 2005; Utting & Zammit 2008). The paradigm of the PPP should shift to one of long-term management and growth, striving to empower communities and to generate a new institutional framework and culture through partnership. This outcome-based framework is one that more closely aligns with the Millennium and Sustainable Development Goals, and one that will truly allow for the PPP to make great strides in promoting development and growth.

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## APPENDIX

**Table A1:** A literature review of Critical Success Factors (CSFs) in public-private partnership peer-reviewed literature. It is important to note that study differ in terms of project type focus, region studied, and methodology; thus, results should be compared cautiously, as findings from other sectors may not directly cross over to the water sector.

Author (Year)	Sector/Focus	Method	Identified CSFs
Tiong (1996)	BOT	Mean scores	<ul style="list-style-type: none"> <li>- Sound financial package</li> <li>- Technical expertise of consortium</li> <li>- Appropriate project identification</li> <li>- Entrepreneurship and leadership</li> <li>- Appropriate project selection</li> <li>- Environmental Impact</li> <li>- Acceptable/low Tariff level</li> <li>- Project profitability</li> <li>- Commitment from both parties</li> </ul>
Gupta & Narasimhan (1998)	BOT	Case study	<ul style="list-style-type: none"> <li>- Sound financial package</li> <li>- Technical expertise of consortium</li> <li>- Training public personnel</li> <li>- Short construction period</li> <li>- Supportive community</li> </ul>
Qiao <i>et al.</i> (2001)	BOT Projects in China	Survey of BOT project company respondents; Mean scores	<ol style="list-style-type: none"> <li>1.Appropriate project identification</li> <li>2.Stable political and economic situation</li> <li>3.Attractive financial package</li> <li>4.Acceptable toll/tariff levels</li> <li>5.Reasonable risk allocation</li> <li>6.Selection of suitable contractor</li> <li>7.Management Control</li> <li>8.Technology transfer</li> </ol>
Jefferies <i>et al.</i> (2002)	BOOT in Sydney, Australia	Case study	<ul style="list-style-type: none"> <li>- Technical expertise of consortium</li> <li>- Efficient approval process</li> <li>- Innovative financing mechanism (sound financial package)</li> <li>- Developed legal and regulatory framework</li> <li>- Available financial market</li> <li>- Appropriate project identification</li> <li>- Trust</li> <li>- Political commitment/stability</li> <li>- Public support</li> </ul>
Askar & Gab-Allah (2002)	BOT in Egypt		<ul style="list-style-type: none"> <li>- Selecting the right partner</li> <li>- Competitive financial proposal</li> <li>- Robust procurement process</li> <li>- Appropriate project identification</li> </ul>
Jamali (2004)	Lebanon	Case study	<ul style="list-style-type: none"> <li>- Trust, openness, and fairness</li> <li>- Technical expertise of consortium</li> </ul>

			<ul style="list-style-type: none"> <li>- Commitment</li> <li>- Common goals</li> <li>- Compatibility</li> <li>- Effective negotiation</li> <li>- Capable legislation and regulatory systems</li> </ul>
Li <i>et al.</i> (2005)	PFI in UK	Factor grouping and Mean scores	<ul style="list-style-type: none"> <li>- Robust procurement process</li> <li>- Strong &amp; experienced consortium</li> <li>- Capable legislation and regulatory systems</li> <li>- Appropriate risk allocation</li> <li>- Available financial market</li> <li>- Political commitment</li> <li>- Appropriate project identification</li> <li>- Favorable economic conditions</li> <li>- Shared authority</li> <li>- Public Support</li> </ul>
Zhang (2005)	Infrastructure PPP; survey of worldwide experts	Survey of practitioners and academics; Mean scores	<ul style="list-style-type: none"> <li>- Economic viability/Project profitability</li> <li>- Appropriate Risk allocation</li> <li>- Sound financial package</li> <li>- Reliable concessionaire/consortium</li> <li>- Strong technical experience of consortium</li> <li>- Favorable investment environment</li> </ul>
Jefferies (2006)	BOOT in Sydney, Australia	Case study	<ul style="list-style-type: none"> <li>- Competitive and transparent procurement process</li> <li>- Clear project goals</li> <li>- Efficient approval process</li> <li>- Appropriate project identification</li> <li>- Experienced public manager/government agency</li> </ul>
Chen & Doloi (2008)	BOT in China	Case study and Practitioner survey	<ul style="list-style-type: none"> <li>- Effective approval process</li> <li>- Low constraints on market entry</li> <li>- Appropriate allocation of risk</li> <li>- Political commitment</li> <li>- Capable legislation and regulatory systems</li> <li>- Available financial market</li> <li>- Low up-front costs</li> </ul>
Tsitsifli & Kanakoudis (2008)	Water PPPs in Senegal, Ghana, and South Africa	Case Study	<ul style="list-style-type: none"> <li>- Strong and innovative financial incentives</li> <li>- Political commitment</li> <li>- Capable legislation and regulatory systems</li> <li>- Risk transfer and shared responsibilities</li> <li>- Local knowledge and expertise</li> <li>- Robust procurement process</li> </ul>

			<ul style="list-style-type: none"> <li>- Tariff levels and subsidies reflect interests of consumers</li> <li>- Public acceptance</li> </ul>
Chen (2009)	BOT in China	Case Study	<ul style="list-style-type: none"> <li>- Commitment from all partners</li> <li>- Appropriate allocation of risks and responsibilities</li> <li>- Efficient approval process</li> <li>- Cost-saving technology</li> <li>- Engaging lenders in decision-making</li> </ul>
Chan <i>et al.</i> (2010)	Survey of PPP experts in China	Survey of PPP experts; Mean scores	<ul style="list-style-type: none"> <li>- Favorable legal environment</li> <li>- Risk allocation and sharing</li> <li>- Strong partner commitment to project</li> <li>- Stable macroeconomic conditions</li> <li>- Transparent and efficient procurement process</li> <li>- Stable political environment</li> <li>- Judicial government control</li> </ul>
Dulaimi <i>et al.</i> (2010)	BOT in United Arab Emirates	Comparative Case Study	<ul style="list-style-type: none"> <li>- Political support</li> <li>- Strong private consortium (technical expertise)</li> <li>- Stable economic conditions</li> <li>- Appropriate risk allocation</li> </ul>
Meng, Zhao, and Shen (2011)	TOT	Case study	<ul style="list-style-type: none"> <li>- Project profitability</li> <li>- Asset quality</li> <li>- Fair risk allocation</li> <li>- Competitive tendering</li> <li>- Use of professional advisors</li> </ul>
Babatunde <i>et al.</i> (2012)	Infrastructure PPPs in Nigeria	Empirical Survey and mean scores	<ul style="list-style-type: none"> <li>- Competitive procurement process</li> <li>- Appropriate project identification (cost-benefit analysis)</li> <li>- Effective regulatory and legal structure</li> <li>- Appropriate risk allocation and risk sharing</li> <li>- Political support</li> <li>- Stable macroeconomic condition</li> <li>- Availability of suitable financial market.</li> </ul>
Cheung <i>et al.</i> (2012)	Comparison of PPPs in Hong Kong, Australia, and UK	Survey of PPP experts in Hong Kong; Mean scores	<ol style="list-style-type: none"> <li>1. Favorable legal framework</li> <li>2. Commitment and responsibility of public and private sectors</li> <li>3. Strong technical expertise of consortium</li> <li>4. Stable macro-economic conditions</li> <li>5. Appropriate risk allocation and risk-sharing</li> </ol>
Hwang, Zhao, Gay (2012)	PPP in Singapore	Survey of PPP practitioners	<ol style="list-style-type: none"> <li>1. Well-organized public agency</li> <li>2. Appropriate risk allocation and responsibility</li> </ol>

		in Singapore; mean scores	<ol style="list-style-type: none"> <li>3. Technical strength of Private partner</li> <li>4. Robust procurement process</li> <li>5. Clearly defined responsibilities and roles</li> <li>6. Clarification of contract documents</li> <li>7. Favorable legal and regulatory framework</li> <li>8. Shared authority between public and private sector</li> </ol>
Zhao <i>et al.</i> (2013)	BOT Projects in China	Case study	<ul style="list-style-type: none"> <li>- Availability of financial markets</li> <li>- Public acceptance</li> <li>- Environmental regulations</li> <li>- Political commitment</li> <li>- Effective regulatory and legal framework</li> <li>- Credit regulations</li> <li>- Project profitability</li> <li>- Technologic complexity</li> <li>- Technical expertise of consortium (management, contractor, and supplier capacity)</li> </ul>
Ismail (2013)	Malaysia	Survey; mean scores	<ul style="list-style-type: none"> <li>- Effective regulatory and legal structure</li> <li>- Political commitment</li> <li>- Share responsibility by public and private sector</li> <li>- Sound economic policy</li> <li>- Availability of financial markets</li> </ul>
Ameyaw & Chan (2014)	International infrastructure PPPs	Mean scores and factor analysis	<ol style="list-style-type: none"> <li>1. Government commitment</li> <li>2. Adequate financing</li> <li>3. Public acceptance/support</li> <li>4. Strong &amp; competent private partner</li> <li>5. Effective regulatory and legal structure</li> <li>6. Strong and competent private partner</li> <li>7. National PPP policy &amp; supporting unit</li> <li>8. Strong partner commitment to project</li> <li>9. Capacity building of local staff</li> <li>10. Quality water workforce (local expertise)</li> <li>11. Competitive tendering</li> <li>12. Profitable project</li> <li>13. Flexible contract w/ reasonable risk allocation</li> <li>14. Internal coordination w/ government</li> </ol>
Sambrani (2014)	BOOT in Bangalore, India	Case Study	<ol style="list-style-type: none"> <li>1. Strong private consortium</li> <li>2. Internal coordination (local and central government are unified)</li> <li>3. Project stability</li> </ol>

			<p>4. Reasonable concession fee</p> <p>5. Tariff controlled by neutral regulatory</p>
Osei-Kyei & Chan. (2015)	Academic journals 1990-2013	Content analysis	<p>1. Appropriate risk allocation and sharing</p> <p>2. Strong private consortium</p> <p>3. Political support (government commitment)</p> <p>4. Public/community support (public acceptance)</p> <p>5. Transparent procurement process</p>
Osei-Kyei & Chan (2016)	Ghana construction projects (BOT and DBFO)	Case study	<ul style="list-style-type: none"> <li>- Strong government commitment and support</li> <li>- Public support</li> <li>- Openness and constant communications</li> <li>- Project profitability</li> <li>- Strong private consortium (technical knowledge and ability to acquire financing)</li> </ul>