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# Private Participation in Infrastructure

Analysis and a look in depth to the Sub-Saharan Africa  
Case in water distribution

**Supervisor**

Ch. Prof. Diana Barro

**Assistant supervisor**

Ch. Prof. Marta Cardin

**Graduand**

Silvia Barellas

Matriculation Number 847251

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## **Introduction**

The purpose of this dissertation is to provide an overview of Public Participation in Infrastructure projects (or “PPI”), with a final focus on projects undertaken in the Water and Sewerage sector in Sub-Saharan Africa. I chose this topic because I have a keen interest in the economic development of emerging countries, and I have been intrigued by a thorny and touching issue such as the one of water distribution. PPI concerning Water and Sewerage sector in Sub-Saharan Africa are less than in the rest of the world, this fact raised questions on what could have been the main reasons. Water is essential for life and I thought that, especially in Africa, PPI projects could have represented one of the key areas in which governments should have invested. I was surprised to realize that, on the contrary, it was not the case. As I will point out during the dissertation, this field has a tight regulatory framework imposed by international organizations, a lot of risks that must be properly allocated and low returns for privates. Consequently, I focused on analyzing how governments could involve private companies in managing water distribution process and assets, in order to understand which is the process through which parties can raise funds and allocate risks. Furthermore, I wanted to understand what are the responsibilities of privates and public authorities when they decide to participate in a PPI for water distribution in Sub-Saharan Africa, and if they could be a deterrent for private companies.

This dissertation is structured in five Chapters. Chapter 1 provides an overview of the history of PPI implementation, with a definition of the topic and an illustration of the advantages and disadvantages of involving private parties in public utilities management. Chapter 2 depicts the overall PPI situation in the world, based on data provided by the World Bank. It includes a description of the Principles issued by OECD to be applied to the PPI projects, of the PPI situation in different regions of the world, and of the main sectors in which PPI are applied. Chapter 3 presents the categories in which contracts can be divided, with a focus on the risk allocation process. The modules and the different types of contracts already functioning, the risk allocation process, the risk estimation techniques and the available mitigation measures are outlined. Chapter 4 introduces my personal analysis: I examine the history of PPI projects in Africa and the main features of the water sector, together with specific related risks. In addition, this Chapter illustrates the OECD Principles that are applied to PPI projects specifically in water and sewerage sector. Chapter 5 is the core of the analysis I made: I start introducing the analysis of the available projects on the basis of data provided by the PPI Database of the World Bank,

then I consider the private companies involved in PPI projects concerning Water and Sewerage in Sub-Saharan Africa and the funds that provide financing resources to private companies and public authorities, in order to begin or complete a PPI project in this field. Finally, I summarized the decisional processes undertaken by the different funds and the risk assessment processes, providing my proposal about the decisional process and risk evaluation criteria applicable to PPI projects concerning the water sector in Sub-Saharan Africa.

# **Chapter 1 - Private sector Participation in Infrastructure: definition, functions and recent trends in the market**

The question whether privatization could be an efficient tool in managing public infrastructures is crucial in the globalization pattern occurred in the last decades. The schemes through which an inclusion of the private sector is possible, are multiples. Generally, we refer to this solution with the term “Private Participation in Infrastructure” (PPI), as defined by OECD and the World Bank Group, but it is also known as PPP, which stands for Public-Private Partnership. The inclusion of private investments in public utilities can vary according to different instruments: those forms can change widely and we will analyze them specifically in the third chapter dedicated to the different frameworks considered. Moreover, the sectors in which PPI can be implemented are different and numerous, therefore the second chapter will be dedicated specifically to the description of the geographical areas and the different sectors where these tools have been applied. I will take into account the most relevant business sectors, analyzed in depth by the World Bank Group: Electricity, ICT (Information and Communication Technologies)<sup>1</sup>, Natural Gas, Airports, Ports, Railways, Roads<sup>2</sup>, and Water and Sewerage<sup>3</sup>. The areas that will be taken into account during this dissertation are: Europe and Central Asia (ECA), East Asia and Pacific (EAP), Latin America and the Caribbean (LAC), Middle East and North Africa (MENA), South Asia (SAR) and Sub-saharian Africa (AFR).

Incredible amounts of money were invested by privates in public infrastructures in the 80s, relying on the fact that those investments would have turned profitable once terminated. The truth was that, after the first two decades (taking into account that crises took over, especially in Latin America), the amounts invested by privates started to decrease. The private management turned to be not so efficient as hoped and people started to look at PPI with skepticism. However, during the last few years, an increase in PPI utilisation was registered. As a confirmation of this trend, in 2017 PPI increased by 24%<sup>4</sup>. East Asia and Pacific (EAP) was the region totalizing the highest amount of investments and debt represented the main source of financing.

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<sup>1</sup> We will refer to them from now on with the name “telecommunication”

<sup>2</sup> Airports, Ports, Railways and Roads will be part of “transport” sector

<sup>3</sup> From the PPI Database of the World Bank Group

<sup>4</sup> World Bank Group “*January-June 2017 Private Participation in Infrastructure (PPI) Half year update*”, PPI Database, Report, 2017, p.2

Nowadays, PPI still represents an important way to finance and boost public works. Hence, it is important to increase private participation in the best available way, without compromising the efficiency of the services provided to the citizens. The role represented by private parties in PPI is the one of bringing operational efficiency, while the role played by governments is the one of pursuing the collective interest of the population, especially monitoring and setting the right level of tariffs. In order to perform those functions, risk allocation process must be clear, with the main purpose of not overriding responsibilities and establishing the right returns.

### 1.1. History

In order to properly understand how Private Participation in Infrastructure and Public-Private Partnership works, an historical introduction is necessary.

First of all, as the World Bank defines it, PPI is “*A long-term contractual arrangement between a public entity or authority and a private entity for providing a public asset or service in which the private party bears significant risk and management responsibility*”<sup>5</sup>. Of course, each region of the world has its own perception of PPI, mainly according to the regimes and cultures that shape the concept of private intervention in public affairs. US government looks at it as a performance-based agreement; the European Union defines it as a cooperation between public and private entities; Asian countries find PPI as a body to meet social obligations<sup>6</sup>; India has almost the same view of United States, defining it as an agreement for the provision of public services or goods.

The introduction of these instruments for privates’ involvement in public interest projects started in the 80s. The word *privatization* became of interest in Britain, with the selling of British Aerospace<sup>7</sup>. At the beginning, there was the clear idea that PPI would have been the

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<sup>5</sup> Mohan B., Latha R.N., “*PPP at Cross Roads: Alternative Models an Imperative*”, SCMS Journal of Indian Management, Paper, October - December 2017, p. 6

<sup>6</sup> Definition provided by ADB (Asian Development Bank)

<sup>7</sup> As it is useful to notice, “*the very term “privatization” has communication origin: [...] after the term “denationalization” spurred to the selling of the state-owned British Aerospace, the government decided to adopt the term “provatization” in hopes that it would be less controversial.*” Calabrese D., “*Strategic Communication for Privatization, Public-Private Partnerships and Private Participation in Infrastructure Projects*”, World Bank Publications, Working Paper, No. 139, March 2008, p. 1

solution to imperfections in sectors management like telecommunications, water and sewerage, electricity etc..

During this period, *deregulation* occurred, that is necessary to mention when we talk about private participations and, in general, privates doing businesses in public sectors. The *deregulation process*<sup>8</sup> started in the 70s in the airline sector in the United States, followed by the telecommunication sector in the 80s and the water sector in the 90s. According to this project, for the first time privates were allowed to do business thanks to restrictions’ removal by governments to markets, in order to favour economies’ development. This is why it can be useful to see what were the impacts of this process in different sectors, as depicted in Table 1.

**Table 1. Gains from deregulation in diverse sectors**

Table 1: Estimated Gains From Deregulation of Selected US Industries		
Sector	Extent of Deregulation	Estimated Annual Gains (billions of 1990 US\$)
Airlines	Complete	13.7–19.7
Trucking	Substantial	10.6
Railroads	Partial	10.4–12.9
Telecommunications	Substantial	0.7–1.6
TOTAL		35.4–44.8

Source: Gray P., “Private Participation in Infrastructure: A Review of the Evidence”, Private Provision of Public Services Group, Private Sector Advisory Services, Paper, October 2001, p. 18

Table 1 shows the estimated annual gains for four different sectors after the introduction of *deregulation*. The four sectors analyzed are: Airlines, Trucking, Railroads and Telecommunications. The sector that shows the highest level of estimated annual gains is Airlines, from US\$13.7 billions to US\$19.7 billions. The total amount of expected annual gains estimations ranged from US\$35.4 billions to US\$44.8 billions. Moreover, the higher was the

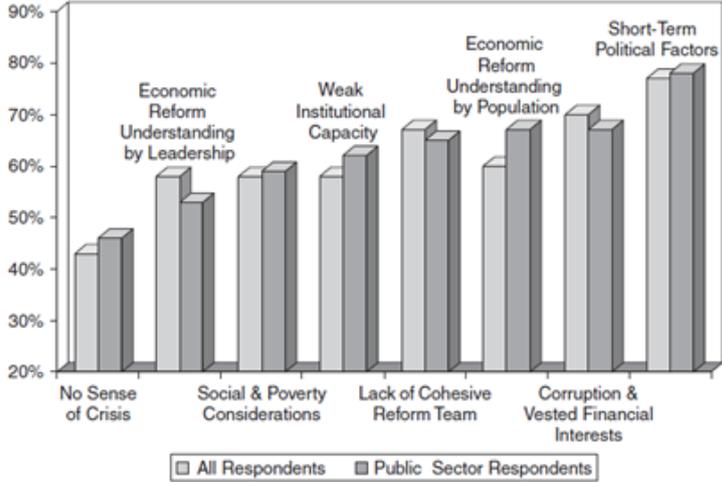
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<sup>8</sup> As the authors Menard and Peeroo report, “*Liberalization then became identified with privatization. However, the two concepts differ. Strictly speaking, privatization involves the transfer of property rights on assets from public to private entities. Liberalization refers to a broader and in a sense less specific policy, which is to introduce competitive pressure, without necessarily involving privatization. Whereas full privatization is often viewed as a way to reform infrastructures, with telecommunications as the paramount example, energy or more recently railways, it was and remains a very uncommon solution in the water sector due to its specificities, England & Wales being the main and most significant exception. However, rules designed to introduce competitive pressure have been adopted in many countries.*” Ménard C., Peeroo A., “*Liberalization in the Water Sector: Three Leading Models.*”, Rolf Kunneke and Matthias Finger, International Handbook of Network Industries: The Liberalization of Infrastructures, Edward Elgar, Working Paper, 2011, p. 6

level of deregulation implemented (column “Extent of Deregulation”), the higher was the level of estimated annual gains as well.

Private infrastructure projects reached a peak between the 1980 and 2000. Private investors and governments were guided by the idea of modernization and still, the belief in increasing benefits to citizens and public at large was strong. But, by the end of the 90s, some problems arose due to the crises in developing countries, leading to PPI fall by more than a half. The decreasing level of trust that population had in public authorities, led to a consequent decrease in trust in PPI projects (and privatization in general). Graph 1 represents the results of an interview made by the World Bank and Harvard University to citizens of 63 different developing countries, asking what were the main reasons of failure of public reforms according to them.

**Graph 1. Responses to reforms implemented**



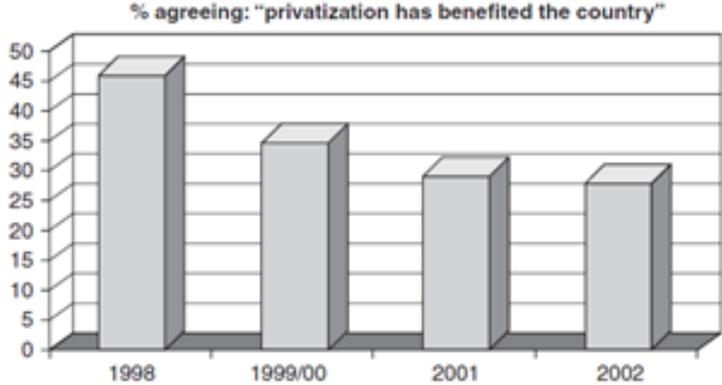
Source: Calabrese D., “Strategic Communication for Privatization, Public-Private Partnerships and Private Participation in Infrastructure Projects”, World Bank Publications, Working Paper, No. 139, March 2008, p. 3

This graph shows the perceptions captured through a survey in response to the implementation of reforms in different sectors. In the horizontal axis are reported the elements and the perceptions of citizens about privatization process. On the vertical axis is displayed the percentage level, representing how many people signalled a specific reason for failure of privatization during the interview. As shown, 90% of the population thinks that reforms are only short-term oriented, benefitting Political class.

The new generations started to lose faith in a possible improvement, the interest in investing decreased designing a struggling pattern of survival. The public discontent and disillusionment led to underestimation of public authorities and privates’ capabilities of management.

Moreover, pricing policies were considered inefficient as compared to the services provided. The observations in Graph 1 and Graph 2 are related to the opinions of citizens in developing countries during the end of the 90s and the beginning of the 2000s.

**Graph 2. Public opinions on privatization**



Source: Calabrese D., “Strategic Communication for Privatization, Public-Private Partnerships and Private Participation in Infrastructure Projects”, World Bank Publications, Working Paper, No. 139, March 2008, p. 4

In Graph 2 are reported the years on the horizontal axis and the percentage of people agreeing on the fact that privatization has effectively benefitted the country on the vertical axis. Differently from Graph 1, Graph 2 is focused on the opinion that citizens expressed about general success and benefits arising from privatization, rather than focusing on reasons for failure. Graph 2 indicates that in 1998, almost the 45% of the population agreed on the fact that privatization benefitted the country. In 2002, this percentage stood at 25%, demonstrating that fewer and fewer citizens did not rely anymore on privatization, as a good mean in order to improve the economy and the wealth of the citizens. For this reason, as Calabrese (2008) stated, “it is crucial to incorporate communication analysis and stakeholder engagement at the policy and program formulation stage”<sup>9</sup>. In order to implement at best the process of privatization, it is necessary a regulatory framework that is able to sustain it and discipline it.

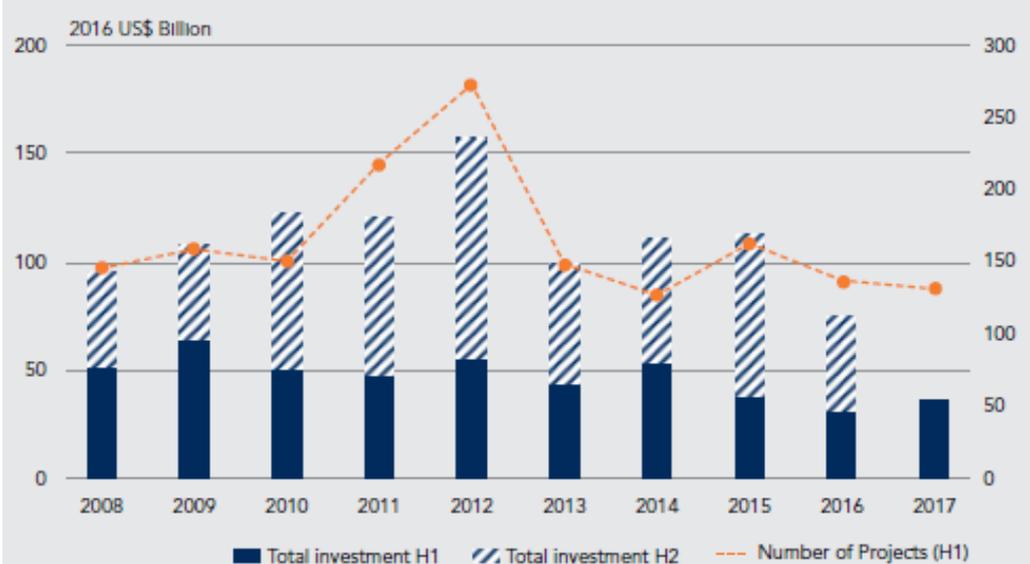
During the last decade, after the sensible drop of 2000s, the PPI started to increase again. Even if they didn’t recover the level of the 90s, there are still signs of an optimistic behaviour. The highest investments in 2016<sup>10</sup> were registered in the Latin America and Carabbean (LAC)

<sup>9</sup> Calabrese D., “Strategic Communication for Privatization, Public-Private Partnerships and Private Participation in Infrastructure Projects”, World Bank Publications, Working Paper, No. 139, March 2008, p.1

<sup>10</sup> World Bank Group “2016 Private Participation in Infrastructure (PPI) Annual update”, Report, 2017.

region<sup>11</sup>, especially in the energy sector. Graph 3 illustrates the amounts invested in PPI projects in Emerging Markets and Developing Economies (EMDE) region in the last decade.

**Graph 3. Overview of PPI in EMDEs in 10 years**



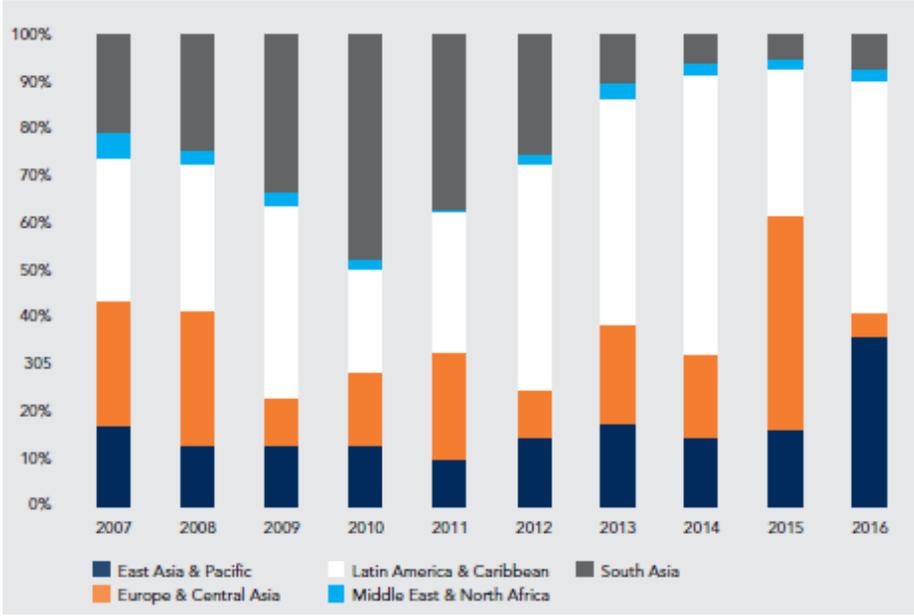
*Source: World Bank Group “January-June 2017 Private Participation in Infrastructure (PPI) Half year update”, PPI Database, Report, 2017, p.4*

By 2008, we can notice a waving behaviour: private investments increased until 2012, then decreased in 2013, and they recover until 2015 to collapse again in 2016. During the first half of the year of 2017, a percentage increase was registered. This instability might have been caused by political uncertainty registered in Emerging Countries and Developing Economies after the global crisis of 2008.

Graph 4 shows the amounts invested in PPI projects according to the different regions: East Asia & Pacific, Europe & Central Asia, Latin America & the Caribbean, Middel East & North Africa and South Asia.

<sup>11</sup> Latin America and Carabbean

**Graph 4. Regional distribution of Private Participations in infrastructures in EMDEs**



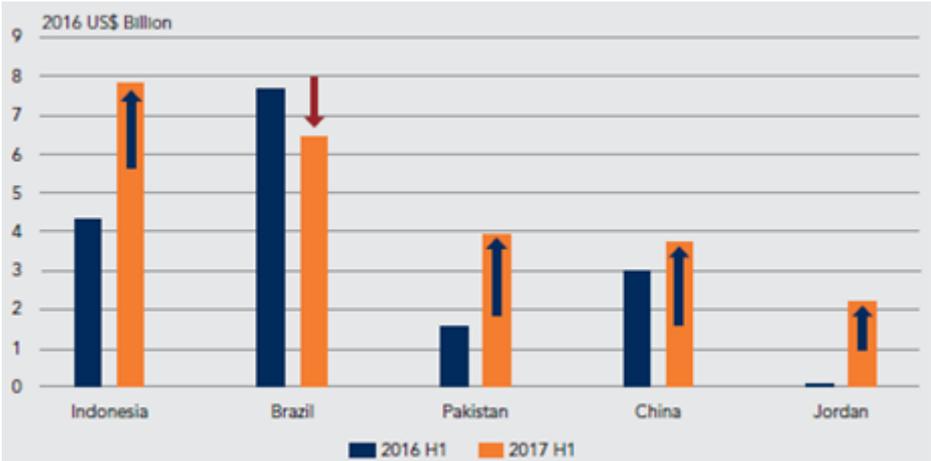
Source: World Bank Group “January-June 2017 Private Participation in Infrastructure (PPI) Half year update”, PPI Database, Report, 2017, p. 6

East Asia and Pacific region (EAP) is the area that shows more stability in investments made from 2007 to 2016, with a steep increase in the last year. Latin America and Carabbean region (LAC) presents a waving behaviour, with the minimum level registered in 2010 and then a recovery phase with a peak in 2014. It could be useful to remember that, in 2010, LAC region was the theatre of many natural disasters, especially in Peru and Chile. Europe and Central Asia (ECA) presents a waving behaviour, as well as LAC region. The investments reached a peak in 2015, whether the lowest level was registered in 2016. South Asia region (SAR) invested the largest amount of money in PPI in 2010, with a subsequent decrease until 2015. In 2016, it is possible to notice a small increase. Middle East and North Africa region (MENA) is the area that still invests the lowest amount of money with respect to the other regions analyzed in Graph 4. In 2011, the amount invested in PPI projects in MENA region was almost zero. Moreover, for what concerns the first semester of the year 2017, even if there was and increase of 24% of the mounts invested in PPI projects around the world, it is still the lowest level of half-year PPI investments registered in the last 10 years and 15% less than the average investments from 2011

to 2016.<sup>12</sup> East Asia and Pacific (EAP) was the region that have been investing most in PPI during the first part of the year 2017, especially China and Indonesia in the energy sector.

Graph 5 illustrates the dynamics of the projects undertaken in the five countries that, in 2017, invested more in PPI projects.

**Graph 5. Comparison of PPI undertaken in H1 2016 and H1 2017 of top five countries**



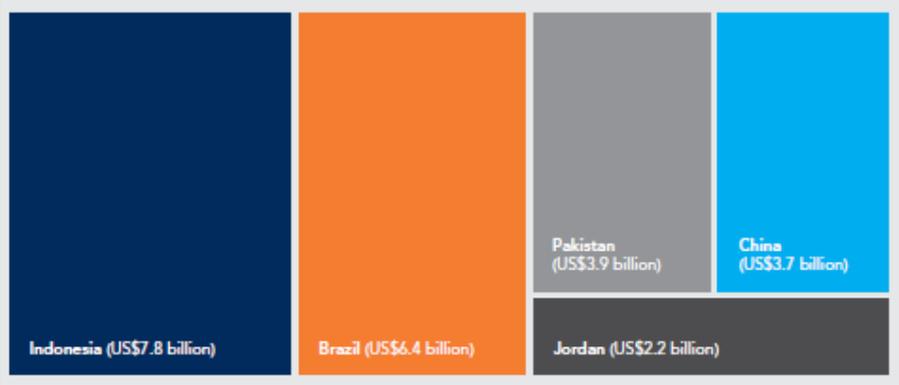
Source World Bank Group “January-June 2017 Private Participation in Infrastructure (PPI) Half year update”, PPI Database, Report, 2017, p. 9

Graph 5 compares the amounts invested in PPI projects registered in the first half of the year 2016 and the first half of the year 2017, comparing the data of the five countries that invested more in PPI projects in the first semester of 2017. Indonesia, Pakistan and Jordan are the countries that registered the greatest increase, passing respectively from US\$4 billion to USD8 billion, from US\$2 billion to US\$4 billion and from almost US\$0 billion to US\$2 billion. China also registered an increase in the amount invested in PPI projects, but restrained. Brazil is still among the Top 5 Countries, even if it registered a decrease form US\$8 billions to US\$6 billions. In the last years, the attention was especially dedicated to investments in Greenfield projects, which represented more than 65% of the total amount. In general, all regions increased the PPI from 2016 to 2017 (looking the first half-years for comparability), with the exception of Brazil.

Figure 1 shows a graphic representation of the amount invested in the five countries that invested more in PPI projects during the first half of 2017.

<sup>12</sup> World Bank Group “January-June 2017 Private Participation in Infrastructure (PPI) Half year update”, PPI Database, Report, 2017, p. 1

**Figure 1. Top Five Countries in the first half of the year 2017 for PPI in EMDE**



Source: World Bank Group “January-June 2017 Private Participation in Infrastructure (PPI) Half year update”, PPI Database, Report, 2017, p. 8

Among the Top 5 countries of the first semester of 2017, Indonesia was the nation that invested most (US\$7.8 billion) with respect to the other countries. Then, follows Brazil with US\$6.4 billion. Pakistan and China invested almost the same amounts, respectively US\$3.9 billion and US\$3.7 billion, showing a distance from the first two countries. In particular, Pakistan, China and Jordan registered less than half of the amount invested by Indonesia in the first half of 2017.

By the end of this analysis, it is possible to conclude that PPI projects are still not so widely implemented. Due to the economic instability, political uncertainty and natural disasters that could occur, it is not possible to state with certainty that a recovery in PPI utilisation is expected. However, we can notice the efforts made by governments, especially in the five countries illustrated in Figure 1, in trying to increase PPI projects implementation and reconsidering them as a powerful resource for the development of infrastructures. This is confirmed by the restrained, general increase of amounts invested in 2016 and 2017.

### **1.2. Advantages and Disadvantages**

When it is necessary to assess if the community can benefit from PPI projects, it is of primary importance to consider both advantages and disadvantages coming from the involvement of private parties. The involvement of private parties by public authorities, in order to raise funds, is a sensible matter to deal with. When privates are involved, they should keep in mind that the project is undertaken in order to benefit the community. So, the main driver can not be only profit, otherwise people might start to lose confidence in public authorities and in capabilities of private management to look for public interest.

Hereafter, a list of advantages and disadvantages will be provided, in order to fix the key points useful for the assessment and evaluation of PPI as solution for financing.

## **Advantages**

The first element that is necessary to mention, is the operational efficiency. Gray (2001) observes that “*Public sector monopoly providers of infrastructure services in most developing countries have a poor track record in operating efficiently. There are weak incentives to reduce costs and to deal with technical and non-technical losses. Staffing levels are also often inflated to meet political goals, and labor productivity is often further reduced by labor systems that offered few incentives for performance*”<sup>13</sup>. Privates are driven by profit and in order to make it, reduction of costs, in order to increase their efficiency, is the easiest way. A decrease in costs can help them in improving their competitiveness, supported also by specific regulatory frameworks that, most of the time, try to push firms toward innovation. Moreover, privates have also available resources to be used as incentives in productivity (for examples increase in wages, rewards for achievements in performances) in order to sustain efficiency. For example, as they are driven by cost-reduction and profit drivers, it is possible that the same service could be provided by privates using less workforce. This attention to cost reduction allows private investors to discard the types of investments that raise more costs than benefits.

From the fiscal point of view, privatization reverse the burden of taxpayers. In public projects, in presence of losses of efficiency, subsidies are required from taxpayers with government guarantees. On the contrary, in case of private investments, there are no government guarantees and the burden is shifted to consumers and investors. From a legal point of view, it is also true that private involvement may help to shape a better regulatory background in which to operate, pushing and raising questions to the public attention and also suggesting solutions that can better solve current possible issues.

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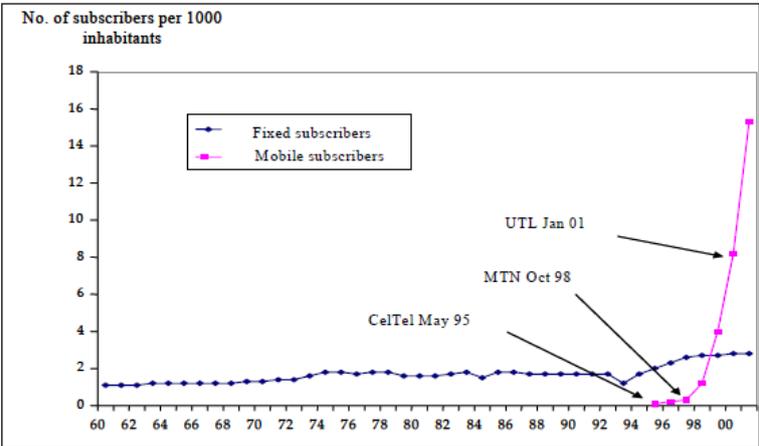
<sup>13</sup> Gray P., “*Private Participation in Infrastructure: A Review of the Evidence*”, Private Provision of Public Services Group, Private Sector Advisory Services, Paper, October 2001, p. 7

So, we can say that “governments turned to the private sector, hoping that private expertise and finance would meet rapidly growing demands for infrastructure services”<sup>14</sup>, bringing an increase in population’s welfare.

The better improvements were identified in telecommunications, especially driven by the increasing competitiveness and abolishment of monopolies, a regime that nowadays we can consider consolidated. The advantages of competitiveness had clear evidence in countries such as Uganda and regions such as Latin America.

Graph 6 shows the results of a successful implementation of PPI in telecommunication sector in Uganda.

**Graph 6. Telecommunications in Uganda after introduction of PPI**



Source: Harris C., “Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons”, The International Bank for Reconstruction and Development, Washington DC, World Bank Working Paper No. 5, April 2003, p.19

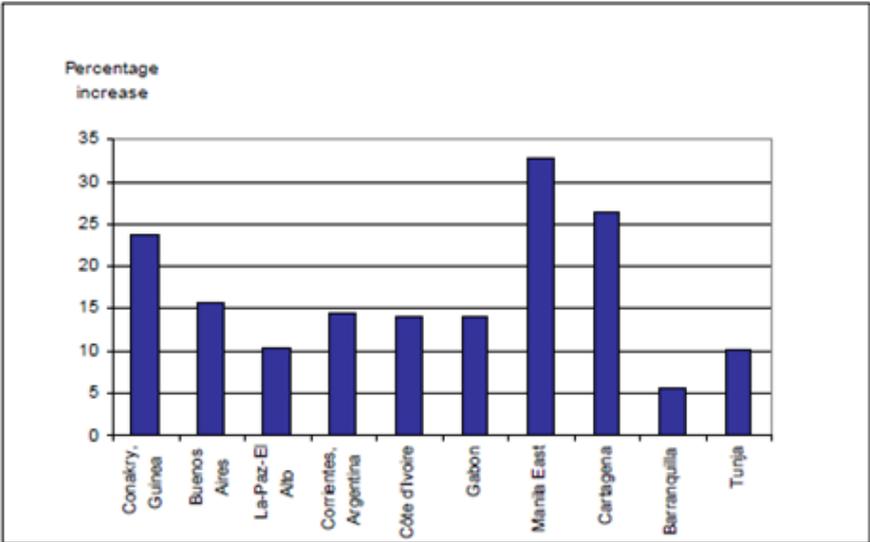
In the horizontal axis is displayed the time horizon, from 1960 to 2002. In the vertical axis, there is the level of subscribers (in units) per 1000 inhabitants. Black arrows indicate the introduction of PPI projects and private companies in this sector. Respectively, CelTel entered in the market in May 1995, MTN in October 1998 and UTL in January 2001. After the introduction of Mobile Telephones, Mobile subscribers registered a boom in the subsequent years, especially in 2002. Fixed subscribers registered a moderate increase as well. This

<sup>14</sup> Harris C., “Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons”, The International Bank for Reconstruction and Development, Washington DC, World Bank Working Paper No. 5, April 2003, p.17

incredible amount of subscribers confirmed the success of the reform implemented and the introduction of PPI projects in this sector.

It is possible to argue the same for the water sector, even if it still represents the most sensitive sector among public utilities for what concerns private intervention. As it will be better explained in Chapter 2 and Chapter 4, water is among the essential goods for life. If tariffs are set too high with respect to the availability of final users, it is possible that riots arise. The following Graph 7 shows the improvements in access to fresh water in different countries of the world after the implementation of PPI.

**Graph 7. Water Access increase after introduction of PPI**

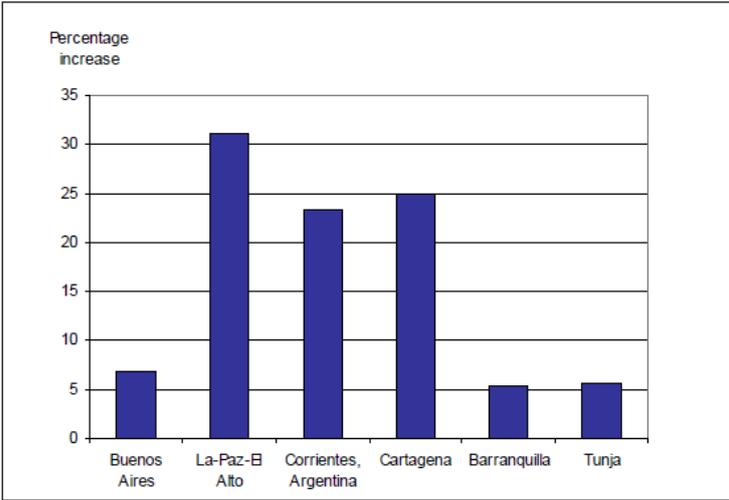


Source: Harris C., “Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons”, *The International Bank for Reconstruction and Development, Washington DC, World Bank Working Paper No. 5, April 2003, p.19*

Data shown regard cities and countries in Latin America (especially Argentina) and Africa that decided to introduce PPI in the water sector. The highest percentages of improvements in accessing fresh water were registered in Manila East, Cartagena and Guinea, respectively with 33%, 26% and 23% of increase.

With water, also sanitation services are fundamental for health. Graph 8 introduces the improvements in access to sanitation services after the introduction of PPI, in order to show the impact of this solution on different fields.

**Graph 8. Sanitation Access after introduction of PPI**

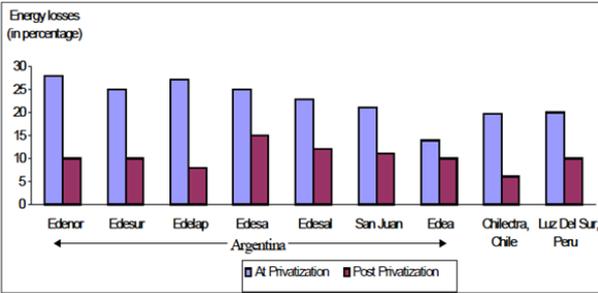


Source: Harris C., “Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons”, The International Bank for Reconstruction and Development, Washington DC, World Bank Working Paper No. 5, April 2003, p.20

Graph 8 considers only Latin American cities that were represented in Graph 7: Buenos Aires, La-Paz-El Alto, Corrientes, Cartagena, Barranquilla and Tunja. The introduction of PPI projects in sanification services in LAC region, showed good results, especially in La-Paz-El Alto, Corrientes and Cartagena. The reform resulted to be particularly successful, increasing access to sanitation services of 31% in La-Paz-El Alto, 25% in Cartagena and 24% in Corrientes.

Even the electricity sectors were able to increase coverage thanks to private intervention, and evidences are mostly available for the LAC zone, as shown in Graph 9.

**Graph 9. Reduction in energy losses in Latin America after introduction of PPI**



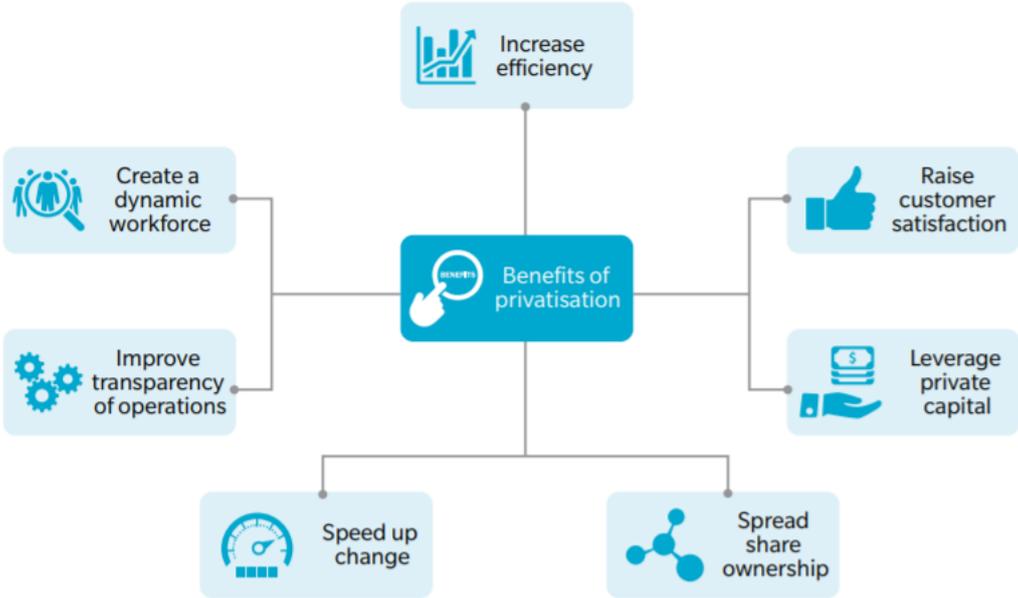
Source: Harris C., “Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons”, The International Bank for Reconstruction and Development, Washington DC, World Bank Working Paper No. 5, April 2003, p.22

As shown in Graph 9, reduction in energy losses in LAC region (specifically Argentina, Chile and Peru) right after PPI implementation are relevant. In most of the cases, reductions were about half of the original value, depicting a situation of successful introduction of PPI instruments, that is related to operational efficiencies of private management.

In order to promote private intervention and encourage operating efficiency, firms that try to invest in provision of utilities can receive subsidies from governments, especially in developed countries, so they can benefit from an overall positive fiscal effect. In this way, governments may be able to divest and raise revenues consequently. Given that, excess in deductions and subsidies allowances should be avoided, otherwise P.A.<sup>15</sup> could incur in losses instead of revenues.

To illustrate the overall advantages explained in this section, Figure 2 summarizes the key benefits that arise from privatization process and that are primarily taken into account when assessing the advantages of a PPI project’s introduction.

**Figure 2. Benefits arising from private sector participation**



Source: Youssef J., Nahas R., “Bridging the infrastructure gap: engaging the private sector in critical national development. Benefits, risks and key success factors”, Oliver Wyman, Report, 2017, p. 8

<sup>15</sup> Public Administration

Figure 2 illustrates the seven key benefits deriving from privatisation. As described before in this section, the benefits are:

- Increase in efficiency;
- Raise customer satisfaction;
- Leverage private capital;
- Spread share ownership;
- Improve transparency of operations;
- Creation of dynamic workforce.

All those factors contribute to push governments towards an increase in PPI utilisation. However, all those factors can be improved in an efficient environment. With this regard, Figure 3 summarizes the key success factors that must be taken into account while developing a favourable context for PPI Project's implementation.

**Figure 3. Key success factors in PPI Project's implementation**



*Source: Youssef J., Nahas R., "Bridging the infrastructure gap: engaging the private sector in critical national development. Benefits, risks and key success factors", Oliver Wyman, Report, 2017, p. 14*

Figure 3 illustrates the main 5 key success factors in PPI development, which are:

- Sound sector strategy and policies;
- Robust process and governance;
- Qualified private sector company;
- Effective regulator and regulations;
- Transparency and communication.

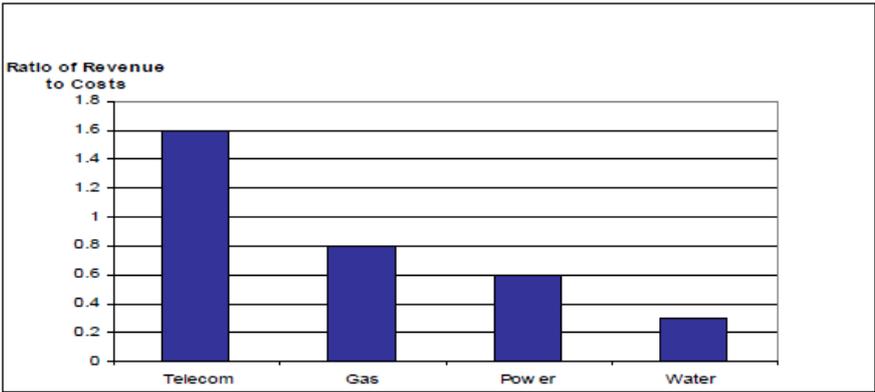
All those factors, if they work together, they create the right synergies and allow for an efficient and successful PPI development and utilisation across the different regions and sectors.

**Disadvantages**

Tariff setting represents the first issue that privates face, thus, private investors must set a price equal to the cost raised from the resources used or higher, in order to reach the breakeven point. In case of purely public management, instead “*infrastructure prices were often controlled to meet short-term political objects*”<sup>16</sup> and this represents the reason why tariffs of publicly managed services are lower than those applied by private companies. This dichotomy causes difficulties about merging the different objectives of private companies and public authorities: because from one hand, margins have to be obtained by privates and, on the other hand, interests of citizens must be pursued by governments, keeping tariffs low. A solution to this problem could be represented by an adequate risk allocation between the parties involved, with clear clauses in the contracts, as it will be better explained in Chapter 3.

The following Graph 10 illustrates cost recovery deriving from operational efficiency in PPI brought by the involvement of private parties.

**Graph 10. Cost recovery on public utilities in the early 1990s**



Source: Harris C., “Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons”, The International Bank for Reconstruction and Development, Washington DC, World Bank Working Paper No. 5, April 2003, p.15

<sup>16</sup> Gray P., “Private Participation in Infrastructure: A Review of the Evidence”, Private Provision of Public Services Group, Private Sector Advisory Services, Paper, October 2001, p. 79

The sector that benefitted most from private involvement through PPI, was telecommunications. This sector registered savings that brought the Revenues/Costs ratio to 1.6. It means that less than a third of the revenues were dedicated to cover costs. However, the sector that registered the lowest Revenue/Costs ratio was the water sector. This is a matter of interest for this dissertation, because it shows the difficulty that arises when the public water sector must be managed with private resources and capabilities. This result is also due to the fact that, as it will be better explained in Chapter 2, water and sewerage sector is the one that showed the lowest amount invested in PPI in the last few years.

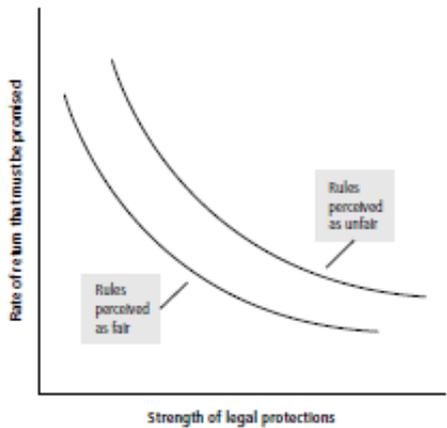
With operational inefficiencies of public management, the lower level of prices claimed by population were not sustainable anymore, so privates started to enter this field. To do this, reforms were required and this generated uncertainties in the population. Citizens were not sure about the success of the involvement of private parties in public affairs, because they had the belief that this could have brought to a steep increase of tariffs. However, in most of the cases, there was no other solution<sup>17</sup>.

In order to bring investments efficiently to the end, arrangements play a crucial role as well. If the arrangements provided by the company are perceived as unfair, the trust decreases turning into necessity of contractual protection. In this way, government loses its credibility. The following Figure 4 shows the relation between rates of returns promised and legal protections.

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<sup>17</sup> Harris C., “*Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons*”, The International Bank for Reconstruction and Development, Washington DC, World Bank Working Paper No. 5, April 2003

**Figure 4. Perceived fairness of privatization and relation to lower rates for legal protection**



Source: PPIAF, World Bank, “Approaches to Private Participation in Water Services: A Toolkit”, Public-Private Infrastructure Advisory Facility & the World Bank, Washington DC, Report, 2006, p. 6

This graph is decreasing. It means that the higher is the rate of return, the lower is the strength of legal protections. In Figure 2 are represented two curves, both showing an inverse relation. The external curve is named *Rules perceived as unfair*, the lower curve is named *Rules perceived as fair*. As reported by the World Bank (2005), in order to implement successfully a PPI agreement, it is necessary to convince citizens that this contract is fair. The risk of not ensuring citizen’s approval is that they could subsequently claim the right to override the responsibilities of the privates, in order to be sure that the tariffs and the cost that they could bear are not arising. If risks arise and responsibilities are misallocated, privates will ask for a higher compensation due to the fact that they bear more risks and more responsibilities. So, a PPI project that is perceived as fair, will lower the probability of citizens’ claims, thus helping in lowering the returns that private investors could ask<sup>18</sup>.

The most concerning disadvantage lies in the intrinsic objectives, which are divergent. For governments, developing infrastructures means to improve and push the development of the country itself, whereas privates look for profit opportunities. The truth is that, most of the time, governments don’t have enough resources to build and maintain infrastructures on their own, so they look for private investors to obtain external financing. As a matter of facts, “several countries, especially within the Asian region, have failed to keep pace with the infrastructural

<sup>18</sup> PPIAF, World Bank, “Approaches to Private Participation in Water Services: A Toolkit”, Public-Private Infrastructure Advisory Facility & the World Bank, Washington DC, Report, 2006, p. 6

*requirement of expanding economies. This gap between the needs and reality can be filled up by encouraging a broader framework of economic liberalization. This would envisage the diminishing role of the government and increase the benefits of Public Private Partnership (PPP), including the role of international trade and foreign investments.”*<sup>19</sup> The main problem is the fact that the two different parties are accountable to different subjects: privates are accountable to stakeholders and shareholders and, on the other side, governments must be accountable to citizens. When privates are involved in public infrastructure projects, they must be transparent and pursue an objective that is favorable to citizens and public at large, otherwise government starts to lose trust from their people and then, again, projects might look riskier than they actually are. If there is lack of transparency and the public sector is affected by operational and managerial inefficiencies in handling investments in infrastructure, black markets and bribery arises from the demand left outside from the government’s offer.

The last element to keep into account in this pattern is the cost of capital. Private firms hold a cost of capital that is inevitably higher than the one of the government for borrowings, even if it does not necessarily mean that is better in managing projects and investments. The cost of capital of the government represents the one that, instead, taxpayers bear effectively due to the “*open-ended credit insurance to the government*”<sup>20</sup>. What rises from the difference between the cost of capital of private firms and the one of the government, lies in the liabilities of taxpayers for which they do not receive compensation. So, that is to say that “*there is no reason to expect the social cost of private finance to be any higher than the social cost of public finance*”<sup>21</sup>.

Hence, we can summarize the reasons for undertaking PPI as follows:

- possibility to invest an higher amount of money in order to satisfy the larger public demand of services;
- provision of superior level of technologies;

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<sup>19</sup> Thakar B., “*Legal Implications Behind Public Private Participation: An Analysis*”, The IUP Journal of Infrastructure, Vol. VII, Nos. 3 & 4, 2009, p. 20

<sup>20</sup> Harris C., “*Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons*”, The International Bank for Reconstruction and Development, Washington DC, World Bank Working Paper No. 5, April 2003, p. 27

<sup>21</sup> Harris C., “*Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons*”, The International Bank for Reconstruction and Development, Washington DC, World Bank Working Paper No. 5, April 2003, p. 27

- availability to meet the maintenance process through years and organize an on-time delivery of the products or services.

The problem lies in the fact that, as the infrastructures are of public interest, private participation is not always welcomed by citizens and this can affect the success of the investment. If citizens are not properly involved as stakeholders, they will not be willing to pay for the service provided and socio-political problems could arise. As main disadvantage, it is possible to argue that the final objectives are, naturally and intrinsically speaking, divergent: public administration and governments should focus on the long-term horizon with no or little interest on returns; privates, on the contrary, focus themselves more on the short run, in order to verify whether they have recovered the costs of the investment they had incurred, and on profits.

## Chapter 2 – Overview and Regulation

### 2.1 OECD Guidelines for Private Sector Participation

During the last few years, OECD has given prominent importance to the regulation of the private intervention in public infrastructure. The 24 Principles to be respected while undertaking PPI projects, have been developed by OECD, stating some ethical key points and operating guidelines, hindering opportunistic behaviours that could damage the society and undermine the sustainable development, especially in developing countries. They are divided into:

- Principles 1 to 4: Deciding on public or private provision of infrastructure services;
- Principles 5 to 8: Enhancing the enabling institutional environment;
- Principles 9 to 12: Goals, Strategies and Capacities at all levels;
- Principles 13 to 19: Making the public-private co-operation work;
- Principles 20 to 24: Encouraging responsible business conduct.

In what follows, I will present the Principles<sup>22</sup> and I will comment them.

The first four Principles state that when a PPI project is undertaken, a financial assessment according to a cost-benefit analysis is not sufficient, and privates must disclose how they will recover those costs through tariffs, together with collaterals. Risk allocation and fiscal transparency are of primary importance.

#### Principle 1

*“The choice by public authorities between public and private provision should be based on cost-benefit analysis taking into account all alternative modes of delivery, the full system of infrastructure provision, and the projected financial and non-financial costs and benefits over the project lifecycle.”*

The first way available to public authorities to choose the private partner is the evaluation through a cost-benefit analysis. As already mentioned, the first reason to involve private parties

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<sup>22</sup> All the following principles are taken directly from OECD, “*Principles for Private Sector Participation in Infrastructure*”, OECD Publications, Report, 2007.

is the economic efficiency gained in managing optimally the resources available. If there is no good assessment of the trade-off, consequently there will be no reason to involve private investors in infrastructure projects. Of course, all the sectorial characteristics must be taken into account, with the sustainability aspect as well.

## **Principle 2**

*“No infrastructure project – regardless of the degree of private involvement – should be embarked upon without assessing the degree to which its costs can be recovered from end-users and, in case of shortfalls, what other sources of finance can be mobilised.”*

In order to let PPI work, it is a matter of importance to recover the costs of operations by collecting charges from final users. This means that, through a transparent process of targeting and setting prices, those must be in line with the cost incurred. Namely, if prices are unreasonably too low, it does not mean that the co-operation worked. This case would represent the first reason why the PPI could not work successfully in the long-run, because if prices are too low they will not cover the costs incurred. Thus, the project could fail. As well, depreciation allowances and market distorting effects harm the possibility of achievement of the targets set.

## **Principle 3**

*“The allocation of risk between private parties and the public sector will be largely determined by the chosen model of private sector involvement, including the allocation of responsibilities. The selection of a particular model and an associated allocation of risk should be based upon an assessment of the public interest.”*

If the capitalization of parties is set unequally, who will carry the financial burden must be the party with the stronger financial situation. Generally, the risk borne by privates relates to the private nature of the operation, while the public-interest risk is borne by public authorities. Even if government may have an interest in shifting the risk to privates, they have to take into account that this have a direct reflection on prices to final users.

#### **Principle 4**

*“Fiscal discipline and transparency must be safeguarded, and the potential public finance implications of sharing responsibilities for infrastructure with the private sector fully understood.”*

Privates must know exactly the environment (legal and social) in which they are operating. A protection of interests is also given by involving guarantees, and privates must ensure accountability process for this protection.

Principles from 5 to 8 are designed in order to establish a sound environment, free from corruption and monopolies, enabling every firm with no restrictions to access capital markets.

#### **Principle 5**

*“A sound enabling environment for infrastructure investment, which implies high standards of public and corporate governance, transparency and the rule of law, including protection of property and contractual rights, is essential to attract the participation of the private sector.”*

The quality of the general climate is a matter of importance for privates in selecting their investments. Legislation and administrative practices can deeply affect the selection process and the success of the intervention.

#### **Principle 6**

*“Infrastructure projects should be free from corruption at all levels and in all project phases. Public authorities should take effective measures to ensure public and private sector integrity and accountability and establish appropriate procedures to deter, detect and sanction corruption.”*

Corruption may arise in each phase of the co-operation. Especially monopolies can give a wide range of opportunities for bribery and rent-seeking. This is why anti-corruption measures should be applied and transparency in operations enhanced.

## **Principle 7**

*“The benefits of private sector participation in infrastructure are enhanced by efforts to create a competitive environment, including by subjecting activities to appropriate commercial pressures, dismantling unnecessary barriers to entry and implementing and enforcing adequate competition laws.”*

The possibility of creating a competitive environment as it was under “perfect market conditions”, most of the time implies that structural reforms are needed. Doing this, it is possible to involve as much privates as possible in the selection process, bringing to the situation an overall improvement. Sometimes, both vertical separation and horizontal separation of the supply chain should be developed, because they enhance the competition according to which private companies choose their partners.

## **Principle 8**

*“Access to capital markets to fund operations is essential to private sector participants. Restrictions in access to local markets and obstacles to international capital movements should, taking into account macroeconomic policy considerations, be phased out.”*

If the domestic capital market is functioning, this makes easier the participation of private parties in the involvement. Most of the times, when the exchange rates are convertible and privates are allowed to move easily capitals abroad, the market in which they are operating starts to be more competitive, especially at international level. On the contrary, if it is difficult to move capitals, it means that there is no possibility of mitigation of this kind of risk.

The following four principles highlight the necessity of communicating and sharing strategies and objectives with final users and all level of government in order to make projects successful.

## **Principle 9**

*“Public authorities should ensure adequate consultation with end-users and other stakeholders including prior to the initiation of an infrastructure project.”*

If consultations are not put in place, there is the possibility that operations will be unsuccessful. Consultations with final users are useful in order to clarify objectives and that undertakings are

in the public interest. This improve expectations about targets to achieve. This point turns useful in cases of problems arising for inefficiencies or mismanagement.

### **Principle 10**

*“Authorities responsible for privately-operated infrastructure projects should have the capacity to manage the commercial processes involved and to partner on an equal basis with their private sector counterparts.”*

Public authorities must be at the same level of the private counterpart in managing commercial process, in order to avoid disparities and the possibility of taking advantage of this difference.

### **Principle 11**

*“Strategies for private sector participation in infrastructure need to be understood, and objectives shared, throughout all levels of government and in all relevant parts of the public administration.”*

The project pursued are not always national, they could be also regional or local. Given these situations, it is of primary interest the value-sharing among all levels of public authorities, setting common goals and coordinate operations and allowances among them, in order to favour this process.

### **Principle 12**

*“Mechanisms for cross-jurisdictional co-operation, including at the regional level, may have to be established.”*

To pursue the public interest, it is necessary that jurisdictions are able to co-operate according to agreements set between the parties. This is important especially looking at the compatibility of the legal systems among nations, and at possible disputes that could arise.

Principles form 13 to 19 state that operations must be transparent, fully disclosed and with no influence from parties. Performance indicators must be put in place. Renegotiations are allowed if in good faith and resolution mechanisms are determined, presenting fairness and transparency.

### **Principle 13**

*“To optimise the involvement of the private sector, public authorities should communicate clearly the objectives of their infrastructure policies and they should put in place mechanisms for consultations between the public and private partners regarding these objectives as well as individual projects.”*

This relates specifically to the issue of building trust among parties, which is essential for co-operation in order to be successful.

### **Principle 14**

*“There should be full disclosure of all project-relevant information between public authorities and their private partners, including the state of pre-existing infrastructure, performance standards and penalties in the case of non-compliance. The principle of due diligence must be upheld.”*

To explain this, it is useful to agree with OECD explanation of the principle, which says that “Due Diligence implies that authorities should undertake such actions as an ordinarily prudent or reasonable party would normally apply to avoid harm to another party or itself. In practice, this implies that foreseeable risks should be accounted for and disclosed and no essential information withheld. Failure to make this effort is considered negligence”<sup>23</sup>.

### **Principle 15**

*“The awarding of infrastructure contracts or concessions should be designed to guarantee procedural fairness, non-discrimination and transparency.”*

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<sup>23</sup> OECD, “Principles for Private Sector Participation in Infrastructure”, OECD Publications, Report, 2007, p. 22

It could happen that government over-relies on perfect market conditions. This is not always true and issues may arise, so it is necessary to establish the right market and legal conditions to preserve fairness and non-discriminatory actions that can be undertaken.

### **Principle 16**

*“The formal agreement between authorities and private sector participants should be specified in terms of verifiable infrastructure services to be provided to the public on the basis of output or performance based specifications. It should contain provisions regarding responsibilities and risk allocation in the case of unforeseen events.”*

The quantification of elements in such a way that makes it easier the evaluation of targets achievement and adherence to contractual terms is relevant. Of course, whenever conditions arises that do not allow privates to proceed in the operations, it is also possible that government accept those changes and renegotiates some terms.

### **Principle 17**

*“Regulation of infrastructure services needs to be entrusted to specialised public authorities that are competent, well-resourced and shielded from undue influence by the parties to infrastructure contracts.”*

This is especially true and necessary in case of monopolies, due to the intrinsic nature and issues that can arise. These regulatory bodies may ensure in the contractual phase that undertakings are meaningful, or that parties operate in the respect of market conditions (arm's length principle).

### **Principle 18**

*“Occasional renegotiations are inevitable in long-term partnerships, but they should be conducted in good faith, in a transparent and non-discriminatory manner.”*

Given the impossibility of coverage of each single possible change and eventuality, flexibility must be ensured. This does not mean that the terms can be changes whenever useful, but only when it is truly necessary and according to the transparency required by law.

## **Principle 19**

*“Dispute resolution mechanisms should be in place through which disputes arising at any point in the lifetime of an infrastructure project can be handled in a timely and impartial manner.”*

The long-lasting relationship among parties is specifically important to include agreements about regulations of possible disputes, how to discipline them and how to handle the possible conflict.

The last five Principles are focused on acting with integrity, in compliance with local and international laws, and on promoting the communication between parties about common objectives and agreed principles. Moreover, they stress the importance to be mindful of the consequences of actions undertaken in the provision of vital services.

## **Principle 20**

*“Private sector participants in infrastructure should observe commonly agreed principles and standards for responsible business conduct.”*

From now on, principles are directed to push positively towards good behaviour of parties, especially law compliance.

## **Principle 21**

*“Private enterprises should participate in infrastructure projects in good faith and with a commitment to fulfil their commitments.”*

We refer to good faith in this case especially with regard to renegotiation power contract that privates are able to put in place.

## **Principle 22**

*“Private sector participants, their subcontractors and representatives should not resort to bribery and other irregular practices to obtain contracts, gain control over assets or win favours, nor should they accept to be party to such practices in the course of their infrastructure operations.”*

The main risk in PPI is of course bribery and bad faith of private parties. This is especially true in nations where governments and law enforcement are weak. This principle tries to push toward meritocracy in corporate governance of private companies.

### **Principle 23**

*“Private sector participants should contribute to strategies for communicating and consulting with the general public, including vis-à-vis consumers, affected communities and corporate stakeholders, with a view to developing mutual acceptance and understanding of the objectives of the parties involved.”*

This represents one of the most important element for what regards the conduction of a responsible business. Communication with final users enhance the conditions in which privates operate for the success of the infrastructure. In is of primary importance to involve the society to get consensus and to improve the overall environment in which private investors try to proceed.

### **Principle 24**

*“Private sector participants in the provision of vital services to communities need to be mindful of the consequences of their actions for those communities and work, together with public authorities, to avoid and mitigate socially unacceptable outcomes.”*

Being accountable is the first matter to take into consideration for privates while udertaking PPI. Privates must take into account that there is the possibility to incur in penalties if they act against law and regulation. This is why it is so important to establish beforehand obligations for both public and private parties. They need to be aware of all the conditions in which they are operating.

The ratio behind the 24 Principles is acting according to common and shared objectives and strategies, promoting transparency and bribery avoidance. Moreover, the constant communication with communities and stakeholders is considered to be a crucial point. Privates must be protected from risks caused by macroeconomic dangerous events, and offer collaterals in case of operating risks, always in the light of providing a vital service to local communities.

## 2.2. Geographical overview

In order to introduce the final chapter, dealing with the water provision infrastructures in Africa, it is useful to look at the overall situation, especially in the OECD sector, which is more similar to the case study.

The areas taken into account are:

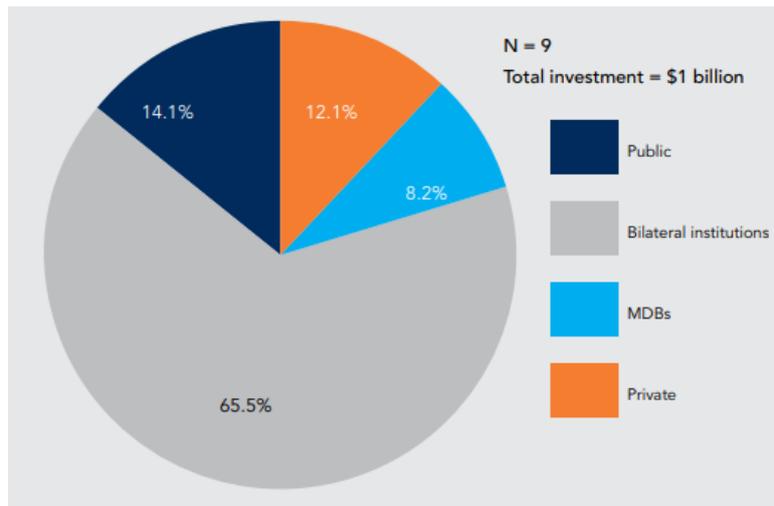
- Europe and Central Asia (ECA);
- East Asia and Pacific (EAP);
- Latin America and the Caribbean (LAC);
- Middle East and North Africa (MENA);
- South Asia (SAR);
- Sub-saharian Africa (AFR).

From now on, we will refer to the different areas in the world by using these acronyms: EMDE (Emerging Markets and Developing Economies) and IDA Countries (poorest countries according to the International Development Association).

We will refer to IDA countries as the poorest countries to which the World Bank dedicated a specific association in order to help them in developing their infrastructure. Those countries, due to the weakness of their governments and the instability of their socio-economic pattern, are unable to keep an increasing, or at least stable, level of investments. Through the last decade, investments reached a peak in 2012, but decreased dramatically the year after. In 2016, projects started to increase again, even if moderately. As PPI Database declared, the decrease was, on average, of 14% each year. The types of contract that are mostly used among IDA Countries, are the Bilateral Institutions, using mainly debt financing.

Figure 5 shows the different debt sources used in IDA Countries in percentage in 2016.

**Figure 5. Sources of Debt in PPI in IDA Countries in 2016**



*Source: World Bank Group “2016 Private Participation in Infrastructure (PPI) Annual update”, Report, 2017, p. 6*

Figure 5 illustrates the 2016’s distribution of the debt resources used in 9 PPI projects in IDA countries, which provided complete financial information. More than two-thirds of the total debt used came from Bilateral Institutions<sup>24</sup>, for a total amount of 65.5%. The second most used form of debt, with a percentage of 14.1%, came from public resources, followed by private resources for 12.2% of the total amount. The form that was less used with respect to other forms, was debt coming from Multilateral Development Banks, with a percentage of 8.2%.

The descriptions and general outlines of the regions that are analyzed by the World Bank in the PPI Database, which is the main reference of this dissertation will be reported below.

#### **a) Europe and Central Asia (ECA)**

When considering the development and the enforcement of PPI, it is not of primary interest to look at developed countries such as EU and US. This is mainly due to the fact that the implementation of a liberalization process is intrinsic to those regions and nations, in which private involvement does not have to be pushed in order to be increased. During the last 25 years, privatization has been regulated involving public authorities, such as Consob<sup>25</sup> and Antitrust, to avoid issues such as bribery and moral hazard. Moreover, the need to face problems like demographic increase and socio-economic stability is not comparable to the situation of

<sup>24</sup> Generally, Bilateral Institutions are Development Banks

<sup>25</sup> Commissione Nazionale per le Società e la Borsa

Lower Middle Income and Low Income countries, in which the pressure in facing those situation is dramatic. This is why, when considering european and central asia situation, we will concentrate on those countries that are facing a phase of development, such as Russia.

The following Figure 6 shows the geographical location of ECA region.

**Figure 6. Geographical location of the ECA Area**

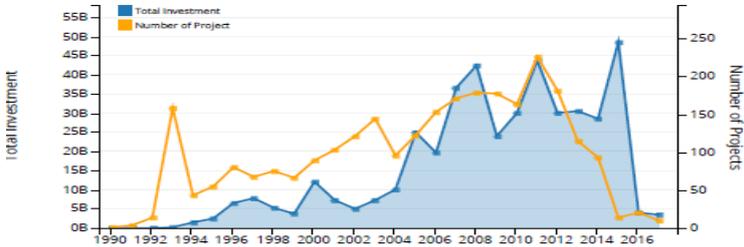


Source: World Bank PPI Database, as of March 2018

The lowering trend of infrastructure investments in this region contributes to the global situation of decline, with a fall of 93% (Graph 11). If countries such as Turkey and Russia are included, it is not difficult to understand the extremely diverse situation among countries of the european region, taking into consideration the political distress situation between these two countries.

The following Graphs 11 and 12 show the amount of projects undertaken during a time range (1990-2016) with two different methods.

**Graph 11. Representation of total investments and number of projects in ECA with a line graph, 1990-2016 (lines)**

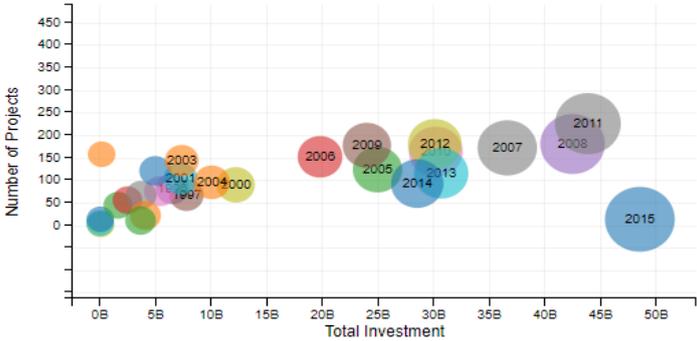


Source: World Bank PPI Database, as of March 2018

In Graph 11 the right vertical axis represents the number of projects, the left vertical axis the amount invested and, the horizontal axis the time horizon. Investments in PPI projects were almost absent at the beginning of the 90s. In 1993 there was a large number of projects with

low amounts invested, and the trend was declining in 1994. From 1995, projects started to increase in amount and numbers. From the end of the 90s until 2004 there was a waving behaviour due to the economic instability and political uncertainty. From 2004, an increasing but still waving trend occurs. Then, in 2016, a sharp decrease was registered in PPI projects utilization.

**Graph 12. Representation of total investments and number of projects in ECA with a bubble graph, 1990-2016**

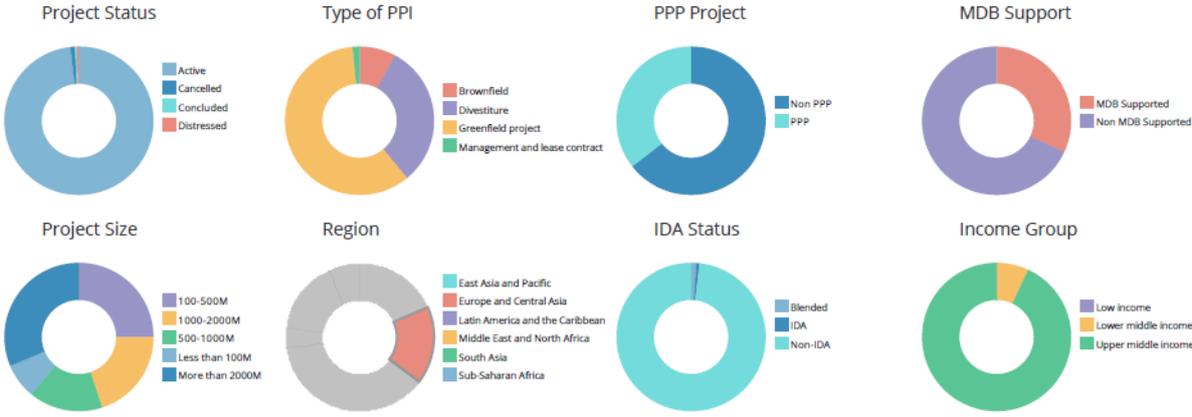


Source: World Bank PPI Database, as of March 2018

According to Graph 11 and 12, it is possible to see that from 2006, the ECA Region started to invest more in PPI. This increase was not only in terms of amount of dollars invested, but also in number of projects undertaken. Russia, starting from 2005 with the federal PPI law, has been trying to implement a policy of public-private partnership to incentivate the development of the country, especially thanks to the involvement and support of the Investment Fund of Russia Federation. The most relevant type of contract applied is the Concession, driven to collection of debt financing. It is not easy to obtain the authorization of the government for the access to funds. First of all, the contract shall comply with all federal law requirements. This, implies that experts must be able to conduct all the verifications needed, and this can't be done rapidly, due to lack of professional knowledge. The first stages of implementations are not easy to face, but Russia declared its intentions to facilitate the procedure in the next years.

Figure 7 shows an overview of PPI situation in ECA region. It analyzes (from left to right and from top to the bottom): Project status, Types of PPI, kinds of projects implemented, Multilateral supports from Development Banks, Size of projects, percentage of projects undertaken with respect to other regions, IDA status and Income group.

**Figure 7. Overview of the main data as of September 2017 in ECA region**



Source: World Bank PPI Database, as of March 2018

The ECA region presents the following characteristics:

- Project Status: the majority of the projects is active, almost the totality. cancelled, concluded or distressed projects are almost absent, meaning that PPI projects implementation started successfully only in the last few years;
- Project Size: mostly ECA region invests in projects more than 2000M, immediately followed by investments in small projects ranging from 100M to 500M. Almost the same percentage is dedicated to bigger projects, that range from 1000M to 2000M. Less resources are invested in projects less than 100M and in projects ranging from 500M to 1000M;
- Type of PPI: in ECA region the highest percentage of the PPI projects undertaken are Greenfield Projects, namely those projects that involve the construction of an asset. Divestitures are the next most applied kind of contract in this area. This means that, in this specific region, governments invest in PPI by involving privates since the earliest stages of the project or by giving them the complete ownership of the asset, in order to be better managed by privates;
- PPI Project: there is a greater incidence of Non-PPI projects among those analyzed;
- IDA Status: Non-IDA status covers almost the totality of the projects analyzed;
- MDB Support: ECA region is mainly financed through forms of debt that do not come from Multilateral Development Banks;
- Income Group: the countries included in ECA area pertain mostly to Upper Middle Income group.

## b) East Asia and Pacific (EAP)

This regions showed the highest level of investments in infrastructures during 2016, with China as top performer, probably owing to the effective implementation of the new PPI regulation.

The following Figure 8 shows the geographical location of EAP region.

**Figure 8. Geographical location of the EAP Area**

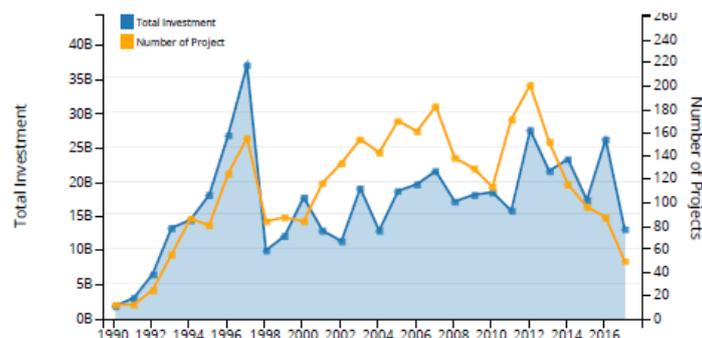


*Source: World Bank PPI Database, as of March 2018*

This region totalized, according to the World Bank Annual Report 2016, almost 35% of the total PPI investments with 80 projects financed (most of them in the energy sector). This huge increase in infrastructure projects is driven by the increasingly higher demand of services and goods, that the government is no longer able to provide alone. It is not unknown that China faces an explosive development, which raised its population to almost 1.4 billion people. This boom in demography must be accompanied by adequate service and goods provision.

The following Graphs 13 and 14 show the amount of projects undertaken during a time range (1990-2016) with two different methods.

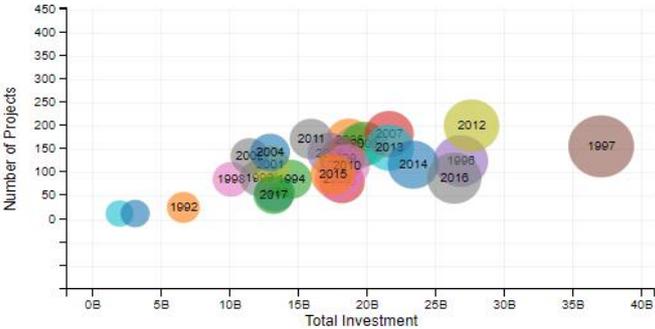
**Graph 13. Representation of total investments and number of projects in EAP with a line graph, 1990-2016 (lines)**



*Source: World Bank PPI Database, as of March 2018*

In Graph 13 the right vertical axis reports the number of projects, the left vertical axis the amount invested and, the horizontal axis, the time horizon. Investments have been showing an increasing trend in PPI projects from 1990-1991, reaching the highest peak in 1997. After this year, a steep decrease was registered, explained by the start of the Asian financial crises. Years of waving behaviour followed, until 2012 when the second highest peak of PPI projects undertaken was registered. However, even if an increasing trend lately occurred, the behaviour is still uncertain.

**Graph 14. Representation of total investments and number of projects in EAP with a bubble graph, 1990-2016**



Source: World Bank PPI Database, as of March 2018

In 2016 the amount invested was more than \$25 billion, increasing from the year before<sup>26</sup>. The chinese market of PPI is the biggest in this region and among all regions considered. In 2016, as a consequence of implementation on new PPI laws, China invested US\$11.4 billion, increasing by 75% from the previous five-year average<sup>27</sup>. Also Indonesia and Philippines invested a lot in PPI in the last few years, especially in 2016 when they invested respectively US\$6.9 billion and US\$5.4 billion. Both secured their investments in particular in the energy sector, which accounts for more than 93% of the entire amount of investments in Indonesia and about 40% in Philippines.

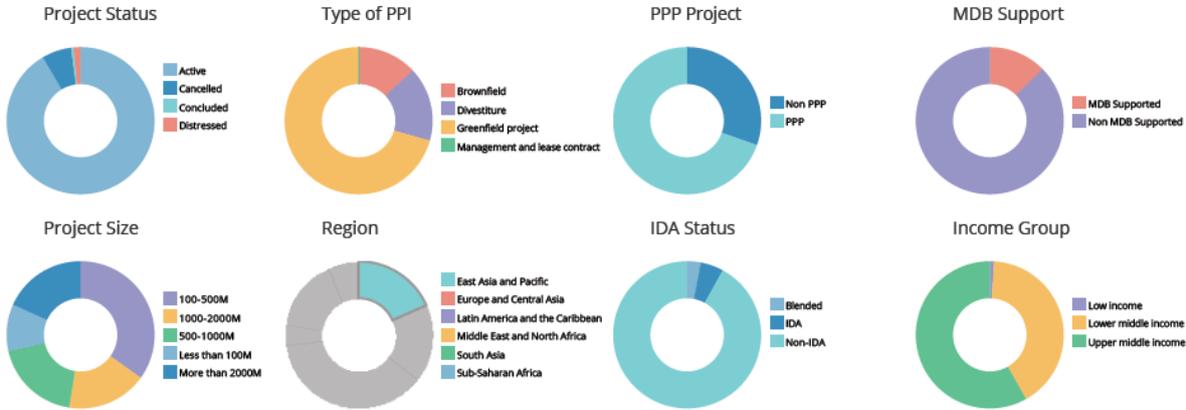
<sup>26</sup> The bubble on the graph referring to year 2017, takes into consideration only the first half of the year. It is worth to notice that the largest amount invested is in 1997. During this year, Hong Kong passed from the UK government to Chinese legislation. Of course, this brought an increase in overall wellness but probably restricted only to that area, given that in 1998 investments returned to the average.

<sup>27</sup> World Bank Group “2016 Private Participation in Infrastructure (PPI) Annual update”, Report, 2017, p.14.

The trend was confirmed in the first half of the year 2017, with Pakistan and Jordan joining the list of countries with highest investments undertaken, for a total amount of 48 projects. Most of the projects of the new entrants are related to the development of renewable energy power plants.

Figure 9 shows an overview of PPI situation in EAP region. It analyzes (from left to right and from top to the bottom): Project status, Types of PPI, kinds of projects implemented, Multilateral supports from Development Banks, Size of projects, percentage of projects undertaken with respect to other regions, IDA status and Income group.

**Figure 9. Overview of the main data as of September 2017 in EAP region**



Source: World Bank PPI Database, as of March 2018

The EAP region presents the following characteristics:

- Project Status: the majority of the projects is active, almost the totality. Only a small part is cancelled or distressed. Almost none of the projects analyzed are concluded. The region is now starting to implement PPI projects after a period of crises;
- Project Size: the situation is miscellaneous. EAP region invests mostly in small projects, ranging from 100M to 500M. The remaining part dedicates almost the same percentages to bigger projects, ranging from 1000M to 2000M, projects for more than 2000M and projects ranging from 500M to 1000M. Less resources are invested in projects for less than 100M;
- Type of PPI: in EAP region the highest percentage of the PPI projects undertaken are Greenfield Projects. Divestitures are the next most applied kind of contract in this area, followed by Brownfield projects, which do not involve the construction of the asset, already existing. Management and Lease Contract is almost absent;

- PPI Project: there is a greater incidence of PPI projects among those analyzed;
- IDA Status: Non-IDA status covers almost the totality of the projects;
- MDB Support: EAP region is mainly financed through forms of Debt that do not come from Multilateral Development Banks;
- Income Group: the countries included in EAP area pertain mostly to Upper Middle Income group.

### c) Latin America and the Caribbean (LAC)

This region faced a huge increase in PPI during the 90s, even if this did not turn into a positive solution for nation's development. What did not work during the 1990-2000 decade, was that there was no communication and meeting of private offer with public demand. The public sector did not place projects in which privates could participate in the market and, consequently, privates did not know that there were possibilities for them in their country. Moreover, during that decade was not even easy for foreign private investors to place investments in this region. As the author reported, *"these problems were caused by the resulting currency mismatch between dollar-denominated debt and local currency business revenues"*.<sup>28</sup>, causing distress situations. Additionally, fiscal costs deriving from renegotiations and guarantees given to privates for bearing risk in the operations, caused distortions and cancellations of contracts.

The following Figure 10 shows the geographical location of LAC region.

**Figure 10. Geographical location of the LAC Area**



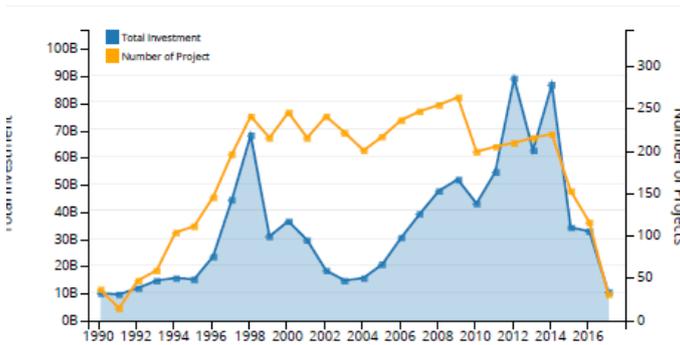
Source: World Bank PPI Database, as of March 2018

<sup>28</sup> Luis A., Foster V., Guasch J. L., Haven T., *"The Impact of Private Sector Participation in Infrastructure: Lights, Shadows, and the Road Ahead"*, World Bank Publications, PPIAF, Washington D.C., Article, 2008, p.30

Nowadays, after a crises that followed 2000s, LAC region represents the driving economy investing through PPI, as World Bank 2016 Annual Update reveals. The country that is investing most is Brazil, mostly in the energy sector. LAC region invested almost 50% of the global amount analyzed, for a total amount of US\$33.2 billion.

The following Graphs 15 and 16 show the amount of projects undertaken during a time range (1990-2016) with two different methods.

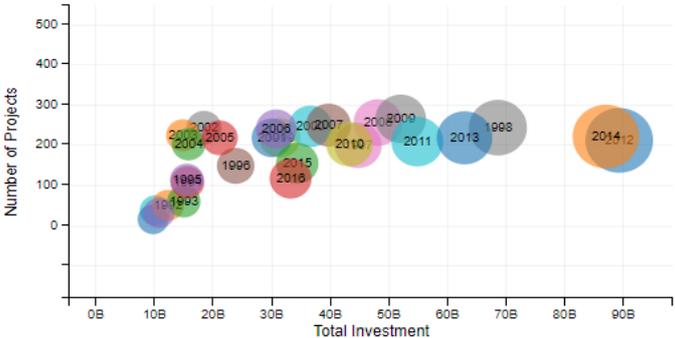
**Graph 15. Representation of total investments and number of projects in LAC with a line graph, 1990-2016 (lines)**



Source: World Bank PPI Database, as of March 2018

In Graph 15 the right vertical axis represents the number of projects, the left vertical axis the amount invested and, the horizontal axis, is reported the time horizon. LAC region registered a peak in 1998, after a stable situation at the beginning of the 90. After 1998, there was a drastic decrease until 2004. From that moment, the trend changed and has been increasing, with two peaks registered in 2010 and 2012, with a final decline in 2015 and 2016.

**Graph 16. Representation of total investments and number of projects in LAC with a bubble graph, 1990-2016 (bubbles)**

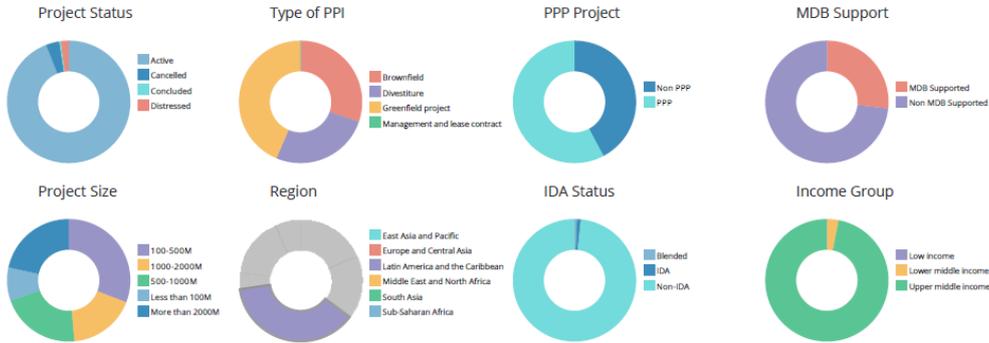


Source: World Bank PPI Database, as of March 2018

As it is possible to see from Graph 16, even if LAC region occupies the first place in classifications for amount of dollars invested in PPI, it is deciling, confirming the 2015 trend. This reduction in PPI trend can be explained by the lack of investments in Panama, in combination with the undertaking of less and smaller projects. Anyway, this decreasing trend, but still on top five regions performing highest PPI investments, can be seen as a signal of a more stable economic and social situation in those countries.

Figure 11 shows an overview of PPI situation in LAC region. It analyzes (from left to right and from top to the bottom): Project status, Types of PPI, kinds of projects implemented, Multilateral supports from Development Banks, Size of projects, percentage of projects undertaken with respect to other regions, IDA status and Income group.

**Figure 11. Overview of the main data as of September 2017 in LAC region**



Source: World Bank PPI Database, as of March 2018

The LAC region presents the following characteristics:

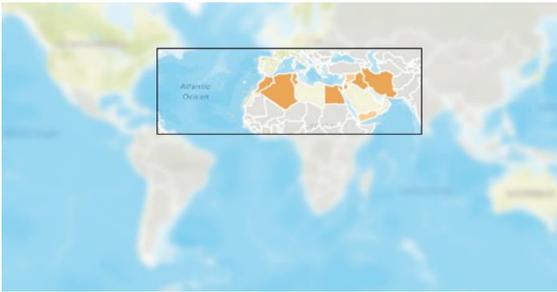
- Project Status: the majority of the projects is active, almost the totality. Only a small part is cancelled or distressed. Almost none of the projects analyzed are concluded. The region is now starting to implement PPI projects after a period of crises, as EAP region;
- Project Size: from Figure 9 it seems clear that LAC region invests in diverse sizes of projects. The highest percentage of the investments is dedicated to small projects, ranging from 100M to 500M. They are followed by bigger projects, that range from 1000M to 2000M, projects for more than 2000M and projects ranging from 500M to 1000M. Less resources are invested in projects for less than 100M;
- Type of PPI: in LAC region the highest percentage of the PPI projects undertaken are Greenfield Projects. Brownfield Projects are the next most applied kind of contract in this area, followed by Divestitures. Management and Lease Contract's application are almost absent as EAP region;
- Region: The LAC region is the one that invested most in PPI projects in the first half of year 2017;
- PPI Project: there is a greater incidence of PPI projects among those analyzed;
- IDA Status: Non-IDA status covers almost the totality of the projects;
- MDB Support: LAC region is mainly financed through forms of Debt that do not come from Multilateral Development Banks;
- Income Group: the countries included in LAC area pertain mostly to Upper Middle Income group.

#### **d) Middle East and North Africa (MENA)**

This region faced, and it is still facing, socio-economic and political instability that badly affect investments in infrastructures. Back in 2010, North Africa and Middle East regions faced the so-called Arab Spring, the revolutionary wave began in Tunisia. Those violent and non-violent riots, as primary consequence, depicted this region as a dangerous one, with no guarantees for privates undertaking projects, providing no incentives for them.

The following Figure 12 shows the geographical location of MENA region.

**Figure 12. Geographical location of the MENA Area**

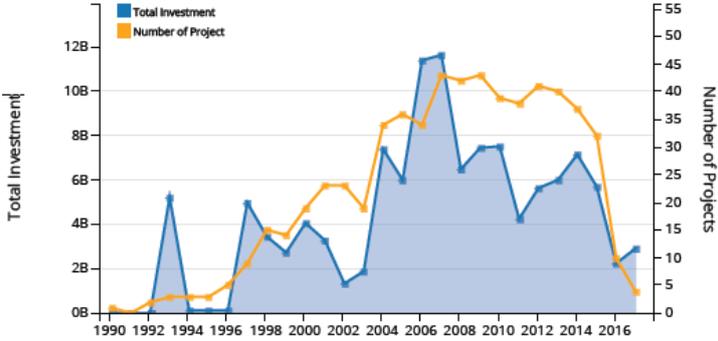


Source: World Bank PPI Database, as of March 2018

However, in 2016 this region started to invest through concessions again, especially in the energy sector and water sector. This increasing trend was confirmed in the first half of the year of 2017, driven by Jordan, Egypt, and Morocco.

The following Graphs 17 and 18 show the amount of projects undertaken during a time range (1990-2016) with two different methods.

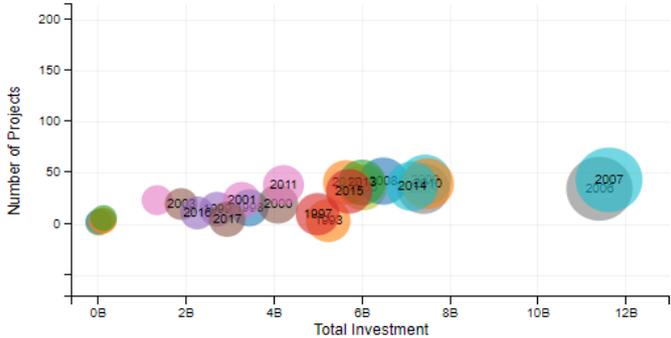
**Graph 17. Representation of total investments and number of projects in MENA with a line graph, 1990-2016 (lines)**



Source: World Bank PPI Database, as of March 2018

In Graph 17 the right vertical axis reports the number of projects, the left vertical axis the amount invested and, the horizontal axis, the time horizon. MENA started the introduction of PPI projects in 1992, reaching a first peak in 1993 and jumping to almost zero investments in the following two years. In 1996 there was a second peak, registering the same level of 1993. From that year on, PPI projects have been constantly implemented. However, in 2002 there was a decline, with a subsequent increase and waving trend during the years, until 2016. The largest amounts invested and the highest number of projects signed were between 2006 and 2008.

**Graph 18. Representation of total investments and number of projects in MENA with a bubble graph, 1990-2016 (bubbles)**

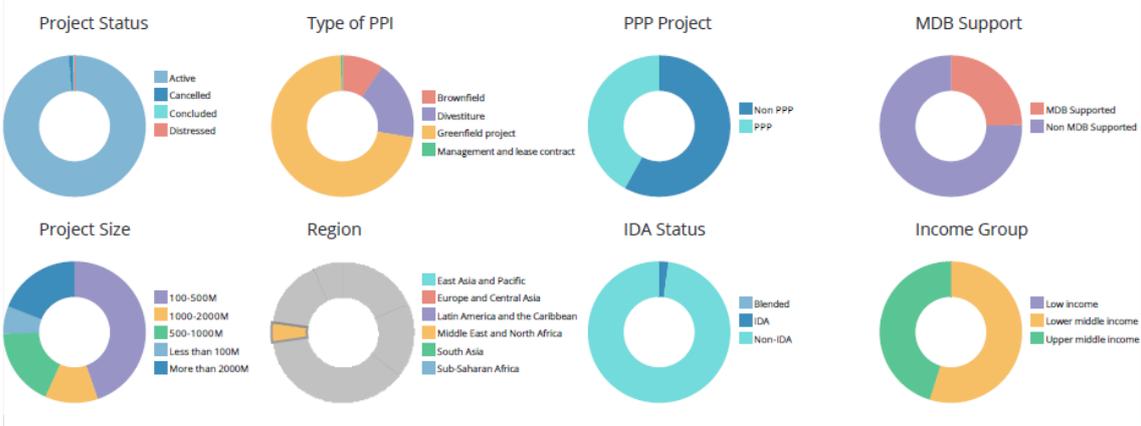


Source: World Bank PPI Database, as of March 2018

The absence of investments by privates during the 90s, is mostly given by the fact that the Gulf War occurred in that decade. After that moment, a sequence of conflicts, especially the US war in Iraq and the terrorist attack in 2001 to the Twin Towers in New York, depicted an extremely sensible pattern in which privates had to move. Fortunately, it is possible to see signs of recovery, especially from Saudi Arabia and Egypt.

Figure 13 shows an overview of PPI situation in MENA region. It analyzes (from left to right and from top to the bottom): Project status, Types of PPI, kinds of projects implemented, Multilateral supports from Development Banks, Size of projects, percentage of projects undertaken with respect to other regions, IDA status and Income group.

**Figure 13. Overview of the main data as of September 2017 in MENA region**



Source: World Bank PPI Database, as of March 2018

The MENA region presents the following characteristics:

- Project Status: the majority of the projects is active, almost the totality. Almost none of the projects analyzed are cancelled, distressed or concluded;
- Project Size: MENA region invests in different sizes of projects. Almost half of the investments' percentage is dedicated to small projects, ranging from 100M to 500M. Then, they are followed by projects for more than 2000M and projects ranging from 500M to 1000M. Bigger projects that range from 1000M to 2000M and projects for less than 100M are those in which less resources are invested;
- Type of PPI: in MENA region the highest percentage of the PPI projects undertaken are Greenfield Projects. Divestitures are the next most applied kind of contract in this area, followed by Brownfield Projects. Management and Lease Contract's application;
- Region: the MENA region is the one that invested less in PPI projects in the first half of year 2017;
- PPI Project: there is a greater incidence of Non-PPI projects among those analyzed;
- IDA Status: Non-IDA status covers almost the totality of the projects;
- MDB Support: MENA region is mainly financed through forms of Debt that do not come from Multilateral Development Banks;
- Income Group: the countries included in MENA area pertain mostly to Lower Middle Income group.

#### **e) South Asia (SAR)**

In this region, the biggest player is India, followed by Pakistan , Nepal and Bangladesh. During 2016, India dropped its PPI investments, mainly resulting as a consequence of huge investments undertaken in 2011 for toll-roads. As for now, the majority of the investments in this region are in the energy sector.

The following Figure 14 shows the geographical location of SAR region.

**Figure 14. Geographical location of the SAR Area**

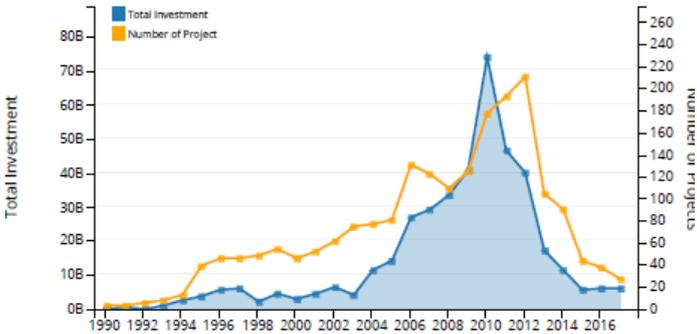


Source: World Bank PPI Database, as of March 2018

It is worth to remember that, specifically for what concerns India, this region is facing issues relating to absence of demand and low interest rates, which are not pushing individuals to invest and causing an extreme liquidity situation. Government is no longer able to face the growth of this emerging country and so, it must rely on resources and management capabilities of privates through PPI.

The following Graphs 19 and 20 show the amount of projects undertaken during a time range (1990-2016) with two different methods.

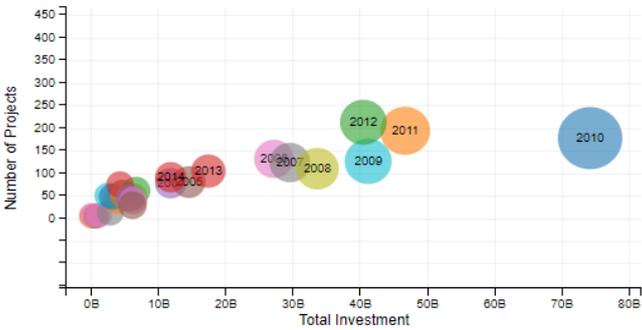
**Graph 19. Representation of total investments and number of projects in SAR with a line graph, 1990-2016 (lines)**



Source: World Bank PPI Database, as of March 2018

In Graph 19 the right vertical axis represents the number of projects, the left vertical axis the amount invested and, the horizontal axis, the time horizon. Investments in PPI projects, for what concerns SAR region, were of lower amount with respect to the other regions analyzed until 2003. From 2003, the trend has been increasing, reaching the highest peak in 2010. Then, there was a change in route and the trend started to decline, with a stable level in the last 3 years.

**Graph 20. Representation of total investments and number of projects in SAR with a bubble graph, 1990-2016 (bubbles)**



Source: World Bank PPI Database, as of March 2018

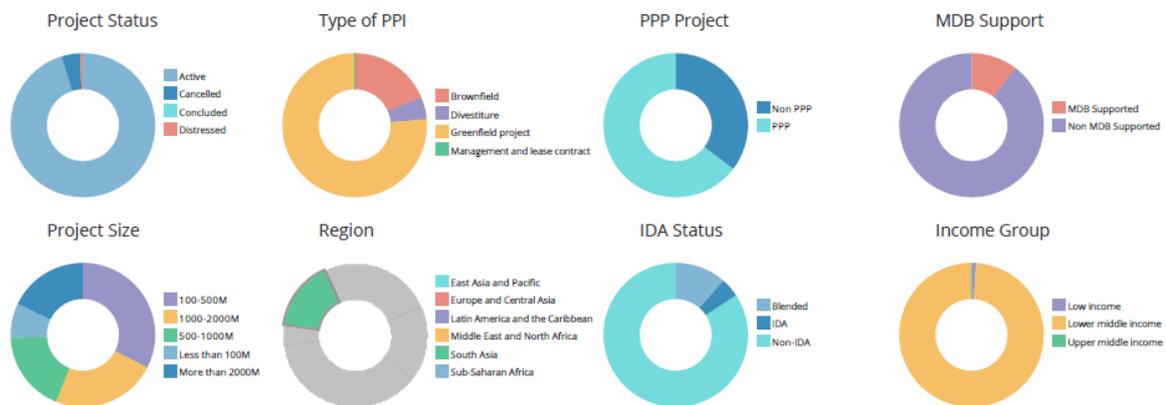
The moment in which India started to invest more than the past, was in 2004. This could relate both to the election of the new government, but mainly to the fact that, in 2004, there was the disastrous event of Tsunami. Even if the epicenter was in Thailand, the tsunami badly affected the coasts of India. This forced the government to invest and rehabilitate the devastated zones, through collaboration with privates for the reconstruction. The highest level of investments was registered in 2010, probably due to the fact that the country hosted the Commonwealth games in Delhi. In 2011 and 2012, important investments were made toward the development of toll-roads.

India, as for now, is still facing issues for what concerns implementation of PPI. There is inadequacy of the private pattern in facing the scale of infrastructure needs, of course supported by an inadequate insitutional framework as well<sup>29</sup>. Management capabilities must be improved, without incurring in less attention towards safety and services to employees. Of course, everything is worsen by the lack of transparency that adversely impact PPI.

Figure 15 shows an overview of PPI situation in SAR region. It analyzes (from left to right and from top to the bottom): Project status, Types of PPI, kinds of projects implemented, Multilateral supports from Development Banks, Size of projects, percentage of projects undertaken with respect to other regions, IDA status and Income group.

<sup>29</sup> Still problems of corruption arise and also unequal sharing of risk among parties.

**Figure 15. Overview of the main data as of September 2017 in SAR region**



Source: World Bank PPI Database, as of March 2018

The SAR region presents the following characteristics:

- **Project Status:** the majority of the projects is active, almost the totality. Only a small part is cancelled. Almost none of the projects analyzed are concluded or distressed. The region that continues to work on PPI projects already started;
- **Project Size:** this area invests in diverse sizes of projects. The highest percentage of the investments is dedicated to small projects, ranging from 100M to 500M. Then, they are followed by bigger projects, that range from 500M to 1000M, and projects for more than 2000M. Less resources are invested in projects for less than 100M;
- **Type of PPI:** in SAR region the highest percentage of the PPI projects undertaken are Greenfield Projects. Brownfield Projects are the next most applied kind of contract in this area, followed by Divestitures. Management and Lease Contracts are almost absent;
- **PPI Project:** there is a greater incidence of PPI projects among those analyzed;
- **IDA Status:** Non-IDA status covers almost the totality of the projects;
- **MDB Support:** SAR region is mainly financed through forms of Debt that do not come from Multilateral Development Banks;
- **Income Group:** the countries included in SAR area pertain mostly to Lower Middle Income group.

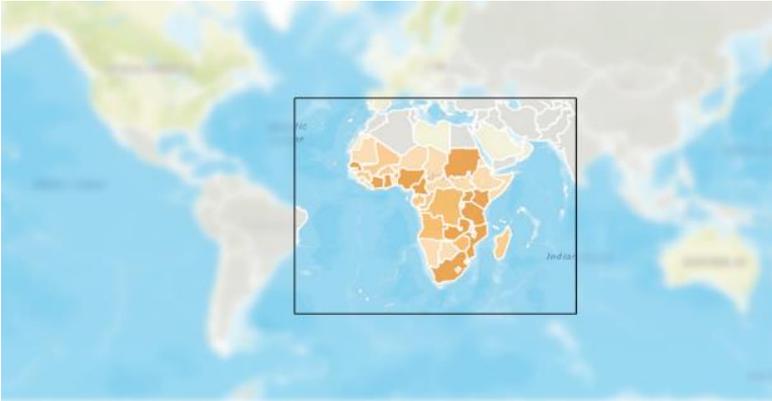
#### **f) Sub-Saharan Africa**

This region is of particular interest for this dissertation. These countries represent the least developed countries worldwide, facing issues such as water scarcity and plagues. In 2016, Ghana totalized two important projects: Amandi Energy Power Plant and Tema Port Expansion,

accounting for almost 70% of investments in IDA countries and mostly financed through debt (as stated by financial information available).

The following Figure 16 shows the geographical location of AFR region.

**Figure 16. Geographical location of the AFR Area**

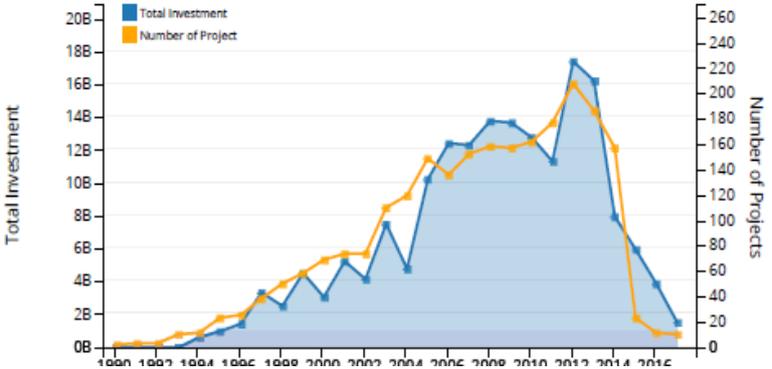


*Source: World Bank PPI Database, as of March 2018*

All the region undertook 11 infrastructure projects for a total amount of US\$3.3 billion. Most of them (9 projects) were undertaken in the energy sector, the remaining 2 in the transport sector. The trend is decreasing from 2015.

The following Graphs 21 and 22 show the amount of projects undertaken during a time range (1990-2016) with two different methods.

**Graph 21. Representation of total investments and number of projects in AFR with a line graph, 1990-2016 (lines)**

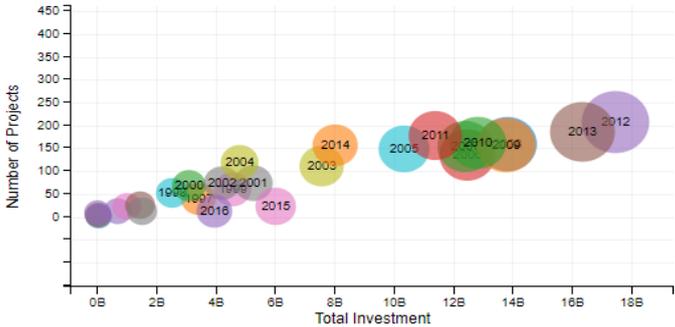


*Source: World Bank PPI Database, as of March 2018*

In Graph 21 the right vertical axis displays the number of projects, the left vertical axis the amount invested and, the horizontal axis, the time horizon. This graph illustrates an absence of PPI investments until 1993. From that moment, AFR region started to invest higher amounts

until 1997. After 1997, the behaviour registered by the analysis has been waving until 2004, even if increasing. From 2004 until 2009, there was a boom in PPI projects utilisation, decreasing in 2012 but recovering the year after, reaching the highest peak in 2012. From that moment on, the trend was declining, registering the lowest level of investments in PPI since 1996.

**Graph 22. Representation of total investments and number of projects in AFR with a bubble graph, 1990-2016 (bubbles)**



Source: World Bank PPI Database, as of March 2018

The growth reached a peak in 2012, mainly due to mineral and ironing firms performing extractions and exporting material. More than one third of the Sub-Saharan Africa investments is represented by Ghana, which imported US\$550 million of liquified natural gas.

Moreover, in Sub-Saharan Africa there are many difficulties in implementing PPI.

Table 2 shows the main five restrictions that do not allow extensive implementation of PPI in Africa.

**Table 2. Top Five Constraints to Privatization in AFR region**

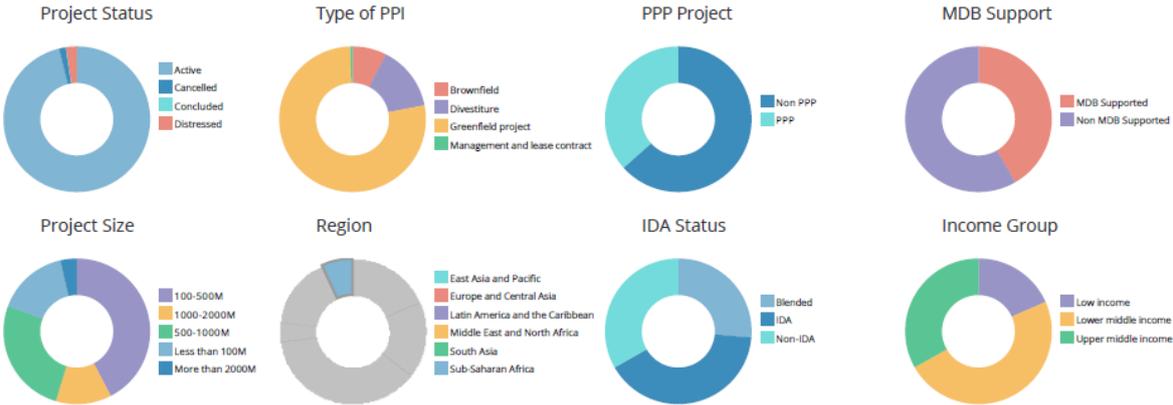
Constraint	Causes	Effects
Lack of consensus	Lack of information Lack of political will Ideological beliefs Vested interests	Weak government commitment Slow process Reluctance to sell enterprises
Political uncertainty	Historical setting Democratization Forthcoming elections	Tardiness Investor uncertainty
Inadequate management capacity	Weak institutional and human resources capacity Lack of commitment Fragmentation	Lack of transparency Distrust of valuation methods Poor design and preparation Incomplete transactions
Legal constraints	Old legislation Lack of commitment Weak judicial system	Insufficient authority given to agency Slow process
Lack of program ownership	Institutional jealousies and government interference Lack of involvement of indigenous private sector Donor driven	Lack of consensus Perception of program as driven by external agencies

Source: strategic communication for privatization, p.5

All of those elements lead to the higher possibility of corruption and, as a consequence, failure of markets and of investments.

Figure 17 shows an overview of PPI situation in AFR region. It analyzes (from left to right and from top to the bottom): Project status, Types of PPI, kinds of projects implemented, Multilateral supports from Development Banks, Size of projects, percentage of projects undertaken with respect to other regions, IDA status and Income group.

**Figure 17. Overview of the main data as of September 2017 in AFR region**



Source: World Bank PPI Database, as of March 2018

The AFR region presents the following characteristics:

- Project Status: the majority of the projects is active, almost the totality. Only a small part is distressed. Almost none of the projects analyzed are concluded or cancelled. The region continues to invest on PPI projects and works on projects already started;

- Project Size: this area invests mainly in small projects, ranging from 100M to 500M. Then, AFR regions invests in bigger projects, that range from 500M to 1000M, and projects for less than 1000M. Less resources are invested in projects ranging from 1000M to 2000M and in projects for more than 2000M;
- Type of PPI: in AFR region the highest percentage of the PPI projects undertaken are Greenfield Projects. Brownfield Projects are the next most applied kind of contract in this area, followed by Divestitures. Management and Lease Contracts are almost absent;
- PPI Project: there is a greater incidence of Non-PPI projects among those analyzed;
- IDA Status: there are three different status that must be taken into account in this region, namely Blended, IDA and Non-IDA. The countries that show those characteristics are almost equally present in the analysis of this area;
- MDB Support: AFR region is mainly financed through forms of debt that do not come from Multilateral Development Banks;
- Income Group: the countries included in AFR area pertain mostly to Lower Middle Income group.

As it is possible to catch from the description, the overall performance of PPI projects in 2016 is declining. The strongest decrease was registered in ECA, while AFR region shows sign of recover. This can stress the fact that there is still the belief that PPI are not the right instruments to enhance the development of emerging countries. This is mainly driven by the fact that there is uncertainty about political stability and lack of an appropriate program for PPI implementation (see Table 2). In addition, the size of the projects are generally small, ranging from 100M to 500M in all the regions, and they are preferably Greenfield. As mentioned during this section, LAC region was the one showing the highest percentage of resources invested in PPI projects in the first half of the year 2017. On the contrary, MENA region was the region that put less efforts in using PPI contracts. For what concerns IDA status, 5 regions out of 6 are Non-IDA, with the exception of AFR that enters into IDA category. All the regions prefer to use debt sources that do not come from Multilateral Development Banks, even if AFR is the region that shows the highest percentage of MDBs' resources utilisation. However, the percentage of active project status in all the regions described is a good indicator that the projects undertaken, even if few, are going into the right direction in order to enlarge the percentage of PPI projects implementation.

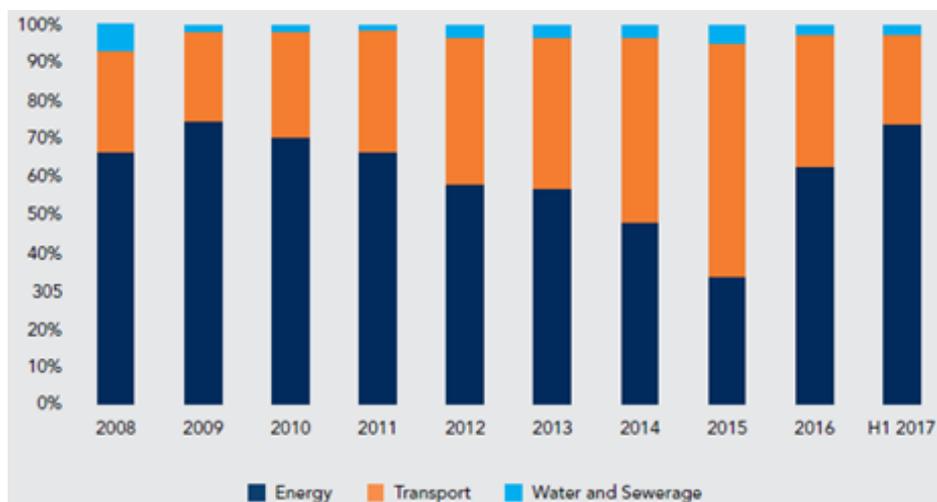
## 2.3.Sector Overview

In this section I analyze and describe the different relevant sectors in which PPI can be implemented. This section aims to answer to some questions, such how is actual status of the regions analyzed, how much their governments invest on them, and which are the most relevant sectors to let a nation grow.

When a country or a region is analyzed, in order to understand its development status, infrastructures are one of the elements taken into account. In the infrastructure sector there are numerous different fields and this is why we will focus only on few of them in this dissertation. Namely: Water and Sewerage, ICT (Information and Communication Technologies), Electricity (Energy) and Roads (Transport). A brief description for each of them will be provided as follows.

Graph 23 synthetize the percentage composition of the investments in different sectors in EMDE region.

**Graph 23. Share of sectoral investments in PPI in EMDE region**



*Source: World Bank Group “January-June 2017 Private Participation in Infrastructure (PPI) Half year update”, PPI Database, Report, 2017, p.11*

Graph 23 shows that the energy sector is historically the most important one in which privates decided to invest, apart from 2015 when transport sector was the prominent one. Water and Sewerage sector is the one in which PPI projects are less implemented, and that’s the reason why I decided to analyze this case in my dissertation.

### a) Energy sector

Investments in this sector are increasing since 2016. This could be mainly caused by the increasing awareness that countries have toward political, social and climate changes. The fact that the regions taken into account are still in a phase of development, does not prevent them from investing in renewable energy. Of course, this tendency is strongly pushed by GRI and Corporate Social Responsibility principles. Enterprises that push toward CSR and renewable energies, also get more consensus and, if in an adequate regulatory framework, an higher probability of success. 127 projects out of 144, relied on renewable energies, according to the PPI World Bank Annual Update 2016.<sup>30</sup> This trend is confirmed in the first half of the year 2017, with 83% of the total projects in energy as renewable. In the same half of the year, Indonesia was the largest country investing in energy. On the contrary, the region that totalized the highest investment in energy sector is Latin America and Caribbean, with 54 projects and more that US\$14 billion<sup>31</sup>.

Figure 18 shows the distribution of investments in the energy sector globally in 2016. The larger is the light blue area, the higher are the numbers of PPI projects undertaken in the sector under analysis.

**Figure 18. Investment measures according to the region (energy)**



Source: World Bank PPI Database, as of March 2018

<sup>30</sup> As the World Bank reports, "Investments in renewable energy amounted to \$US20.4 billion or 61.4 percent of the total investment in electricity generation projects. The predominant technologies were: solar, with 53 projects; onshore wind, with 36 projects; and hydropower with 21 projects". World Bank Group "2016 Private Participation in Infrastructure (PPI) Annual update", Report, 2017, p.10

<sup>31</sup> World Bank Group "2016 Private Participation in Infrastructure (PPI) Annual update", Report, 2017

Figure 18 illustrates that Latin America (LAC) and East Asia (EAP) are the two regions that invest the larger amount of resources in PPI in the energy sector. Africa region (AFR) is the area in which fewer amounts were invested in 2016.

**b) ICT<sup>32</sup>**

This field is a matter of interest especially in Sub-Saharan Africa. During the first half-year of 2017, 30 projects were undertaken for US\$4.3 billion<sup>33</sup>. If ICT structure is not well endorsed, with no maintenance, this could result in a possible fragmentation of the nation, that will not be able to make these technologies reach each part and each citizen of its territory. Still, as in the energy sector, LAC region totalized the highest amount invested together with East Asia and Pacific region.

Figure 19 shows the distribution of investments in the ICT sector globally in 2016. The larger is the light blue area, the higher are the numbers of PPI projects undertaken in the sector under analysis.

**Figure 19. Investment measures according to the region (telecommunications)**



Source: World Bank PPI Database, as of March 2018

<sup>32</sup> Information and Communication Technologies

<sup>33</sup> World Bank Group, “Contribution of Institutional Investors. Private Investment in Infrastructure 2011–H1 2017”, PPI Database, Report, 2018

PPI projects in telecommunications were registered in Latin America (LAC) for the highest amounts and number of projects undertaken, and East Asia (EAP). In the Rest of the World PPI in telecommunication sector were almost absent.

**c) Transport**

As telecommunication, investments in infrastructure allow countries to strengthen the liaisons among citizens. Not just within the country, but also with the rest of the world. Openness of the borders can be enhanced through the development of infrastructures such as roads, railways, ports and airports. During 2016 investments declined, especially due to the lower investments in ports and airports, which are particularly costly investments. Higher investments were dedicated to the reinforcement and development of networks of roads, rails and undergrounds. In the first half of the year, 2017, transport investments accounted for 24% of the total investments overall for US\$8.7 billion<sup>34</sup>.

Figure 20 shows the distribution of investments in the transport sector globally in 2016. The larger is the light blue area, the higher are the numbers of PPI projects undertaken in the sector under analysis.

**Figure 20. Investment measures according to the region (transport)**



Source: World Bank PPI Database, as of March 2018

Transport sector is the one in which were registered the highest level of PPI projects after the energy sector (illustrated above, Figure 16). Latin America (LAC), East Asia (EAP) and Middle

<sup>34</sup> World Bank Group “2016 Private Participation in Infrastructure (PPI) Annual update”, Report, 2017

East (MENA) are the regions that invested more in transport sector in 2016. As of 2016, the MENA region invested more resources in transport rather than other sectors in PPI implementation, as well as Africa region (AFR).

#### **d) Water and Sewerage**

This sector represents one of the most controversial, especially when trying to assess whether it is ethically right that privates deal with a primary good such as water and its distribution. There are many cases in which private provision of water is perfectly working, such as in UK. Nevertheless, there are cases in which the situation is so terrible, that privates are not interested in the well management of this resource. It is also true that citizens often have bad opinion about PPI in water and sewerage, because communication strategy and involvement are frequently done in a wrong way. Moreover, it is common to think that privates could charge final users higher prices than state-owned enterprises, and concerns are enforced by the fact that water is a necessary good essential for living.

Given this preamble, PPI in water and sewerage in 2016 represented not even 3% of the total PPI globally. The decrease in percentage was mostly given by the reduction in water utility projects availability. Most of the projects undertaken referred to water treatment infrastructures (20 projects out of 27). The highest investments were registered in China (for which a small amount of data is available), Brazil and Philippines, with the Bulacan Bulk Water Supply Project (nearly US\$49 billions from private investors). The majority of the projects undertaken were under BOT agreement.

In the first half of 2017, 15 projects were already undertaken, most of them (12) in China. Mainly, these project related to water treatment plants.

Figure 21 shows the distribution of investments in the water and sewerage sector globally in 2016. The larger is the light blue area, the higher are the numbers of PPI projects undertaken in the sector under analysis.

**Figure 21. Investment measures according to the region (water and sewerage)**



*Source: World Bank PPI Database, as of March 2018*

Figure 21 depicts a situation in which the countries and regions that are investing more resources in PPI projects in Water and Sewerage sector in 2016, are EAP region and LAC region, even if LAC have invested lower amounts than EAP. What is interesting is that AFR, one of the regions in which water scarcity is a plague that touches all the citizens, seems to have registered almost no PPI projects in 2016, for what concerns water distribution. Figure 19 shows that there is a discrepancy on this issue: the extreme necessity of finding a solution for water scarcity and the difficulty in implementing PPI projects in this field. However, this sector will be better illustrated in depth in Chapter 4.

As it can be seen, ICT, Transport and the Energy sectors are those in which privates are more willing to invest their resources. Moreover, regions like LAC and SAR are extremely committed in using PPI projects as a valuable resource in order to foster the growth and the development of their economies. AFR shows almost an absence of PPI Projects in Water and Sewerage sector, investing more in PPI projects in the energy sector. This leads me to understand the necessity and the possibility that private companies should consider water sector as a potential market in which is possible to invest.



## Chapter 3 – Contracts and Risk allocation in PPI

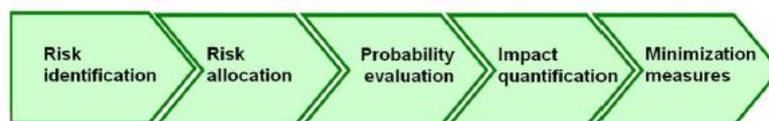
Chapter 3 is dedicated to a depiction of the contract arrangements that are generally used in PPI projects, highlighting when those instruments and risks are specific for the water sector. In order to give an overview, in the first section I will describe the most relevant insights about risk identification in a PPI project, in the second section I will analyze the different kinds of contract and the parties involved, and in the third section I will illustrate risk estimation methods and mitigation instruments. The aim of this chapter is to provide some meaningful instruments in order to introduce Chapter 4 and Chapter 5, that will focus on PPI projects concerning water and sewerage sector in Sub-Saharan Africa region.

### 3.1. Risk identification

This section focuses on risks undertaken by private firms whenever they decide to be involved in PPI projects, on their returns and how they find them potentially interesting for their business.

Figure 22 illustrates the risk allocation process undertaken by private parties and governments when they decide to set up a contract for a PPI Project.

**Figure 22. Process of risk allocation in PPI contracts**



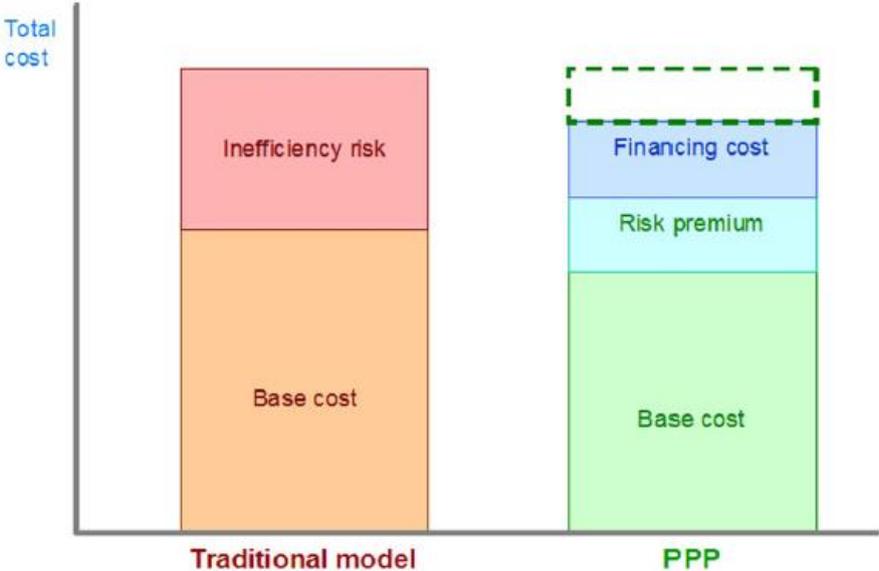
*Source: Marques R.C., Berg S., "Risks, Contracts, and Private-Sector Participation in Infrastructure", Journal of Construction Engineering and Management, Article, Issue 11 Vol. 137, 2011, p. 927*

Figure 22 is composed by five arrows. which are: Risk identification, Risk allocation, Probability evaluation, Impact quantification and Minimization measures. This section will focus on first arrow of Figure 22, explaining the most relevant insights and key elements to be taken into account in this phase of the process.

Before Risk identification, when parties decide to start a PPI project, the first analysis they make is a cost-benefit analysis. It means that public authorities evaluate which benefits could arise if private companies are involved. Graph 24 illustrates the advantages that can arise thanks to the implementation of PPI, by comparing the inefficiencies in managing risks with the purely

public management of infrastructure projects (Traditional Model) and the benefits obtained with PPI thanks to the private intervention, and enhanced by a fair allocation of risks and responsibilities among parties.

**Graph 24. Advantages obtained with PPI implementation**



*Source: Marques R.C., Berg S., “Risks, Contracts, and Private-Sector Participation in Infrastructure”, Journal of Construction Engineering and Management, Article, Issue 11 Vol. 137, 2011, p. 926*

From the PPP (or PPI) column we can observe that the efficiency of private parties in managing the assets, leads to a reduction of inefficiency risk that would have occurred if the projects had adopted the Traditional Model. In the Traditional Model column there are two sections: the Base Cost, which is also present in the PPP column, and the inefficiency risk that increases the Total Cost burden. PPP column is characterized by three sections: the first one is the Base Cost, the second one is the risk premium paid to private parties and the third one is the Financing Cost. As we can observe, the missing section on the top of the PPP column is the gain obtained by reducing the inefficiencies and, consequently, the Total Cost burden.

However, it is not sufficient to identify the inefficiency reduction. To understand the main factors that could mine the good performance of a PPI project, it is necessary to analyze and study the different risks that could affect its successful achievement. Hence, in order to categorize risks that can incur in the development of a PPI project, Table 3 provides an initial subdivision. In Table 3, risks are divided into 6 main categories commonly identified in the literature, which are: Political Risks, Financial Risks, Construction Risks, Operating and Maintenance Risks, Market and Revenue Risks, and Legal Risks. All of them include a variety

of more specific risks. For instance, the category of Political Risks include: Expropriation, reliability and creditworthiness of the government, Change in law and government policies, Political opposition, Corruption, Delay in approvals and Political force majeure events.

**Table 3. Risks of PPI contracts subdivision.**

Category	Risk Factors
Political Risks	<ul style="list-style-type: none"> <li>• Expropriation, reliability and creditworthiness of the government</li> <li>• Change in law and government policies</li> <li>• Political opposition</li> <li>• Corruption</li> <li>• Delay in approvals</li> <li>• Political force majeure events</li> </ul>
Financial Risks	<ul style="list-style-type: none"> <li>• Unfavorable economy in the host country</li> <li>• Rate of return restrictions</li> <li>• Lack of credit worthiness</li> <li>• Inability to service debt</li> <li>• Bankruptcy</li> <li>• Complex financial structure of PPP projects</li> <li>• Lack of guarantees</li> <li>• Financing risks</li> <li>• Loan ability</li> <li>• Fluctuation of the inflation rate, interest rate, foreign currency exchange rate</li> <li>• Unfavorable international economy</li> </ul>
Construction Risks	<ul style="list-style-type: none"> <li>• Land acquisition and compensation</li> <li>• Construction cost overrun</li> <li>• Construction time delay</li> <li>• Material/labor availability</li> <li>• Project site conditions</li> <li>• Contractor's failure</li> <li>• Construction force majeure events</li> </ul>
Operation and Maintenance Risks	<ul style="list-style-type: none"> <li>• Operation and maintenance cost overrun</li> <li>• Operator's incompetence and low operating productivity</li> <li>• Availability of material</li> <li>• Force majeure events</li> </ul>
Market and Revenue Risks	<ul style="list-style-type: none"> <li>• Insufficient revenue</li> <li>• Government restriction of profit and tariff</li> <li>• Inaccurate pricing and demand estimate</li> <li>• Fall of demand</li> <li>• The competition risks</li> <li>• Force majeure events</li> </ul>
Legal Risks	<ul style="list-style-type: none"> <li>• Prejudiced and unfair process of awarding the project</li> <li>• Host-country's interference in choosing subcontractors</li> <li>• Overprotective control/supervision by the host government</li> <li>• Disapproval of guarantees by the government</li> <li>• Change of host-country's fiscal regime</li> <li>• Change of host-country's consideration of the project's scope</li> <li>• Non-cooperation between public agencies</li> <li>• Actions or omissions of the public authorities that prevent the project to be completed</li> <li>• Unsteady legal and regulatory framework</li> <li>• Poor legislation</li> <li>• Non-enforcement of legislation</li> <li>• Lack of a stable project agreement</li> <li>• Vague and inconsistent clauses and specifications and inaccurate phasing</li> <li>• Non-accordance between all contracts in the BOT framework</li> <li>• Language barrier for the contract</li> <li>• Breach of contract provisions</li> <li>• Revision of the contract clauses</li> <li>• Unanticipated change of the concessionaire scheme</li> <li>• Lack of confidentiality and trust in the concession company</li> <li>• Risks of early termination</li> <li>• Legal force majeure events</li> </ul>

Source: Kwak Y.H., Chih Y., Ibbs C.W., "Towards a Comprehensive Understanding of Public Private Partnerships for Infrastructure Development", *California Management Review, Reprint Series, Vol. 51, No. 2, Paper, Winter 2009, p. 68*

Each category includes a list of specific risks that can be identified under common characteristics. However, it is not sufficient to list them into different categories. This is why it could be useful to identify them according to the different phases of a PPI project. According to the studies of Mohan *et al* (2017), the risks in which privates and public authorities could incur can be summarized in pre-construction and construction risks, as follows in Table 4.

**Table 4. Division of risks between pre-construction and construction phase**

<b>PRE-CONSTRUCTION RISKS</b>	<b>CONSTRUCTION PHASE RISKS</b>
<i>Land Acquisition</i> – if incurred, it makes the proposal meaningless. It is borne by the public entity	<i>Design risk</i> – the one established is not able to meet the requirements
<i>External linkages</i> – timely connectivity which helps in cost reduction	<i>Construction risk</i> – possible delays
<i>Financing risk</i> – no adequate financing at viable rate, which brings delays in financial closure	<i>Volume risk</i> – variations in demand of services needed
<i>Planning risk</i> – no adequate pre-development studies with relevant deviations from expectations	<i>Payment risk</i> – no collection, or not sufficient, of fees charged for cost recovery
<i>Approval risk</i> – not received them timely, with delay in construction	<i>Financial risk</i> – possibility of additional funding costs for increased margins
	<i>Environmental health and safety risk</i> – more damages than expected, stop the construction process when reached the maximum level
	<i>Hand over risk</i> – default in handover of assets or need to hand back to public entity for failure in meeting minimum standards

Source: Mohan B., Latha R.N., “PPP at Cross Roads: Alternative Models an Imperative”, SCMS Journal of Indian Management, Paper, October - December 2017. Personal revision.

Table 4 shows two columns:

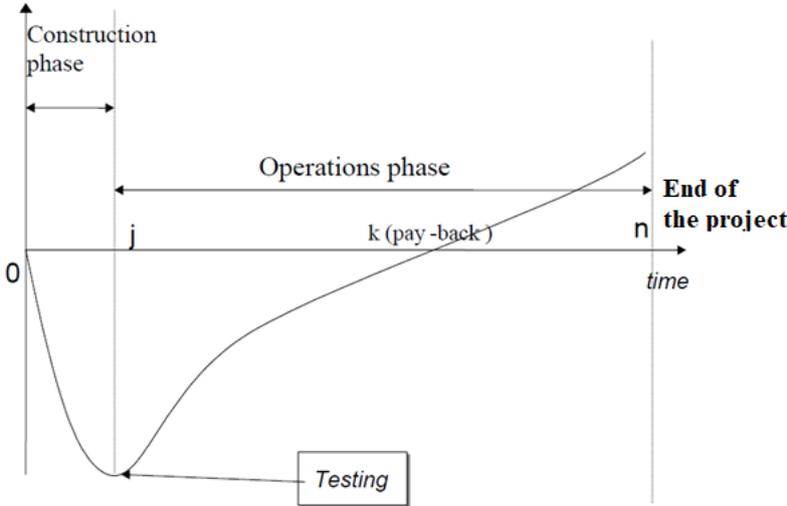
- Pre-construction risks: it includes Land Acquisition, External linkages, Financing risk, Planning risk and Approval risk;
- Construction phase risks: it includes Design risk, Construction risk, Volume risk, Payment risk, Financial risk, Environmental health and safety risk, and Hand over risk.

Both of them characterized the pre-performance phase of a PPI project, namely when it is still not in operation. All those risks are related to management and financing activities performed during the PPI project’s life. During the different phases of a project, it is possible to find the same risk. For instance, the Currency risk (namely, the risk of exchange rates), which impacts

on the performance of cash flows both in pre-construction and construction phase. To overcome the risk of exchange rates, the solutions can be both indexation or using local currency financing, in which possibilities of hedging are available. But this is possible only in case of long-term project financing. If this it is not the case, indexation to domestic inflation can be a viable solution for self-hedging. This risk is also related to the high specificity of assets involved, which makes it difficult to be diversified. Given the size of the projects, it may be that assets brings many related risks from a financial point of view, even if they bring a positive economic effect to the society.

Hence, the first step to make in risk evaluation is to consider risks according to the phases of the projects and the cash flow behaviour during the Life Cycle of a PPI Project. Graph 25 depicts cash flow variations according to the Construction phase (that includes Pre-Construction Phase and the Construction Phase as identified in Table 4), and to the Operations phase (or Post-construction phase), which was not considered in Table 4.

**Graph 25. Cash Flow behaviour of a PPI Project**



*Source: OECD, “Private Financing and Government support to promote long-term investments in infrastructure”, OECD Publishing, Analytical Report, September 2014, p.15*

Graph 25 illustrates a V-behaviour, with a minimum reached between the Construction Phase and the Operations Phase. Risk identification, evaluation and allocation are extremely important in the Construction phase, as already explained in Table 4. Graph 25 shows that during the Construction phase, cash flows are negative and, for this reason, private companies must present the right guarantees. After the minimum reached at the end of the Construction phase, there is a slow recovery connected to the start of the Operational stage. The recovery shows a steeper

increase in the first period, then it becomes more gradual. The payback is reached in  $k$ , then the project starts to produce positive cash flows. So, when privates undertake the development of infrastructure projects, the first challenge is the generation of positive cash flows. This implies that private investors look for the right type of investment, in which they can ask final users to pay for the service provided. Together with the generation of positive cash flows, there is also the ability of creating an efficient cost management structure, which could bring to the realization of economies of scope. As mentioned, the bigger is the enterprise, for example an international one, the higher is the possibility of creating economies of scope, even with the possibility to outsource in order to reduce costs.

For what concerns Operation phase risk factors, the kind of risk that mostly occurs and that determines changes in success or failure of a project, among macroeconomic risks, is the political risk. This risk can incur in many different forms, for example in changing tariffs or regulation, and under the form of renegotiations. According to studies conducted by Reside (2009), we can say that political risk is positively affected and directly linked to “*the quality and transparency of the system of contracting; the capacity of government and state-owned enterprises to coordinate projects and bear some risks, especially fiscal risk; the capacity of off-takers and customers to pay tariffs; and, the political and public acceptability of the project, as well as the extent of public consultation performed for the project.*”<sup>35</sup> Private investors are particularly sensitive to political risk: the riskier is the country situation, the more reluctant private investors will be. To let them invest, it is necessary that the government provides them with enough guarantees, generating also a supporting regulatory framework. To reduce those uncertainties, a well regulated market helps, especially by ensuring justice in case of controversy. Moreover, the higher is the competitiveness, the better it is for final users, who will bear less risk. Other macroeconomic factors such as social and environmental risks, can increase the failure rate risk with the possibility of moral hazard (favouring corruption and bribery) and adverse selection (choosing projects that are not financially and/or technically sound, or with not adequate guarantees, or projects that are too risky, showing a higher rate of return), which cause distortionary effects on incentives<sup>36</sup>. Another cause determining the market failure, is the overestimation of demand of public goods and services. This leads the private parties to overprice the goods or services, bringing the situation to an overall failure of PPI

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<sup>35</sup> Reside R.E. Jr, “*Global determinants of stress and risk in Public-Private Partnerships (PPP) in Infrastructures*”, ADBI Working Paper Series, Issue 2 Vol. 8, March 2009

<sup>36</sup> Incentives will be better explained at pp. 67-68 of this Chapter.

project. For example, according to Reside (2009) studies, we can sum up the effects of macroeconomic factors on failure rate as shown in Table 5.

**Table 5. Factors affecting failure rate in macroeconomic context**

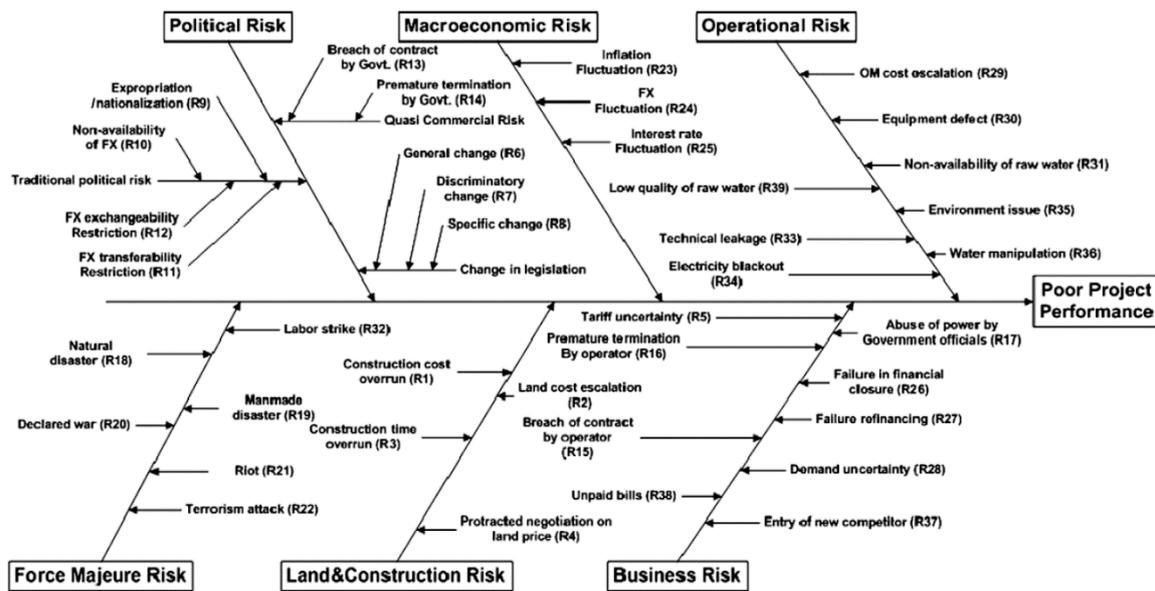
<b>FACTORS RAISING FAILURE RISK RATE</b>	<b>FACTORS LOWERING FAILURE RISK RATE</b>
Tariff freezes	High growth → higher demand and higher revenues
High growth → moral hazard and adverse selection; good governance → riskier projects	Fiscal surpluses
Rigid exchange rate policies and economic growth → underestimation of currency risk	Trade openness
/	Political risk guarantees

*Source: Reside R.E. Jr, “Global determinants of stress and risk in Public-Private Partnerships (PPP) in Infrastructures”, ADBI Working Paper Series, Issue 2 Vol. 8, March 2009. Personal revision.*

In the first column of Table 5 is illustrated how a macroeconomic factor could seriously impact on the success of a project and, in the second column, how to lower the related risk of failure. It is worth to notice that a generally positive factors such as high growth, can have side effects. As stated by Reside (2009), over-forecast of demand is likely to happen in a pattern of economic growth. High growth leads government to be less objective and not enough severe in the selection processes, accepting riskier projects. Thus, growth leads to higher demand of services, higher growth of infrastructure projects and needs, larger projects and, consequently, higher possibility of failure if those projects are not financially and technically sound.

All the risks identified during this section can register a stronger or weaker impact on a project. It is necessary to take into consideration that each risk identified could affect the performance of a PPI project and Figure 23 depicts the impact of different kind of risks on performance.

**Figure 23. Cause-effect diagram of risk factors' impact on PPI performance**



Source: Wibowo A., Mohamed S., "Risk criticality and allocation in privatised water supply projects in Indonesia", *International Journal of Project Management*, Issue 28, Article, 2010, p.507

Figure 23 is a cause-effect diagram, in which the main arrow is the central one, going from the left to the right, namely from Great Performance to Poor Project Performance. Along this main arrow, there are smaller arrows that have an impact on it, and each one of them represents the impact that each risk has on performance. Moreover, each main category of risk is influenced by the presence of smaller factors, that could worsen the performance. The main categories of risks are:

- political risks: it includes specific factors such as quasi-commercial risk, traditional political risk, or change in legislation;
- macroeconomic risk: it includes specific factors such as inflation and fluctuations;
- operational risk: it includes specific factors such as low quality of raw water, equipment defect, or O&M (Operations and Maintenance) cost escalation;
- force majeure risk: it includes specific factors such as natural disasters, labour strikes, or declared war;
- land and construction risk: it includes specific factors such as construction costs overrun, or land cost escalation;
- business risk: it includes specific factors such as tariffs uncertainty, abuse of power by governments, or failure refinancing.

This diagram is important in order to visualize the main categories of risks that are generally taken into consideration in the risk assessment phase of PPI projects in general.

The more the government has difficulties in facing society needs, the more it will ask private parties to do that on its behalf. However, given the intrinsic nature of the operations, government will still play a relevant role to ensure the compliance to national and social requirements. To favour PPI, government may decide to create a regime of tax benefits or subsidize the initial sunk cost in order to realize those positive effects for the society. On the other side, privates are expected to recover the costs of the project, compensating also the risk. In order to enable all those mechanisms, an optimal financing mix is required. This optimization comes from the consideration of a sunk cost (that could be covered by the government) and the optimal debt ratio. Usually, with sunk costs, uncertainties in the economic and socio-political pattern are taken into consideration, which let the risk rate increase. As the rate increases, privates will ask for more guarantees and the probability of market failure increases as well, hence the government must provide instruments to face this possible issue. The level of the subsidy must be carefully calculated: if too low, PPI are not encouraged; if too high, could lead to mismanagement of resources and, therefore, no efficiency. Moreover, financial and economic sides must be balanced. The subsidy level affects the optimal debt ratio and when the government establishes the subsidy, it incurs in contingent liabilities, so it is necessary to define a financial support program, which requires a feasibility study conducted by the government in establishing the optimal level of subsidy and the ratio before starting the operations. Their nature made governments not take them into account for many years, until the introduction of fiscal incentives.

For what concerns target and incentive settings, they can positively stimulate privates in managing efficiently public infrastructures, as subsidies. The key role played by the incentives is the one of matching the possibility of making profits for privates, together with the possibility of setting safeguard mechanisms in order to protect citizens. If incentives works well, they allow profit making for privates that coincides with a better management of public utilities, benefitting public authorities and citizens. From an economic point of view, in setting incentives, it would be useful to include some fixed elements in contracts, such as:

- price regulation: this element is extremely important in order to fairly balance the possibility of privates of making profits and the safeguard of citizens' interests. If price regulation is not respected, there could be the following consequences: citizens will pay

more than the fair price and their rights won't be respected, private companies will make extra profits, or citizens will pay less than the fair price and private companies will not be able to cover their costs.

- quality standards: this element must be set in order to ensure that the parties involved in the PPI project will work in order to achieve not only a better manage service, but also to ensure a better quality of the utility and service provided to the citizens, who should result in being better-off;
- coverage targets: these are achievements set in order to cover specific areas that are agreed among parties, which are larger than the areas that are already covered by public utility providers; and, in addition, it is extremely important to decide
- what are measurable objectives in order to set incentives, because the translation of public interest into monetary terms could lead into management myopia.

All those elements are decided and shared among parties in order to ensure transparency.

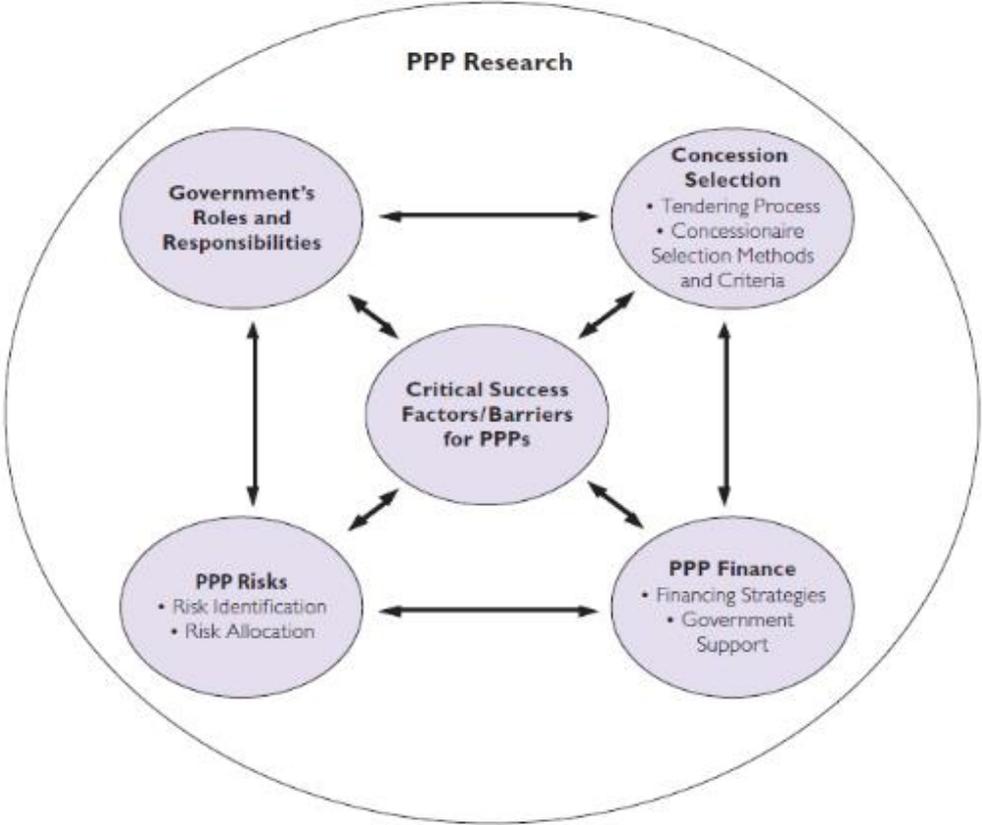
### **3.2. Contracts and Risk allocation**

This section focuses on the second arrow of Figure 22. Risk allocation is one of the crucial factors affecting the final performance of PPIs, as stated by Kwak *et al* (2009)<sup>37</sup>. This is why it is necessary to explain how and why it is so difficult to establish the right level of risk allocation in a PPI contract. As a consequence, it is necessary to identify the different types of contract according to which risks can be allocated and the possibility of failure or success of a project. The first step to make in order to identify the level of possible success/failure of a project is to evaluate its Factors. Among these Factors, PPI Risks plays a relevant role. Figure 24 summarizes the Critical Success Factors/Barriers (CSF) for PPIs.

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<sup>37</sup> Kwak Y.H., Chih Y., Ibbs C.W., "Towards a Comprehensive Understanding of Public Private Partnerships for Infrastructure Development", California Management Review, Reprint Series, Vol. 51, No. 2, Paper, Winter 2009, pp. 51-78

**Figure 24. Critical Success Factors/Barriers for PPIs**

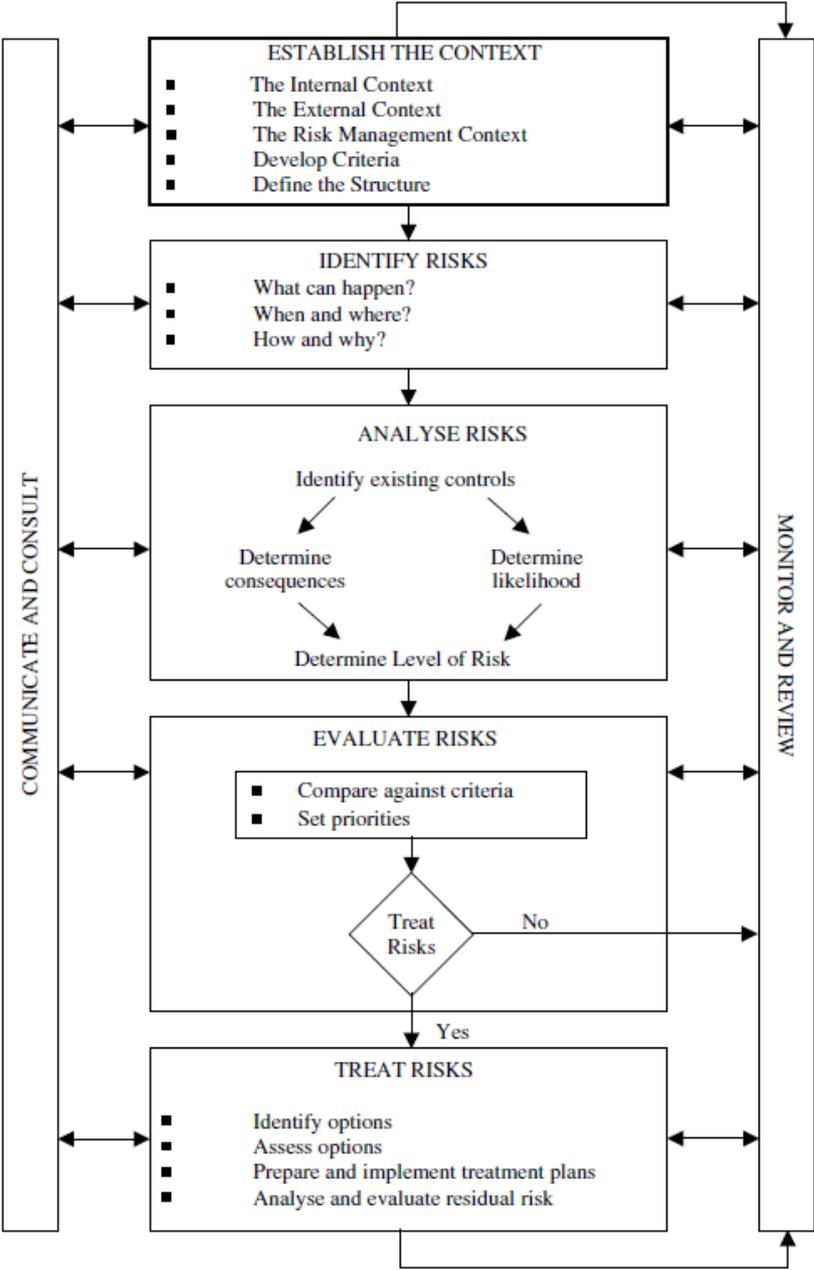


*Source: Kwak Y.H., Chih Y., Ibbs C.W., "Towards a Comprehensive Understanding of Public Private Partnerships for Infrastructure Development", California Management Review, Reprint Series, Vol. 51, No. 2, Paper, Winter 2009, p. 57*

Figure 24 shows the relationship among the different CSF. Four factors are taken into account: Government’s role and responsibilities, Concession Selection (considering the tendering process and the selection methodology), PPP Finance (considering the financing strategies and the support given by the government) and PPP Risks (considering identification process and allocation). All these factors directly impact on the performance of the project, and they are also related to each other. For example PPP Risks, which is the area of interest of this Chapter, depend on the government’s role played in the contract for what concerns risk allocation. However, they also depend on the support in financing activity given by the public authority itself. All these aspects vary according to the type of the contract chosen.

As mentioned, to start a PPI project it is necessary to set up a contract, in which risk allocation between parties is essential. Figure 25 illustrates the steps included in the risk allocation process, specifically for the PPI case.

**Figure 25. Steps in Risk allocation process for PPI projects**



*Source: Mead P., “Current Trends in Risk Allocation in Construction Projects and Their Implications for Industry Participants”, Construction Law Journal, Issue 23, No. 1, Article, 2007, p. 27*

The two columns represent the two activities that must be carried out during the whole process, in order to allocate and manage risk efficiently. The column on the left represents the Communication and Consulting Activity, the column on the right the Monitoring and Review Activity, parallel to each other. In between the two lateral columns, there are the five main steps that compose the risk management process.

The steps that create the risk management process are the following:

- 1) Establish the context: each project has its own peculiar industrial features that must be taken into account;
- 2) Identify risk: this is the phase in which, after that all specificities are considered, risks are identified;
- 3) Analyse risk: risk analysis is related to the determination of the probability (*likelihood*) and the consequences of each kind of risk identified in each scenario;
- 4) Evaluate risk: it regards the assessment of the risks according to their level and the criteria used to measure them;
- 5) Treat risk: in this step the right mitigation instruments must be found.

In this Chapter we will focus on finding the most suitable risk allocation process and evaluation measures in PPI contracts.

All the activities shown in Figure 25 are carried out by the different parties involved in a PPI project. The three main subjects and one object involved in a PPI contract are:

- Public authorities (subject); that are looking for support from private parties in order to increase the funds available to develop infrastructures and to manage the resources more efficiently;
- The Project Company (subject): that handles the projects considered. Most of the time, these projects can be sub-divided into turnkey projects (with, as a consequence, turnkey contractors) that can be allocated among different independent companies, and projects allocated to a single company. We will dedicate our analysis to single companies undertaking a PPI project;
- The Utility (object): the core object of the contract;
- The Lender (subject): who provides the biggest part of the financial resources necessary to the project (usually, around 60-70%).

To ensure cooperation and efficiency among the subjects involved in a PPI project, there are a few key points that are relevant in order to create a sound environment in which to operate.

The key points are some criteria that should be respected during the evaluation of the private parties and in the drawing up of a PPI contract, namely:

- 1) The separation between bidders and the subject that designs the tender. This is important in order to maintain the equal treatment of the parties involved and to avoid the risk of favouring one party over another;
- 2) All the procedures and criteria used for the selection and evaluation of private parties have to be transparent. An accurate analysis of the managerial capabilities and maturity of the company involved should be a matter of importance during the selection process. Generally, there is a competitive bidding in order to select the best proposal among the available ones;
- 3) The possibility that one of the parties manipulates the negotiation and renegotiation process, must be discouraged. If too risk is apportioned to private parties, it could lead to failure in the operations and in the market, especially if the shared obligations are not perfectly designed and clear. Contracts must take into account the statutes of the companies and the regulatory framework (laws and rules) in which they are moving.

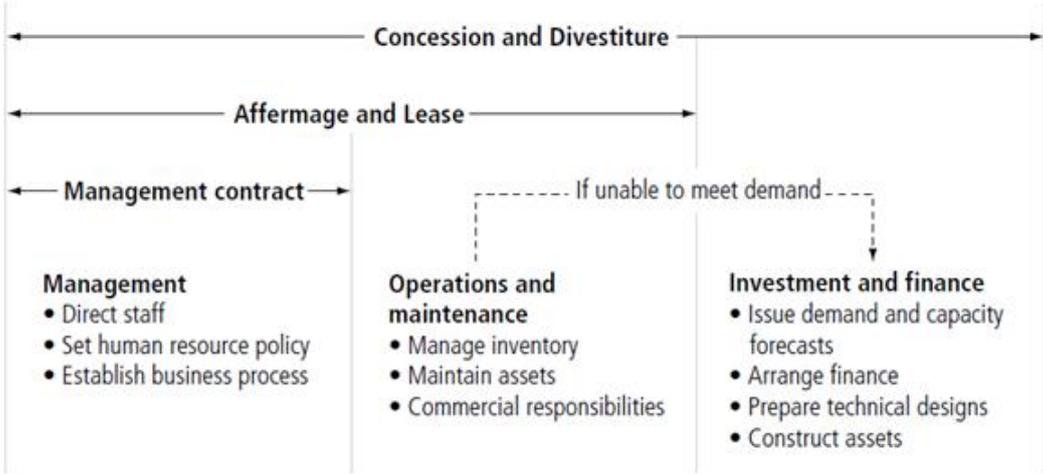
All these criteria should be followed in order to avoid opportunistic behaviours that could lead to project failure.

The subjects involved in a PPI project can cooperate and share responsibilities according to different types of contracts applied. According to the literature, there are different types of contracts available to the public sector in order to let privates participate in PPI projects:

- Management contracts;
- Affermage-leases;
- Concessions;
- Divestitures;
- Joint Ownership.

The contracts listed above may differ according to the type and amount of responsibilities transferred and they are shown in Table 6. This table shows three different areas of responsibilities that are generally covered according to different types of contracts. The responsibility areas covered are highlighted with arrows that touch the beginning and the end areas.

**Table 6. Different areas of responsibility and corresponding contracts.**



Source: PPIAF, World Bank, “Approaches to Private Participation in Water Services: A Toolkit”, Public-Private Infrastructure Advisory Facility & the World Bank, Washington DC, Report, 2006, p. 99

As reported by PPIAF (2006), there are three areas of responsibility:

- 1) Management area: it includes staff, human resources and business processes;
- 2) Operations and maintenance area: it includes inventories, asset and commercial management;
- 3) Investment and finance area: it includes forecasts, financing, technical desing and construction acitivities.

The arrows indicate which areas of responsibility are allocated to the operator under the common arrangements. Thus, management contract covers the management responsibilities, the Affermage-leases contract covers management and O&M responsibilities and, finally, Concession and Divestiture contracts cover management, O&M and Investment and Finance responsibilities. The dashed line means that if the O&M responsibilities can not meet the financing requirements, privates should be also in charge of the Investment and Financing activity and responsibility.

In what follows, the different types of contracts are described with specific focus to the areas of responsibilities involved.

**a) Management contracts**

As its core object, this instrument has the transfer of managerial responsibilities from public parties to private investors. Usually, allocation of management contracts is based on a bid.

Governments establish the payment of a fixed fee to private parties in order to repay them for the management activity. Fees can be fixed, and the commercial risk is either borne completely by government, or borne also by privates, if the risk is linked to the performance. These contracts usually last three to five years and they could incorporate fees and incentives to private companies.

The main characteristics of management contracts are depicted in Table 7.

**Table 7. Features of management contracts.**

Private Company	Receives fees from government
Public Authority	High level of risk borne
Risk Sharing	Low
Area of Responsibility	Management

*Source: Personal revision of data*

Management contracts represent the easiest form through which PPI can be implemented. In management contracts privates do not set tariffs to final users. This means that they do not have any influence on final prices, because governments are the entity in charge of establishing them. Thus, public authorities keep the ownership and set tariffs, and privates collect fees as remuneration for their management activity.

**b) Affermage-leases**

Generally, this form of contract establishes a greater involvement of the private party, which bears higher risk than in management contracts. Affermage-leases covers operating and maintenance responsibilities. The risk of financing the investment is borne by the public authority, which is responsible for deciding and coordinating the investment program.

Through leases, revenues coming from tariffs are given to the private company, and they provide the lease payment to the public authority. In this way, profits depend on the ability of the private party to effectively manage the service in order to reduce costs and increase sales. Thus, for private companies it is important that revenues are high enough in order to let privates cover the fees that they must pay to the public authority and governments must set policies that are able to protect privates from tariff-related risk issues. The most relevant tariff-related risk issue concerns the tariff-setting process: if tariffs are set too high for citizens, they could cause

socio-political distress and possible non-payment of services. With this type of involvement, government must control public tariff setting process, and privates are more encouraged to improve operating efficiency. Hence, the private investor works and provides services or goods under a lease contract, charging customers for the use, and the public authority keeps the ownerships and receives a rental from the private company.

As final insight about Affermage-leases contracts, OECD (2009) reports, “*Affermage only differs from a lease in terms of revenue for the private sector. In both cases, the private sector collects the tariffs and pays, on top of the operation and maintenance costs, a fee to the public sector. But while the fee is fixed in the first case, it is proportional to the volume of water sold in the second case*”<sup>38</sup>.

The characteristics of these contracts are summarized in Table 8.

**Table 8. Features of Affermage-leases contracts.**

Private Company	Receives revenues from tariffs to end users
Public Authority	Receives rentals from private companies Ownership of assets Established tariffs to end users
Risk Sharing	Significant
Area of Responsibility	Management, Operating and Maintenance

Source: Personal revision of data

**c) Concessions**

According to concession contracts, private parties are not only responsible for managing activities and maintenance of assets, but also for financing investments. Hence, the government has the ownership of assets under a legal point of view with related rights. This specific form has a typical duration of 25 to 30 years. Its characteristics are described in Table 9.

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<sup>38</sup> OECD, “*Private Sector Participation in Water Infrastructure*”, OECD Checklist for Public Action, Report, 2009, p.19

**Table 9. Features of Concession contracts.**

Private Company	Receives revenues from tariffs to end users Establishes tariffs to end users
Public Authority	Receives fees from private parties Ownership of assets
Risk Sharing	Substantial
Area of Responsibility	Management, Operating and Maintenance, Financing Investment

Source: Personal revision of data

When the license given to private companies in order to operate is revoked, the assets revert to the public authority. The risk is higher for privates, so the implementation of this contract is more difficult than management contract or affermage-lease contract. As a consequence of the higher risk borne, profits and benefits for privates are higher. This could lead privates to set tariffs that would be too high for citizens, so the government has to provide tariff-related risk policies, in order to both protect citizens from higher prices and still encourage privates in participating in a PPI project. As reported by PPIAF (2006), these policies mainly relate to the desing of an arrangement in which the government promises that the level of tariffs or the subsidies that he will disburse to privates, will be enough in order to cover the costs in which privates incur<sup>39</sup>.

**d) Divestiture**

The divestiture arrangement works like a concession, with the difference that privates have full responsibilities towards all the elements, keeping the ownership and the rights over assets. Divestitures establish a fixed-term license to set the value to the assets involved. Its characteristics are depicted in Table 10.

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<sup>39</sup> PPIAF, World Bank, “Approaches to Private Participation in Water Services: A Toolkit”, Public-Private Infrastructure Advisory Facility & the World Bank, Washington DC, Report, 2006, p.11

**Table 10. Features of Divestiture contracts.**

Private Company	Receives revenues from tariffs to end users Establishes tariffs to end users Ownership of assets
Public Authority	Almost no risk Receives fees from private parties
Risk Sharing	Substantial
Area of Responsibility	Management, Operating and Maintenance, Financing Investment

*Source: Personal revision of data*

The contract establishes that the private party keeps the asset. As in concessions, the risk borne by private parties is relevant. As a consequence, divestitures represent the most profitable contracts for operators in terms of operating and investment performance.

**e) Joint ownerships**

With joint ownership, a new company is created by the melting of two existing companies: a private one and a state-owned enterprise. Its characteristics are depicted in Table 11.

**Table 11. Features of Joint ownership contracts.**

Private Company	Control on management activities
Public Authority	Asset ownership
Risk Sharing	High
Area of Responsibility	Management, Operating and Maintenance, Financing Investment

*Source: Personal revision of data*

In joint ventures the private control is limited. This leads to the necessity to define who has the management control, otherwise private parties may not be incentivised in pursuing operating efficiency. It is necessary an active involvement of private parties in order to let joint ventures work efficiently.

After having analysed all the characteristics of the different contracts, it is possible to notice the following elements:

- a) Management contract is the easiest form of PPI to implement, because there is the lowest rate of risk transferred to privates and a smaller area of responsibility. In this contract the public authority has the ownership of the asset, sets tariffs, and pays fees to private companies;
- b) In Affermage, leases the private companies collect revenues by setting tariffs agreed with the public authority, and pays lease payments to the government. The public authority has the ownership of the asset and private companies have also O&M responsibilities;
- c) Concession provides the highest rate of return to privates, but also the highest level of risk sharing. Private companies are responsible for financing and investment activities, have the ownership of the asset until the end of the contract, and the government pays a subsidy to the private company;
- d) In Divestiture the private company has the ownership of the asset, establishes the tariff level and has all the responsibilities.

In what follows, a description of the different types of contract in the water sector and their application in the Africa region will be provided.

For what concerns the different forms of contract can be applied also in the water sector, Table 12 summarizes the main characteristics described above. However, no relevant differences were registered during the analysis.

**Table 12. Five types of arrangements<sup>40</sup>**

Type of arrangement	Definition in the <i>Toolkit</i> of operator duties	Selected responsibilities of the operator	Stylized typical profit function for operator	Selected risks typically borne by operator—and typical share of total project risk	Ownership of operating assets	Ownership of infrastructure assets
Management contract	Supplies management services to the utility in return for a fee	Providing management services to the utility	Fixed fee + bonus – managers' salaries and related expenses	Depends on the nature of the performance bonus—very small	Contracting authority	Contracting authority
Affermage	Runs the business, retains a fee (generally not equal to the customer tariff) based on the volume of water sold, but does not finance investments in infrastructure assets	Employing staff Operating and maintaining utility	(Affermage fee x volume of water sold) – operating and maintenance costs	Operating and commercial risks—significant <sup>a</sup>	Operator	Contracting authority
Lease	Runs the business, retains revenue from customer tariffs, pays a lease fee to the contracting authority, but does not finance investments in infrastructure assets	Employing staff Operating and maintaining utility	Revenue from customers – operating and maintenance costs – lease fee	Operating and commercial risks—significant <sup>a</sup>	Operator	Contracting authority
Concession	Runs the business and finances investment, but does not own the infrastructure assets	Employing staff Operating and maintaining utility Financing and managing investment	Revenue from customers – operating and maintenance costs – finance costs – any concession fee	Operating, commercial, and investment-related risks—major	Operator	Contracting authority
Divestiture	Runs the business, finances investment, and owns the infrastructure assets	Employing staff Operating and maintaining utility Financing and managing investment	Revenue from customers – operating and maintenance costs – finance costs – any license fee	Operating, commercial, and investment-related risks—major	Operator	Operator

Note: The use of terms such as “affermage,” “lease,” “concession,” and “divestiture” varies, and arrangements that go by these names do not always have the features set out in the table.  
<sup>a</sup> Other things being equal, the operator bears more demand and risk in an affermage because the government's payment is fixed in a lease, and variable in an affermage.

Source: PPIAF, World Bank, “Approaches to Private Participation in Water Services: A Toolkit”, Public-Private Infrastructure Advisory Facility & the World Bank, Washington DC, Report, 2006, p.9

Table 12 provides an application of the features of the contracts already mentioned in this section, to the PPI contracts in the water sector. However, Table 12 provides some key insights relating to a clearer separation of ownership between parties and specification of operating and infrastructure asset:

- in management contracts, it is the public authority that has the ownership of all the assets, while in affermage-leases and concessions the private company has the ownership of operating assets, and governments have the ownership of infrastructure assets;
- in divestiture, the private companies have the ownership of both operating and infrastructure assets.

<sup>40</sup> PPIAF does not consider Joint ownership because it represents an hybrid instrument, creating a new company by mixing public and private companies and sharing some of the characteristics of the Concession contracts shown in Table 9.

Hence, no relevant differences are highlighted, as already mentioned.

For what concerns the different types of contracts applied in the Africa region, Table 13 hereunder introduces the main types of contracts used in PPI projects in the region of interest, depicting also the key characteristics. Table 13 illustrates the Asset Ownership, Operation & Maintenance, Capital Investment, Commercial Risk and Contract Duration of each kind of contract.

**Table 13. Distribution of contract arrangements in Africa region**

Approach	Asset Ownership	Operation & Maintenance	Capital Investment	Commercial Risk	Contract Duration
Service Contract	Public	Public/private	Public	Public	1-2 years
Management Contract	Public	Private	Public	Public	3-5 years
Lease	Public	Private	Public	Shared	8-15 years
Concession	Public	Private	Private	Private	25-30 years
Build-Operate-Transfer (BOT)	Public and Private	Private	Private	Private	2-30 years
Divestiture	Private or public and private	Private	Private	Private	Indefinite or limited by license

Source: Afeikhena J.T., “Private Sector Participation in Infrastructure in Africa”, *SSRN Electronic Journal, Paper*, 2008, p. 278

Service contract involves private sector only in the operation and maintenance activities and it has the lowest duration (on average), this is why it is the simplest form that can be implemented, for example for the smaller PPI projects. This contract was not considered previously in this section because, even if considered also by OECD<sup>41</sup>, it is not commonly shared by the literature given the smallest duration and given the fact that it is not so widely globally implemented. Lease contract can be matched with Affermage-leases contracts previously described in this section<sup>42</sup>. The contract with the highest duration is concession, and generally it is one of the most implemented forms of contract in this region. Anyway, the characteristics of the contract’s structure do not change. BOT contracts are a kind of contract that will be analyzed later in this section<sup>43</sup>. This is a contract that involves private companies since the construction phase of the

<sup>41</sup> OECD, “Private Sector Participation in Water Infrastructure”, OECD Checklist for Public Action, Report, 2009, p. 19

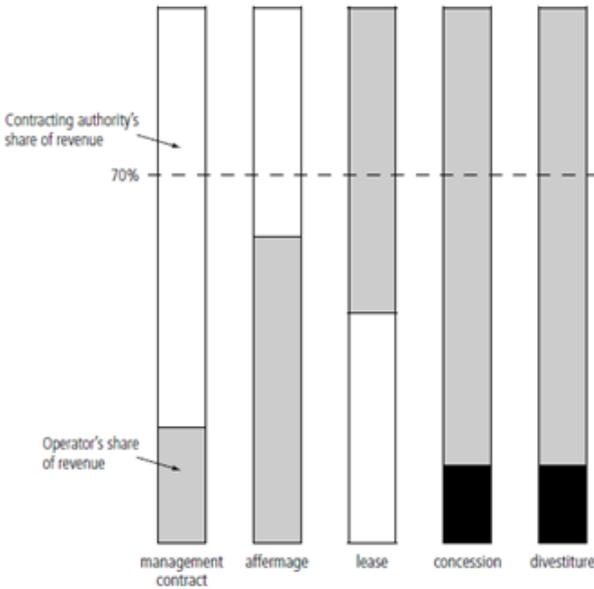
<sup>42</sup> Chapter 3 of this dissertation, p.75

<sup>43</sup> Chapter 3 of this dissertation, p. 85

asset, until its completion, involving the three areas of responsibility of Table 3. By the end of the contract, the asset reverts to the public authority and the private company can decide to lease it in the future. Divestiture shows the same characteristics that were previously illustrated in this section<sup>44</sup>, with no relevant differences.

Given the main interest of private companies, for what concerns revenue flows according to each kind of contract, there are different sources of revenue for each party. Figure 26 illustrates how revenues change according to the different model of contract applied.

**Figure 26. Operator and contracting authority’s share of customer revenue under five arrangements**



Source: PPIAF, World Bank, “Approaches to Private Participation in Water Services: A Toolkit”, Public-Private Infrastructure Advisory Facility & the World Bank, Washington DC, Report, 2006, p.8.

In this picture there are five columns corresponding to the different kinds of contracts, and each one of them illustrates the level of revenues assigned to the private company and the private party, namely:

- Management contract<sup>45</sup>, in which the highest level of revenues are assigned to the public authority;

<sup>44</sup> Chapter 3 of this dissertation, p. 77

<sup>45</sup> Chapter 3 of this dissertation, pp. 74-75

- Affermage<sup>46</sup>, in which one slightly more than 50% of revenues are collected by private companies;
- Lease<sup>47</sup>, in which slightly less than 50% of revenues are collected by private companies;
- Concession<sup>48</sup>, in which the totality of the revenues are assigned to private companies;
- Divestiture<sup>49</sup>, in which the totality of the revenues are assigned to private companies.

The higher is the risk borne by private parties, the higher is the share of revenues that is expected from the project. Moreover, it is possible to see the slight difference between affermage contracts and lease contracts, as explained in the description of Affermage-leases contracts at page 75.

All the contract's descriptions come from an in-depth analysis of the literature, which generally concentrates on the study of only one kind of contract and/or one specific region of the world. Hence, Table 14 depicts and summarizes the most relevant information collected, in order to have a clearer picture of the literature findings and opinions.

**Table 14. Summary of the Literature Review**

Authors	PPI Types	Region	Key findings
Grimsey, Lewis	Waste-water treatment	Scotland	Main characteristics: <ul style="list-style-type: none"> <li>- Transfer risk from public to privates where privates can best manage them</li> <li>- Offer incentives to privates as return</li> <li>- VFM is the main aim of the public sector</li> </ul>
Kwak, Chin, Ibbs	All	All	Description of the main findings in the literature for the risk classification in PPI contracts
OECD	All	All	Recent crises badly impact on PPI projects implementation. Key trade-offs to take into account: <ul style="list-style-type: none"> <li>- Between financial stability and abundance of invested capital;</li> <li>- Between increased financial support and VFM;</li> </ul>

<sup>46</sup> Chapter 3 of this dissertation, pp. 75

<sup>47</sup> Chapter 3 of this dissertation, pp. 75

<sup>48</sup> Chapter 3 of this dissertation, pp. 76

<sup>49</sup> Chapter 3 of this dissertation, pp. 77

<b>Authors</b>	<b>PPI Types</b>	<b>Region</b>	<b>Key findings</b>
			<ul style="list-style-type: none"> <li>- Relevance of financial support by public parties, which is replaced by the preference of a clear institutional framework, transparent bidding and awarding procedure, strong rule of law and absence of political interference.</li> </ul>
Hwong, Zhao, Gay	CSF	Singapore	Identification of positive and negative CSF in PPI projects in Singapore. Negative factors were more affirmative than positive ones, and PPI projects are not well accepted by private companies.
Thakar B.	BOOT	India	<p>Identification of the main characteristics of BOOT contracts.</p> <p>Success factors that contribute to a positive implementation of a PPI:</p> <ul style="list-style-type: none"> <li>- Stable regulatory framework;</li> <li>- Priority on projects;</li> <li>- Strong mutual support between the parties;</li> <li>- Mutual Gain;</li> <li>- Choice of stakeholders;</li> <li>- Transparency;</li> <li>- Profitable Venture;</li> <li>- Lack of Ambiguity.</li> </ul>
Mohan, Nair	PPI Models	India	<p>Need to develop new models to meet the emerging public mood and expectations.</p> <p>Push towards projects in which governments have management control of the firm.</p>

*Source: Personal revision of data.*

In what follows we compare the contract analysis made according to the literature, which is conducted considering the risks allocated between public and private parties, with the one made by the World Bank, which is established according to the characteristics of the assets, for example considering if they must be built or just managed. Table 15 illustrates the types of contracts used according to the World Bank and their description.

**Table 15. Types of contract according to the World Bank.**

Types	Descriptions
Build-own-operate (BOO), Build-develop-operate (BDO), Design-construct-manage-finance (DCMF).	The private sector designs, builds, owns, develops, operates and man-ages an asset with no obligation to transfer ownership to the government. These are variants of design-build-finance-operate (DBFO) schemes.
Buy-build-operate (BBO), Lease-develop-operate (LDO), Wrap-around addition (WAA).	The private sector buys or leases an existing asset from the government, renovates, modernizes, and/ or expands it, then operates the asset, again with no obligation to transfer ownership back to the government.
Build-operate-transfer (BOT), Build-own-operate-transfer (BOOT), Build-rent-own-transfer (BROT), Build-lease-operate-transfer (BLOT), Build-transfer-operate (BTO).	The private sector designs and builds an asset, operates it, transfers it to the government when the operating contract ends, or at some other specified time. The private partner may subsequently rent or lease the asset from the government.

*Source: Zimmermann J., Eber W., "Consideration of Risk in PPP-Projects" Business, Management and Education, Issue 1 Vol. 12, Paper , 2014, p. 31*

The types of contracts are divided into three main groups, according to their features. BOO, BDO and DCMF are contracts in which privates designs, build, own, develop, operate and manage the assets with no trasfer at the end of the contracts. The second group, where the private company can buy or lease the assets, managing it and operating on it with no trasfer at the end of the contract, includes BBO, LDO and WAA. The last group is the biggest and comprises BOT, BOOT, BROT, BLOT and BTO. In this group, privates perform all the activities already mentioned, returning the asset to the government but with the possibility of leasing it afterwards.

The above-mentioned contracts (Table 15) can be also considered as part of more general categories, that are identified as follows:

- **Brownfield contracts:** they concern those projects in which the asset is already existing and the private company is only involved in management activities. This kind of contracts includes all those projects in which private parties must rehabilitate the asset and then revert it back to the government. They include: BBO (Buy, Build, Operate), LDO (Lease, Develop, Operate) and WAA (Wrap-around addition);
- **Divestiture contract:** namely the private company is in charge of building and managing the asset, but it has also the ownership at the end of the contract. It includes:

BOO (Build, Own, Operate), in which charges are received by private entities from governments directly or as annuity and do not involve transfer of assets as BOTs, BOD (Build, Develop, Operate) and DCMF (Design, Construct, Manage, Finance);

- **Greenfield contracts:** they deal with management activities of an asset that must be built by the private company. At the end of the project, the private company must revert the asset to the government, paying a rental if the company wants to operate on it. They include: BOT (Build, Operate, Transfer), BROT (Build, Rent, Own, Operate), BLOT (Build, Lease, Operate, Transfer), BTO (Build, Transfer, Operate) and BOOT (Build, Own, Operate and Transfer). BOOT contracts are the most used among all types. According to the definition, “a *BOOT contract is a form of project operation, wherein the private entity works under a contract with another authority to design, construct and operate a facility for a specified period, after which the ownership is transferred back to the authority. During the time that the project proponent operates the facility, it is allowed to charge facility users pre-agreed toll, fees or rentals*”<sup>50</sup>.
- **Management and lease contracts:** are considered as hybrid forms of Brownfield and Greenfield contracts.

Of course, governments are not bound to choose one out of the available forms of contracts, but they can arrange the forms and the terms that best suit the project. So, it is possible to face a contract that presents a mixture of the characteristics above-mentioned, such as management and lease contracts. To better understand how risks are assigned according to these forms of contracts (Table 15), Figure 27 depicts an example of the most relevant risks in which parties can incur while choosing a contract, for example a BOT contract.

### Figure 27. Typical Risks in BOTs contracts

- |   |
|---|
| <ul style="list-style-type: none"> <li>• Difficult trade-off between costs and the ability to meet design parameters</li> <li>• Imperfect knowledge of demand catchments</li> <li>• Tight deadlines for completion and commissioning, with risks borne by contractor</li> <li>• Tight contract structure</li> <li>• Leakage of risk to the Special Purpose Vehicle, with impact on equity and debt</li> </ul> |
|---|

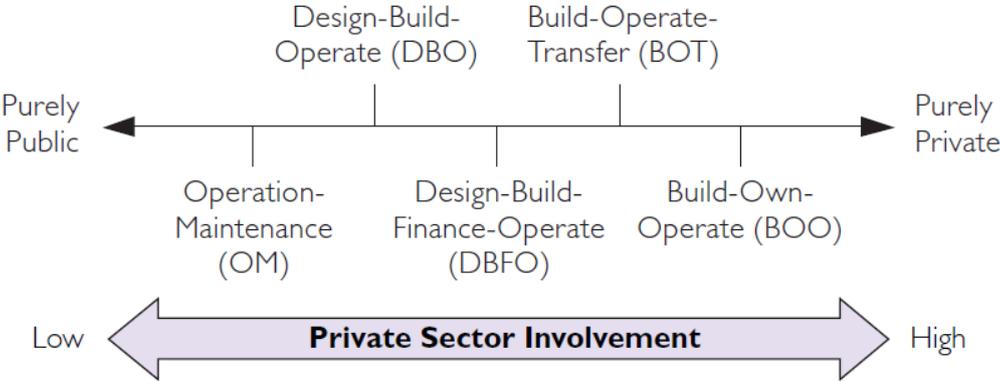
Source: Clements-Hunt P., “*Financing water: risks and opportunities*”, UNEP FI, CEO Briefing, A document of the UNEP FI Water and Finance Project, Geneva, Switzerland, Publication, August 2006, p.16

<sup>50</sup> Thakar B., “*Legal implications behind public private participation: an analysis*”, The IUP Journal of Infrastructure, Vol. VII, Nos. 3 & 4, 2009, p. 22

The main issues that can arise in the implementation of a BOT contract mainly relate to the design of the criteria for evaluation of the contract's structure and deadlines, the lack of information about demand features and the absence of clear connection with the Special Purpose Vehicle (SPV).

With the main purpose of Table 3, Figure 26 identifies the level of private sector involvement according to the different types of contract and, consequently, their level of responsibility. Hence, Figure 28 identifies the public and private participation considering specific types of contracts as examples, namely OM, DBO, DBFO, BOT and BOO, that were considered in Table 15.

**Figure 28. Private sector level of involvement across different types of PPI contracts**

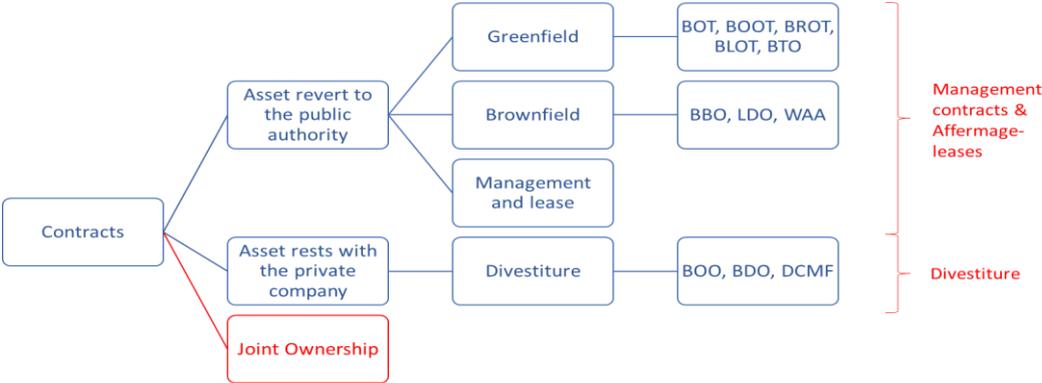


*Source: Kwak Y.H., Chih Y., Ibbs C.W., "Towards a Comprehensive Understanding of Public Private Partnerships for Infrastructure Development", California Management Review, Reprint Series, Vol. 51, No. 2, Paper, Winter 2009, p. 54*

The private sector involvement is at lowest level in Operation-Maintenance contracts, while is the highest in BOO. In OM contracts, private parties are engaged only in management activities, so little risk is borne by private companies and the project is almost purely public. On the other side, BOO contracts are those in which the ownership is of private companies and so the majority of the risk is borne.

Given the variety of cases and the types of existing contracts in the field of PPI, I tried to summarize and categorize them as shown in Figure 29, in order to provide a simplified general overview of all the instruments and categorisations available.

**Figure 29. Subdivision of different forms of contracts for PPI projects in the water sector**



Source: Personal revision of data.

In Figure 29, the instruments available according to the World Bank’s subdivision are blue coloured, while red is the literature subdivision compared to the World Bank’s one, in order to clarify common characteristics according to each category. Clearly, each type of contract has its own features and peculiarities that must be taken into account when evaluating it. Of course, there is no best solution among all of those presented. Each situation, each cultural mindset and regulation can favour a set of solutions with respect to others<sup>51</sup>. The contract represent the key element through which the collaboration takes place.

The agreement set between the two parties has the main function of eliminating the possibility of conflict of interests, moral hazard, myopia setting short-run and extra-profitable objectives, and responsibilities overrun. However, it is not enough for granting a successful operation. The regulatory framework and the incentives given to privates play a crucial role in determining the well-functioning of the project. This means that the entire environment in which privates and government are operating (social, political, cultural) can influence the success and the ability

<sup>51</sup> As Koppenjan F.M. J *et al.* report, for example, “In China, joint ventures between local government and multinational corporations are more frequently used. Local or provincial governments generally take the lead in these enterprises, while the international party provides the money.” Koppenjan J., Enserink B., “Public-Private Partnerships in Urban Infrastructures: Reconciling Private Sector Participation and Sustainability”, Public Administration Review, Issue 2 Vol.69, Article, 2009, p. 289

of privates of effectively managing the operations. However, a structure is common to all types of contracts, and comprises few key elements:

- a) **Allocation of risk:** it has to deal with the determination of how risk is shared between parties and how to remunerate it through premiums. This calculation is done by evaluating managerial capabilities of private entities in conducting operations.
- b) **Pricing model:** it relates to the ability of setting the right price for the service or good provided. It is also called Value For Money (VFM).
- c) **Costs during the life cycle and related risks:** they are the third element to keep into consideration when setting up a contract between parties. It is necessary to determine the costs related to the life cycle and risks in order to avoid opportunistic behaviour, to share responsibilities among parties during mobilization stages, and to improve transparency.
- d) **Measure of private control:** it is a matter of extreme importance, especially as regards the impact on prices, the ability to manage core activities and the avoidance of possible myopia problems. Given the nature of the transaction among parties, which is not under perfect market conditions, the creation of a new and separate company (called Special Purpose Vehicle – SPV) is necessary to start operations. In this phase, user charges, the nature of the economic environment (monopoly, duopoly,...), as well as contingent liabilities with public authorities are determined. In this way, the public sector can only regulate the provision of services and goods, trying to avoid political interferences.
- e) **Cost of capital:** it differs from private companies to public authorities. This difference is related to the risk shifting process, the nature of the project and the allocation of responsibilities. The fact that the government has a lower cost of capital, does not mean that it can better manage infrastructure projects than privates, leading to a lower rate of borrowings. The only reason why the rate is lower is that it shifts the risk burden on taxpayers. It means that if governments register losses, taxpayers will be the subjects that will pay for those losses. Conversely, private firms bear all the risk burden. If governments try to remunerate taxpayers for the risk they bear, there would be no difference between public and private management of infrastructures. Privatization not only could bring efficiency from a managerial point of view, but also an immediate injection of liquidity in order to bring down debt position or meet budgeting needs. Moreover, passing from public management to privately handled projects, in order to take advantage from operating and cost efficiencies, it is necessary to take into account

the presence of transaction costs. In transaction costs, elements such as costs of setting a regulatory framework and conduction of the bidding process, are included.

- f) **Incentives to private parties:** it is necessary to take into account the methods and the parameters adopted in determining rewards. However, privates might be not satisfied by receiving just the price charged to consumers. Returns are the main aim of private companies. The easiest way of obtaining profits, would be setting higher charges to final users. However, to avoid this mechanism, public authorities set incentives to private companies. Privates have incentives to improve the quality of the goods and services they provide and their on-time delivery. They expect to have objectives and targets to achieve in order to get those incentives and rewards, this is why it is extremely important to set targets properly in order to avoid possible moral hazard issues.
- g) **Transfer of know-how, capabilities and technologies:** the reason why PPIs are considered as instruments, is because they can combine public utility of operation and efficiency in management deriving from privates' capabilities. For this reason, there is *“the need for a framework that enables the private sector partner to make reasonable returns on investments without diluting the standards and quality of services provided”*<sup>52</sup>.
- h) **Regulatory framework:** it plays a key role in facilitating the entrance and co-operation between public and private parties. In order to provide an efficient service, it is necessary that the environment in which privates and public authorities are operating is regulated, ensuring fair competitiveness and sufficient legal protection.

To understand the relevance of the regulatory framework, the example here below can provide useful insights. Example 1 illustrates a relevant historical episode of successful implementation of PPI as a way of merging public interest with private efficiency in management.

### **Example 1**

The first successful implementation of PPI contracts in water sector privatization was accomplished in United Kingdom, when it was first introduced this kind of cooperation between public and private parties in 1992. It was the so-called Private Finance Initiative (PFI). This peculiar initiative encouraged private parties to get involved in public projects. Privates offered value for money (VFM), good risk sharing proposal and involvement in design,

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<sup>52</sup> Mohan B., Latha R.N., *“PPP at Cross Roads: Alternative Models an Imperative”*, SCMS Journal of Indian Management, Paper, October - December 2017, p. 8

construction and management, with DBFO contracts. With this initiative, privates paid the construction and public authorities paid back to the government a rent for 20-30 years. This way, government did not directly own assets anymore but received capital assets and support services. This exchange between assets, services and payments was carried out through the creation of a Special Purpose Vehicle (SPV) lasting 25 years. PFI is regulated by HMT (Her Majesty's Treasury) and watched by NAO (National Audit Office), PAC (Public Affairs Council) and ASB (Accounting Standards Board)<sup>53</sup>. With PFI was the SPV that was able to choose, according to its valuation, the input in order to obtain the outputs required by the government and set on contracts by the government. The outputs required, as Wall *et al.* (2009) report, were “*In simple terms, [...] defining the service(s), required; allocating the risk to the party most able to bear it; complying with a process; demonstrating VFM; and relating payment to performance.*”<sup>54</sup> For what concerns the inputs chosen by the SPV, they could have been the materials used, the financing methods and the subcontractors, namely all those elements that were necessary in order to meet the government's requirements.

Table 16 summarizes the most relevant data of this example.

**Table 16. Summary of Example 1**

<b>What</b>	<b>Where</b>	<b>When</b>	<b>How</b>
First implementation of PFI contracts in water sector	United Kindom	1992	Through Private Finance Initiative (PFI). Creation of a Special Purpose Vehicle (SPV) of 20-30 years to carry out a DBFO contract (PFI) in water distribution.

*Source: Personal revision of data.*

This is an example of a good implementation of PFI introduction that clearly established roles and responsibilities, incentivizing PFI projects in a country.

When we talk about PFI, we must consider the type of market in which we are operating, as well. Usually, under public ownership and without the presence of PFI, the regime is the one of monopoly. In this kind of market, the possibility of setting incentives is usually low and the

<sup>53</sup> Wall A. and Connolly C., “*The Private Finance Initiative: an evolving research agenda?*”, Public Management Review, Vol. 11, Issue 5, 2009, p. 711

<sup>54</sup> Wall A. and Connolly C., “*The Private Finance Initiative: an evolving research agenda?*”, Public Management Review, Vol. 11, Issue 5, 2009, p. 709

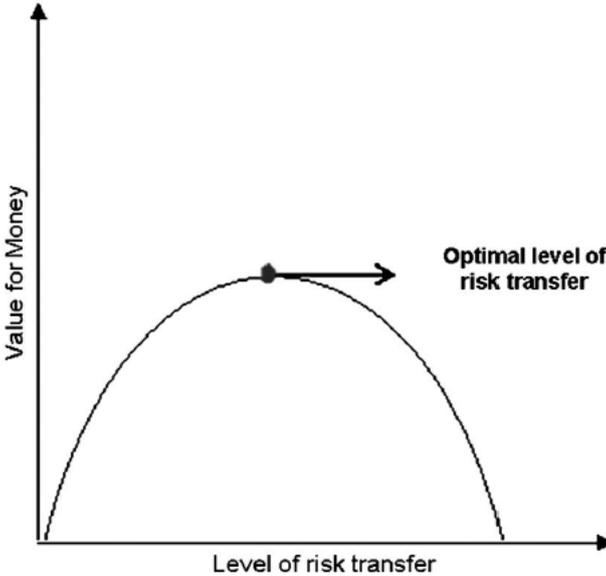
regulatory framework must be carefully developed to regulate it, especially if the monopoly causes the disaggregation of a vertically integrated supply chain. This happens when the suppliers, vendors and all the other subjects of the supply chain have been previously decided. When competition is introduced, it facilitates the creation of opportunities and it pushes towards making the best offer to final users. It is also important to consider the following relevant aspect in risk allocation. If the project was purely public, governments would have been the authority in charge of setting tariffs. This could lead them in setting tariffs that are too low to cover the costs in which the public authorities incurred. To cover such losses, the governments should increase taxes, shifting the risk burden of possible losses to the taxpayers. On the contrary, if the project was entirely privately managed, private parties would have borne the entire risk of losses and of management activities. If the project is purely private, it allows private companies to set higher tariffs in order to collect enough revenues to cover costs in which they incurred. Hence, taxpayers are not charged of any risk burden, being better off, and there would be higher fiscal resources flowing toward the government. In addition, there are microeconomic and macroeconomic issues and risks that privates must take into account when they decide to participate in infrastructure projects. As Harris (2003) reports, for example macroeconomic shocks can increase cost of financing in local currency terms<sup>55</sup>, so changes in costs of capital are needed in order to reflect these movements. Thus, risks should be carefully identified and fairly apportioned to the parties who can best manage them. However, risk management will allocate only a small part of the entire possible risk to the private investor, due to the impossibility of taking into account for estimation each risk that could occur. Generally, most of the macroeconomic and exogenous risks are allocated to public authorities, while project risks are borne by private investors. If the risk and the regulatory pattern are not well managed, this leads to concentrate on problem-solving issues rather than prevention. Moreover, risk may be mis-priced in order to lower the contract price of the deal, making it more competitive even if it does not actually push toward Value For Money, but just spending less.

To sum up the overall process of risk allocation, Graph 26 depicts the optimal level in PPI contracts.

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<sup>55</sup> Harris C., “*Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons*”, The International Bank for Reconstruction and Development, Washington DC, World Bank Working Paper No. 5, April 2003

**Graph 26. Optimal level of risk allocation in PPI contracts.**



*Source: Marques R.C., Berg S., “Risks, Contracts, and Private-Sector Participation in Infrastructure”, Journal of Construction Engineering and Management, Article, Issue 11 Vol. 137, 2011, p. 926*

In Graph 26 the optimal level of risk is related to the Value For Money (VFM) brought by private companies. This function is increasing until the optimal level is reached, then it decreases. This means that there are two situations in which the VFM is zero relating to the level of risk transferred: the first case is the one in which no risk is shifted at all, the second is the one in which all the risk is transferred. In both cases it is just one party that bears all the risk. Thus, Graph 26 shows that the VFM increases only if the risk is fairly apportioned to the parties involved, according to the capabilities of managing the kind of risk analysed.

**3.3. Risk estimation and mitigation**

As already mentioned<sup>56</sup>, in PPI the risk is transferred from taxpayers to private investors. This means that risk-mitigation instruments are required, together with a right estimation and allocation on contracts. Generally, risks are divided according to the parties who can best manage it. Given the fact that activities are managed by privates and know-how is employed, risk allocation and mitigation are an important aspects.

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<sup>56</sup> Chapter 3, p.89

In PPI projects the risk distinction, according to Zimmermann *et al* (2014)<sup>57</sup>, is made according to its transmission between parties. Risk estimation is made with regard to the probability of happening and related damage. In order to make efficient allocation, it is necessary that information is available and comparable. The lower is the availability of information, the higher is the uncertainty of risk occurrence and the standard deviation, so it must be established a proper treatment with mitigation measurements. Moreover, it is necessary to keep in mind that PPI have an average duration of 20-30 years, so a multitude of events and variables should be taken into account. This is why, most of the times, only successfully closed projects are inserted into statistics for the evaluation process.

In addition, it often happens that the risk sharing is not clearly apportioned due to the structure of PPI contract, especially with the creation of the Special Purpose Vehicle (SPV) in Private Finance Initiative (PFI). As Demirag *et al.* (2012) stated, “*this PFI structure may insulate debt investor from holding risk and leads financial institutions and service providers to demand high risk premiums to compensate for the risks and uncertainties assumed over the long life of the contract because the way that risk profiles change over the duration of PFI projects is not well known*”<sup>58</sup>. The costs connected to private participation and tender costs raises the risk of the operation rather than lowering it. Always according to Demirag *et al* (2012), PFI regards prioritization of risk-return criteria and enhancing opportunities of investments, but this implies that parties must bear risk according to a contract. Generally, the estimation of risk can be done by using Moody’s ratings, specifically on PFI, which use estimation of losses instead of cash flows, together with the likelihood of happening. These estimations are run according to the Monte Carlo Method, assuming that creditors hold operational risks on a single project. A differentiation on the base of the nature of risks is done, taking into account the various supports that a creditor could have in the performance and considering them a shield to SPV (positive impact on credit quality). As Demirag *et al.* (2012) report, the risk estimation requires four steps:

- 1) Project risk assessment – controllable and uncontrollable;
- 2) Determination of the capital structure – the weaker the assessment, the stronger must be the capital structure;

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<sup>57</sup> Zimmermann J., Eber W., “*Consideration of Risk in PPP-Projects*” Business, Management and Education, Issue 1 Vol. 12, Paper , 2014, pp. 30-46

<sup>58</sup> Demirag I., Khadaroo I., Stapleton P., Stevenson C., “*The diffusion of risks in public private partnership contracts*”, Accounting, Auditing & Accountability Journal, Paper, Issue 8 Vol. 25, 2012, p. 1322

- 3) Recovery on concession termination – all risks must be covered in the model;
- 4) Procurer's credit quality.

This risk transfer is needed to lower credit risk and augment rating grade, in order to reduce financier's risk, which is only possible in presence of an adequate legal framework. It is also useful to notice that the equity capital exposed to risk is only partial, so all the efforts to protect and monitor risk for financier is focused on not reverting it to them, away from the SPV. As the author reports, "*The financial structure used to deliver PFIs means that both debt and equity holders are risk averse so that risk diffusion away from the SPV is essential to raise finance at an affordable price. Significant financial and performance support that add cost to the public sector are put in place to limit the liability of financiers*".<sup>59</sup> A mean to do that is through due diligence. Value For Money strictly depends on risk transfer on privates, and it is not always true that parties use models for optimal allocation but instead try to just transfer risk elsewhere. From a micro-level point of view, the increase in Value For Money depends on tenders. Financiers, clearly, try to find carefully the best partners. This leads to the creation of barriers to entry and the choice of more certain projects (risk avoidance). Of course, this behaviour leads to a distorted choice of investment programs.

For what concerns risk allocation of systematic risk, according to Jin and Doloi (2008)<sup>60</sup>, a useful instrument that can be used to ensure efficient risk allocation is TCE (Transaction Cost Economics). This model sees risk allocation, namely the process of apportioning the responsibilities that are specifically matched to a kind of risk according to different circumstances, as a transaction. TCE considers the transactions costs (which are the costs of running the economic system) that can arise from the contracting process in PPI. So, the main concept in TCE is that the parties involved in the contracting process will try to adopt a governance structure that allows them to split and assess risks in order to reduce such

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<sup>59</sup> Demirag I., Khadaroo I., Stapleton P., Stevenson C., "*The diffusion of risks in public private partnership contracts*", Accounting, Auditing & Accountability Journal, Paper, Issue 8 Vol. 25, 2012, p. 1336

<sup>60</sup> Jin X.H., Doloi H., "*Interpreting risk allocation mechanism in public-private partnership projects: an empirical study in a transaction cost economics perspective*", Construction Management and Economics, Issue 26, No. 7, Article, 2008, pp. 707-721. According to them the risk is allocated as exchange among parties. The risk that a party could take is linked to the management responsibilities during the bidding process. The risk will depend on: ability in risk management, trading history with the party, uncertainty and risk commitment. Chang C.Y., "*A critical review of the application of TCE in the interpretation of risk allocation in PPP contracts*", Construction Management and Economics, Article, Issue 2 Vol. 31, 2013, pp. 99-103

transaction costs. The concept that lies at the base of PPI and TCE, is the Value For Money<sup>61</sup> (“VFM”), that represents the optimal combination of costs incurred and services provided to the community. VFM is also strictly connected to the optimal risk transfer. Governments must take into account which risks should be borne by private parties and, if these risks are misallocated, public authorities must raise taxes in order to have enough resources for obligations of repayment in case of risk occurrence. On the other side, if private companies bear an inappropriate amount of risk, they will ask for a higher premium to be paid, leading also to a renegotiation phase that represents a source of costs. Thus, essentially, TCE is implemented in order to economise on the costs that can occur in the totality of the PPI Project, taking into account production costs but also transaction costs. The key elements identified by Jin and Zhang (2011)<sup>62</sup> are:

- 1) Asset specificity;
- 2) Uncertainty;
- 3) Frequency;

and they represent the three dimensions according to which risk allocation may change. If those dimensions are not appropriately taken into consideration, the main costs that will arise can be identified as:

- a) Higher costs for higher contingency (extra premium paid to privates);
- b) Higher costs for monitoring activities;
- c) Deterioration of quality and price relationship;
- d) Higher costs for disputes;
- e) Higher costs for limiting the risk of taking advantage of one party’s position;
- f) Higher costs for renegotiations in order to achieve optimal risk allocation.

The positive feature of the TCE Method is that it is possible to evaluate the contract issue. However, this model brings a few issues itself:

- 1) The first one is the unit of analysis. Risk is a part of the transaction and its value must be set according to the Value For Money of the entire project in which it is comprised. Risk management capability is a meter of allocation and, according to TCE definition,

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<sup>61</sup> Utility derived from each purchase or amount spent

<sup>62</sup> Jin X.H., Zhang G., “*Modelling optimal risk allocation in PPP projects using artificial neural networks*”, International Journal of Project Management, Issue 29, Paper, 2011, pp. 591-603

“*transaction occurs when a good or service is transferred across a technologically separable interface*”<sup>63</sup>. So, it can be mediated by governance structures, which are meter of tender as well. This could lead to a bad decision;

- 2) The second issue is related to the efficacy of the combination of pre-agreed allocation, contractual arrangements and payments. The enforceability of the risk-management responsibility depends on contractual terms and reimbursements. There could be the possibility of one party to take advantage on another in order to set an higher payment. Moreover, the loss or gain consequent to risk occurrence are divided ex ante, as goodwill gesture. There is the need of setting a much more rigorous approach, especially according to contractual arrangements, in order to avoid this overcome;
- 3) The third point is the nature of governance structure. The model considers PPI as insurance contracts, but it does not take into account all the efforts and resources that parties employ. This is why transaction costs, payoffs and property rights should be taken into account.

Table 17 will summarize the literature contribution to the identification of risk allocation and evaluation methods, that were presented in this section.

**Table 17. Literature review on risk evaluation instruments in PPI contracts**

<b>Authors</b>	<b>Evaluation Method</b>	<b>Region</b>	<b>Key Findings</b>
Jin	TCE	Australia	TCE Method can help to embrace economies into risk management. TCE sees risk allocation as process of assigning responsibilities based on characteristics of the parties and of the contracts.
Ameyaw, Chan	FSE	All	Utilization of quantitative fuzzy variables in the assessment of the likelihood and severities of risk factors (22 elements analyzed). There are 2 main application of this method: <ol style="list-style-type: none"> <li>1) Establishment of risks that can occur;</li> <li>2) Help in project selection.</li> </ol>
Jin, Zhang	ANN (Artificial Neural Network)	All	This method (ANN) was adopted in response of TCE and RBV. ANN model helps in the risk allocation decision-making process. It considers influential

<sup>63</sup> Chang C.Y., “A critical review of the application of TCE in the interpretation of risk allocation in PPP contracts”, Construction Management and Economics, Article, Issue 2 Vol. 31, 2013, p. 101

<b>Authors</b>	<b>Evaluation Method</b>	<b>Region</b>	<b>Key Findings</b>
			factors such as partners risk management routines, cooperation history, risk management commitment and risk management environmental uncertainty.
Jin, Doloi	TCE (Transaction Cost Economics) and RBV (Resource-Based View)	All	Consideration of the resource-based view in support of the TCE method in order to minimize behavioural uncertainties and transaction costs.
Zimmerman, Eber	Transmission, probability of happening and damage	All	In order to make an appropriate risk allocation, it is necessary that information is available and accessible to the parties equally.
Demirag, Khadaroo, Stapleton, Stevenson	Risk rating	All	To assess risk, it is possible to use the method applied by the rating agencies, namely the Monte Carlo Method.

Source: Personal revision of data.

However, regulating systematic risk is easier, but problems arise with the unpredictable and unsystematic part of it. This is why, in contracts, risk should be considered and deeply analyzed through each stage<sup>64</sup> and contracts should include “*responsibilities and risks relating to the procurement and operation of a capital asset being transferred to private sector.*”<sup>65</sup> Risk can be allocated implicitly or explicitly. The former relates to the dimension of responsibility transfer by contract: the higher the responsibilities transferred, the higher the probability of bearing risks related to construction and volume of assets used; the latter can be done through payment mechanisms or through specific contract terms.

Hence, risk mitigation measures are of primary importance when we consider unsystematic risks and allocation. In order to mitigate risks, Xu *et al.* (2011), established 9 measures divided in two sections, summarized in Table 18.

<sup>64</sup> Nisar T. M., “*Risk Management in Public–Private Partnership Contracts*”, Public Organization Review, Issue 1 Vol. 7, Paper, March 2007, p. 1-19

<sup>65</sup> Nisar T. M., “*Risk Management in Public–Private Partnership Contracts*”, Public Organization Review, Issue 1 Vol. 7, Paper, March 2007, p. 6

**Table 18. Measures to cope with risks**

<b>ENVIRONMENT RISKS</b>	<b>GOVERNMENT INTERVENTION RISKS</b>
<i>Precautionary measures</i> – scrutinize conditions to avoid market risk	<i>Authority and responsibility</i> – clear clauses and guarantee to prevent government intervention
<i>Transfer risk</i> – inclusion of government guarantee, compensation and tariff clauses	<i>Connetion</i> – with local authorities to mantain good relationships
<i>Long-term agreement</i> – obtaining of price guarantee from government	<i>Letter of guarantee</i> – obtained by higher level of public authorities
<i>Preferential benefit</i> – tax beneficiary regime for land, revenues, exchange rates, market supplies	<i>Consortium</i> – with state-owned, private and international firms
	<i>Political risk insurance</i>

Source: Xu Y., Lu Y., Chan A.P. C., Skibniewski M.J., Yeung J.F.Y., “A computerized risk evaluation model for public-private partnership (PPP) projects and its application”, *International Journal of Strategic Property Management*, Issue 3 Vol, 16, Article, 2012, pp. 277-297. Personal revision.

These are measures that can be adopted in order to minimize the impact of macroeconomic events and unsystematic risks that can occur during projects. Those risks impact on the pre- and construction phase, as previously shown in Table 4 in this Chapter. If a risk can highly affect cost, time and performance during construction, it will also affect operations after the construction phase. So, efforts to mitigate them in the construction phase will have positive reflections also in the post-construction one.

To summarize the best strategies that can be adopted in order to face risk occurrence, Table 19 provides some useful practical examples of actions that can be undertaken.

**Table 19. Financing strategies according to different risk situations.**

Risk Conditions	Financing Strategies
Low Risk	<ul style="list-style-type: none"> <li>• Use high debt-to-equity ratio for maximum leverage and maximum return on invested equity.</li> <li>• Establish minimum contingency credit facilities to minimize financing costs.</li> <li>• Use capital markets to procure debt financing to reduce interest costs.</li> <li>• Procure long-term financing early to reduce financing costs.</li> </ul>
High Political Risk	<ul style="list-style-type: none"> <li>• Involve international firms or organizations to create leverage with local government authorities.</li> <li>• Seek assistance from influential individuals or organizations who have rapport with local government authorities.</li> <li>• Seek local government support and guarantees.</li> <li>• Procure insurance from government organizations such as the Overseas Private Investment Corporation.</li> <li>• Establish contingency credit facilities to cover unanticipated expenses.</li> </ul>
High Financial Risk	<ul style="list-style-type: none"> <li>• Obtain loans from international lending institutions.</li> <li>• Use fixed-rate or standardized-rate debt financing.</li> <li>• Denominate loans in local currency.</li> <li>• Structure debt financing in the same currencies as anticipated revenues.</li> <li>• Structure revenues in both local and foreign currencies.</li> <li>• Seek government support and guarantees.</li> <li>• Insert revenue escalation provision into the contract.</li> <li>• Establish a contingency credit facility to cover unanticipated expenses.</li> </ul>
High Market Risk	<ul style="list-style-type: none"> <li>• Finance early phases with equity and temporary loans and refinance during the operation phase with lower-cost long-term debt.</li> <li>• Structure the debt repayment schedule to start low and escalate during the initial years of operation.</li> <li>• Negotiate contract terms that allow increases in user fees.</li> <li>• Establish a contingency credit facility to cover unanticipated revenue shortfalls.</li> <li>• Restructure debt, if necessary, to solve cash flow problems during the concession period.</li> </ul>

*Source: Kwak Y.H., Chih Y., Ibbs C.W., “Towards a Comprehensive Understanding of Public Private Partnerships for Infrastructure Development”, California Management Review, Reprint Series, Vol. 51, No. 2, Paper, Winter 2009, p. 71*

As reported in Table 19, the most suitable financing strategies according to the different levels of risks are:

- 1) **Low Risk:** improve the use of debt instruments, establish contingency credit facilities and prefer long-term financing;
- 2) **High Political Risk:** maximise local and international support and guarantees;
- 3) **High Financial Risk:** revenue escalation, use loans from international institutions, prefer fixed-rate loans, prefer local currency, prefer government support;
- 4) **High Market Risk:** try to finance with equity sources the first phases of the projects, structure debt repayment with increasing principal, establish credit contingencies and negotiate contracts.

Given this situation, in the last years PPIs were concentrated on countries in which the level of risk perceived was lower. However, recent crises had a negative impact in this trend, especially where PPI projects are not so diffused. So, in order to reduce political risk, handling macroeconomic events in a proper manner is of the outmost importance.

To conclude this chapter, I would like to point out few key elements. Public-Private Partnerships or Private Participation in Infrastructure (PPP or PPI), provide different types of contracts that mainly changes according to the different allocation of risk among parties. In order to allocate risks, specifically during the due diligence phase, different models are available and each of them takes into consideration different variables. The choice of variables is mandatory, because there are no available models that are able to capture every kind of risk, both at a micro and at a macroeconomic level. According to the literature, Moody's ratings are a good proxy for PFI contracts, which imply an higher involvement of private parties and the creation of a Special Purpose Vehicle (SPV). TCE is another good proxy according to the literature, which considers risk as a transaction cost that arises among parties during the contracting process. However, it still brings a few issues itself due to its strictly relation to a governance structure and a fair measurement process according to the unit of analysis. Nevertheless, even if there are countless types of contracts and risk allocations, a general rule can be found: basically the risk relating to macroeconomic variables, is generally borne by public authorities, while performance and operational risk are borne by private investors. The more the public authority can transfer the risk on privates, the lower will be the cost of PPI. But, the higher is the risk for privates, the higher will be the risk premium required for remuneration, and the higher the possibility of adverse selection and moral hazard. This helps us to understand the critical role that contracts plays in the outcome of PPI, because the higher is the risk, the higher will be the possibility of failure. Thus, parties must pay close attention when sharing risk in the contract, because it is a crucial point that must be clear and agreed.

## **Chapter 4 – PPI in the Water sector: a focus on the Sub-Saharan Africa region**

The aim of this chapter is to provide insights and overviews of the Water and Sewerage sector. We will start analyzing the historical path of Africa, with a focus on the Sub-Saharan region based on data provided by the World Bank and OECD. Thereafter, we will concentrate on the description of the water sectors outlining the main features of water as a primary good essential for living and then examining its use in industrial activities, for instance as a renewable energy source. Once that the most important characteristics are given in order to understand the importance and the sensitivity of this good as perceived by stakeholders, we will describe all the 24 Principles issued by OECD to be applied to PPI projects in water infrastructures. This introduces the last part of section 2, dedicated to water accountability. Section 3 will include the analysis of the risk factors that can arise when PPI projects are undertaken in water and sewerage sector. By the end of chapter 4, it should be clear what are the main features of the Africa region in terms of socio-political pattern, the role played by PPI projects in this area, the characteristics and the issues of water when treated and distributed, and the risks that public and private parties should consider while undertaking PPI projects in water and sewerage sector in Sub-Saharan Countries.

### **4.1. Historical development of PPI in Africa region and focus on recent development of Sub-Saharan countries**

Looking at the historical path developed by Africa and according to Nellis (2005)<sup>66</sup>, it is clear that there were many failures in projects led by state-owned enterprises. This is due to the traditional way of conducting affairs inherited by past governments, in which state participation was thought as fundamental. The issue was that governments did not have enough capital to sufficiently cover projects from 1960s to 1980s. After seeing that state-owned enterprises were performing poorly, due to insufficient funds and conflicting objectives, governments started a phase of reforms leading to commercialization and restructuring. Some of the state-owned

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<sup>66</sup> Nellis J., “*The Evolution of the Enterprise Reform in Africa: From State-owned Enterprises to Private Participation in Infrastructure – and Back?*”, Energy Sector Management Assistance Program ESMAP, ESMAP Technical Working Paper No. 84, Washington, 2005

enterprises were not able to survive and, generally speaking, this phase was not successful. Many clients, with increasing prices, were not able to meet their payments and sanctions were not functionally applied. So, in the 1990s, public authorities started to welcome PPI, mixing public and private involvement. New reforms were implemented, especially in order to regulate pricing policies and, consequently, improving the quality of the services provided, together with transparency. At the first stage, few problems, related to evaluation methods, occurred due to the missing updating process of past contract conditions. Namely, African countries were trying to implement a new form of cooperation between public and private parties, without renewing contract conditions. Consequently, few readjustments were made in order to make criteria for evaluation process more realistic. The majority of governments saw in PPI the possibility of increasing access to water for population because, with this instrument, they would have been able to raise adequate funds in order to develop the needed projects. However, the possibility of involving private managers brought to another issue: managers involved were not actually able to handle the PPI projects due to lack of know-how, generating a decrease in cash flows and cancellation of some projects. Another reason for the failure of PPI implementation in water sector was the socio-political reaction in tariff increases due to the need to cover costs of construction. Those costs, together with negative cash flows generated by such large projects, lead governments to promote smaller and less risky projects, as we will better explain below.

Table 20 briefly summarizes the main reasons for failure of private sector participation in PPI's water and sewerage projects.

**Table 20. Summary of reasons for failure of private participation in PPI projects in water and sewerage sector**

- Capital intensity, with high, up-front investments combined with long payback periods and low sector returns
- Risk of political pressure on tariffs
- Weak or inconsistent regulation, lack of transparency, and perceived risk of regulatory capture
- Subsovereign risk – local government entities standing counterparty to bulk water sale agreements while having a poor collection record, suboptimal financial condition, and weak credit
- Water unaccounted for, water loss, inadequate distribution networks in a state of disrepair, and the lack of investment funding to remedy the same, thus threatening long-term project viability
- Foreign exchange risk, with mismatch between local currency revenues and foreign currency financing
- Forms of credit backstop (for example, sovereign counter guarantees for financial obligations of subnational entities being scaled back in the face of decentralization, ratings agency reviews and downgrades)
- Lack of local government access to bank and capital markets due to absence of central government authorization, and competition for scarce financial resources
- Aversion of private insurers and reinsurers to providing bond insurance and political risk insurance to subnational entities in developing countries due to lack of transparency, poor financial condition of reference entity, and absence of credit rating.

Source: Baietti A., Raymond P., “Financing Water Supply and Sanitation Investments: Utilizing Risk Mitigation Instruments to Bridge the Financing Gap”, *Water supply and sanitation sector board discussion paper series, Water Sector Board DPs, Paper no.4, January 2005, p.8*

The list of possible reasons for failure in private participation highlights the difficulties that can arise and hinder private parties contributions during periods of crises and socio-political instability.

After the 2008 financial crises, cancellations and delays increased. To explain this unsuccessful implementation, there are few reasons available, apart from cost rising with no corresponding increase in efficiency. First of all, Africa did not have sovereign credit ratings, only some of the projects have debt rating, of class BB or lower. Secondly, there was a limited capacity for financing coming from locals. Third, longer payback and build-out periods increased the risk of the infrastructure project, meaning that it is possible that macroeconomic events incur, especially political and regulatory. During this period, a new scenario arose with the introduction of smaller and less risky projects, in which big private companies that once were involved in PPI projects were no longer the only players in this cooperation. Small-scale providers came up beside bigger private companies, with a progressively larger involvement of small-scale providers of water services, as reported by OECD (2011)<sup>67</sup> and Meera *et al.*

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<sup>67</sup> OECD, “Financial planning tool for water utilities. Meeting the Challenge of Financing Water and Sanitation”, User Manual, OECD Publications, Report, 2011

(2003)<sup>68</sup>. This brought the necessity of reforming the regulatory framework, following an increasing decentralization process. This larger involvement of small-scale providers was pushed by the fact that smaller players were more able to respond to local issues, rather than larger private companies. However, the main advantage of large private companies is the one of implementing economies of scale and scope in larger areas. Table 21 illustrates the advantages and disadvantages that come from enlarging the scope of the water sector and utilities.

**Table 21. Advantages and disadvantages of economies of scope in the water sector**

Benefits	Costs
Facilitates access to water resources in water-scarce areas	Introduces distance with end users, dilutes accountability, and makes it more difficult to tailor services to meet their needs
Allows economies of scale in dimensioning works if towns are neighboring	Requires political will to aggregate at local level if water is a municipal responsibility
Allows economies of scale in procurement and support functions	Limits the potential for direct competition or for carrying out comparative competition
Allows economies of scope in sharing overhead costs	Introduces risk of resistance to cross-subsidization from those that lose out
Facilitates access to private finance and international donors	Attracts local private operators to smaller service areas
May make transaction more attractive for international operators, up to a certain point	Creates the problems (as well as the advantages) of cross-subsidization
Allows cross-subsidization of poor areas by richer ones	

Source: PPIAF, World Bank, “Approaches to Private Participation in Water Services: A Toolkit”, Public-Private Infrastructure Advisory Facility & the World Bank, Washington DC, Report, 2006, p. 60

Table 21 shows that there is a slight prevalence of benefits over costs, coming from economies of scope. Generally speaking, benefits that can arise from economies of scope relate to the larger access to water resources, to the easier procurement, to the possibility of spreading costs over a larger base, and to the improvement of the access to private and international financing and cross-subsidization. Disadvantages relate to the reduced accountability to stakeholders, the cross-subsidization, the stronger political willing to move to municipal responsibility and the local private operators’ attraction to smaller areas, which are more difficult to be monitored and that can favour moral hazard. Larger private companies are able to construct and lead bigger plants and projects, diluting costs and lowering prices for service provision. However, small

<sup>68</sup> Meera M., Kameel V., “Financing Small Water Supply and Sanitation Service Providers. Explaining the microfinance option in Sub-Saharan Africa”, Water and Sanitation Program-Africa, Nairobi, Kenya, Working Paper, December 2003

scale providers know better the local issues and are able to reach smaller villages that can have more difficulties in accessing water than larger cities.

As mentioned, the possibility to involve also small-scale providers in PPI projects in the water sector can be interesting for financiers: firstly, because the private sector engagement in water and sanitation services is increasing, secondly because smaller operators can better reach rural and poorest areas. However, the main issue faced by small-scale providers lies in the difficulty in accessing credit, due to the lack of provision of collaterals. Moreover, small-scale providers have also fewer opportunities for economies of scale, in order to reduce costs. But the small dimension enables them to cover a higher portion of services to residents, rather than big infrastructure projects.

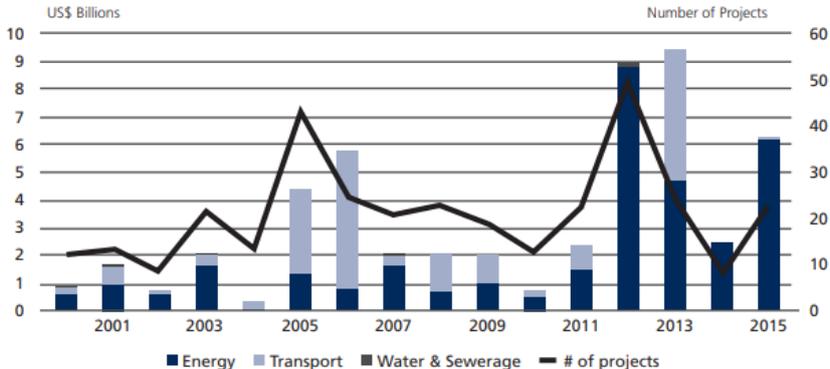
Despite the costs deriving from economies of scale and scope shown in Table 15, and the positive aspects of small-scale providers involvement, funds and access to capital to small providers are still inadequate. This turns into the inability of operators to bring a project to completion, being them self-financed. To support small-scale service providers, microfinance is evolving in order to get them the right instruments to develop their projects.

For what concerns recent historical development of Sub-Saharan Africa, according to the World Bank (2016)<sup>69</sup>, investments have not been constant during the past decade, being always the poorest region in investing in PPI. This is especially due to the presence of wars and plagues. Graph 27 shows the number of projects undertaken in Sub-Saharan Africa in the last fifteen years. The number of projects recorded relates to the energy sector, transport, and water and sewerage.

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<sup>69</sup> World Bank Group, “2015 Sub-Saharan Africa (AFR) PPI Update”, PPI Database, Report, 2016

**Graph 27. Number of projects undertaken in Sub-Saharan Africa in each sector (energy, transport, water, and sewerage) from 2001 to 2015**



Source: World Bank Group, “2015 Sub-Saharan Africa (AFR) PPI Update”, PPI Database, Report, 2016, p.2

From Graph 27 it is possible to see that, until 2011, the number of projects undertaken in Sub-Saharan Africa was low, with the exception of the boom registered in 2005 and 2006, probably due to the strong enforcement of Millenium Development Goals by the end of 2015 by Kofi Annan, secretary general of the United Nations in those years, and the Africa Cup of Nations in 2006. However, in the period from 2001 to 2011, the transport and the energy sectors registered the highest numbers of projects undertaken. In 2012 there was a boom, probably due to stronger involvement of regional and supranational organisations in pushing towards the infrastructure investments. In 2012 and 2013, the energy sector registered the majority of the PPI projects undertaken, with almost no investments registered in the water sector. In 2014 there was a slight drop in PPI investments, then they more than doubled in 2015 (an increase of 151%). The sector in which there are higher investments in the energy sector, especially in the field of renewables driven by REIPPP<sup>70</sup> Project in South Africa, followed by the transport sector. Table 22 shows the average investment commitment in the energy sector, transport, and water and sewerage sectors in Sub-Saharan Africa.

<sup>70</sup> Renewable Energy Independent Power Producer Procurement

**Table 22. Details of projects undertaken in Sub-Saharan Africa in each sector (energy, transport, water, and sewerage). Data refer to 2015 and are shown in terms of US Dollars**

	Number of Transactions	Average Investment Commitment (US\$ millions)	Total Investment (US\$ millions)	% of Total	% Change from 5-year average
Energy	22	\$280	\$6,163	98%	+71%
Transport	1	\$134	\$134	2%	-91%
Water & Sewerage	0	\$0	\$0	0%	--
<b>Total</b>	<b>23</b>	<b>\$274</b>	<b>\$6,297</b>	<b>100%</b>	<b>+31%</b>

Source: World Bank Group, “2015 Sub-Saharan Africa (AFR) PPI Update”, PPI Database, Report, 2016, p.2

According to the 2015 sector analysis<sup>71</sup>, Sub-Saharan Africa in 2015 totalized 23 projects, 22 of which in the energy sector for a total investment of more than US\$6 billion, and a single project in the transport sector for a total amount of US\$134 million. Energy is focused on electricity generation, involving countries such as South Africa (renewable), Uganda, Nigeria, Rwanda, Senegal, and Zambia. Renewable energy includes solar power, wind, hydro and waste; other investments are made in natural gas and diesel. For what concerns transport, the projects related to the development of Dakar-Diamniadio (Senegal) Toll Road according to a BOT project.

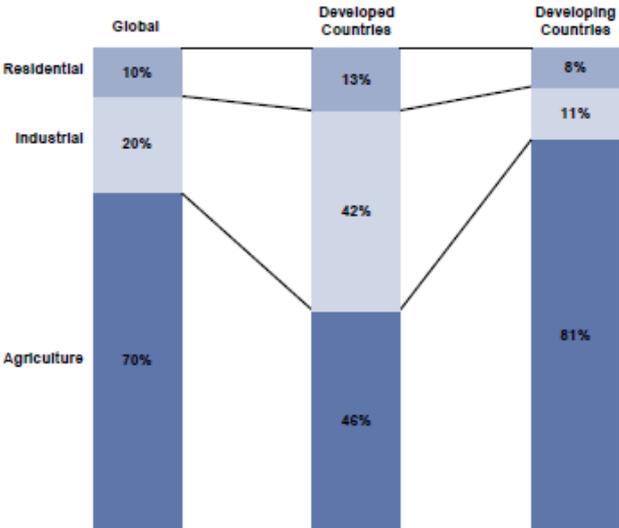
**4.2. Water**

Water is one of the primary goods for the human being, for which the availability is necessary in order to survive. This is why, in a region such as Sub-Saharan Africa (and, actually, countries all over the world), countries should be primarily committed to manage properly this good. Specifically, they set up meetings and events with international organizations in order to sensitize enterprises and communities, promoting waste of water avoidance and pushing towards improving accessibility to fresh water where it is scarce. Population around the world is growing, but the supply of drinking water is shrinking due to pollution and climate change. Businesses related to water are less cyclical and with modest and incremental product cycles, so risks are mainly related to operations, strategy implementations and regulatory frameworks. It is also important to take into account that water infrastructure services can be divided into different kinds: pipes, pumps, desalination, tests, treatments, drinking water and waste. For what concerns the provision of basic water services (such as distribution), PPI projects are now more focused on maintenance and replacement, with lower demand and an higher pressure on

<sup>71</sup> World Bank Group, “2015 Sub-Saharan Africa (AFR) PPI Update”, PPI Database, Report, 2016

prices. On the contrary, equipment and services are superior in technology, so demand is higher, with a greater possibility of growth and more barriers to entry. Opportunities for growth, according to Goldman Sachs (2008)<sup>72</sup>, are increasing in the water sector. This is especially driven by the necessity of finding ways to access drinking water resources, that are just 1% of the total amount of surface water. Governments and enterprises are trying to improve technologies in order to augment the percentage of global freshwater availability, trying to reach 30% by having access to ground water. Of course, the higher the development of a country, the more it passes from agricultural to the industrial sector as shown in Figure 30, the higher will be the consumption of water. Figure 30 is composed by three columns, representing 3 different regions (Global, Developed Countries and Developing Countries) and 3 different sectors of implementation (Residential, Industrial, and Agriculture).

**Figure 30. Global Water use according to different regions and different sectors of implementation**



Source: Dray D., Samuelson A., Zepf M., Kejriwal A., “The Essentials of Investing in the Water Sector; version 2.0”, Americas: Multi-Industry, Goldman Sachs, Working Paper, March 24, 2008

The global use of water, in 2008, was divided into 10% dedicated to municipal use, 20% for industrial use and 70% for agricultural activities. Figure 30 splits these percentages according to the water use in Developed Countries and Developing Countries. Developed Countries show a more balanced use of water between industrial and agricultural activities (respectively 42%

<sup>72</sup> Dray D., Samuelson A., Zepf M., Kejriwal A., “The Essentials of Investing in the Water Sector; version 2.0”, Americas: Multi-Industry, Goldman Sachs, Working Paper, March 24, 2008

and 46%), given by the status of the different economies. Developed Countries use 13% of water for residential use. Developing Countries concentrate their water use in agricultural activities (81%), which is still the leading sector in this area. Only a small amount, almost equal, is dedicated to the industrial activity and residential use, respectively 11% and 8%.

Giving the fact that water is involved in so many activities and it is a vital necessity, it is useful to consider its price elasticity: since it represents a necessity and there is no substitute, the demand is strictly rigid and insensitive to price changes. However, it is not possible to say that its elasticity is totally insensitive to price movements. The reason lies in the fact that if prices increase, reaching the maximum level of availability and willingness to pay of end users, riots can arise, leading so socio-political instability.

As mentioned, water is a good employed in industrial activities. According to Dray *et al.* (2008)<sup>73</sup>, water cycle has 5 stages:

- First stage: Identification of sources of water – During this phase water is disinfected in order to be used by population and industries.
- Second stage: Treatment stage, filtration, and disinfection – treatment process aim to eliminate specific elements such as bacteria or organic compounds.
- Third stage: establish final users – They can be municipal treatments, residential, industrial or wastewater management.
- Fourth stage: water handling before discharge.
- Fifth stage: discharge.

At first phase treatments can be applicable, at secondary phase biological treatment are applicable, and at advanced phase water is reclaimed. All those phases can impact on different sectors of usage, namely agricultural, industrial and domestic sectors. Those processes, such as water treatment and distribution can be a national or a municipal matter, even if generally it is considered as municipal use<sup>74</sup>.

Water is also an extremely important resource of renewable energy. During our decade, the environmental issue is particularly serious. The more organizations try to sensitize enterprises and governments, the more industries continue to pollute both in developing and developed

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<sup>73</sup> Dray D., Samuelson A., Zepf M., Kejriwal A., “*The Essentials of Investing in the Water Sector; version 2.0*”, Americas: Multi-Industry, Goldman Sachs, Working Paper, March 24, 2008, p. 33

<sup>74</sup> Municipal use means that its network of distributors is not implemented at a national level but it is a local affair.

countries. As mentioned above, availability of global fresh water is just 1% with respect to the total presence of surface water on earth. If we continue to pollute, we put in extreme danger water as both life good and renewable energy source.

In order to promote sustainable investments in the water sector and sanitation, it is necessary to develop and enhance reforms of the regulatory framework to implement the right financing mechanisms. According to Meera (2003), there are three main issues that must be faced with regard to regulation<sup>75</sup>: an institutional framework that ends in inefficient and ineffective resource utilization, inadequate public resources to meet the need of coverage, and exclusion of poorest from coverage services. All of them can be addressed by giving incentives for sector promotion, leveraging other resources from the market and providing subsidies toward poor people respectively. Promotion of sector reforms can be done via decentralization mechanisms, in order to support local reforms, projects and initiatives: through special funds dedicated to the support of reforms and partnerships, or programmatic approaches to link sector reforms and world-wide projects. Each of those instruments has its own mechanisms: decentralization is provided through a fiscal framework and inter-governmental transfers to promote reforms; special funds are pushed for social reasons, community development, and institutional challenge funds; programmatic approaches can be implemented through sector-wide and medium-term expenditure, sectoral and maintenance loans (or adaptable program loans), and sector adjustment loan (or poverty reduction support credit). Leveraging activities are done through the attraction of private participation, development of local credit institutions and improving resources coming from households and the community at large. Subsidies to poor people need adequate rules, funds and must be accessible according to auctions, being output-based incentives.

The investments in the water sector are regulated by the same 24 principles described in Chapter 2 and delivered by OECD (2009)<sup>76</sup>. For the majority of the principles, the concepts that lie at the base of the statement are the same. Differences arise in topics that are more sensible from the point of view of socio-political consequences, for example in Principles 1), 2) and 3). Moreover, differences in Principles 6) and 7) highlight the necessity of establishing a new competitive environment in the water sector. Differences in Principles 10) and 14) relate,

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<sup>75</sup> Meera M., “*Meeting the Financing Challenge for Water Supply and Sanitation.*”, World Bank, Water and Sanitation Program, Washington DC, Working Paper, May 2003, p. 11

<sup>76</sup> OECD, “*Private Sector Participation in Water Infrastructure*”, OECD Checklist for Public Action, Report, 2009, pp. 38-84

respectively, to the capabilities that should not pertain to a specific subject, and to the information that must be completely provided.

In order to regulate the commitment of big international associations into water distribution with PPI projects implementation, OECD issued 24 Principles with the same purpose of those explained in Chapter 2, but adapted to this specific context. All those Principles emphasize the need of transparency in water-related activities undertaken, but Principles also recall to a strong commitment, in order to avoid hazardous behavior in management activities. The creation of a good and fair market is one of the pillars of OECD Principles, together with stakeholder engagement. Here below, the 24 Principles with some key specific aspects for water are described:

- *Principle 1: “Informed and calculated choice”* – Water is a primary good essential for living, representing also one of the most important inputs for industries. Giving the disparities among different regions and countries of the world, it is necessary to take into consideration all the different situations, even if there could be lack of information. In developing countries, there is the presence also of small-scale providers.
- *Principle 2: “Financial sustainability of infrastructure projects”* – From a financial point of view, water sector represents a long-term investment, which is also irreversible. When undertaken, investors and financiers could incur in lack of accountability and transparency, moreover, it is undermined by the complex pricing procedures. Asymmetry of information is also a key issue that could arise. This is why there could be no fair reflection of characteristics in prices, together with positive externalities as well.
- *Principle 3: “Apply tailor-made model of private sector involvement”* – Given its intrinsic characteristics, the risk is high in the water sector. This is why risk sharing is so important in the contractual phase. Moreover, each private has its own characteristics with different comparative advantages, and countries have disparities, making it difficult to assess capacities of bearing it.
- *Principle 4: “Preserve fiscal discipline and transparency”* – Private investors in the water sector are characterized by having long-term expenditures and contingent liabilities, mainly due to the nature of this good, which makes also transactions costs high. If private providers fail in their objectives (as local and, consequently, subnational entities), the government is assumed to play their role.

- *Principle 5: “Enabling environment”* – Water sector is strictly related to political interests, even from the international community, especially from financing aspects. This is true in the case where small-scale providers are not able to provide efficient service and quality of the good, which is dependent on land tenure, decentralization process, housing security and environmental care.
- *Principle 6: “Fight against corruption”* – The financing process needs particular attention, given the size of flows and number of transactions that occur. Given the public and political importance of water as a good, and being generally in a monopolistic market, there is the need to reduce the asymmetry of information and improve transparency and accountability. Rationing and interruption of the water delivery could represent an opportunity for collusion and corruption.
- *Principle 7: “Create a competitive environment”* – The water sector is not so open toward competition. Possibilities to compete are low given inelastic demand and supply, economies of scale, high transaction and transportation costs and high fixed costs. Competitiveness arises in pre-contractual phase with competitive bidding, if it is not so difficult to hide renegotiations and monopolies in favor of one specific player. In addition, after that contracts are signed, competitiveness is left at borders, once the competitive advantage and know-how are gained.
- *Principle 8: “Facilitate access to financial market”* – Even if it is a high-risk sector (commercial, environmental and political) for private investors, water sectors ensure long-term, stable but low cash flow returns at the local level. Another key point for investors is the uncertainty in setting tariffs, which affects cash flow streams.
- *Principle 9: “Consultation with stakeholders”* – When we talk about stakeholders in the water sector, it is necessary to understand that they are more with respect to other sectors, given the nature of the good and its externalities. The main stakeholders are users, employees, public authorities, donors, financiers, NGOs and environmental associations. Projects in water distribution may arise important local externalities with a vertical and horizontal integration and government levels.
- *Principle 10: “Empower authorities responsible for privately operated infrastructure projects”* – The provision of this service is increasingly delivered to local partners in order to be more efficient in the provision, more accountable and flexible, even if this is not always true. Horizontal cooperation is extremely important, especially in monitoring performance, even if there could be political interferences.

- *Principle 11: “Clear and broadly understood objectives and strategies”* – Responsibilities are split horizontally among institutions, which makes sometimes difficult to understand their allocation. Moreover, governance and reforms include social and environmental policies which translate into many objectives to take into account.
- *Principle 12: “Mechanisms of cross-jurisdictional co-operation”* – Given the big infrastructure needs in the water sector, with the development of local networks for distribution, it is necessary a cross-border management to ensure poverty reduction in local sites.
- *Principle 13: “Establish communication and consultation with private sector”* – There is the need to best allocate risks and responsibilities among stakeholders and parties involved in order to avoid failures and repercussions.
- *Principle 14: “Full disclosure of project related information”* – Asymmetry of information can lead to underestimations and controversies, and the regulatory framework must push to avoid it.
- *Principle 15: “Fair, non-discriminatory and transparent awarding of contracts”* – This situation can be reached through a transparent and competitive bidding process, to enhance the credibility of authorities and processes. If there is a rigged contract awarding, this fall on the poorest.
- *Principle 16: “Output/performance-based contracts”* – Generally, performance in this sector differs a lot within and among countries, but the debate on output rather than input can help in allocate ownership of operators.
- *Principle 17: “Competent, well-resourced and independent regulatory bodies”* – In order to preserve interests of users, especially in terms of safety, there is the need of a holistic approach in order to address also complexities in pricing policies and conflicting objectives. Regulatory bodies play a key role in this sector, which is capital-intensive, monopolistic, long-term and multi-stakeholder.
- *Principle 18: “Allowing for good faith, transparent and non-discriminatory renegotiations”* – Potential events could affect the environment in which parties are operating and, giving the long-term nature of contracts, there could be the need to renegotiate terms according to the new situation.

- *Principle 19: “Setting dispute resolution mechanisms”* – It could happen that disputes arise among investors, especially if foreign, and they are amplified in cases of weak governance and regulatory frameworks. This falls again on the poorest users.
- *Principle 20: “Responsible business conduct”* – Giving the nature of the good and its interactions with users, it is important that parties decide to conduct the business with right policies and generate political interest, especially in contexts where governance is weak. In this section, diversity among parties plays an important role: bigger actors have more power in negotiations and water activities may escape from being accountable, while smaller ones have limited knowledge of standards.
- *Principle 21: “Good faith and commitment”* – Partnerships are characterized to be long-term, with possibilities of misallocation of risks and asymmetry in information. In addition, water sector requires specific knowledge in order to provide better service, given that it has a particular impact on the political pattern. Privates have concerns about reputation linked to this kind of activity.
- *Principle 22: “Fight against corruption”* – Competitiveness in this sector is limited and it provides opportunities to collusion in setting tariffs. Moreover, first investment is represented by huge cash flows in a sector where the good provided is a primary one. The weaker the government and accountability mechanisms, the higher the probability of corruption.
- *Principle 23: “Communication with the consumers”* – Users represent the key player in the water sector because they determine the failure or the success of the investment. If the delivery is perceived as unfair, there is the high possibility that riots arise.
- *Principle 24: “Awareness and responsibility for the social consequences of actions”* – Externalities and impacts of the water sector are wide and touch economic, social, political and environmental aspects. Consequences that poor people can face are related to tariffs settings, investment design, the technology used, connection and water quality. For what concerns the environment, consequences that could face are conservation and system management, together with the treatment of effluents.

Table 23 summarizes the main differences resulting from a comparison of the 24 Principles in the Water sector and the 24 Principles mentioned in the previous Chapter 3.

**Table 23. Differences between the 24 Principles applied in the Water Sector and the 24 Principles applicable to each PPI sector**

<b>24 General Principles</b>	<b>24 Water Sector Principles</b>	<b>Differences</b>
1) Decisions based on a cost-benefit analysis	1) Informed and calculated choice	Consider all the different features of the projects, without applying a standard formula or ratio
2) Cost recovery by end users	2) Financial sustainability	There is no focus on the tariffs applied to final users, in order to avoid pressure on this topic, which is extremely important for socio-political reasons
3) Risk allocation through models of PPI based on public interest	3) Tailor-made model of private sector involvement	There is more flexibility given to the water sector for risk allocation, in order to find the most suitable form of contractual risk allocation, as to avoid myopia
4) Fiscal discipline and transparency	4) Fiscal discipline and transparency	No difference
5) Sound enabling environment	5) Sound enabling environment	No difference
6) Free from corruption	6) Fight against corruption	Stronger commitment in the Water Principle due to the natural monopolistic market
7) Benefits enhanced by competitive environment	7) Create a competitive environment	In the water sector the competitive environment is not consolidated, so it must be pursued
8) Ensure access to capital markets	8) Ensure access to capital markets	No difference
9) Consultation with stakeholders	9) Consultation with stakeholders	No difference
10) Private's managerial capacities in commercial processes	10) Empower authorities with operational responsibilities	No focus on private abilities but on the different subjects that could have them
11) Strategies understood and objectives shared	11) Clear and understood objectives	No difference
12) Cross-jurisdictional cooperation	12) Cross-jurisdictional cooperation	No difference
13) To optimize private involvement, clear communication of infrastructure projects	13) Communication and consultation with privates	No difference

24 General Principles	24 Water Sector Principles	Differences
14) Full disclosure of relevant information	14) Full disclosure of project-related information	No focus on relevant information, each piece of information is important
15) Fairness, non-discrimination and transparency in awarding	15) Fairness, non-discrimination and transparency in awarding	No difference
Principles from 16 to 24	Principles from 16 to 24	No difference

Source: Personal revision of the 24 Principles.

However, even if OECD Principles are established with the presence of many other environmental principles issued by other international organizations (i.e. ESG), it is necessary to monitor the performance of water companies in implementing such Principles. According to the report of the OECD (2009), there are five main ways in which accountability can be implemented, and they are summarized in Table 24.

**Table 24. Indicators of operational management in water sector projects**

<b>Continuous water supply</b> (Average hours of access to tap water in hours/day)	Indicator of both availability and quality of water.
<b>Estimate of unaccounted for water</b> (Amount of water lost through pipes)	Unaccounted for water indicates the quality and level of maintenance of water networks. 15-20% is considered good practice in OECD countries.
<b>Operating cost coverage ratio</b> (Total annual operational revenues divided by total annual operating cost)	It measures the extent to which consumer tariffs and additional fees or subsidies contribute to overall operations and minor maintenance costs. A ratio below 1 implies that incoming fees do not meet costs, which indicates an unsustainable system.
<b>Billing collection rate</b> (Income as a percentage of billed revenue)	It indicates the level of bill recovery. A low percentage reflects low willingness or capacity to pay or discontent with the service and may lead to a cycle of under-funding and deterioration in operations and maintenance.
<b>Staff per 1 000 connections</b> (Number of water utility employees per 1 000 connections)	Crude indicator of labour productivity. It gives a rough estimate of the efficiency of network management: the higher the number, the lower the productivity. The international standard is about 2 per 1 000 (depending on local conditions).

Source: OECD, "Private Sector Participation in Water Infrastructure", *OECD Checklist for Public Action, Report, 2009*, p. 92

Table 24 shows that there are indicators available and good practices that can be followed, setting ideal targets. Water accountability mainly relates to the quality of supply, maintenance processes, level of bills collection, cost coverages through tariffs, and labor productivity. As it is possible to see, those instruments monitor the efficiency of the services provided and cost recovery. This is due to the difficulty in establishing measures that do not enhance managers' myopia and short-term orientation, but rather the provision of a good service for a long term.

For what concerns specifically the accountability measures applied in the African pattern, the situation is depicted in Table 25.

**Table 25. Performance indicators in the context of Africa region**

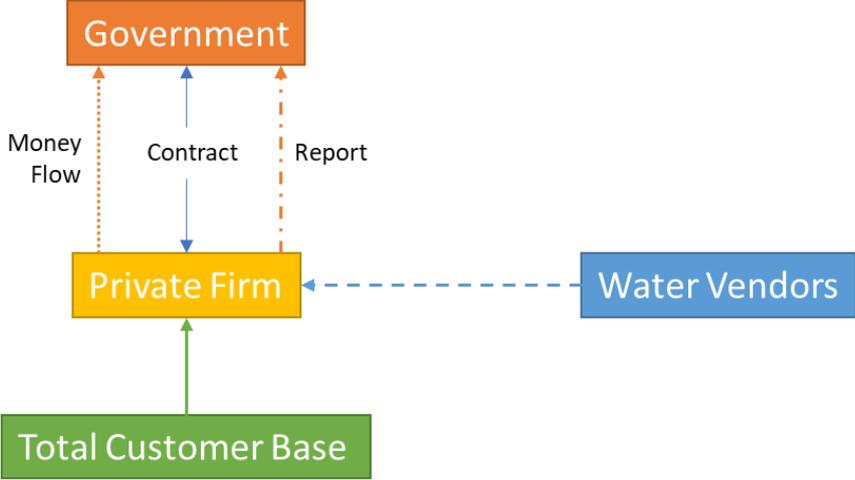
	Continuous water supply	Estimate of unaccounted for water	Operating cost coverage ratio	Billing collection rate	Staff per 1 000 connections
<b>Burkina Faso</b>	No	15% (2005)	135% (2005)	72% (2005)	9.7 (2005)
<b>Ethiopia</b>	12 h/d	30 to 35% (2006)	80% on average (2006)	NA	6.7 in Adama, 11.5 in Awassa, 28 in Dire Dawa, 16.9 in Harar (2002)
<b>Ghana</b>	No	50% to 60% (2006)	NA	NA	60 (2006)
<b>Kenya</b>	Not everywhere. 24 h/d in Nyeri, 19 h/d in Mombasa	50% (2004)	120% in Nyeri, 94% in Mombasa, 57% in Nakuru (2000)	54% in Nairobi (2007)	7.3 in Mombasa, 10.8 in Nyeri (2000)
<b>Mali</b>	No	32% for EDM (2005)	135% for EDM (2005)	94% for EDM (2005)	5.9 for EDM (2005)
<b>Nigeria</b>	No, 4 to 16 h/d (4 in Abakaliki, 16 in Osogbo)	Up to 83% (2004)	50% in Maiduguri, 19% in Abakaliki, 77% in Kastina (2003)	As low as 43% (2004)	Up to 48 (2004)
<b>Senegal</b>	Yes in Dakar	20% (2003)	158% for SDE (2003)	98% (2005)	3.2 (2005)
<b>South Africa</b>	Yes for 98% of population	31% on avg, 19.2% in Cape Town, 29% in Johannesburg (2006)	87% in Cape Town, 92% in Johannesburg (2006)	83% in Cape Town, 76% in Johannesburg (2006)	1.6 in Cape Town, 1.2 in Johannesburg (2006)
<b>Tanzania</b>	No	Range from 28% to 86% (2006)	Between 100 and 110% (2005)	60% to 80% (2005)	14 (2005)
<b>Uganda</b>	22 h/d	31% (2007)	141% (2005)	90% (2006)	7 (2007)
<b>Zambia</b>	15 h/d on average. 15 h/d in Lusaka (2006)	47% on avg, 51% in Lusaka (2006)	102% on avg, 102% in Lusaka (2006)	84% on avg, 83% in Lusaka (2006)	From 8 to 18. 13 in Lusaka. (2006)

Source: OECD, "Private Sector Participation in Water Infrastructure", OECD Checklist for Public Action, Report, 2009, p. 95

From data in column 3 of Table 25, we can see that unaccounted for water is extremely high in this region. Countries such as Ghana and Nigeria show respectively 50% to 60% and up to 83% of the estimated percentage of unaccounted water (column 2). In addition, the collection of bills is extremely heterogeneous in percentage. For example, Nigeria shows only 43% of billing collection rate, whether Senegal 98%.

At the base of each PPI project in the water sector, there is a common. In order to completely understand the management model that is generally followed in PPI in water and sewerage sector, Figure 31 illustrates a generally applicable scheme, based on the information provided by Effah *et al.* (2015).

**Figure 31. Water Supply Management Model (PPI in water and sewerage)**



Source: Effah A. E., Chan A., Owusu-Manu D.G., “Domestic Private Sector Participation in Small-Town Water Supply Services in Ghana: Reflections on Experience and Policy Implications”, *Public Organization Review, Springer, Paper, Issue 2 Vol. 15, , 2015, p. 178. Personal revision of data.*

According to Figure 31, Private companies’ main stakeholders are the Water Vendors, the final users and the Public Authorities. The relationships among stakeholders are managed through different types of contracts, properly described in Chapter 3 and in the following section. Water Vendors provide the resource to the private firm, that distributes and manages it for the citizens, who pay the firm in order to receive water. Public Authorities give the possibility to private firms to manage this service through a specific kind of contract, that establishes the repayments and the forms of accountability of private firms to governments.

**4.3. Risk in the water sector**

In this section there will be a detailed description about risks that can occur in water and sewerage PPI projects, particularly in Sub-Saharan Africa region. First, we will introduce a subdivision of risks according to its characteristics and its impacts. Later, we will see how risks can change according to the contract underwritten for PPI projects in water sector. After having understand risks characteristics and differences according to each kind of contract, we will try to understand how those risks can be mitigated, always taking into account that we are considering the case of PPI projects in water and sewerage sector, specifically in Africa region. To conclude, allocation measures will be introduced, with a brief description of market structures’ impacts on risk allocation.

Managing risk is a matter of strategic importance when considering water as a scarce resource. This is due to the fact that, even if water is a renewable source, it increases less than proportionally with respect to the global demand because of the pollution and contamination coming from industrial activities. Scarcity can come from a drop in supply, an increase in demand, changes in access to resources and the socio-cultural context related to the perception of the situation. When privates decide to invest in water infrastructures, they assess potential business opportunities and risks. They do that, by looking at some key points: good prospects of early cash flows, good placement of securities and guarantees, market potential, well assessed political and legal framework, well-developed contracts, independent regulation, and macroeconomic policies. In doing this kind of evaluation, the most relevant risks that are taken into account are those related to the regulatory and political framework, not enough policies to discipline non-payments, failure in adjusting tariffs by public authorities, delays and macroeconomic shocks. When we are considering risk in the water sector, we should take into account that those risks can be divided into different categories. Risk can be systematic, operating or financing. Moreover, they can be distinguished according to the impact it has on stakeholders, so it can be direct or indirect. The former impacts directly on reputation and financial performance, and it can be differentiated and managed by privates through a diversified portfolio; the latter affects clients perceptions, which have an impact on financial performance, like lower dividend repayments and lower equity value. Table 26 summarizes risks according to sub-divisions, and it is based on data provided by UNEP FI (2004).

**Table 26. Sub-division of kinds of risks in the water sector**

SYSTEMATIC	OPERATING	FINANCING
<ul style="list-style-type: none"> <li>• Drought and drought cycles</li> <li>• Water quality concerns</li> <li>• Effective water management capabilities</li> <li>• Regulatory framework and political pattern</li> <li>• Cross-boundary conflicts</li> <li>• Stakeholders concerns</li> </ul>	<ul style="list-style-type: none"> <li>• Asset conditions</li> <li>• Collection of revenues</li> <li>• Construction of structures and plants</li> </ul>	<ul style="list-style-type: none"> <li>• Possibility of losses</li> <li>• Loan default</li> <li>• Devaluations</li> <li>• Project failure</li> <li>• Reputation</li> <li>• Exchange rate risk</li> </ul>

DIRECT RISKS	INDIRECT RISKS
<ul style="list-style-type: none"> <li>• Direct impact on reputation</li> <li>• Direct impact on financial performance</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholders perceptions</li> </ul>

Source: UNEP Finance Initiative, SIWI, “Challenges of Water Scarcity. A Business Case for Financial Institutions”, United Nations Environment Program, Report, 2004, p. 19

In order to make clear what each kind of risks refers to, a brief description is provided, based on data provided by UNEP FI (2004).

#### a) Systematic Risks

- drought and drought cycles: they can be considered as qualitative risk (the accessible water is polluted or unsuitable) or quantitative (there is not enough water to satisfy community needs). It has a negative impact on management activities and efficiency, especially in terms of delays, reduction in capacity and financial performance;
- water quality concerns: it mainly relates to the availability of technologies for water treatment. If those technologies are not available, they badly affect efficiency and financial performance, given the fact that polluted water is represented by more than 90% of sewage and 75% of industrial waste<sup>77</sup>. Risk is mainly represented by liabilities or additional costs;
- effective water management capabilities: generally, there is a lack of capability in managing effectively water resources with respect to the developed countries, especially relating to the right implementation of regulation;
- regulatory framework, political pattern: these two points relate to the process through which obtain licenses, or being liable for not compelling with rules on pollution, pay for tariffs and policies to be followed by financial institutions;
- cross-boundary water and possible conflicts: as UNEP FI relation reports, “*Cross-boundary concerns include risk of conflict, pollution upstream, blocking of waterways and mismanagement of shared resources*”<sup>78</sup>, namely wars among states but not of international interest;

<sup>77</sup> UNEP Finance Initiative, SIWI, “Challenges of Water Scarcity. A Business Case for Financial Institutions”, United Nations Environment Program, Report, 2004, p. 13

<sup>78</sup> UNEP Finance Initiative, SIWI, “Challenges of Water Scarcity. A Business Case for Financial Institutions”, United Nations Environment Program, Report, 2004, p. 19

- stakeholders concerns: relates to the increasing need of being accountable and transparent towards all local and international organizations, especially NGOs, in order to gather as many resources and consensus as possible.

## **b) Operating Risks**

According to responsibility areas in the delivery of water, there are corresponding risks to take into consideration:

- Asset condition, which affects bids according to the information available to the parties, including costs such as maintenance;
- Collection of revenues, which is related mainly to the willingness of pay of final users and contingent liabilities;
- Construction of structures and plants, which brings themselves costs of labor, time in terms of construction and obtaining permits and licenses.

So, the main parties' characteristics to take into account during contractual allocation of risks are the ability to undertake those risks, to predict eventual changes, to influence those changes and control their impacts, and the possibility to diversify those risks. Namely, the allocation is done looking at the ability to managing them in overall terms.

## **c) Financial Risks**

According to UNEP FI (2004) , it seems that the most important factors influencing financial risks and opportunities are: disruptive activities and the possibility of losses, increase in investments for water and wastewater treatment, losses due to canceled or delayed projects and opportunities of expansions, demand risk and currency risk which play a key role in the determination and allocation of risks.

- Disruptive activities and the possibility of losses. Water scarcity and bad resource management lead to the necessity of looking in depth at the situation and analyze each context and its own peculiarities. Among all the risks, institutions must pay particular attention to those relating to the value chain of water-intensive sectors, shortages, and transport among countries. This pushes firms in thinking about innovative solutions, resulting in opportunities for financiers. The main categories of risks are project profile,

low rates of return, foreign exchange risks, sub-sovereign risks, political and regulatory risks, contractual risk and information asymmetry, and resource failure.

- Increase in investments for water and wastewater treatment. Project profile usually includes a high investment for the first few years, with negative cash flows, then becoming positive due to increases in revenues in the long term. Usually, are capital-intensive projects and assets are strictly specific to the purpose, so not usable in any other sector, and the investor is dependent on it for its returns. Risks are hard to avoid, so the only way of mitigations is finding the right financing mix and matching loan terms and cash profile. The financial mix is composed by equity and soft, commercial finance for leverage. The low rate of return is given by the fact that there is a delay in positive cash flows with resistance in increases of tariffs, as opposed to what happens in developed countries. In developed countries, investing in water is considered a safe investment and, when the rates are adjusted to risk, it happens that sometimes are even lower. Investments in water sector have poor profitability, and this is why this sector needs improvements in regulatory frameworks, especially in order to avoid monopolies or hazardous behaviours. This is true also for wastewater projects, which are even lower in profitability and their tariffs are included in water bills, leading to lack of transparency issues. The third element is the foreign exchange risk. This kind of risk arises because revenues are usually in local currencies, making necessary a conversion into other currencies related to financing instruments, like borrowings. The main risk that could arise is devaluation and it is not so easy to protect projects from it. Usually, tariffs are related to changes in exchange rates but it must be noticed that, if changes are massive, the formulas give back unrealistic changes. Otherwise the alternative is to raise funds in local currency, but in Africa happens that banks have no such capital or do not trust in repayments, moreover returns are not appealing. In addition, if investors are international, they have more chance to diversify its investments globally, reducing the impact of this kind of risk. For what concerns sub-sovereign risk, it arises from the fact that governments are increasingly delivering investments in water sectors to municipalities, which do not have the same power in raising funds for projects, with also less experience in managing them. Political risk arises when there is the possibility of government intervention in order to exploit the situation. Contractual risk and information asymmetry are massive in this context. Given the long period of contracts, eventually the environment in which the firms are operating can change.

- Losses due to cancelled or delayed projects and opportunities of expansions. Sometimes can also happen that the bidder do not have full information about the project at the time of subscription. So, when changes happens, they do not welcome them, being not so flexible. It also happens that, even if they are able to change some conditions in the contract, they do not do it timely. There are ways to reduce contractual risk, such as preparation facilities, contractual flexibility, allow renegotiations when unexpected events occur; from political risk, parties can protect themselves through partial risk guarantees by the government or breach of contract cover. Resource failure is related to the shortage of water resources, especially due to climate changes. This leads firms to lower their revenues and facing possible extra costs. For what concerns costs, it is possible to augment tariffs, even if it is not so straightforward.
- Demand risk and currency risk. This is due to the fact that it is extremely difficult to predict and assess how their changes will affect performances and in which measure. Specifically, exchange rate risk raises costs from operational (price of inputs), maintenance and construction (price of parts) and financial (profitability, especially if revenues are in local currency, but loans are in foreign currency) points of view.

To understand how systematic, operating and financial risks can impact on business activities and on projects, Table 27 summarizes the risk factors coming from the scarcity of water, the situations in which businesses can found themselves, and the possible impacts.

**Table 27. Risk factors and impacts due to water scarcity**

<b>Factors producing water scarcity risks</b>	<b>Risk situation</b>	<b>Business and financial impacts</b>
<i>Drought and drought cycles</i>	Lack of sufficient water at the project level for specific operation Lack of specific water quality for specific operation Temporary suspension of water use license	Disruption of operation Increased costs to secure alternative supplies Constraints on expansion or growth
<i>Deteriorating water quality</i>	Pollution of water resources by the enterprise or as a result of external factors Inability to find clear water resources in due time or within reasonable costs	Disruption of operation Reputation risk Financial liabilities due to legal liabilities or clean up costs or impact on quality of assets

<b>Factors producing water scarcity risks</b>	<b>Risk situation</b>	<b>Business and financial impacts</b>
<i>Changing political and regulatory conditions</i>	Change in water policy unfavorable to certain business actions, allocation rights, etc. Change in tariffs Change in liability laws (contamination) Political manipulation of water issues	Constrain on expansion of a facility or growth in a business sector due to uncertainty Financial performance risk due to increased costs of water charges or discharges Impacts on assets value
<i>Lack of institutional and managerial capacity for</i>	Lack of capacity at national or regional level to provide effective water governance Mismanagement of watershed, waterways Fragmentation of responsibilities Ineffective enforcement of water regulations and allocation rights	All these situations create uncertainty for long-term planning
<i>Cross-boundary concerns</i>	Risk of conflict Decision upstream with consequences for users downstream impacting quality or quantity	Disruption of operation Financial performance risks (due to quantity or quality issues)
<i>Local community and stakeholders concerns</i>	Competing claims and priorities resulting in changes in water use rights Mishandling of stakeholders concerns, or perceptions of abuse, or lack of attention on the part of the company to address local community concerns	Reputation risk Loss of water license to operate Customer boycotts

Source: UNEP Finance Initiative, SIWI, "Challenges of Water Scarcity. A Business Case for Financial Institutions", United Nations Environment Program, Report, 2004, p. 19

Risks identification is a matter of interest for the literature, which has already provided a list of the main risk factors assumed in PPI contracts. The following Table 28 provides a summary of the literature's result of the different analysis made according to four papers: the first one is

Kwak *et al.* (2009)<sup>79</sup>, Ameyaw *et al.* (2015)<sup>80</sup> is the second paper, Hwang *et al.* (2013)<sup>81</sup> is the third paper, and Wibowo *et al.* (2010)<sup>82</sup> is the fourth and final paper. In order to make an exhaustive comparison, I chose to take into account the list of risks that were included in the paper of Kwak *et al.*, then I verified if the other three papers presented the same list of risks.

**Table 28. Risks identification in PPI projects according to the literature**

		1	2	3	4	
		Kwak Y.H., Chih Y., Ibbs C.W.	Ameyaw E.E., Chan A.P.C.	Hwang B.G., Zhao X., Gay M.J.S.	Wibowo A., Mohamed S.	Authors that identified the risk
1	Expropriation/Reliability/Creditworthiness of Governments	x	x	x	x	4
2	Change in Law and Government Policies	x	x	x	x	4
3	Political Force Majeure	x	x	x	x	4
4	Political Opposition	x	x	x		3
5	Corruption	x	x	x		3
6	Delay in approvals	x		x		2
	Risks identified by the authors	6	5	6	3	
<b>Political Risks</b>						
1	Financing risks	x	x	x	x	4
2	Fluctuations of interest/foreign/exchange rates	x	x	x	x	4
3	Unfavourable economy in host country	x	x	x		3
4	Unfavourable international economy	x	x			2
5	Rate of return restrictions	x				1
6	Lack of credit Worthiness	x				1
7	Bankruptcy	x				1
8	Complex financial structure of PPP projects	x				1
9	Lack of Guarantees	x				1
10	Loan ability	x				1
	Risks identified by the authors	10	4	3	2	
<b>Financial Risks</b>						

<sup>79</sup> Kwak Y.H., Chih Y., Ibbs C.W., “Towards a Comprehensive Understanding of Public Private Partnerships for Infrastructure Development”, California Management Review, Reprint Series, Vol. 51, No. 2, Paper, Winter 2009, pp. 51-78

<sup>80</sup> Ameyaw E.E., Chan A.P.C., “Evaluation and ranking of risk factors in public-private partnership water supply projects in developing countries using fuzzy synthetic evaluation approach”, An International Journal, Expert Systems with Applications, Issue 42, Article, 2015, pp. 5102-5116

<sup>81</sup> Hwang B.G., Zhao X., Gay M.J.S., “Public private partnership projects in Singapore: Factors, critical risks and preferred risk allocation from the perspective of contractors”, International Journal of Project Management, Issue 31, Article, 2013, pp. 424-433

<sup>82</sup> Wibowo A., Mohamed S., “Risk criticality and allocation in privatised water supply projects in Indonesia”, International Journal of Project Management, Issue 28, Article, 2010, pp. 504-513

		1	2	3	4	Authors that identified the risk	
		Kwak Y.H., Chih Y., Ibbs C.W.	Ameyaw E.E., Chan A.P.C.	Hwang B.G., Zhao X., Gay M.J.S.	Wibowo A., Mohamed S.		
1	Construction force majeure events	x	x	x	x		4
2	Construction cost overrun	x	x	x	x		4
3	Construction time delay	x	x	x	x		4
4	Material/labour availability	x	x	x	x		4
5	Project site conditions	x	x		x		3
6	Contractor's failure	x	x	x			3
7	Land acquisition and compensation	x	x		x		3
	Risks identified by the authors	7	7	5	6		
<b>Construction Risks</b>							
1	Operation and Maintenance cost overrun	x	x	x	x		4
2	Operator's incompetence and low operating productivity	x	x	x	x		4
3	Avaliability of material	<i>already counted</i>					4
4	Force Majeure events	<i>already counted</i>					4
	Risks identified by the authors	4	4	4	4		
<b>O&amp;M Risks</b>							
1	Inaccurate pricing and demand estimates	x	x	x	x		4
2	Fall of demand	x	x	x	x		4
3	Force Majeure events	<i>already counted</i>					4
4	Insufficient revenue	x	x		x		3
5	Government's restrictions of profits and tariffs	x	x	x			3
6	the competition risk	x					1
	Risks identified by the authors	6	5	5	4		
<b>Market and Revenue Risks</b>							
1	Prejudiced and unfair process of awarding	x	Government's power abuse				4
2	Host-country interference in choosing subcontractors	x					4
3	Overprotective control/supervision by host government	x					4
4	Change of host-country's fiscal regime	<i>already counted</i>					4
5	Poor legislation	x	x	x	x		4
6	Non-enforcement legislation	x	x	x	x		4
7	Breach of contract provisions	<i>already counted</i>					4
8	Risks of early termination	<i>already counted</i>					4
9	Legal force majeure events	<i>already counted</i>					4
10	Non-cooperation between public agencies	x	x	x			3
11	Actions or omissions of the public authorities that prevent the project to be completed	x	x		x		3
12	Unsteady legal and regulatory framework	x	x	x			3
13	Vague and inconsistent clauses and specifications and inaccurate phasing	x	x	x			3
14	Change of host-country's consideration of the project scope	x		x			2
<b>Legal Risks</b>							

		1	2	3	4	
		Kwak Y.H., Chih Y., Ibbs C.W.	Ameyaw E.E., Chan A.P.C.	Hwang B.G., Zhao X., Gay M.J.S.	Wibowo A., Mohamed S.	Authors that identified the risk
15	Lack of stable project agreement	x		x		2
16	Disapproval of guarantees by the Government	x				1
17	Non-accordance between all contracts in BOT framework	x				1
18	Language barrier for the contract	x				1
19	Revision of contract clauses	x				1
20	Unanticipated change of concessionaire scheme	x				1
21	Lack of confidentiality and trust in concession company	x				1
	Risks identified by the authors	21	13	14	10	

1	Water theft		x			1
2	Pipeline failures during distribution		x		x	2
3	Low quality of Raw Water		x			1
4	Climate Change risk		x			1
5	Environment protest caused interruption				x	1
6	Water meter manipulation				x	1
7	Raw water scarcity		x			1
		0	5	0	3	

Source: Personal revision of the literature.

Table 28 synthetizes the main PPI projects risks identified according to the literature, with a specific insight about risks identified in the water sector. I chose to set the paper of Kwak *et al.* as reference, because it listed and differentiated more risks than the other authors. In this way, the classification and the correspondence among the papers was more straightforward. Sometimes happens that some risks are already embedded in other items (signalled with “*already counted*”), due to the fact that some authors decided to incorporate some specific risks in bigger items because of the similarity in application. The matching risks, according to Table 28, are substantial in the Construction Risks section, Operating and Maintenance Risks (O&M Risks) section and Legal Risks section. The main risks identified across the literature are:

- Construction Risks: construction force majeure vents, construction cost overrun, construction time delay and material/labour availability;
- O&M Risks: O&M cost overrun, operator’s incompetence and low operating productivity, availability of material, and force majeure events;

- **Legal Risks:** prejudiced and unfair process of awarding, host-country’s interference in choosing subcontractors, overprotective control/supervision by the host government, change of host-country’s fiscal regime, poor legislation, non-enforcement legislation, breach of contract provision, risk of early termination, and legal force majeure events.

From Table 28 it is possible to understand the relevance of the macroeconomic events (classified as “force majeure”), of the risks that are related to the operations that are carried out during the project, and the importance of a fair awarding process and of an adequate legal framework. In addition, some water specific risks are identified and, among them, the most relevant is the failure in the distribution process and the tools used. Other risks in the water sector are related to macroeconomic conditions and opportunistic behaviours, such as water theft or water meter manipulation.

Risks can also change according to the different contracts available, as presented in Chapter 3. The following Table 29 will provide useful insights for what concerns how risk is managed according to each kind of contract.

**Table 29. Allocation of risks according to different types of contracts<sup>83</sup>**

CONTRACTS	RISKS
<i>Management contract</i>	<ul style="list-style-type: none"> <li>• operator has management role</li> <li>• publicly owned water company is accountable for other responsibilities (i.e. maintenance and undertaking of new investments)</li> <li>• risk transferred to operators depends on performance bonus; if no bonus, risk of not being paid but small risk in water business</li> <li>• typically, little risk is transferred to the operators</li> </ul>
<i>Affermage-leases</i>	<ul style="list-style-type: none"> <li>• operating, maintenance, commercial and management responsibilities are borne by the operator</li> <li>• authority has responsibility for new investment</li> <li>• significant risk transferred</li> <li>• according to the shape of the contract, if it is an affermage matters more operators’ tariff adjustments, if it is a lease matters more costumers tariff</li> </ul>

<sup>83</sup> For more information about different types of contracts, see Chapter 3.

CONTRACTS	RISKS
<i>Concessions</i>	<ul style="list-style-type: none"> <li>• operator bears the risk of delivery, including management, operation, maintenance and new investments</li> <li>• substantial risk transferred to operator but it depends on customer tariffs</li> </ul>
<i>Hybrids</i>	Customization of risk sharing on the base of existing types of contracts.

*Source: PPIAF, World Bank, "Approaches to Private Participation in Water Services: A Toolkit", Public-Private Infrastructure Advisory Facility & the World Bank, Washington DC, Report, 2006, pp. 121,122. Personal revision.*

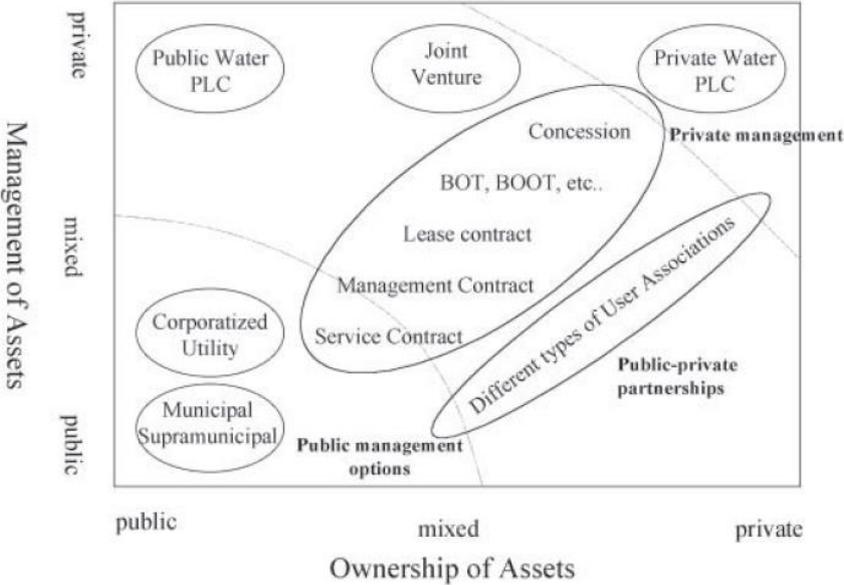
Comparing the contract-related risks in the water sector with the ones illustrated in Chapter 3, it is possible to notice that:

- in management contracts the risk transferred to the operators, depending on the risk performance bonus, is smaller. Moreover, publicly owned companies are also accountable for additional responsibilities;
- in other contractual forms the main difference is related to the increased weight given to the tariff-setting responsibilities. This is related to the importance of citizens' perceptions of tariff-setting procedures.

All those risks must be taken into account when private parties and public authorities decide to undertake a PPI project in water and sewerage sector.

Graph 28 illustrates the relationship between levels of management and levels of ownership according to the different types of contracts already described in Chapter 3, and here specifically applied in PPI in the water sector.

**Graph 28. Contracts applied in PPI projects in water and sewerage sector**



Source: Gleick P.H., Wolff G., Chalecki E.L., Reyes R., “New Economy of Water. The Risks and Benefits of Globalization and Privatization of Fresh Water”, Pacific Institute, Report, February 2002, p. 26

Graph 28 shows that Service Contracts, Management Contracts, Lease Contracts, BOTs, BOOTs and Concessions are the example of a mix between management and ownership of assets. Service contracts present an higher public involvement, whether concessions involve mainly private parties’ management. Corporatized utilities and Municipal/Supramunicipal are Public management options, whether Private Water PLC are of entirely Private management.

Once that operating, systematic and financial risks are identified according to the project and contract, there is the need to measure them. The way in which water-related risks are measured is still no adequate, for example the estimation of the water footprint, but a framework in which a firm can move is useful. Credit rating is the first mean through which the risk can be estimated for a firm, even if it does not capture all aspects (for example, qualitative) that could impact the company. So, the main actions that are possible to take in order to assess risk are the assessment of water footprint, the calculation of sustainability indicators and diagnostic instruments, assessment by rating companies and studies of benchmark, bank’s models for risk assessment and integration of sustainability accountability with day-to-day activities. But, how is the water footprint assessed? According to Hoekstra and Chapagain in their Water Footprint of Nations (2006), “the water footprint of a nation is the volume of water needed for the production of

*goods and services consumed by its inhabitants*"<sup>84</sup>. It considers water components jointly with the sector in which is used, with trade and consumption level of population and supply chain.

According to a survey conducted by UNEP FI (2004) on 400 stakeholders, the risks identified mainly regard the "*inappropriate water pricing and lack of regulatory institutions as leading obstacles to investments*"<sup>85</sup>, especially in the due diligence process where risk must be assessed and allocated. The more the risk is managed, the higher will be the benefits. Mitigation strategies are keys for promotion because they encourage both parties to have an overview of the situation, taking into consideration each possible event through the right indicators and dialogues with stakeholders. Table 30 is used in order to understand the dynamics of risk mitigation instruments in a specific context, considered to be typical in Africa, namely the agricultural activity.

**Table 30. Risks in irrigating agriculture**

<b>RISKS</b>	<b>GENERAL MITIGANTS</b>	<b>FINANCING OPTIONS</b>
<i>Project profile and cash flow</i>	Financing structure to match project profile and cash flow; increase cost recovery from farmers	Sufficient grant and equity; Adequate loan tenor; Partial Credit Guarantees to cover later servicings
<i>Production, client and credit</i>	Credit risk assessment by experienced institutions; Use of local financial intermediaries	Credit Risk Insurance (i.e. Partial Credit Guarantee); Collective securities schemes; Liquidity and refinance facilities
<i>Market</i>	Government provide market intelligence; Investment in supporting infrastructure (e.g. access roads, storage facilities)	Adequate capitalization of borrowers
<i>Environmental</i>	Investigation, due diligence, consultation, option appraisal; Appropriate risk allocation by public sponsor	
<i>Climate, resource, shortage</i>	Diversify water sources; Choice of drought-resistant crops	Weather insurance and exotic derivatives

<sup>84</sup> Hoekstra A.Y., Chapagain A.K., "Water footprint of nations: Water use by people as function of their consumption pattern", Water Resour Manage, Article, 2006

<sup>85</sup> UNEP Finance Initiative, SIWI, "Challenges of Water Scarcity. A Business Case for Financial Institutions", United Nations Environment Program, Report, 2004, p. 22

<b>RISKS</b>	<b>GENERAL MITIGANTS</b>	<b>FINANCING OPTIONS</b>
<i>Foreign exchange</i>	Use local capital markets for funds	Credit enhancement of local bonds and guarantees to local banks; MFIs raise funds locally, and on-lend local currency
<i>Sub-sovereign</i>	Institutional reforms to ensure financial autonomy and sound cash flow	External guarantees; Agreements with sub-sovereign institution and sponsor
<i>Political, regulatory and contractual</i>		Political risk insurance; Partial Risk Guarantees; Breach of Contract cover; Participations (B loans) to confer preferred creditor status

Source: Clements-Hunt P., "Financing water: risks and opportunities", UNEP FI, CEO Briefing, A document of the UNEP FI Water and Finance Project, Geneva, Switzerland, Publication, August 2006, p. 21

Table 29 represents the standard approach that should be adopted in assessing and evaluating risks of a project in the water sector, specifically in irrigated agriculture. This example considers the risk factors, the mitigants and the related financing options for the projects applicable to this specific field. For example, for the risks related to the project profile and its cash flow generation, the main mitigants identified are the appropriate financing structure and a good cost-recovery plan from farmers. The appropriate financing structures that are identified consist in guarantees and equity instruments, an adequate loan tenor and partial credit guarantees in order to cover savings.

Now that the risks are identified, together with market structures, it is necessary to consider the mitigation measures to be adopted in order to best manage those risks. According to Marques and Berg (2011), risk allocation and mitigation are fundamental issues when building up a contract. In the next Table 31, few mitigating instruments will be provided for each type of risk considered.

**Table 31. Minimization instruments according to each type of risk in which private firms can incur**

Risks	Minimization approaches
Planning	Careful selection of project designers; increased detail in studies
Conception	Careful selection of project designers; realism in studies planning; auditing studies and projects; contracts with premiums and fines
Expropriation	Experienced work teams; project compatibility; fixed-price contracting
Construction	Strict management; fixed-price contracting; insurance contracting
Environmental	Sensitizing actions; supervision and research; pressure near the authorities
Maintenance/repairs	Association to specialized companies; fixed-price contracting; insurance contracting
Operation	Association to specialized companies; fixed-price contracting; insurance contracting
Performance	Systematic control; fixed-price contracting
Technological	Contracts with warranties; insurance contracting
Demand (consumption)	Sensitivity analysis; sensitizing actions; making payment easier
Collection	Sensitivity analysis; service interruption; making payment easier; customers and collection management
Capacity	Increase studies accuracy; cost-benefit analysis
Competition	Sensitivity analysis; public disclosure of indicators
Financial	Long-term financing; hedging policies; backup funding (bank accounts)
Inflation	Indexation of revenues to inflation; fixed-price contracting; forward contracts
Legal	Protected by contract
Regulation	Keep with international trend; systematic control of performance; benchmarking policies
Unilateral changes	Protected by contract
Public contestation	Sensitivity analysis; public disclosure of indicators
Force majeure	Mostly protected; insurance contracting

Source: Marques R.C., Berg S., “Risks, Contracts, and Private-Sector Participation in Infrastructure”, *Journal of Construction Engineering and Management*, Article, Issue 11 Vol. 137, 2011, p.929

According to each risk, guarantees should be provided. For what concerns the duration of the projects in the water sector, partial credit guarantees can be provided, giving coverages to repayments. Then, for political risks, associations like the World Bank provide partial risk guarantees to cover default possibility of debt due to non-performance of public authorities. Regarding foreign exchange rate risk, which mainly relates to inconvertibility and devaluation, a partial credit guarantee is provided as well. Probably, the lower level of investments in water sector is especially due to the specificity of risks that do not pertain to other sectors, such as the capital-intensive nature, the nature of water itself as primary good and, consequently, high pressures from governments in setting tariffs, lack of access to financing, conditions of poverty and lack of knowledge in management.

In allocating systematic, operating and financial risks, there is a best practice that can be followed: governments are responsible for macroeconomic risks and privates for operating ones. In order to allocate responsibilities and risks among the two parties, there are three steps that have to be considered: allocation of responsibilities according to laws and regulatory pattern, the decision of the level of public authorities that will be responsible for the provision, and the parties responsible for difficult decisions (for example pricing and environmental care). Many times occurs that division between actors is not so clear. The choice of tiers is not easy: generally, water distribution includes a single town and characteristics of the service are the

same for every user. So, as the World Bank reports (2006), “*collective choice mechanism is needed to set levels of service and hence costs, in a way that suits most customers.*”<sup>86</sup> This represents an additional reason explaining why small-scale providers are increasingly involved in the provision of this service. Local public authorities have a clear idea of what are the local issues to be addressed and this helped in the accountability process of local users. In addition, capacities from a financial and technical point of view are needed to gauge the lack of capacity of governments in providing an efficient and effective service. Another key point for governments are economies of scale, which are reached through a single provider for many towns rather than a unique provider for each one. So, it could be interesting to see how responsibilities are allocated if water services are under state or municipality management. According to the World Bank (2005), provision can be assigned through municipal contracts, with national regulators that have responsibilities for monitoring performance and tariff setting. Other activities can be assigned to other public players according to the function that has to be performed. As already mentioned, local players may know better the issues and the preferences of local final users, but they may face problems in raising capital and information. The structure of the market plays a key role in the determination of risks and their allocation. Hence, the three main structures of the market considered are: horizontal, vertical and cross-sectoral.

- Horizontal structure: providers are all at the same level of the value chain and decisions are made in order to establish how many providers per site and the decision-making process. The horizontal structure is strictly related also to the involvement of small-scale providers rather than big players and takes into account different elements in the decision-making process. If there is a single reservoir but many operators, it makes more sense to have a single bigger operator instead of having conflicts among different smaller ones;
- Vertical structure: providers at different levels interacting in the same value chain, and decisions are made towards how it is divided and how many of firms should interact in the provision from the beginning until the end of the process;
- Cross-sectoral structure: it includes ownership and affiliations among sectors and utilities. First of all the location of towns and villages, secondly their position with respect to reserves.

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<sup>86</sup> PPIAF, World Bank, “*Approaches to Private Participation in Water Services: A Toolkit*”, Public-Private Infrastructure Advisory Facility & the World Bank, Washington DC, Report, 2006, p. 53

## **Chapter 5 – Analysis of PPI Projects in Water and Sewerage sector developed in Africa Region.**

I have chosen as the subject of this Chapter, the analysis of PPI projects and of the private investors involved in PPI, with the main aim of providing a personal proposal about the evaluation process of projects and about risk allocation, applicable to water and sewerage PPI projects' in Sub-Saharan Africa. I will dedicate section 5.1 to the introduction of all the different projects listed in Table 33 and Table 34. Then, I will make a deeper analysis of the private companies involved in PPI projects: section 5.2 contains a review of their policies and strategies in order to understand their main points and verify whether there are common characteristics or not, and section 5.3 focuses on the funds that provide the financial instruments to private companies in order to operate. In this part of the chapter I will carry out an exhaustive description of the funds, in order to clarify their structure, the products they offer, their mission and how do they mitigate the risks in which private companies incur in undertaking PPI projects. In order to better understand policies and strategies of those funds, I will develop three case studies that will better depict the situation in which we are moving. In section 5.4 I will point out what in my opinion are the main risk allocation process and evaluation methods applied by funds, when deciding whether to finance a private company for a project and how, and a personal revision of data with a final proposal.

### **5.1. PPI projects in Sub-Saharan Africa**

This section will present a summary of the main PPI projects undertaken in Sub-Saharan Africa concerning Water and Sewerage. In order to do it, it can be useful to see the debt structure of Sub-Saharan Africa as compared to the other regions.

Generally, the structure of a PPI project is debt-equity 70:30. The biggest part of PPI is financed through loans. One of the main advantages of the loan's structure is that repayments are scheduled, and has a positive reflection on risk, which is lower than equity resources. On the other side, asymmetries of information could arise between debtholders and equityholders. However, in PPI projects, this problem is unlikely to rise, due to the fact that information disclosure's requirements are substantial.

As of the latest report available from the World Bank (First Half Year Update 2017), Table 32 depicts how regions incurred into debt financing.

**Table 32. Debt type by region**

	Total Debt Funding (US\$ billion)	Commercial Debt (% of total debt)	Multilateral Debt (% of total debt)	Bilateral Debt (% of total debt)	Public Debt (% of total debt)	Projects analyzed/total projects
EAP	\$6.5	48%	3%	48%	1%	10/12*
ECA	\$0.8	89%	9%	2%	0%	5/10
LAC	\$4.9	48%	0%	4%	47%	17/30
MENA	\$2.2	10%	13%	23%	54%	4/4
SAR	\$4.0	17%	10%	51%	22%	21/29
SSA	\$0.7	1%	66%	25%	8%	8/11
Global	\$19.2	38%	8%	31%	23%	65/96

\*China excluded

Source: World Bank Group “January-June 2017 Private Participation in Infrastructure (PPI) Half year update”, PPI Database, Report, 2017, p.15

Table 32 is particularly relevant for the analysis made in this section, because it compares the different types of debt used in PPI projects according to the different regions of interest. The debt types taken into account are:

- Commercial: debt between privates and commercial banks;
- Multilateral: debt issued by institutions such as the World Bank or IMF<sup>87</sup>;
- Bilateral: debt between governments;
- Public<sup>88</sup>: debt issued to state-owned enterprises or private firms, with payments guaranteed by the government of the country that provided the loan.

The first column summarizes the Total Debt used in each region, and the last column shows the projects analyzed in order to collect those data. As illustrated, for the EAP region were analyzed 10 projects out of 12. In those projects are not included data regarding the Chinese debt position. This is due to the difficulty in collecting disclosed data for this specific country, which has tight rules in this matter. SSA (or AFR, namely Sub-Saharan Africa) registers only 1% of the total

<sup>87</sup> International Monetary Fund. Those institutions are part of the Bretton Woods Institutions. <<https://www.jubileeaustralia.org/debt-definitions>>

<sup>88</sup> Or Public Guaranteed Debt

debt as commercial, and it has the highest percentage (66% in the third column) of the Multilateral debt with respect to all the other regions<sup>89</sup>.

In order to verify this structure and to understand how PPI Projects in the Water sector are financed in Sub-Saharan Africa, Table 33 and Table 34 show useful insights. Table 33 refers to data available on PPI Database website of the World Bank (2018) and it shows: names of the projects undertaken, countries involved, year of beginning, investment information, type of contract chosen, duration of the project. Table 34 shows: procurement process, private companies involved, debt information, funds providing financial resources and/or guarantees. I built up this table on the basis of the data available in the database, in order to summarize all the most relevant information regarding Water and Sewerage Projects in Sub-Saharan Africa. Then, I summarized the key points in the following comments. For the purpose of this dissertation, I will not analyze the Government's point of view, because I will concentrate on the risk identification and eligibility criteria adopted by funds.

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<sup>89</sup> It should be noted that, as mentioned in Chapter 2 (p. 53), generally speaking the AFR (or SSA) region shows a higher percentage of Non-Multilateral Debt utilization. This mismatching information is due to the availability of data: in Chapter 2 data are as of March 2018, whereas Table 32 is dated back to September 2017. However, AFR (or SSA) region is the one showing the highest percentage of the Multilateral Debt use with respect to the other countries.

**Table 33. Summary of Sub-Saharan Water and Sewerage PPI operational characteristics**

Project name	Country	Year	Status	Investment details	Type of PPI	Contract years
1) <i>Senegalaise des eaux</i>	Senegal	1996	Concluded	Total investment 20 mln	Management and Lease contract - Lease contract	10
2) <i>Societe d'Energie et d'Eau du Gabon (SEEG)</i>	Gabon	1997	Distressed	Total investment 294 mln	Brownfield - Build, Rehabilitate, Operate, Transfer	20
3) <i>Durban Wastewater</i>	South Africa	1999	Active	Total investment 11.9 mln	Greenfield - Build, Operate, Transfer	20
4) <i>Aguas de Mocambique (Maputo and Matola)</i>	Mozambique	1999	Active	Total investment 31.3 mln	Management and Lease contract - Lease contract	15
5) <i>Greater Nelspruit Utility Company (GNUC)</i>	South Africa	2000	Active	Total investment 25.5 mln	Brownfield - Build, Rehabilitate, Operate, Transfer	30
6) <i>Societe d'exploitation des eaux du Niger (SEEN)</i>	Niger	2001	Active	Total investment 3.4 mln	Management and Lease contract - Lease contract	10
7) <i>Dar es Salaam</i>	Tanzania	2003	Cancelled	Total investment 8.5 mln	Management and Lease contract - Lease contract	10
8) <i>Omdurman Water Treatment Plant</i>	Sudan	2007	Active	Total investment 120.7 mln	Greenfield - Build, Operate, Transfer	13
9) <i>Befesa Desalination Plant</i>	Ghana	2012	Active	Total investment 126 mln	Greenfield - Build, Own, Operate	25
10) <i>Notto Diosmone Palmarin and Gorom Lampsar Water Supply System</i>	Senegal	2015	Active	Total investment 33 mln	Management and Lease contract - Lease contract	10
11) <i>Kigali Bulk Water Supply Plant</i>	Rwanda	2017	Active	Total investment 60 mln	Greenfield - Build, Operate, Transfer	27

**Table 34. Summary of Sub-Saharan Water and Sewerage PPI financial characteristics**

Project name	Method	Sponsor	Debt information	Multilateral support
1) <i>Senegalaise des eaux</i>	Competitive bidding (4 bids) with Lowest tariff - National granting contract	Bouygues (FR) - 58%	No	IDA (1995): 100 mln loans
2) <i>Societe d'Energie et d'Eau du Gabon (SEEG)</i>	Competitive bidding (3 bids) with Lowest tariff - National granting contract	Veolia Environment (FR) - 26% Electricite de France (FR) - 26%	No	No
3) <i>Durban Wastewater</i>	Competitive bidding (18 bids) with Lowest Tariff-Local/Municipal granting contract	Veolia Environment (FR) - 51%	No	No
4) <i>Agua de Mocambique (Maputo and Matola)</i>	Competitive bidding (4 bids) with Lowest tariff - National granting contract	Mazi-Mozambique (AFR)	No	IDA (1999): 38 mln loans IDA (2004): 8 mln loans AsDB (1999): 15 mln loans
5) <i>Greater Nelspruit Utility Company (GNUC)</i>	Local/municipal granting contract	Biwater (UK): 100%	No	No
6) <i>Societe d'exploitation des eaux du Niger (SEEN)</i>	Competitive bidding (2 bids) with Lowest tariff - National granting contract	Veolia Environment (FR) - 52%	No	IDA (2001): 48 mln loans Other (2001): 10 mln loans
7) <i>Dar es Salaam</i>	Competitive bidding (1 bids) with Lowest tariff - National granting contract	H.P. Gauff Ingenieure GmbH Co. (DE) - 26% Super Doll Trailer Manufacturer Company (AFR - Tanzania): 49% Biwater (UK): 26%	No	IDA (2003): 62 mln loans AsDB (2003): 48 mln loans EIB (2003): 34 mln loans
8) <i>Omdurman Water Treatment Plant</i>	Direct Negotiation - National granting contract	Biwater (UK): 49%	No	No
9) <i>Befesa Desalination Plant</i>	Competitive bidding with Lowest Tariff - National granting contract	Sojitz Corporation (JP) - 44% with 16.5 mln equity Abengoa (ESP) - 50% with 18.75 mln of equity	Debt funding (commercial): Standard Bank 87.5 mln Debt/equity ratio 70:30	MIGA - Guarantees - 179 mln
10) <i>Notto Diosmone Palmarin and Gorom Lampar Water Supply System</i>	Competitive bidding - National granting contract	Electricity Generating Public Company Limited (EGCO)	No	No
11) <i>Kigali Bulk Water Supply Plant</i>	Competitive bidding with Lowest Tariff- National granting contract	Metito - 100% with 13.15 mln equity	Debt funding (commercial): 40.6 mln Debt/equity ratio 68:32 Providers: international - AFDB 19 mln and EAIIF with 21.6	AFDB and EIAF loans

Source: PPI Database, World Bank. Personal revision of data.

Table 33 and Table 34 represent a summary of the data available for PPI projects in water and sewerage sector in Sub-Saharan Africa. The projects listed in the two tables are the result of a selection process based on data availability on the PPI Database of the World Bank. Thus, I chose to take into account only those projects that disclosed financial and operational data about the investments. The first thing that is worth to highlight is the status of the PPI Projects in this region. All of the projects are Active, except for Project 2 and Project 7. For what concerns Project 2, *Societe d'Energie et d'Eau du Gabon (SEEG)*, is in a Distressed situation, given by the excessive amount of unsecured debt raised. Project 7, *Dar el Salaam*, was cancelled in 2010

due to the misinformation and asymmetries between the different stakeholders in this project, which turned to be unsustainable.

Moreover, all those projects present not only different time horizons and different amounts invested, but also diverse purposes, and type of contracts applied<sup>90</sup>. From the sixth column of Table 33, it is possible to notice that there is no absolute prevalence of a particular type of contract<sup>91</sup>. Moreover, from the last column of Table 34, we can observe that the Multilateral is predominant, confirming the evidence of Table 32.

In the projects considered we have:

- 4 Greenfield projects, and just 2 Brownfield;
- 5 Management and lease contracts, which are the most common form of contracts for PPI projects.

As for the term horizon we have:

- Management and lease contracts that are characterized by a shorter term horizon (10 years on average)
- Greenfield and Brownfield projects (20-25 years on average).

For what concerns the amounts invested:

- in Management and lease contracts amounts are lower (less than \$35 million total investment)
- the other two kinds of contracts present higher amounts (more than \$120 million total investment on average).

This means that, in Sub-Saharan countries in the Water sector, there is a preference for undertaking less risky projects in terms of time horizons and amounts invested.

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<sup>90</sup> As mentioned in Chapter 3 and 4, each contract has its own different characteristics and risk allocation rules, leading to different evaluations and assessments by funds providing guarantees or financial resources.

<sup>91</sup> As mentioned in Chapter 3, there are different types of contracts according to the scope and the final goal of each project. There are Greenfield projects, relating to projects starting from their very beginning, and Brownfield projects, relating to maintenance and operating activities on assets already available.

## 5.2. Private companies analysis

In this section I will present the main features of the private companies and funds involved in the PPI Projects under consideration (with reference to Table 33 and Table 34). For what concerns the private companies, information was collected from Bloomberg and MarketLine reports. For each firm I decided to describe:

- A general historical introduction in order to identify the business that each firm conducts;
- A SWOT analysis, which identifies the strengths, the weaknesses, the opportunities and threats of the firm. In this way, it is possible to understand how is structured their business and the way to conduct it with respect to the competitors, allowing for a comparison with the other private firms in this section;
- Two main financial indicators, which are the Beta of Equity and the Probability of Default, in order to allow for a deeper comprehension of their business with respect to the market and their ability to meet their obligations. As it will be better shown later in this section, the majority of the private companies show a Beta of Equity around one, meaning that their business is generally not riskier than the market in which they operate (I will take into account the market in which the business have their headquarters). In addition, Probability of Default is near zero, meaning that they are generally able to meet their obligations.

As mentioned in the introduction of this section and illustrated by Table 33, the main private firms are:

### a) Bouygues

This firm conducts a diversified business, with five main segments: constructions through Bouygues Construction; roads through Colas; property through Bouygues Immobilier; media through TF1 (Télévision Française); and telecommunications through Bouygues Telecom. PPIs are the core activity in developing countries and, especially, in the sustainability field.

The SWOT Analysis of Table 35, made according the Marketline Report (2017), will help to understand key characteristics of Bouygues firm.

**Table 35. Bouygues SWOT Analysis**

<p><b>Strength</b></p> <p>Enhanced 4G Services          TF1's Strong Market Position          Well Diversified Business Presence</p>	<p><b>Weakness</b></p> <p>Declining Profit Margins          Overdependence On European Markets Exposing Bouygues' Business To Concentration Risks</p>
<p><b>Opportunity</b></p> <p>Creation Of Objenious To Strengthen The Group's Position In The Internet Of Things (IoT)          Increasing Use Of Smartphones          Strengthening TF1's Leadership Position In Digital and Content Production Markets          Growing Construction In The Asian Region</p>	<p><b>Threat</b></p> <p>Growing Debt Burden Of European Nations          Rising Cost Of Construction Materials</p>

Source: MarketLine, "Company Profile. Bouygues Group", Journal Paper, 12 May 2017.

Table 35 highlights the following key points:

- Strengths: the firm pushed towards the empowering of 4G services for mobile connections, it has a strong market position in the media sector and it applies a diversified strategy conducting its business in different regions of the world and different sectors;
- Weaknesses: its business is still strongly related to the Eurozone and it presents a declinign behaviour in profit margins;
- Opportunities: they are mainly related to the IoT (Internet of Things) and technology, but the firm also could grow in the business of constructions in the Asian region;
- Threats: issues related to the increased Debt Burden and costs of construction in the European area.

Bouygues started as an industrial works and construction firm in Paris, led by Francis Bouygues. The company listed on the Paris stock exchange in 1970. In 1978, the firm built the Terminal 2 of Paris Charles de Gaulle airport. During the 80s, the company went through mergers and acquisitions, incorporating France's top highway contractor, Screg Group, which included Colas, together with TF1. By the end of the 90s, the company was one of the top players in the telecommunication sector as well.

Bouygues mission is: *"We strive to encourage the integration of all talents and thus to guarantee equal opportunities for all; We are determined to ensure the safety of our employees and work actively to protect their health and prevent all work-related accidents; We are mindful of the quality of life at work and are rolling out connected and innovative environments; We are active in recognising and developing talents by providing mechanisms to enhance their*

*skills sets; We offer rich and varied career paths, we train and reward both individual and collective achievements.”<sup>92</sup>*

In Table 36 I summarize, according to Bloomberg data, the riskiness of Bouygues as captured by its Beta and probability of default.

**Table 36. Bloomberg data on Bouygues**

Beta	1.085 riskier than the market
Probability of default	0.0467% Bouygues Construction 0.0009% Bouygues Group BBB+ rating from S&P

*Source: Bloomberg, 2018.*

As we can see, the Beta confirms that the business is slightly riskier than the french market, probably due to the overdependence of European Markets. The probability of default is low, confirming their capacity to meet the firm’s obligations.

Bouygues company was involved in project 1 of Table 33.

**b) Veolia Environment**

Veolia carries out as main activities transportations and utilities, particularly water ones, and is undertaking a restructuring program which should end by the end of 2018. It is willing to focus its activities in developing cities in emerging countries, which are seen as opportunities for expansion. In order to do this, Veolia pursues improving quality and efficiency of water supply as objectives.

The SWOT Analysis of Table 37, made according the Marketline Report (2017), will help to understand the key characteristics of Veolia firm.

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<sup>92</sup> Bouygues website, < <https://www.bouygues.com/en/talent/why-join-us/values-and-mindset/>>

**Table 37. Veolia Environment SWOT Analysis**

<p><b>Strength</b></p> <p>Focus on innovation through research and development          Strong market presence in Europe          Diversified portfolio of services and assets</p>	<p><b>Weakness</b></p> <p>Risks relating to major project design and construction activities          High debt burden</p>
<p><b>Opportunity</b></p> <p>Strategic contracts          Planned acquisitions</p>	<p><b>Threat</b></p> <p>Long term contracts          Climate uncertainty          Stringent competition</p>

Source: MarketLine, “Company Profile. Veolia Environment S.A.”, Journal Paper , 13 January 2017.

Table 37 highlights the following key points:

- Strengths: consolidated investments in R&D, strong european market position with a disversified strategy in terms of services offered;
- Weaknesses: higher risk and debt burden for the size of the projects undertaken;
- Opportunities: M&A activities;
- Threats: uncertainty of the climate change and strong prensence of long term contract that could be impacted.

The company wants to help local institutions and citizens to face water scarcity problems and to cope with environmental restrictions and population growth. As reported by Bloomberg, *"Company’s strategy is refocusing the company geographically and concentrating on areas where it can seize less capital intensive opportunities. [...] Its approach depends on level of development: in relatively under-developed African cities, Veolia’s approach is to improve quality and efficiency of water supply; in more developed Latin America it is focusing on its core operations of Build-Operate-Transfer water contracts and landfill; and in eastern Europe it aims to work with small and medium-sized cities looking to privatize their water and waste management operations"*<sup>93</sup>.

The vision of the company is *"We see a future in which end-of-life resources are transformed into products that enrich our lives and can power our homes and industry, and in which production and consumption go hand in hand. We call this the circular economy."*<sup>94</sup>

<sup>93</sup> Bloomberg, 2018

<sup>94</sup> Veolia website, < <https://www.veolia.co.uk/our-approach/our-vision-and-strategy>>

In Table 38 I summarize, according to Bloomberg data, the riskiness of Veolia as captured by its Beta and probability of default.

**Table 38. Bloomberg data on Veolia**

Beta	0.854 less risky than the market
Probability of default	0.0049% BBB rating from S&P

Source: Bloomberg, 2018.

As we can see, the Beta confirms that the business is safer than the french market, probably due to the diversified strategy. The probability of default is low confirming their capacity to meet the firm’s obligations.

Veolia company was involved in projects 2, 3 and 6 of Table 33.

**c) Biwater**

The company operates in the water sector, especially in construction and management activities. Biwater pursues geographical differentiation, always trying to promote environmental sustainability and raising awareness. The mission of the company is *“To provide sustainable treated water solutions that serve communities, help protect the environment, and foster economic development for generations to come”*, and its vision is *“To be the world leader in treated water solutions, growing the business ethically and sustainably.”*<sup>95</sup> The company was founded in 1968 by Adrian White in the United Kingdom, and the name came up with the idea of combining the two main core businesses of the firm: wastewater treatment and fresh water provision. After developing its business in the UK by opening other offices, the company awarded the first project in Nigeria in cooperation with Ministry of Defence. According to the project, Biwater was in charge to design and build a new treatment plant to cover rural areas. During the 80s the company went through an increasing number of projects out of the UK and through M&A activities. Biwater was also the first buyer of a British water company during privatization process. In 2005 Biwater opened a Center of Excellence in Desalination and

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<sup>95</sup> Biwater website, < <https://www.biwater.com>>

Membrane Treatment in California, US. The main regions in which the company collects revenues are America, Africa, Middle East, Asia and Pacific regions.

For this company, information is not available on Bloomberg with regard to Beta and probability of default. However, I still decided to mention it because of its contribution to the last project shown in Table 33, and for which a few reports<sup>96</sup> were available.

Biwater company was involved in projects 5,7, and 8 of Table 33.

**d) Sojitz**

The company carries out different businesses, ranging from automotive to lifestyle commodities, of which chemicals are the largest. In order to pursue diversification, Sojitz undertakes its activities in different regions of the world, especially Asia, Middle East, Africa, and America. But the home country Japan represents the one in which the company carries the largest part of its business.

The SWOT Analysis of Table 39, made according the Marketline Report (2016), will help to understand key characteristics of Sojitz firm.

**Table 39. Sojitz SWOT Analysis**

<p><b>Strength</b></p> <p>Diversified product portfolio and well balanced revenue stream          Strong market share          Strong and diversified customer base</p>	<p><b>Weakness</b></p> <p>Geographical concentration</p>
<p><b>Opportunity</b></p> <p>Growing global chemical business          Significant acquisitions          Expansion through strategic agreements, joint ventures, and contracts</p>	<p><b>Threat</b></p> <p>Laws and regulations          Weak economic outlook of the Japanese economy could impact company performance          Natural disaster risk</p>

Source: MarketLine, “Company Profile. Sojitz Corporation”, 2 Journal Paper , 3 September 2017.

Table 39 highlights the following key points:

- Strengths: diversification strategy for products and services, consolidated market share;
- Weaknesses: business conducted only in a concentrated area;

<sup>96</sup> Factiva, “Biwater International Limited”, Factiva Company Report, Dow Jones, 2018; Biwater Holdings Limited, “Consolidated Financial Statement. Year ended 30 June 2017”, Dorking, United Kingdom, Report, 2018

- Opportunities: M&A activities and grow in chemical business;
- Threats: natural disasters, not sound legal environment and weak Japanese economy.

As reported by Bloomberg, the firm is facing a transitioning phase, moving from investment activities to management as well. The origins of this company are dated back to 1863 when Bunsuke Iwai (founder) opened a shop in Osaka to sell imported goods. From that moment on, the firm had to modernize itself in order to be attractive to its customers, taking into consideration changes in trends and wars. During the Japan crises in the 90s, the company was able to undertake the right investments to survive, especially in the oil refinery sector. During the 2000s the company merged and changed its name to Sojitz Holdings Corporation, to change definitely in 2005 in Sojitz Corporation.

Sojitz's mission is: *“The Sojitz Group creates value and prosperity by connecting the world with a spirit of integrity.”*<sup>97</sup>

In Table 40 I summarize, according to Bloomberg data, the riskiness of Sojitz as captured by its Beta and probability of default.

**Table 40. Bloomberg data on Sojitz**

Beta	0.989
Probability of default	0.0061% BBB- rating from S&P

*Source: Bloomberg, 2018.*

As we can see, the Beta confirms that the business is slightly safer than the Japanese market, probably due to the strong market share. The probability of default is low confirming their capacity to meet the firm's obligations.

Sojitz company was involved in project 9 of Table 33.

#### e) Abengoa

The core business of Abengoa is the development of technology instruments for environmental sustainability and development, especially for emerging countries. Abengoa was founded in Spain in 1941 by Javier Benjumea Puigcerver and José Manuel Abaurre Fernández-Pasalagua in Seville. Now it mainly operates in the US and develops instruments that can be implemented

<sup>97</sup> Sojitz website, < <https://www.sojitz.com/en/corporate/philosophy/>>

in different sectors, from energy to aluminum and stain-dust recycling and water. Those industry present high-growth rate, which represents the overall strategy of the firm, especially after being almost declared bankrupt.

The vision is “to be a world leader in the development of innovative technological solutions in the Infrastructures, Energy and Water sectors, in a way that contributes to economic and social progress, developing an ethical culture which enhances a model of responsible management with our environment, and a sense of pride of belonging among our employees.”<sup>98</sup>

The SWOT Analysis of Table 41, made according the Marketline Report (2016) will help to understand key characteristics of Abengoa firm.

**Table 41. Abengoa SWOT Analysis**

<b>Strength</b> Strong research and development activities Wide geographic range	<b>Weakness</b> Litigations
<b>Opportunity</b> Strategic divestitures Major projects Growth in the global construction market	<b>Threat</b> Strict competition rules Stringent environmental regulations Foreign exchange rate fluctuations

Source: MarketLine, “Company Profile. Abengoa S.A.”, Journal Paper, 30 June 2017.

Table 41 highlights the following key points:

- Strengths: R&D activity and geographical diversification strategy;
- Weaknesses: litigations;
- Opportunities: divestitures, bigger projects and construction market;
- Threats: stringent economic and environmental rules, exchange rate fluctuations.

In Table 42 we summarized, according to Bloomberg data, the riskiness of Abengoa as captured by its Beta and probability of default.

**Table 42. Bloomberg data on Abengoa**

Beta	0.790 less risky than the market
Probability of default	8.41%

Source: Bloomberg, 2018.

<sup>98</sup> Abengoa website, <<http://www.abengoa.com>>

The Beta confirms that the business is safer than the Spanish market, probably due to the strong geographic range. The probability of default is higher with respect to the other private companies, showing a difficulty in meeting their obligation as of 2018.

Abengoa company was involved in project 9 of Table 33.

#### **f) Metito**

Metito is a company mainly involved in the development of water treatment systems and technologies, together with management consulting activities. The company was founded in 1958 by Farouk Ghandour in Beirut. Since then, Metito developed its business around the world. For this company, information is missing on Bloomberg concerning Beta and probability of default. Anyway, I decided to mention it in the analysis because of its contribution to the last project shown in Table 33, and for which a few reports<sup>99</sup> were available.

Metito company was involved in project 11 of Table 33.

In the following I will present a case study based on the data provided by the World Bank. It represents the way in which a PPI Project works, with a scheme of the main relationships that occur during its life (n.6 from Table 33). In addition, it is one of the most successful in the field of water and sewerage in Sub-Saharan Africa and one of the projects that had more information disclosed.

#### **Case Study n.1**

As reported by the World Bank (2014)<sup>100</sup>, the Affermage-lease contract in Niger is a perfect example of how PPI works in the field of the water sector in Africa. In 1999, Niger government found out that it was necessary a collaboration with private companies in order to face water scarcity and management issues. Accordingly with Veolia Water, the *Société de Patrimoine des*

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<sup>99</sup> The availability of reports and sources includes: profile on PPI Database on World Bank's website <[www.worldbank.org](http://www.worldbank.org)>, African Development Bank, "*Kigali Bulk Water Supply Project*", Private Sector Operations, Project Brief Report, 15 December 2015, African Development Bank, "*Evaluation of the Bank's Utilization of the Public Private Partnership Mechanism (2006 - 2016)*", Inception report, Volume 1, Main Report, 3 April 2017

<sup>100</sup> World Bank Group, "*Water PPPs in Africa*", Report, July 2014

*Eaux du Niger (SPEN)* was created, as a state-owned asset holding company. SPEN was in charge of managing asset ownership, promoting development, debt servicing, increasing awareness and monitoring service quality. On the other side, the government should have retained policy, set tariffs and been responsible for water resource management. SPEN signed a 10 year affermage-lease contract with *Société d'Exploitation des Eaux du Niger (SEEN)*, which was a professional operator, as counterpart. In order to implement the cooperation, Veolia incurred in a two-stage bidding process in 2001, competing with other 3 companies. Veolia won by offering the lowest tariff.

Details about financing process as follows:

- Creation of SPEN in 1999 by Veolia and Nigeria Government;
- Incorporation of SEEN by SPEN in March 2000;
- \$2 million SEEN's initial capital, of which:
  - o 52% Veolia
  - o 34% local private investors
  - o 9% SEEN's staff
  - o 5% Government
- The initial cost of investment program was \$103 million, 85% provided by the World Bank, African Development Bank (AfDB), Banque Ouest Africaine de Développement (BOAD – West African Development Bank), and Chinese investors.

As reported by the World Bank, the outcomes were positive. There was an increase in access to piped water with an improvement in operating performance and efficiency, labor productivity, affordability and bill collection from final users. Moreover, thanks to the continuity of the service provided, 98% of water samples are now in compliance with bacteriological standards<sup>101</sup>. Cost recovery was immediate, reached in the first five years, user

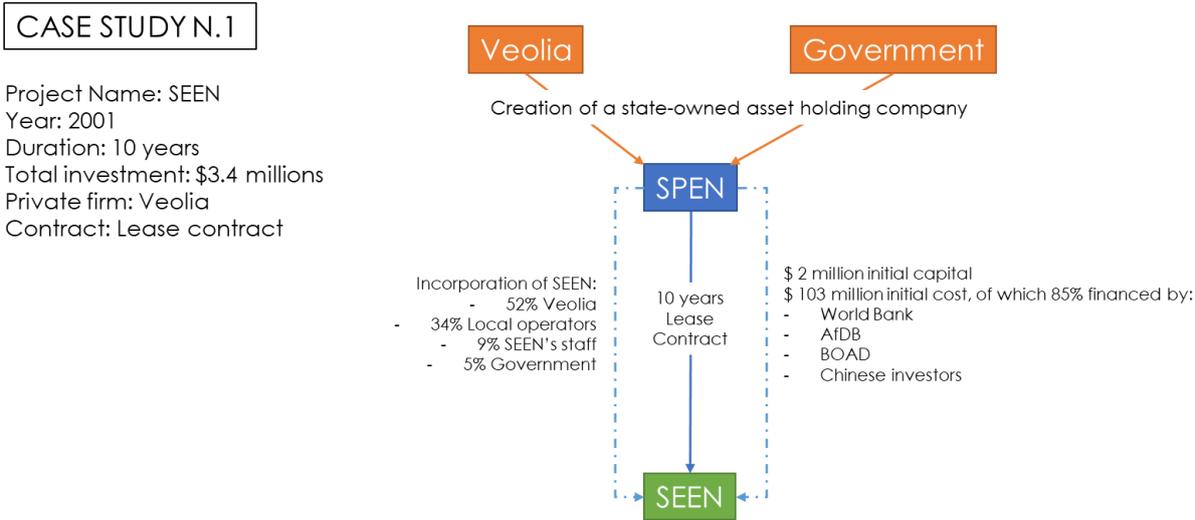
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<sup>101</sup> Specifically, “For example, the proportion of people with direct access through a residential connection increased from 31 percent to 59 percent, and the number of residential connections increased threefold (from 56,300 to 171,750 units). [...] Since 2006, water has been available on a continuous basis in most urban centers and areas of Niamey. NRW has declined from 22 percent to about 17 percent. The bill collection ratio of private consumers has increased by 6 percentage points, from 91 percent to 97 percent. Staff productivity improved from 8.6 to 3.6 staff per 1,000 connections, without any layoff program, and a 20 percent increase in salary was instituted.” World Bank Group, “Water PPPs in Africa”, Report, July 2014, p.18

charges contributed to the Capital Expenditures (CAPEX), Non-Revenue Water (NRW)<sup>102</sup> decreased, staff productivity improved and there was a 20% increase in salary. Given the autonomy in managing the activity and positive impacts and results, it was no longer necessary to get government subsidies.

The following Figure 32 summarizes the subjects involved and the key steps of the Case Study n.1.

**Figure 32. Sythesis of Case Study n.1**



Source: Personal revision of Case Study n.1

As mentioned in the descriptions of the private companies, even if they pursue different management strategies, they have a few key characteristics in common. All of them tend to operate on more than one kind of business due to the fact that different sectors have surely different risk patterns, some are riskier and others are safer. Moreover, companies tend to operate globally, even if they have particular interests in developing countries. This means that, given the high-risk profile of water investments in developing countries companies will generally try to mitigate this risk by running a business in safer areas of the world and safer sectors. It is also important to notice that companies such Sojitz do not concentrate their business on water but, given their highly profitable core business, they decide to undertake this kind of projects thanks to their previous economic and financial stability.

<sup>102</sup> Water that is pumped but, due to inefficiencies or endemic situations, do not reach the final consumer.

According to the analysis made, most of the private companies involved (4 out of 6 companies analyzed) in PPI Projects in Sub-Saharan Africa Water sector, apply diversification strategies to their businesses. It means that not only most of them decide to operate in different businesses, resulting to be more profitable<sup>103</sup>, but also in different regions of the world (5 companies out of 6 diversify their business in geographical terms)<sup>104</sup>. As shown, private companies cannot rely just on water sector and PPI investments in the poorest regions of the world, as they would increase their probability of default and they could not be able to provide right collaterals to funds that provide them debt and equity instruments for undertaking those projects. Private companies must diversify their business in order to face possible issues that can arise by investing in the Water sector and in emerging countries only. They must be able to show that if the project fails, they still will be able to face their obligations. This is a particular aspect that impacts strongly on small-scale providers, that have no possibility of showing this capability and, for this reason, they are not able to collect resources in order to participate to this kind of business at a local level.

### **5.3. Analysis of the Funds that provide loans and resources to privates in order to implement PPI projects**

As mentioned in the introduction and shown in the Table 34, private companies need to raise funds in order to undertake this kind of projects. So, in the following, I will describe the main funds that provided financial resources to private companies and governments in order to implement PPI Projects.

#### **a) MIGA**

This fund provides mainly guarantees, in fact the acronym stands for Multilateral Investment Guarantee Agency. This fund was established in 1988, and it is part of the World Bank Group. MIGA basically provides insurance for certain types of risks to the private investors, always taking into consideration the specific characteristics of each project, trying to provide the best risk-mitigation instruments. It is also worth mentioning that usually the banks that decide to

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<sup>103</sup> For example ICT, Transport, commodities or renewable energies in general (such as Veolia)

<sup>104</sup> Europe, America and the Middle East, which are more stable economically speaking

operate in emerging countries are forced to face political risks and protect themselves from them. This kind of risks could prevent banks from providing financing instruments to sustain long-term growth. As mentioned in their reports, “MIGA can cover cross-border medium- to long-term lending in the forms of equity, credit lines, bond issues, securitizations and other funding instruments such as investment funds, as well as programs for discounting of receivables or factoring.”<sup>105</sup>

The fund is rated AAA - Moody's<sup>106</sup>, in accordance with other rating agencies.

Generally, the risk-mitigation products provided by MIGA to the investors are Guarantees and Dispute mediation services. Within guarantees instruments, three main typologies can be identified: transfer restriction coverage, which provides protection against losses derived from inability to convert foreign resources into local currency (principals, royalties, etc.), but not against devaluation; expropriation coverage, which protects against losses from acts by the host government, which could for example reduce their percentage of ownership, but not if those actions are taken in Bona Fide; breach of contract, which covers losses coming from breaches or repudiations of agreements by the host government, can be used in order to ask for a dispute resolution mechanism.

MIGA fund provided guarantees to project 9 of Table 34.

In order to understand how MIGA decides to allocate coverages to privates in PPI Projects, I tried to provide a case study leveraging on the structure of a case study provided by a report issued by AfDB and Government of Tanzania<sup>107</sup>. I adapted the format to one of the projects illustrated in Table 33 at the beginning of this section.

The following case study (Case Study n.2) provides an example of how fund's evaluation process works. This is useful in order to understand the criteria that each fund can apply according to its own method.

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<sup>105</sup> World Bank Group, MIGA, “MIGA: Reducing the Risk Profile of Financial Investments”, Financial Brief, September 2005, p. 1

<sup>106</sup> Foster W., Kulakovskiy M., Diron M., “International Finance Corporation – Aaa stable”, Sovereign and Supranationals, Moody's, Report, 29 November 2017

<sup>107</sup> Befesa Desalination Developments Ghana Limited, “Environmental impact statement on proposed seawater reverse osmosis desalination plant at Nungua, Accra”, Report, March 2011.

## Case Study n.2

The case study presented in Table 43 is used in order to understand how MIGA evaluation criteria work. The case study provided is the one of Befesa Desalination Plant, for which MIGA provided guarantees for US\$179 million<sup>108</sup>.

**Table 43. Overview of key elements of Befesa Desalination Plant project in Ghana**

<i>Overview</i>	The objective is to provide a sustainable quality of bulk potable water supply for sale to the Ghana Water Company Limited (GWCL) through distribution to residents, visitors, and businesses of the region.
<i>Facilities</i>	The plant will have the following major facilities: <ul style="list-style-type: none"> <li>• Desalination Plant</li> <li>• Product pipes</li> <li>• Intake and Outfall pipes, and</li> <li>• Parking lot.</li> </ul>
<i>Rationale</i>	The management of Befesa understood the need for potable water in the city of Accra. The site covers a total area of 6.1 acres and aims to produce 60,000 m <sup>3</sup> /day (13.2 million gallons a day) of bulk potable water.
<i>Need</i>	The project covers a 6.1 acres area and it is undertaken in order to help the population in having access to safe, fresh and potable water.
<i>Value Addition</i>	This project presents few and limited, site-specific, largely reversible and readily addressed (through mitigation measures) risks and impacts. Social and environmental risks and impacts include community and occupational health and safety, solid waste, hazardous waste, sludge and wastewater, soil erosion and runoff and marine habitat. These risks and impacts are expected to be mitigated according to Table 44, as follows.
<i>Know-how</i>	The project supports MIGA's strategy of promoting investments in infrastructure projects in the poorest regions of the world. Moreover, it provides resources only to eligible countries for assistance from the International Development Association.

*Source: MIGA website and Befesa Desalination Developments Ghana Limited, "Environmental impact statement on proposed seawater reverse osmosis desalination plant at Nungua, Accra", March 2011. Personal revision.*

<sup>108</sup> For more information, please refer to Table 33 and Table 34 at the beginning of Chapter 5.

This project was financed by different institutions, such as Standard Bank and MIGA. Respectively, they fund the project in the following manner:

- Standard Bank loan \$87.5 million
- MIGA guarantees \$179.2 million

The project invested \$126 million in physical assets with private participation of:

- Sojitz Corporation: 44% ownership with \$16.5 million of equity invested
- Abengoa: 50% ownership with \$18.75 million of equity invested.

In order to monitor the targets of the projects, Performance Standards were followed to manage them consistently, as Table 44 shows below.

**Table 44. Performance Standards for Befesa Desalination project in Accra region**

PERFORMANCE STANDARDS	DESCRIPTION	MITIGATION
<i>PS1: Social and Environmental Assessment and Management System</i>	The project is engaged in Environmental Impact Statement ("ESIA") program.	Publish documentation on marine works, including characteristics, risks, and impacts deriving from operations.
<i>PS2: Labor and Working Conditions</i>	55 workers (40 local hires and 15 expatriate staff). Befesa Ghana may also engage local sub-contractors. The project sponsor expects local workers to be paid 20-25% above the market average.	Inspections from Safety authorities to check compliance with the plan. Training courses and instructions must be given to workers, issuing preventive and mitigation measures to avoid incidents.
<i>PS3: Pollution Prevention and Abatement</i>	Soil erosion and runoff: Construction activities could impact surface water quality. Land clearing, grading and earth works are could increase this risk as well.	Soil erosion and runoff: mitigation through H&S Plan for construction and the ESAP. Construction activities are scheduled to avoid or

<b>PERFORMANCE STANDARDS</b>	<b>DESCRIPTION</b>	<b>MITIGATION</b>
	<p>Wastewater: Sanitary wastewater is expected to be generated in both the construction and operation phases.</p> <p>Solid and hazardous waste: Construction waste includes building materials debris, soil and plant debris. Solid wastes, during operations, include mixed domestic waste, plastics, cables, paper, wood, toners, metals, and containers. Hazardous wastes, during project construction and operation, include used oil, batteries, ink cartridges, fluorescent tubes, containers and chemical substances.</p> <p>Air emissions: dust emissions from construction activities (grading, excavation and earthworks; loading/unloading, handling, storage and transport of materials or wastes; and vehicle movements)</p>	<p>reduce this impact. Seawater monitoring.</p> <p>Wastewater: septic tank as provided for in the Q&amp;E Plan.</p> <p>Solid and hazardous waste: waste management plan that details best practice control measures for the storage, transport, and disposal of each waste type. Constant monitoring and transparent accountability</p> <p>Air emissions: water spraying</p>
<i>PS4: Community Health, Safety, and Security</i>	<p>Traffic: high level, with risks and impacts including additional wear and tear to the local road networks and accidents.</p> <p>Noise: activities generate noise impacts to communities during construction and operation.</p>	<p>Traffic: careful planning of routes and restriction on movements for construction vehicles and equipment.</p> <p>Noise: controlled and of short duration, Noise will be monitored during construction.</p>

<b>PERFORMANCE STANDARDS</b>	<b>DESCRIPTION</b>	<b>MITIGATION</b>
<i>PS4: Community Health, Safety and Security [continue]</i>	<p>Emergency response: Accidents and emergency situations during both construction and operation that lead to or could lead to uncontrolled adverse environmental and social risks.</p> <p>Spills: Spills of hazardous materials are expected from on-site vehicles or equipment, as well as hazardous material storage areas.</p>	<p>Emergency response: impacts prevented, minimized or eliminated through the development and implementation of an emergency response plan.</p> <p>Spills: Avoidance of spills is expected through adopting appropriate mitigation measures and performing periodic inspections of vehicles, machinery, and parking areas.</p>
<i>PS6: Biodiversity Conservation and Sustainable Natural Resource Management</i>	<p>Assessment of potential impacts to marine habitat. Construction of the outfall will involve installation of a temporary marine breakwater, mechanical fracturing of rock and excavation and trench, which present a risk of increasing seawater turbidity in the immediate vicinity of the plant site.</p>	<p>Limited duration (6 months ca.). This risk will be avoided or reduced through scheduling of marine works during optimal conditions. Seawater monitoring will be conducted throughout construction and operation.</p>

Source: Befesa Water, "Environmental and Social Review Summary. Befesa Seawater Desalination Project – Ghana", Madrid, Spain, 17 June 2011; MIGA website <<https://www.miga.org/>>. Personal revision.

As it can be seen, once that project objectives and needs are identified, a classification of risks and impacts should follow. With respect to this project and to standards of MIGA, risks were classified according to a set of Performance Standards adopted to monitor the project results, in terms of impacts and outcomes. I came to the view that MIGA as a fund issuing specifically guarantees, first, analyzes the overview of the project, then it assesses the Performance Standards to be followed while monitoring activities and finally, it divides the risks and evaluates the mitigation instruments and activities supported by privates. In accordance with this evaluation, the fund decides how and how many guarantees to issue.

## b) IDA

IDA (International Development Association) provides loans to private investors who want to undertake projects in emerging countries. IDA stands for International Development Association: it was founded in 1960 and it is part of the World Bank Group. Unlike MIGA, this fund provides concessional financing, generally with sovereign guarantees.

The fund is rated AAA - Moody's<sup>109</sup>, in accordance with other rating agencies.

As I have already mentioned in Chapter 3, I found that the main principle that is followed is the allocation of risk according to the parts who can best manage them. The risks that are typically considered by IDA are:

- Construction and completion risk, which is formed by:
  - *Cost of Construction* is the turning point for every kind of assumption. During this phase, some mechanisms of lock (i.e. for costs of commodities) and review (i.e. management mechanisms) should be considered.
  - *Delay* is the risk that occurs at the last stage.
  - *Performance*, according to which conditions of the final results should be agreed in a contract. This considers objective criteria in measures, in order to avoid refusals based on subjective opinions, i.e. involving technical tests.
- Operating risk, is related to the variability of revenues streams that are assigned to lenders (i.e. cost of workers could increase for wage inflation, so lenders could ask to be protected by indexing them according to specific conditions) and to performance as well (i.e. if pieces of plants and equipment break down, for which lenders ask for warranties).
- *Demand risk*;
- *Force Majeure and Change in law*, which are not included in financing agreements, with still repayments to be paid.

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<sup>109</sup> Foster W., Kulakovskiy M., Diron M., “*International Finance Corporation – Aaa stable*”, Sovereign and Supranationals, Moody’s, Report, 29 November 2017

- *Political and Regulatory Risk and Expropriation or Nationalization Risk* are particularly important for emerging markets. They arise particularly in the case of governments which may decide to close the project or change terms of the agreement.<sup>110</sup>

So, risks that could arise are combined with specific risk-mitigation instruments.

As concerns interest rates applied on contract loans, they usually provide EURIBOR, LIBOR or NIBOR plus a spread or margin expressed in basis point, when floating. Otherwise, loans can be at a fixed or variable rate (lending rate set by banks plus a margin). Usually, a fixed rate is established for Project Finance. This is due to the fact that if forecasts about project's cash flows are necessary, projections can be more stable and reliable rather than using variable or flexible rates. If the loan is established with variable or flexible rates, it would be necessary to provide hedging instruments because none of the parties would like to bear the risk. The interest rate can arise issues between local and foreign currencies as well, because most of the time interest rates applied by international companies and local institutions may differ.

IDA fund provided loans to projects 1, 4, 6 and 7 of Table 34.

### c) **AsDB**

The Asian Development Bank (ADB or AsDB), established in 1966, is one of the most powerful institutions as regards financing long-term activities in emerging countries.

The company is rated AAA - Moody's<sup>111</sup>, in accordance with other rating agencies.

The main strength of the company is the careful credit selection and prudent financial management. As a lender, it provides loans to both sovereign and non-sovereign borrowers in

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<sup>110</sup> As explained in the PPP IRC website, *“Some of this will be managed in the project agreements with the government taking some of the risks in terms of compensation to be paid in the case of unilateral termination or expropriation, but not all political risks are likely to be borne by the government. Commercial lenders may be prepared to take a degree of political risk, but in some countries, the perceived political risk inhibits or even prevents the financing of projects which otherwise might be viable. Since the commercial insurance market can only absorb a limited degree of true political risk, many project sponsors have turned to multilateral agencies or export credit agencies to shoulder some or all of this burden”*, EPEC PPP website, < <http://www.eib.org/epec/>>

<sup>111</sup> De Guzman C., Diron M., Muehlbronner K., *“Asian Development Bank – Aaa Stable”*, Sovereign and Supranationals, Moody's, Report, 23 August 2017

order to foster growth in emerging countries. The bank identifies three main scopes of work: developing countries, sustainability, and integration at a regional level. The way in which the bank is able to extend its loans is done through paid-in capital, reserves, and proceeds from borrowings, with concessional funds available to borrowers. The bank provides also guarantees and equity financing, together with technical assistance. As rated, "*ADB's treasury portfolio is largely invested in conservative assets, such as money market instruments and government securities.*"<sup>112</sup>

The main financing projects issued by AsDB are: Non-Recourse Project-Based Financing, in which lenders have no possibility to recourse to sponsors if difficulties arise but with access to project cash flows, and Recourse Balance-Sheet Financing, where they can access to sponsors in the case where they are not able to meet their debt obligations using their own cash flows (credit quality and risk profile are taken into consideration when considering whether to finance this kind of project). Consulting its reports<sup>113</sup>, I saw that AsDB distinguishes explicitly risk allocation according to different stages of financing:

- Pre-construction phase: in this stage, the risks that are taken into consideration are those relating to the building activity. Consequently, the credit profile in this situation is weaker, given the limited choice of lenders and the high indebtedness level. Of course, this is reflected on costs;
- Post-construction phase: usually corresponds to refinancing. After the cost incurred for building activities, the concluded activity improves the credit position and quality of the company's profile. As a consequence, borrowers try to refinance their debt lowering the cost related to it, namely the interest rate. In this phase, the assessment is made looking at project viability and enhancement mechanism.

Asian Development Bank provides a few case studies in order to better understand its policies with regard to the strategy of risk allocation according to the credit quality of the borrowers.

AsDB fund provided loans to project 4 and 7 of Table 34.

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<sup>112</sup> Hrvatin R., Phua Y., "*Asian Development Bank*", RatingsDirect, S&P Global Ratings, S&P Rating Report on Asian Development Bank, 19 July 2017, p.7

<sup>113</sup> Tsunoda J., Pai R., Agrawal P., "*Credit Rating Methods for Public-Private Partnership Infrastructure Projects and Small and Medium-Sized Enterprises in South Asia*", South Asia Operational Knowledge Working Paper Series No. 3, February 2014

The following case study is inspired by the ones provided in the report of the AsDB (2014)<sup>114</sup>, and I adapted it according to data of the Kigali Bulk Water Supply in Rwanda shown in Table 33.

The following case study (Case Study n.3) describes an hypothetical situation in which the growth of the project and its cost-recovery process have a crucial impact on the success of a project, and illustrates the risks that can affect the results of the PPI.

### **Case Study n.3**

The private company Metito is involved in the construction of a bulk water supply according to a PPI project signed with Rwanda government, the government water utility company and Kigali Water Limited (KWL). At the end, the project is expected to set charges to final users. The contract signed allows for 27 years Greenfield BOT project, and the contract is awarded according to a competitive bidding process with the lowest tariff. Metito confirms to the government that has a consolidated experience in this field and know-how.

The project regards a supply system construction that has to cross 3 different countries connecting 3 major cities in emerging economies, with high prospects of growth. This means that the effectiveness of the project is also strictly related to the growth of those economies.

After the first 6 years, the project seems to have a good operating performance, with a compounded growth rate of 11%. Credit quality is ensured by the growth rate, positive and increasing y.o.y., by the extensive number of people using the supply system due to the demographic boom of emerging countries, and by debt-protection instruments ensuring a debt coverage ratio of 2.5x loan tenures. However, the main risk in which is possible to incur is represented by the instability of government structures, natural disasters, and plagues that could arise.

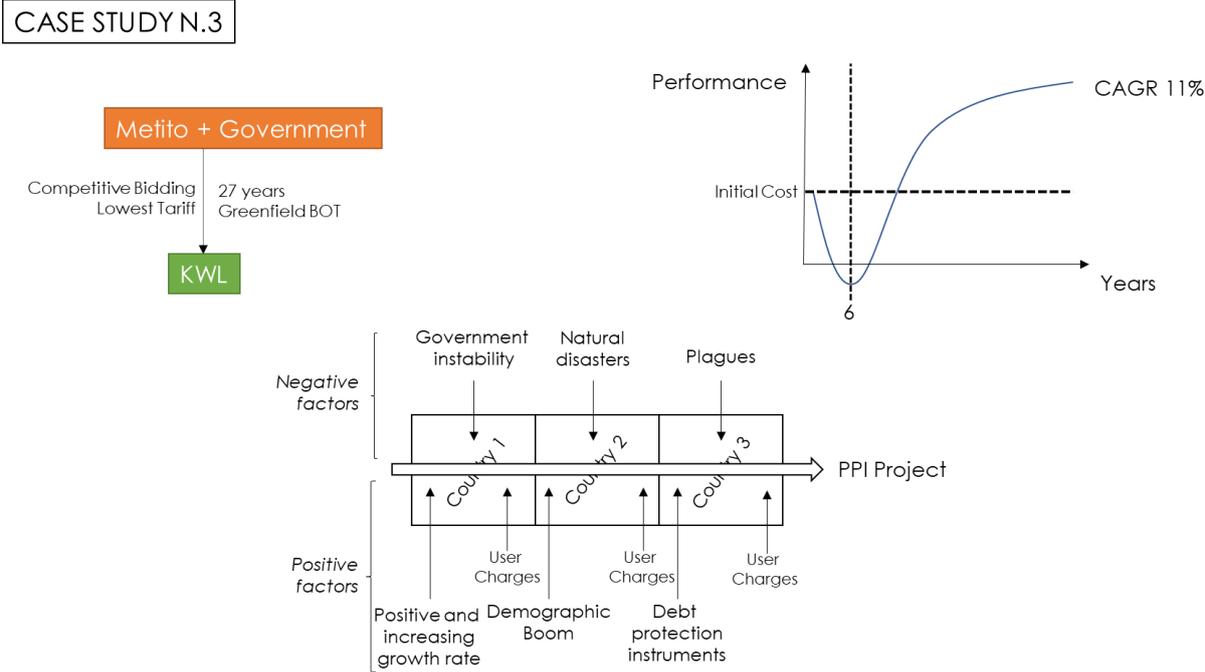
As it can be seen, the quality and the growth of the project are ensured only after the 6<sup>th</sup> year of implementation of the project, when the construction phase is concluded and the credit profile is ensured by a positive compounded growth rate.

The following Figure 33 summarizes the key elements of the Case Study n.3.

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<sup>114</sup> Tsunoda J., Pai R., Agrawal P., “*Credit Rating Methods for Public–Private Partnership Infrastructure Projects and Small and Medium-Sized Enterprises in South Asia*”, South Asia Operational Knowledge Working Paper Series No. 3, February 2014

**Figure 33. Synthesis of Case Study n.3**



Source: Personal revision of Case Study n.3

**d) AFDB**

African Development Bank has the same approach of the Asian Development Bank. It provides mainly loans instruments to investors who want and demonstrate to pursue long-term strategies and projects to foster growth and wellness of developing countries, together with the reduction of poverty. This multilateral finance institution was founded in 1964. The AFDB includes the African Development Fund and the Nigeria Trust Fund.

The bank is rated AAA- Fitch<sup>115</sup>, in accordance with other rating agencies.

The products offered are mainly sovereign guaranteed loans, loans to privates and equity investments. As reported by Fitch, "Sovereign loans granted by AfDB are non-concessional, ie their interest rate reflects the bank's cost of funding plus a fixed margin. Loans to the private sector also incorporate a premium reflecting the borrower's risk profile. Only 17 countries are eligible for sovereign loans, as AfDB's loans are only granted to middle-income countries.

<sup>115</sup> Paget-Blanc E., Martin V., "African Development Bank. Full rating report", Fitch Ratings, Supranationals, Report, 8 December 2017

Lower-income countries can obtain concessional loans granted by the African Development Fund (ADF) and the Nigerian Trust Fund (NTF), two funds managed by AfDB but financially and legally independent”<sup>116</sup>.

The main loan instruments provided by AfDB are presented in Table 45.

**Table 45. Characteristics of Loan Terms provided by the AFDB**

	<b>FFL (Fully Flexible Loan)</b>	<b>FSL (Fixed Spread Loan)</b>
<i>Maturity</i>	25 years	15 years
<i>Grace period</i>	8 years (included in maturity)	5 years (included in maturity)
<i>Repayments</i>	Semi-annual and equal payments	Equal principal payments + semi-annual interest payment
<i>Interest rate</i>	Base rate + funding cost margin + lending margin + maturity premium (floored to zero)	The base rate (floating or fixed) + risk-based lending spread
<i>Floating rate</i>	/	6 months USD LIBOR. JPY LIBOR or EURIBOR
<i>Lending margin</i>	80 bps (0.8%)	/
<i>Maturity premium</i>	<0% if loan maturity <= 12.75 y; 0.10% if 12.75 < avg loan maturity <= 15y; 0.20% if avg loan maturity > 15y.	/
<i>Front-end Commitment fee</i>	0.25% of loan amount 0.25% of undisbursed amount	Determined during the appraisal Min 0.5%, Late payment is 0.2% of unpaid amount
<i>Supervision fee</i>	/	Determined during the appraisal

Source: AFDB website. Personal revision.

AsDB fund provided loans to project 11 of Table 34.

<sup>116</sup> Paget-Blanc E., Martin V., “African Development Bank. Full rating report”, Fitch Ratings, Supranationals, Report, 8 December 2017, p.2

#### **e) EIAF**

Emerging Africa Infrastructure Fund was set up in 2001 as Public-Private Partnership, in order to provide loan and debt instruments<sup>117</sup> to finance construction processes and private infrastructure development. The main aim of this institution is to address the gap that arises from high-interest rates on short-term loans that are asked by the commercial banks, given that most of the times do not fit the structure of infrastructure investments.

The main instruments that it provides are:

- Project loans and corporate loans of between US\$10 million and US\$50 million, generally it provides loans between \$10 million and \$36.5 million over 15 years;
- Senior debt;
- Subordinated and/or mezzanine debt;
- Loans in US\$ or €, loan periods of up to 20 years;
- Local currency loans possible in certain circumstances;
- Anchor or cornerstone investor in bond issues;
- Bridging finance.

EIAF fund provided loans to project 11 of Table 34.

#### **f) EIB**

Probably, the European Investment Bank is the biggest institution providing loan and other financing instruments to investors worldwide and, specifically, in Africa. This is the non-profit long-term lending institution of the European Union, founded in 1958. EIB is a publicly owned international financial institution and a policy-driven bank.

The company's loans are rated BBB+ -Fitch<sup>118</sup>, and the bank AAA – Moody's.

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<sup>117</sup> Such as long-term debt or mezzanine finance

<sup>118</sup> Martin V., Perry N., "European Investment Bank. Update", Fitch Ratings, Supranationals, Report, 30 October 2017

The bank operates counter-cyclically, in a high credit quality and low political risk environment, conducting a low-risk strategy. The asset quality is very high, with a tight selection and monitoring processes of projects. The bank presents a very low rate of non-performing loans and a high liquidity ratio. Generally, EIB asks for guarantees in case of non-sovereign loans. The bank provides 25-30% of the total value of the project, 100% only if in presence of projects after natural disasters with co-financiers, too.

Thus, the main activities undertaken by the bank are: long-term financing for large-scale infrastructure projects and loans to support Small-Medium Enterprises. Moreover, EIB provides different kinds of loans that share a single common framework:

- Conditions: project must have the same mission and lending objective, and it must be sound economically speaking. It must be sound also from the financial, environmental and technical point of view;
- Interest rate: they can be fixed, floating, revisable or convertible;
- Fees: can be charged for project appraisal, legal services, commitment, non-utilization, etc.;
- Currencies: EUR, GBP, USD, JPY, SEK, DKK, CHF, PLN, CZK, HUF and eventually other currencies if needed;
- Repayment: semi-annual or annual, with eventually grace periods for capital repayments in the construction phase.<sup>119</sup>

Usually, as the credit quality of the counterpart deteriorates, further enhancements are required (i.e guarantees and collaterals) in order to compensate. According to the Epec PPP Guide, the risk allocation strategy of EIB can be defined as follows, according to Table 46.

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<sup>119</sup> EIB website, < <http://www.eib.org/>>

**Table 46. Subdivision of risk according to EPEC PPP Guide for EIB**

<i>Commercial risks</i>	<ul style="list-style-type: none"> <li>• Supply risk: the ability of the PPP to deliver. It can be divided into construction risk and supply-side operational risk. The changes in the cost of capital are included in this subdivision, together with exchange rates and inflation</li> <li>• Demand risk: insufficient volumes compared to what is asked by the population.</li> </ul>
<i>Legal and political risk</i>	Include regulatory and legal framework, together with taxation, disputes resolutions, expropriations, and nationalizations.

Source: EIB website, < <http://www.eib.org/>>

Moreover, as AsDB, EIB differentiates risks also according to the stages of the projects analyzed. The Bank, according to its Evaluation Report (2005), identifies:

- *funding risks*, represented by the failure in reaching financial closes (carried by public authority and it mitigates it by looking for well prepared privates in bidding process) and interest rates movements (both public or privates could bear it);
- *completion risk*, especially related to delays in delivering the project (the responsibility is borne by privates);
- *operating and management risk*, regarding increasing costs in which the private company could incur (privates are responsible as well, hence they should be incentivised in lowering them);
- *termination risk*, represented by the delivery of the project earlier than expected but with lower quality (risk borne by both parties); and *revenue risk*, being different if we consider direct payments (level of tariffs is dependent on amount of final users, that could change, and it is responsibility of private party), indirect payments (privates could desing fees in order to limit their risk) or availability of payments (stricktly related to the status of the infrastructure, quality of the assets and so forth, risk borne by privates)<sup>120</sup>.

The most relevant risks that have to be considered during the implementation phase are costs of construction, costs related to bureaucracy, delays, and corruption in the bidding process. On

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<sup>120</sup> Data revised leveraging on EIB Report. Thomson C., Goodwin J., “*Evaluation of PPP projects Financed by the EIB. Synthesis Report*”, Evaluation Report, March 2005.

the other side, during the operation phase, the most relevant costs are those of operating and management and revenue costs. However, EIB always takes into account sustainability parameters in order to assess the performance of projects during monitoring activities. Key elements that are taken into account are: *Relevance*, *Effectiveness*, *Efficiency*, and *Sustainability*, as they will be better explained later in this chapter, in section 5.4.

EIB fund provided loans to project 7 of Table 34.

Therefore, private companies mainly refer to Development Banks and Funds to collect debt resources (5 companies out of 6, according to Table 34) or guarantees (1 out of 6) in order to protect themselves from risks<sup>121</sup> that could arise during the different stages of the projects.

#### **5.4. Funds' decisional process analysis and Risk Evaluation**

As mentioned in the previous Chapters (specifically, Chapter 2 and 4), PPI projects undertaken in the water sector are fewer with respect to other sectors, such as ICT or transport, and generally involve lesser amounts invested. The main factors that undermine the development of PPI projects in the water sector are the low rates of return of water and sewerage projects, and the difficult process of risk allocation. This is why decisional processes and risk evaluation methods are such a delicate process for the funds that issue loans, guarantees or any other form of financial resources to private firms.

It is necessary to remind that funds face two main phases: determination of eligibility criteria in the procurement phase, and finalization of eligibility judgement with the rating process.

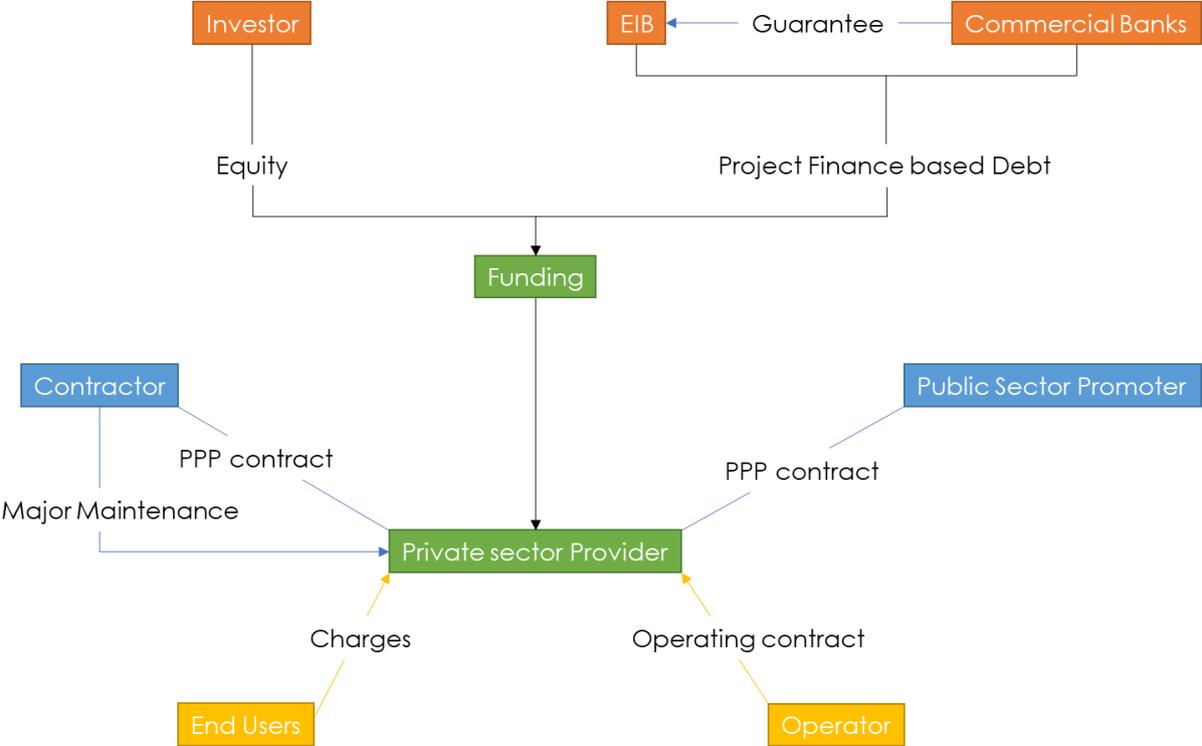
Thus, Development Banks have their own criteria in establishing the eligibility of projects and risk allocation. As reported by EIB (2005), the procurement procedure has to take into account timing requirements and specifications of physical works, explaining revenues collection and operating and maintenance costs. Therefore, projects must be technically sound to the provider of financial resources. Moreover, contractual relationships must be explicit and written in the contract improving transparency. With this regard, Figure 34 shows the kinds of relationships that EIB discloses in its contracts. Figure 34 was drawn on the base of the example provided on

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<sup>121</sup> Especially macroeconomic

their reports, which was connected to the PPI projects in the transport sector. I reworked the Figure in order to adapt it to the context of water and sewerage projects.

**Figure 34. Contractual relationships in PPI contracts (EIB example)**



Source: Thomson C., Goodwin J., “Evaluation of PPP projects Financed by the EIB. Synthesis Report”, Evaluation Report, March 2005, p.12. Personal revision.

Figure 34 illustrates the contractual relationships that occur in the PPI projects that EIB finances. In my opinion, this Figure can be used in a cross-sectoral way and adapted to all funds analysed in this dissertation, because the role played by the latter are the same of EIB’s. Thus, this picture can be divided into 4 sections:

- Orange section: it represents the sources of funding, namely the investor that provides Equity and the Banks that provide Debt and Guarantees (the funds analyzed in this section of the dissertation can be placed here, as debt and guarantees provider);
- Green section: shows the direct flow and connection of the funding providers with the Private Party involved in the PPI project;
- Blue section: displays the two main subjects that operate and are involved in the PPI project, performing the activities that have been agreed according the different types of contract (see Chapter 3 and Chapter 4). The two parties are the Contractor and the Public

Sector Promoter, which respectively perform the activities and bear responsibilities according to the signed contract;

- **Yellow section:** contains sources coming from the PPI project implementation dedicated to cost-recovery, namely the end users paying charges and operators paying fees according to the operating contract.

Another important role is played by sustainability, which must be respected and improved with specific measures that have to be declared by private companies and public authorities in the project description. Hereunder follows a description of the eligibility criteria in evaluating a PPI project adopted by different funds, in order to highlight possible differences or similarities.

Sustainability is a point that is stressed also by The Nordic Consulting Group (2008) in its report and like EIB, it highlights the evaluation criteria that are taken into account while establishing eligibility. Table 47 shows the evaluation of the relevant characteristics that are analyzed in procurement and acceptance process.

**Table 47. Criteria for evaluation of a PPI Project**

Main themes derived from the evaluation	Evaluation Study's objectives			
	Assessment of the PPP Programme's general performance of achieving enhanced CSR	Assessment of the definition of CSR used in the PPP Programme projects	Defining the assessment criteria in the PPP Programme projects	Focus on Africa and prioritisation of the demand for PPP Programme projects
1. The PPP Programme and the CSR definition		O	O	
2. Meeting the PPP Programme objectives	O			
3. Programme spheres			O	
4. The six development impact criteria			O	
5. Additionality and local ownership			O	
6. Geographical spread of projects under the Programme				O
7. Eligibility criteria for accessing Programme support	O			
8. Project formulation, monitoring and reporting procedures	O			

Source: Kirkemann P., Appelquist M.L., "Evaluation Study. Public Private Partnership Programme", Nordic Consulting Group A/S, Denmark, Evaluation Study, November 2008, p.29

These criteria reflect the importance given to the clarity of the objectives, to sustainability goals and to performance measurement. What differs them from EIB is the lower attention given to the relationship structure, and to the cost-revenues projection, together with the higher importance of prioritization of demand for water services.

EPEC (European Public-private partnership Expertise Center) also discloses its own criteria for evaluation, which are: Relevance, Effectiveness, Efficiency, Value Added, and Sustainability, as shown in Table 48.

**Table 48. Evaluation criteria and assessment**

Evaluation criteria / Themes / assessment	The Memorandum	Governance	Activities	Dissemination	EPEC direct impact
Relevance	✓✓✓	✓✓✓	✓✓✓	✓✓	
Effectiveness		✓✓✓	✓✓✓	✓	
Efficiency		✓	✓✓✓		
Value added			✓✓		N/A
Sustainability	✓		✓✓		N/A

Source: Bozier P., Chirita R., Gargani F., Newman L., Odoardi R., Rytel M., “Ex-post Evaluation of EPEC (The European Public-Private Partnership (PPP) Expertise Center). Final report.” PwC, Report, 6 December 2013, p.8

Each aspect has its own description:

- Relevance means the consistency of goals with the mission of the company, the values of the fund, and EU policies;
- Effectiveness is the ability to reach the declared objectives despite changes occurred;
- Efficiency is the achievement of objectives without wasting available resources and with the generation of positive externalities to the community;
- Value Added is the additional quality that the project gives to the fund;
- Sustainability relates to the socio-political and environmental elements that are considered by the company in its decision about the project.

According to EIB and to The Nordic Consulting Group report, sustainability and goals consistency achievement are key aspects of the evaluation process. As for EIB, there is attention paid to the cost-revenue relationship: although it is not explicitly stated it is a part of the concept of efficiency. Differently from the report of The Nordic Consulting Group, there is scarce or no attention given to the geographical spread of project program and I found that the most relevant and shared objectives relate to CSR, sustainability, clarity of goals and efficiency of cost-revenue relationship.

MIGA discloses its eligibility criteria as well, which differs from the previous criteria due to the nature of the fund, which provides guarantees instead of loans. As reported by the fund MIGA (2015), *“In keeping with MIGA’s objective of promoting economic growth and development, projects supported must be financially and economically viable, environmentally sound, and consistent with the labor standards and development objectives of the country.”*<sup>122</sup> I notice that there is a prevalence of the soundness of economic and financial data. Anyway, importance is also given to the environmental sustainability disclosed by private companies in presenting their request for financing loans and/or guarantees.

From this point on, after having evaluated whether a project presents some key characteristics, funds must assess a rating to the project, in order to finalize its eligibility. Also in this phase, each fund discloses its own rating method. Table 49 provides rating evaluation criteria used by EIB in its own methodology.

**Table 49. Example of rating against evaluation criteria (EIB)**

Criterion	Project Rating			
	Good	Satisfactory	Unsatisfactory	Poor
Relevance/Efficacy	4	6	-	-
Efficiency*	2	4	2	-
Sustainability*	2	5	1	-
<b>Overall Rating</b>	<b>4</b>	<b>4</b>	-	-

*Source: Thomson C., Goodwin J., “Evaluation of PPP projects Financed by the EIB. Synthesis Report”, Evaluation Report, March 2005, p.24*

<sup>122</sup> MIGA Multilateral Investment Guarantee Agency, World Bank, *“Investment Guarantee Guide”*, Report, July 2015, p.1

EIB sets up a table in which, for each key measure (Relevance/Efficacy, Efficiency and Sustainability), it scores it using a range from 0 to 6 points. Then, EIB totalizes the scores assessing the overall rating.

As mentioned, rating methodology changes according to each fund. As we have seen before, each Bank can establish its own eligibility criteria, as well as rating methods, in assessing risk relevance. For example, Asian Development Bank has established its criteria as shown in Table 50.

**Table 50. Risk assessment criteria and rating process (AsDB)**

Rating Parameter	Weight (A)	Rating Score (B)	Weighted Rating Score (C = A X B)
Business risk	20%	5	1.0
Project implementation risk	20%	4	0.8
Financial risk	20%	5	1.0
Legal/contractual risk	10%	4	0.4
Private partner credit profile	10%	5	0.5
Public sector entity role and credit profile	20%	7	1.4
<b>Total weighted rating score</b>			<b>5.1</b>
<b>Stand-alone rating</b>			<b>BBB</b>
<b>Credit enhancement (1 rating category)</b>			<b>1.0</b>
<b>Final rating score (rounded to the nearest integer)</b>			<b>6.0</b>
<b>Final rating</b>			<b>A</b>

*Source: Tsunoda J., Pai R., Agrawal P., “Credit Rating Methods for Public–Private Partnership Infrastructure Projects and Small and Medium-Sized Enterprises in South Asia”, South Asia Operational Knowledge Working Paper Series No. 3, February 2014, p. 26*

AsDB, in order to establish the final rating rate, evaluates business risk, project implementation risk, financial risk, contractual and legal risk, credit profile of the private company and of the public authority. It calculates a weighted average depending on the presence and relevance of those risk in the project, then it multiplies it according to a credit enhancement system, thus obtaining the final rating result. Differently, from EIB, which is more focused on the evaluation of relevance, efficiency, and sustainability, AsDB shows greater interest in the process of their identification and allocation between parties.

The African Development Bank can also provide a Rating scorecard in order to finalize a rating level of the project. This is done by weighting the risks identified in the contractual phase with mitigation instruments. Table 51 shows how AfDB evaluates and assess the risk profile of a project.

**Table 51. Risk profile and Rating assessment (AfDB)**

Key Risks	Measures/Actions	Expected Impact
<b>Concentration &amp; Systemic Risks</b>	Programmatic approach for fast disbursing operations	<i>Gradual consumption of risk capital</i>
	Review of the possibility of widening the scope of enclave policy within the credit policy guidelines	<i>Greater Portfolio Diversification</i>
	Hedging instruments	<i>Reduction of Unexpected Loss</i>
<b>Non Sovereign Portfolio Risk Profile</b>	Greater accountability of investment officers through the establishment of deal sheet	<i>Ensuring quality at entry in the portfolio</i>
	Good collateralization and strong guarantees	
	Strong pipeline development	
	Enhanced projects' supervision	<i>Improving Portfolio Management</i>
	Close monitoring of Equity investments and development of early exit strategy	
	Adequate net income transfer to reserves	<i>Increasing risk bearing capacity</i>
	Development of risk sharing instruments (syndication, trade finance facility)	<i>Reduction of Expected Loss</i>
<b>Policy Reviews</b>	Review of the Credit Policy	<i>Under Board Purview</i>

Source: African Development Bank, “Portfolio Credit Risk Review”, Financial Management Department (FFMA), Report, 2011, p. iv

As far as I can observe, AfDB shares the same view of AsDB, that is focusing on risk identification and mitigation instruments. This means that, for EIB, risk evaluation comes after establishing evaluation criteria for eligibility, while for AsDB and AfDB it is a part of the rating process.

After having analyzed reports<sup>123</sup> on risk evaluation and allocation between parties, I came up with the conclusion that it is extremely difficult to identify one single process for risk allocation

<sup>123</sup> Specifically, I refer to the following papers and reports: African Development Bank, “Portfolio Credit Risk Review”, Financial Management Department (FFMA), Report, 2011; IRMA Initiative for Risk Mitigation in Africa, “African Development Bank: Initiative for Risk Mitigation. Needs Assessment for Risk Mitigation in Africa: Demands and Solutions”, Final Report, March 2013; Liu H.J., Love P.E.D., Smith J., Sing M.C.P., “Testing a PPP Performance Evaluation Framework”, Hong Kong, Australia, Conference Paper, Proceedings of the International Conference on Smart Infrastructure and Construction, June 2016, pp. 681-686; Tsunoda J., Pai R., Agrawal P., “Credit Rating Methods for Public-Private Partnership Infrastructure Projects and Small and Medium-Sized Enterprises in South Asia”, South Asia Operational Knowledge Working Paper Series No. 3, February 2014; Bozier P., Chirita R., Gargani F., Newman L., Odoardi R., Rytel M., “Ex-post Evaluation of EPEC (The European Public-Private Partnership (PPP) Expertise Center). Final report.” PwC, Report, 6 December 2013; OVE Office of Evaluation and Oversight, “Evaluation of Public-Private Partnerships in Infrastructure”, Thematic Evaluation, Washington D.C., Report, March 2017; Kirkemann P., Appelquist M.L., “Evaluation Study. Public Private Partnership Programme”, Nordic Consulting Group A/S, Denmark, Evaluation Study, November 2008; Thomson C., Goodwin J., “Evaluation of PPP projects Financed by the EIB. Synthesis Report”, Evaluation Report, March 2005

in the contract setting. Risk allocation is a sensible matter, that can injure and negatively impact on the final results of the projects. If risks are misallocated, the parties that contractually should bear them could fail, giving no or inadequate protection with mitigation instruments. Moreover, risk sharing process is strictly related to the kind of contract under consideration: BOT, DBOT, Greenfield, Brownfield, Project Finance are all different ways of conducting PPI activities. Despite the difficulty in depicting a clear framework, in the final part of this chapter I will introduce a proposal that shares key features for each kind of contract, and a summary of the key risks to share and take into account when PPI projects are undertaken, taking into consideration the necessities and the point of view of the funds that provide financial resources for PPI Projects' development.

In the model proposed in Figure 35, I tried to summarize all the available data<sup>124</sup>, and I came up with a personal elaboration dividing Evaluation process and Risk allocation into six stages:

- 1) Evaluation of Value Addition of the PPI Project;
- 2) Capital Budgeting and Tariff Setting processes;
- 3) Evaluation of Sustainability of objectives and operating processes;
- 4) Risk allocation process, mitigation instruments setting and standard setting for negotiation process that could eventually occur in the future;
- 5) Monitoring activities of results and sustainability;
- 6) Contingent modifications allowed, in which terms and ranges.

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<sup>124</sup> Data available from reports, journals, academic reviews, and databases ranging from PPI Database of the World Bank and Business Source Complete to Bloomberg.

**Figure 35. Evaluation and Risk-sharing process in PPI Projects implemented in Water and Sewerage sector in Sub-Saharan Africa**



*Source: Personal elaboration of information available, data analyzed and results obtained through the entire analysis.*

The first phase I considered is **Value Addition**. When Development Banks are trying to decide whether to finance a PPI Project or not, they look at the Value Addition that they could bring to the project. If they come up that they can not offer the most appropriate measures and, more importantly, that the projects seem not to add value to their portfolio, they avoid allocating their resources to private companies. The project must be in line with the vision of the fund and must respect key elements of their business.

Once having established the presence of Value Addition, funds want to analyze the **Capital Budget** required and already available from privates and, most important element, the tariff setting planned by privates once that the project is terminated. By setting tariffs, private companies try to find resources in order to cover repayments and costs. If they set tariffs that,

according to the funds, are inadequate to meet their cost needs and obligations, Development Banks can establish not to provide funds to private companies.

Each fund relies on its own KPI (Key Performance Indicators) or set of **evaluation measures**. But there is a common line that lies at the basis of all evaluation methods: Corporate Social Responsibility and environmental objectives. Development Banks, despite the financial stability and financial evaluation, are particularly interested in understanding how private companies are committed in sustainability matters and how they intend to mitigate environmental and sustainability risks. As shown in Table 44 of Befesa Case Study, the fund decided to monitor the activity of the project on the basis of Performance Standards about environmental issues. Each Performance Standard involves the necessity to identify the issues involved in that standard and a specification, case by case and element by element, of the way the company wants to face, limit and mitigate those risks.

This is why the phase of **risk allocation** is so important. The totality of the funds I examined assumes that risk should be allocated among the parties who can best manage them. Of course, each PPI project includes different risk specificities. For example, the diversification of risks according to the different phases of contracts. However, I identified some key risks that should be taken into account when parties are negotiating contracts, which are listed below according to the phases of the project. 2 funds out of 5 declare that there is a distinction of risks depending on the different stages of the project, that generally are two: implementation and termination. During the implementation phase of a PPI Project in Water and Sewerage in Sub-Saharan Africa, the main risks that could possibly arise are:

- Risk of not finding enough resources to start the project (borne by Government);
- The volatility of the interest rate applied during the bidding phase (borne by both parties);
- Increases in costs for operating and maintenance activities (mostly borne by Privates);
- Natural disasters, wars and other macroeconomic phenomena that could negatively impact on the success of operations or increase costs (borne by Government).

Risks in this phase are higher due to the high uncertainty of the general framework in which the project is located. In the second phase of the project, the termination stage, I found that the following risks are generally taken into consideration:

- Delays in delivery of assets (borne by Privates);

- Increased costs of preparation of the assets (borne mostly by Privates, but has also a reflection in Governments);
- Earlier termination due to the use of scarce quality resources (borne by both parties);
- Collection of inadequate (not sufficient or too high, according to the availability of consumers) fees applied to final users (borne by Privates).

A general principle is that private companies should bear risks relating to management and operating activities, while public authorities should bear macroeconomic risks. The last risk of the previous list is especially true for a good such as water one. It is fundamental to keep in mind that water is essential for life. Moreover, it is a scarce resource in Sub-Saharan Africa, with a lower level of access and dramatic levels of pollution. Water is strictly related to health, this means that setting tariffs is an extremely sensible matter. Demand is inelastic, meaning that whatever the price, people will pay it as they have no other alternative to have access to potable water. Nevertheless, if prices increase or are set too high, riots can arise.

All those risks must be taken into account, and this is why privates ask not just loans, but also guarantees, as those provided by MIGA. This fund is specialized in providing instruments able to **mitigate risks** such as currency inconvertibility and transfer restriction, expropriation, war, terrorism, and civil disturbance, breach of contract, and non-honoring of financial obligations. Also MIGA, as all the other funds analyzed in this dissertation, has its eligibility code. All the funds analyzed (5 out of 5), as already mentioned, declare as eligible all those private companies that show long-term commitment and true interest in developing activities in emerging countries, together with financial stability and coverages.

After having established risk allocation, it is necessary to verify a **monitoring process** in order to check whether privates' obligations are in accordance to what is written and negotiated in the contracts. As confirmed by EPEC Guide, key elements that can be evaluated during the monitoring process are:

- Relevance (consistency of the objectives with policies);
- Effectiveness (goals achievement);
- Efficiency (impacts and outcomes);
- Sustainability (long-term goals, environmental and sustainable commitments).

The last stage of the process is the possibility of **modifying contract terms after** that important changes had occurred. Of course, this could be also entailed as risk in the termination phase, borne especially by governments. Privates could negotiate conditions that are more favorable

to them later in the process or, on the contrary, public authorities could expropriate the asset from private companies whenever they find it useful. This is why funds issue guarantees also for this kind of risks (i.e., breach of contracts, expropriations, etc.).

## Conclusions

Throughout the dissertation, the main objective was to understand the reason why PPI concerning Water and Sewerage sector were not widely implemented in Sub-Saharan Africa. As shown in the first chapter, there are many advantages coming from the implementation of PPI projects, the most important of which are the increase in management efficiency and the cost reduction. However, this is not sufficient in order to enhance PPI implementation in Africa, since AFR (or SSA) region is the one that invests less in PPI projects as it can be seen in Chapter 2. Even if OECD promotes PPI regulation providing a set of 24 Principles to be applied when privates are involved in these projects, and it shows particular interest in regulating the PPI framework in the water sector, PPI project implementation in African countries is still difficult. African countries have a history of corruption and lack of trust in public authorities' capability of managing PPI projects, and that is why it is difficult to enhance their growth. Transparency and stakeholder engagement are therefore of primary importance, as stressed by the 24 Principles described in Chapter 4.

Furthermore, the success of a PPI depends on the right risk allocation as well. Risk measurement and mitigation instruments are key elements that must be considered, and risks must be allocated between the parties that can best manage them. As pointed out in Chapter 3 and Chapter 4, risk evaluation and sharing process requires a careful examination of the risks that can occur and a meaningful choice of the type of contract applied, according to the characteristics of the project. Moreover, the success of a PPI project is strictly related to the availability of funds. Even if private companies and public authorities perfectly allocate risks, it is necessary that Development Banks and funds are involved to ensure mitigation risk instruments. As explained in Chapter 5, each fund establishes its own eligibility criteria when it has to choose the project to finance. After having analyzed the different characteristics of the private companies and the criteria established by funds, I tried to synthesize a common structure for a decisional process and risk allocation method that could be valid for all the PPI projects concerning Water and Sewerage sector in Sub-Saharan Africa. According to my proposal, the Evaluation of a PPI Project in Water and Sewerage in Sub-Saharan Africa and the related Risk sharing process can be divided into six phases. PPI Project Value Addition is the first phase, in which funds establish if a project adds value and is in line with their portfolio. The second stage is Capital Budgeting and Tariff Setting, where private companies must demonstrate their financial stability, together with the project's one and how they plan to recover the costs. The

third phase is CSR Evaluation of Objectives, that establishes if the project is compliant with sustainability requirements and if the private companies adopt CSR measures and objectives. Risk Allocation and Negotiation is the following stage in which parties must evaluate the ability of managing risks, according to specific criteria. Monitoring process is implemented once that the project has started, in order to establish whether the project is proceeding according to what established in the contract, and it is based on four main indicators: Relevance, Effectiveness, Efficiency and Sustainability. The last phase is Contingent Modifications that can be applied in case of relevant changes occurred during the life of the project.

As a final observation, we can conclude that investing regarding PPI Projects in Water and Sewerage sector in Sub-Saharan region is not so easy to manage. Water is a necessity good, but it could not prevent privates, funds and governments from evaluating financial stability of projects, rate of returns and positive cash flows. Private companies must show stability of course, but also a strong commitment in environmental and sustainable matters.

Guarantees and coverages are requested and obtained, and we can say that private companies that want to pursue PPI activities in the Water Sector are not primarily driven by returns.

I hope that PPI projects in Sub-Saharan Africa will increase in the future, within a proper regulatory framework and with firm's right sustainable commitment, in order to grant to the poorest part of the population the fundamental right of having access to sufficient and safe water.

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