

CIB TG72: Public Private Partnership

Research Roadmap

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1. Executive Summary

Public-Private-Partnerships (PPPs) are joint ventures, in which business and government cooperate; each applying its strengths to develop a project to deliver public services more quickly, more efficiently or otherwise better than a government could accomplish on its own. Significant synergies are expected from combining public and private sector resources, while safeguards are also needed to avoid risks of any abuse of the necessarily closer working arrangements and relationships.

This roadmap report highlights a number of significant challenges for PPP. It also presents a number of positive innovative opportunities.

There are various types of public-private partnerships being used in different parts of the world and for different projects. While in some countries Design-Build-Finance-Operate (DBFO) is popular for their Private Finance Initiative (PFI) projects, other PPP modalities used world-wide are special turnkey contracts, perpetual franchises, BOT, BOOT, BTO, lease-purchase, lease-develop-operate, sale and leaseback etc. Each of these approaches can offer distinct advantages to clients or private sector actors, often depending on the specific social, economic, political and regulatory environment.

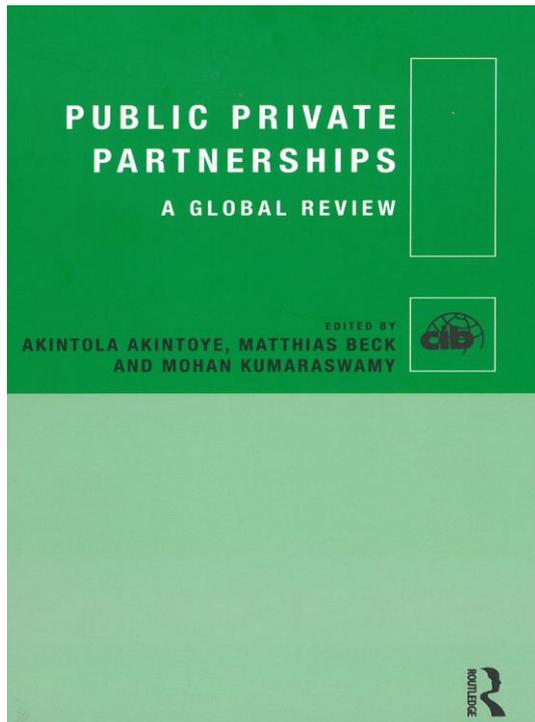
In addition, there are diverse drivers for PPP development, different practices and varying degrees of success of PPPs across countries. Indeed, these differ, not just from place to place, but also from time to time, given periodic shifts in needs, agendas and priorities along national development trajectories. As in any such comparison, there is value in adapting relevant lessons learned to applicable scenarios, so as to shorten learning curves or avoid similar mistakes e.g. in selecting PPP modes, protocols and partners.

Our overview conveys that there is still much to learn about PPP in relation to its drivers, policy framework, financial context, institutional framework, organisational structure, scope, limitations, changes in its applications, risks and potential benefits over time with future development.

There is also much research to be undertaken in order understand these issues which are categorised under seven research themes: (i) financing, and financial models and structure, (ii) Risk allocation and Management; (iii) Transparency and Accountability including Regulatory and Institutional frameworks; (iv) Public Policy and Private/Public Sector behaviours; (v) PPP Project Evaluation; (vi) Contractual structure; and PPP Performance Indicators

This research road map should be read in conjunction with:

- Public Private Partnership: A Global Review by Akintoye A, Beck M, and Kumaraswamy, M (Edt) Routledge, London, ISBN 978-04-415-72896-6; 2016



PPP: A Global Review, 2016
CIB Series
TG72 Public Private Partnerships

2. Introduction

The CIB Secretariat had developed the diagrammatic template and the basis of its corresponding descriptive commentary below, to demonstrate and assist in the design and development of a CIB research roadmap. We have adjusted and fine-tuned the commentary to align it better to guide the PPP-specific research and development journey.

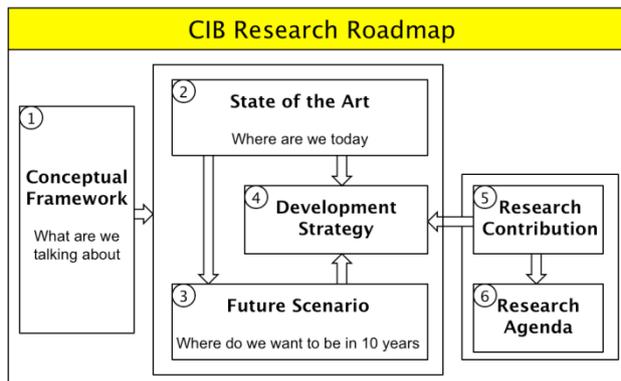


Figure 1. Outline of R&D Roadmap. Source: CIB secretariat.

As indicated in the illustration above, the research roadmap addresses the following six themes:

1 Conceptual framework:

- What are the primary issues involved in PPP developments? How do these interrelate? What influences them?
- Who are the stakeholders? What are the critical (make or break) areas of their expertise?
- What are the characteristics of the most relevant PPP systems, processes and technologies?

2 State of the art:

- Where are we today?
- What are the perceived problems, challenges, barriers and needs for improvement?
- What have been the failure factors in aborted, sub-standard or failed PPP scenarios?
- Who are the world's leading countries with proven expertise in PPP and what are the key issues that make them successful?
- What are the factors that have successfully contributed to PPP developments?
- What are the factors that define a successful PPP development?

3 Future scenarios:

- What is our vision of where PPP will (and/or should) be in 5, 10 and 20 years?
- What are the required/envisaged future systems, processes and technologies needed (for each of these timeframes)?
- What are the preferred future principles, practices and skills for PPP needed (for each of these timeframes)?

4 Development strategies

- What is needed in terms of knowledge, information, tools, concepts and applications for a successful PPP development?
- What systems, processes, mechanisms are needed? How do we get from where we are today to where we want to be in the future for a successful PPP (considering the 5, 10 and 20 year timeframes)?

5 Research Contribution

- How can research and development (R&D) contribute to such a development strategy?
- What are the requirements for R&D to significantly contribute to PPP success?

6 Research Agenda:

- What should the research and development (R&D) agenda focus on for PPP's (locally and worldwide)?
- What are the critical and other relevant areas of PPP research and development needed e.g. innovation drivers, core priority areas etc.?
- What forms of international cooperation should be set up: (a) within the research community and (b) between research and practice (in order to accelerate the desired forms of PPP development to deliver greater value to stakeholders)?

3. Conceptual Framework

The need for innovation and significant performance gains through procurement strategies is now more important than ever before. The industry is faced with the need to deliver enhanced value for money, with increasingly complex projects, enhanced competition, and additional pressures to comply with legislative demands and requirements, for example, sustainable development. Innovative construction procurement methods have been developed to meet these new demands, also helping to improve risk management and value for money. These new methods are now transforming the industry.

Public Private Partnerships (PPP), particularly Private Finance Initiative (PFI) projects, were created for the provision of public services and not specifically for the exclusive provision of capital assets such as buildings. However, PPPs do not fit under a single model, but need to be tailored to individual circumstances. Indeed the PPP spectrum would cover many types of partnerships, ranging from PFI, joint ventures, and concessions, to the sale of equity stakes in state-owned businesses.

The overall aim of PPP is to increase the flow of capital projects against a background of restraint on public expenditure, and with a particular remit of transferring risk from the public to the private sector. Thus, through PPP, the contractor has an incentive to design a facility that will have a low operating cost, or provide an incentive to generate the lowest operational cost over the long term. This may result in the delivery of a higher specification facility than might otherwise have been expected, which is particularly effective where there are limitations on capital spend under traditional procurement routes.

PPP is now accepted as an important avenue for funding major public sector infrastructure capital projects. PPPs are joint ventures in which business and government co-operate. Ideally this co-operation should allow each partner to rationalise, consolidate and apply their strengths more

effectively to develop a project and deliver services faster, better and more efficiently than government could accomplish on its own. Under these over-arching general goals, the practical implementation of PPP projects can take on several variants. In some instances, the private sector may be responsible for the designing, financing, constructing, owning and/or operating the entire project. In such circumstances, the private sector would want to be assured that the public-private partnership structure is designed to provide competitive rates of return commensurate with, or indeed better than, a financial rate of return that they could earn on alternative projects of comparable risk. Where the private sector makes a lesser contribution to an overall PPP project, with, for instance the public sector providing part of the financing or a large part of the project risk, these requirements for a market return can be relaxed.

In terms of types of PPP, the World Bank has taken a holistic view of PPP and defined these as including all investment (public and private) in projects with private participation in public sector infrastructure provision. The World Bank, accordingly, identified four categories of PPPs (World Bank, 2005):

- Management and Lease Contracts. These are contracts where a private entity takes over the management of a state-owned enterprise for a fixed period while ownership and investment decisions remain with the state. In a management contract the government pays a private operator to manage the facility and assumes the operational risk. In a lease contract the government leases to the private operator who takes on the operational risks.
- Concessions. A private entity takes over the management of a state-owned enterprise for a given period during which it also assumes significant investment risk. A concession can have several functions, including: (i.) rehabilitate, operate, and transfer; (ii.) rehabilitate, lease or rent, and transfer; and (iii.) build, rehabilitate, operate, and transfer projects.
- Greenfield Projects. The World Bank identifies four categories of this, including: (i.) Build, lease, and own; (ii.) Build, own, transfer, or build, own, operate, transfer; (iii.) Build, own, and operate, and (iv.) Merchant projects where a private entity or a public-private joint venture builds and operates a new facility for the period specified in the project contract.
- Divestitures. These involve the full (100%) or partial transfer of government owned equity to a private entity which buys an equity stake in the state-owned enterprise as part of an asset sale, public offering, or mass privatization program.

Various types of public-private partnerships are being used in different parts of the world and for different projects. While in the UK DBFO is popular for PFI projects, other methods of PPP used worldwide are turnkey contracts, perpetual franchise, BOT, BTO, Lease-purchase, lease-develop-operate, sale and leaseback etc. Each of these approaches can offer distinct advantages to clients or private sector actors, often depending on the specific social, economic, political and regulatory environment.

New hybrids of PPP programmes are being developed. For example, Kokkaew (2016) presented a quasi-equity instrument known as infrastructure fund as a new form of procurement that could fill the financing gap in Thailand infrastructure development. The fund is a type of mutual equity fund established to mobilize funds from general and institutional investors for investment in Thailand's infrastructure projects. These Infrastructure funds are believed to provide some distinct advantages over projects financed solely by state-owned enterprises through budget borrowing or bond issuing and/or private investor financing. The first advantage is that infrastructure funds provide project

developers with alternative sources of funds for their projects and thus reduce their borrowing needs. Another advantage is that both retail and institutional investors can invest in the country's infrastructure projects in the form of 'investment units'.

Infrastructure funds are governed by the Securities and Exchange Commission (SEC). Both Thai state-owned enterprises and concessionaires in PPP projects may use infrastructure funds for raising new capital for the following types of infrastructure projects: rail transit systems, water supply, electricity, deep sea ports, road/expressway/toll-way/concession ways, airports/airfields, waterworks, communications, natural disaster prevention systems, and alternative energy. The fund can invest in infrastructure projects in a variety of ways, including by investing directly in the assets themselves, by purchasing the asset, or by transferring the asset into the fund.

The key concept of infrastructure fund is that a Project Company or Special Purpose Vehicle (SPV) can sell "rights to future revenues" and project asset to investors in the form of investment units of the infrastructure fund. Proceeds from the sale of rights to future revenues will be treated as revenues of the Project Company or SPV which then can use this new capital to expand its operation or to build a new facility. The main goals of introducing the infrastructure fund are to exploit the Project Company's experience, technology and expertise in managing projects and to introduce new players (such as financial institutions, pension funds, and retail investors) into infrastructure investment. Investors, on the other hand, who currently experience very low yield in the money market, may buy into this type of assets, which potentially provide long term and stable yields through dividends and may additionally profit from the appreciation and general growth of the assets themselves through capital gains.

The typical structure of an infrastructure fund is illustrated as follows:

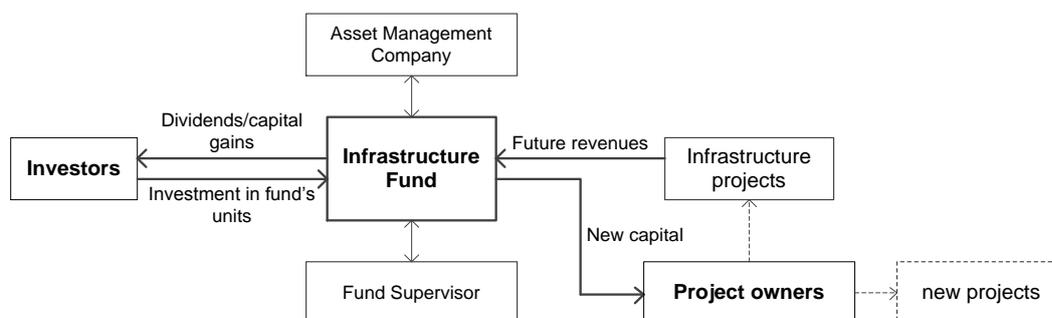


Figure 2. Example of a typical Infrastructure Fund structure

PPP has not being without major problems across the globe. There are projects that have been abandoned, renegotiated, taken over by governments, etc. when they become unmanageable. Examples abound in countries like Portugal, Greece, Brazil, etc. For the same reason Sarmiento and Renneboog (2016) are of the view that, it is necessary to understand the reasons for the unsuccessful PPPs, before continuing its use. They identified seven main questions in relation to the use of PPPs in Portugal:

- 1) Is it useful to have a large number of projects (and investment) in a short period of time?

- 2) Does the government possess the necessary management skills to set up and follow up the complex PPP contracts and processes?
- 3) Is the public management of the tender process sufficiently strict and does the regulation provide a sufficiently strong supportive framework?
- 4) Is the use of PPPs sufficiently traded off against other types of public investments (e.g. are PPPs only seen as an off-budget operation or do other reasons apply?)?
- 5) Are the financial assumptions in the PPP contract sound and is the subsequent budgetary control sufficiently strict?
- 6) Is the risk appraisal and allocation over the public and private sector sufficiently clear?
- 7) How come that in a vast majority of the PPPs, the contract terms were renegotiated which has led to a systematic increase in the payments by the public sector (Reis, 2013)?

4. State of the Art

The section provides a profile of the state of the art, through the lens of a structured summary of PPP development in 20 countries and the Hong Kong SAR (i.e. a total of 21 jurisdictions)¹, as follows:

Australia

PPPs are vigorously promoted in the context of social and public facilities and services in Australia. In order to ensure an efficient delivery of infrastructure investment, the Australian Government Infrastructure Department has developed a comprehensive set of National PPP Guidelines; which have been endorsed by the Australian Federal Government through its Infrastructure Australia Department and the State, Territory and Commonwealth Governments as an agreed framework for the delivery of PPP projects. These Guidelines provide a comprehensive framework that enables both the public and private sectors to work together to improve public service delivery through private sector provision of infrastructure and related noncore services. By 2012, there were 125 PPPs that had been completed with a total value exceeding \$59 billion Australian Dollars. However, there remains a significant gap and a corresponding opportunity for PPP to grow in the next decade. A key motivation for using the PPP procurement strategy in Australia was due to the need for more infrastructure including highways networks, social and public buildings, which was caused by increasing population; but the government lack funding to fulfil this increasing demand of better and more infrastructure. Another motivation is improved project scoping and risk assessment by government. The level of risk assessment by government agencies prior to contract award is much greater on PPPs. This additional analysis makes the government agency a more informed purchaser, better able to interrogate the pricing and risk assumptions of bidders. The book chapter from which this summary is distilled, being based on four cases, highlighted the importance of undertaking detailed risk analysis and proper risk allocation, also underscoring the importance of dynamic optimal risk sharing between the government and private parties during the life-cycle of a PPP project.

Belgium

¹ This section is extracted from Akintoye A, Mathias B, and Kumaraswamy M, (2016) Public Private Partnerships: A Global Review Routledge, London.

Despite a long history of public-private endeavours, PPP in Belgium took off relatively late. By 2013, PPP had become a well-embedded procurement method for long-term infrastructure projects. However, the distribution of PPPs across the different regions of Belgium is skewed. Both in terms of the number and volume of PPPs, the Flemish Region has an edge over the Walloon Region and the Brussels-Capital Region. This is mainly due to the fact that a national PPP policy was never drafted. In fact, only in Flanders has there ever been an official policy. PPP in Belgium was initially supported on account of its fiscal-budgetary advantages, since it allowed financing investments off-balance-sheet. Criticism of the national Audit Court and global credit institutions made decision makers look for other possible benefits of PPP and alternative PPP structures as well. Consequently, it is now required that emphases are put on the potential of PPP to create more than just financial added value.

Canada

Public-private partnerships have increasingly become the model of choice to design, build, finance, operate and maintain large public infrastructure projects over the past decade. To date over one hundred (100) health care, justice, transportation, waste and water treatment, energy, and recreation facilities have been delivered through PPPs, and another 100 are in various stages of the delivery process. Within the context of a highly active marketplace, the book chapter from which this summary was drawn, shows that while PPPs in Canada involve an expansion of the private sector involvement in infrastructure provision, government still maintains a central role for the development of infrastructure. During the current wave of projects, PPPs have been primarily motivated by a desire to realise value for money, which is generated by transferring construction and availability risk to the private sector partner and encouraging innovation over the lifecycle of the project. Conversely, Canadian governments have maintained a key position in selecting projects that meet the public interest, financing much of the upfront capital infrastructure costs using their lower borrowing capacity, and retaining demand risk enabling them to maintain long-term policy flexibility over service planning and coordination.

China

The Chinese government has been encouraging and supporting the participation of private investors in the provision of infrastructure and public services. There is a huge investment opportunity for PPP in China. China has a wealth of experience with delivering PPPs with strong support from central and subnational governments. However, the legal, regulatory and institutional frameworks for PPPs are still immature. Given the tremendous economic growth and immense demand for infrastructure and public services, the book chapter from which this summary was extracted, argued how China will continue to have a strong demand for future PPP projects.

Finland

It was only very recently that the Finnish Transport Agency and some bigger Finnish cities introduced a few public-private partnership contracts. The utilisation of private finances in public sector investment projects in Finland has remained because both the central government and the funding agencies of local governments have enjoyed good credit ratings, hence have been able to obtain affordable loans from the international markets. In addition, the municipalities have had taxation rights, broad local tax bases and a high capacity for sustainable financial management. However, the economic recessions, global financial crisis and growing needs to renovate existing old buildings and build new premises in some cities, have increased government interests towards possibilities to apply partnership types of investment procurement. The first but limited experiences with the PPP contracts have been mixed. These new procurement methods in some instance are regarded to be more expensive compared to

what would have been if they were procured by traditional investment arrangements through budget financing. After these experiences The Association of Finnish Local and Regional Authorities has developed an alternative framework model for PPP contracts and private finance. In the life cycle model of public investments, the local government keeps the ownership of service facilities and takes care of the financing without a special purpose vehicle and private capital but signs 20-25 years' contracts with construction companies for maintenance of the service facilities.

Greece

The country endorsed PPPs in the early 1990s, initially as a model to deliver transport infrastructure within the Trans-European Transport Network (TEN-T) programme. Through interchanging governments, the State tapped into EU structural funds and private financing in order to overcome public financing restrictions and provide much needed social and transport infrastructure. At the same time, the private sector began to play a role that required a longer term view on a project's construction and life-cycle costs. The successful initial implementation of hybrid public-private funding solutions in transport projects was followed by a slower but steadfast adaptation to PPP regulatory standards via changes in legislature and government reform. The State's new private-funding oriented strategy brought important changes to the country's infrastructure and financial markets. New players emerged in the Greek market; while older actors underwent necessary restructuring in order to better position themselves in this previously unknown economic paradigm. International groups assessed the opportunity presented by an emerging economy such as Greece adapting to a growth program that was more inviting to private sector involvement, and entered the market decisively, bringing on board an international perspective and years of infrastructure financing, development and operation experience. Grand scale transport projects as well as social infrastructure and energy PPP's were tendered and awarded in continuation of this policy, but their development was severely hindered by the effects of a deep recession from which the country is still recovering. Even though this recovery has been costly, particularly from a socio-economic point of view, and important challenges still lie ahead in the country's regulatory and legislative reform, there is a strong political will to continue implementing PPPs as an important vehicle to develop the country's transport, social and energy infrastructure.

Hong Kong

Since the 1970s many infrastructure projects have been procured through PPPs in Hong Kong including the Build, Operate, Transfer (BOT) and Design, Build, Operate (DBO) approaches. Considering that Hong Kong is regarded a vibrant international city and a major gateway to Mainland China; its intensive infrastructure development has encouraged much private sector participation for promoting the PPP approach. After the global financial crises and in order to boost the local economy, the Hong Kong Government launched "Ten Major Infrastructure Projects"; some of which were earmarked to be procured using the PPP approach. However, due to many reasons, including catching up of delays, these projects are now funded directly by the government instead, some of them also using the Design and Build option. There is, however, a new move currently towards the use of PPP in conservation and revitalisation projects where the time pressure for these types of project is not as great.

India

Indian infrastructure sector has been under continued focus at both international and national levels, the reason being that infrastructure has been considered to be the key to India's socio economic development. In this context, PPP plays a significant role in reenergizing India's infrastructure sector.

The PPP model which has made an initial footprint in India's national highways development is now gradually spreading into other sectors like power, airports, and urban infrastructure. The forms and extent of adoption of the PPP model varies across different infrastructure sectors, wherein built-operate-transfer (BOT) and its variants are popular in roads and ports sectors while service and management contracts are more prevalent in urban infrastructure sector. Although the Indian infrastructure sector is considered to fall short in meeting the private sector investment targets, the extent of operational PPP projects indicates that the PPP model has made an impressive mark on the Indian infrastructure landscape.

Indonesia

The participation of the private sector in infrastructure service provision in Indonesia under the arrangement of public private partnership dates back to the 19th century. While the number of completed PPP projects remains limited, this arrangement is growing in importance as the gap between the supply of government funding and the demand for infrastructure development widens. The build-operate-transfer model is still the main option for PPP in Indonesia. The Government of Indonesia has taken significant efforts to foster more PPP development, including reforming the legal and regulatory framework and providing government support. This support may take the form of contingent support mechanisms (e.g., land capping instruments, guarantees) and non-contingent support mechanisms (e.g., Project Development Facility, land revolving and acquisition fund, Viability Gap Funding). To allow for more competition between state-owned enterprises and private-sector firms, the Government has also introduced a public-corporate partnership, a broader concept of PPP. The capital market in Indonesia is generally liquid, especially with the presence of non-banking financing institutions established by the Government, which can provide flexible and long-term capital. The key issues that may hinder successful PPP implementation in Indonesia centre around commitment to policy sustainability, coordination amongst government stakeholders, and capacities of public sector. It is generally regarded that Indonesia is on the on the right track in terms of PPP investment. However, the main challenge remains on how to maintain this momentum.

Ireland

There has always been a history of private sector involvement in services and infrastructure delivery in the Republic of Ireland in the running of schools, some local authority services and the building of toll bridges. There have been ten privatisations of state owned enterprises since the 1980s. The origins of PPP in Ireland trace back to the 26th Dáil (1989 – 1992) when the Fianna Fáil and Progressive Democrats coalition came to power. The main rationale for PPP is the increasing infrastructural deficit and the prospect of reduced investment by the EU during a period of rapid economic growth. Political expediency is offered as an alternative reason for the introduction of PPPs as they offer early project infrastructure and also move capital expenditure off budget. The book chapter from which this extract was drawn, examines the recent decision to expand the use of PPP as a means of stimulating the economy, the new measures and reforms in relation to PPP, as well as the similarities between them and recent changes to PFI made in the UK by HM Treasury.

Italy

Although PPP is a relatively recent practice, its use is widely spreading in delivering public infrastructure. Nevertheless, there are still some shortcomings which are related to administrative, financial, and legal issues that make the application and use of PPP, although considerable in number and value, less effective and efficient in Italy than in some other countries. In order to overcome these

limitations, different interventions are required in order to strengthen the practices and advance the body of knowledge. In order to overcome the gaps in existing literature on the Italian PPP experiences and current scenario, there are on-going studies including an understanding of the key aspects characterizing PPPs in Italy. Some studies adopt a mono-dimensional perspective with the analysis of the extent of adoption and diffusion of PPP in Italy based on data generated on PPP projects by sector and/or by types. The book chapter from which this extract was distilled, formulates useful recommendations for an effective implementation of PPP based on the analysis of the main constraints for PPP development in Italy.

Japan

Until recently, Japan has depended on tax revenue at national and local municipality levels to procure the needed infrastructure development. The driver for the use of PPP is because most of the infrastructure are now deteriorating and need re-investment injections. Most of the existing infrastructure was developed over a short period of time during the era of Japan rapid economic growth, hence the present concentrated pattern of the deterioration. A third sector procurement approach to infrastructure development; a rudimentary form of PPP, was introduced in 1980s in the form of joint public-private corporations for Japan infrastructure development. In the book chapter from which this summary was extracted, it was estimated that the current public works budgets for maintaining currently existing infrastructure are between 30% to 40% below actual needs which makes PPP an attractive alternative investment option. The government, municipalities, and private companies have recognised that covering the cost of all of required extensive infrastructure renovations with public works is impossible. Therefore the government has announced in 2013, a "PPP/PFI Action Plan" to promote PPP/PFI. The Action Plan expects the target amount for PPP/PFI projects to increase to 10-12 trillion yen; which is 3-4 times of past PPP/PFI expenditure and is generally regarded as being very ambitious. Japanese PFIs are governed by the PFI Act of 1999. The 2011 revision adopts concessions whereby ownership of infrastructure stays in the hands of government while administration rights are transferred to private companies.

Malaysia

Realising the contribution of the PPP programme to the development of the country's public infrastructure and facilities, the government has shown continuous support for PPP. This is evidenced in the government's plans and policies that give emphasis to the use of PPP. In particular, in the Tenth Malaysia Plan, which covers the government's plan for the country's infrastructure development for the period from 2011 to 2015, it has been highlighted that PPP will be extensively intensified with 52 large scale projects to be delivered via PPP. Although the government's present focus for PPP in Malaysia is on infrastructure projects, in the future, more PPP projects will be launched in other sectors, including education, telecommunications and renewable energy. Moreover, there are other proposals being negotiated between financial institutions and the private sector to embark on PPP projects in other countries, particularly other developing countries. Due to the importance of PPP for the economic development of the country, PPP is labelled as 'Malaysia's Third Way' of procurement.

Nigeria

There is a wide gap between demand and supply of both economic and social infrastructure. With an increasing population and an ambitious national vision, but with limited resources, the Nigerian governments at both Federal and state level are opting for PPP as an alternative procurement approach. Overall, the public and private sector investors in Nigeria support PPPs. Users and civil

society organisations do not question the desirability of projects executed with PPP but rather express concern over perceived official corruption, lack of transparency and inadequate consultation. The experience with PPP in Nigeria has been mixed: some projects have succeeded while some have failed. Despite this chequered track-record, there is growing demand for PPP projects which are seen as creating opportunities for new skills development and professionals at both national and state levels.

Portugal

PPPs have been used intensively in Portugal mainly for highway construction and in the health sector (Sarmiento and Renneboog, 2016). This has enabled the country to close the infrastructure gap and avoid the budget constraints at the point of investment. Doubts about whether PPPs represent value-for-money have emerged. Sarmiento and Renneboog (2016), also present factors militating against the success of PPP in Portugal: (i) there was very high concentration of PPP projects over a limited time span and the public sector was not prepared for this, nor had the ability to manage and control the contracts, (ii) the motive to resort to PPPs was mainly to avoid budget constraints, but not to use public resources better by taking advantage of private sector efficiency, (iii) the risk allocation between the private and public sector was flawed because the private sector bore too little risk and payments from the public to the private sector were considerably above the investment cost. Consequently, the current and future annual payments from the state to the private sector are considered a great burden to the government and users of the facilities in the current times of austerity and budget consolidation. This has in some situations led to PPP renegotiations in order to reduce public payments.

Switzerland

Switzerland has 17 PPP projects in a broader sense. They involve either buildings or service projects. One project qualifies as a PPP project in a narrow sense including a life-cycle approach to design, construction, operation, maintenance, and financing. This project covers an administrative centre and a regional prison in the canton Berne. Operation started successfully in 2012. No PPP project of any kind has been implemented in the Swiss transportation sector so far. All Swiss PPP projects were initialized without an explicit Swiss PPP legislation. Adequacy tests and Public Sector Comparators are tools that are used to analyse the potential of PPP procurement when an infrastructure project is planned. At the moment, no PPP project development is in the pipeline. In the near future, it is expected that public-private co-operation will continue in general, but PPP projects in particular will remain isolated cases.

Taiwan

The country has successfully used public-private partnerships to complete infrastructure projects. The use of PPP as 'outside-the-box' budget strategy was the main reason why the Taiwanese government adopted the PPP framework. Official data show that private capital is urgently needed to fill gaps in the public construction budget. However, because the market for project financing is still developing in Taiwan, financial institutions are reluctant to provide loans for Special Purpose Vehicles unless they are well secured by the mother companies or by collateral. In Taiwan, formal institutional frameworks are classified as "contractual" and "legal". The Taiwan Ministry of Finance provides model contracts for each PPP type. In addition, the Taiwan government has improved the domestic environment for PPPs by promulgating the Act for Promotion of Private Participation in Infrastructure Projects in February, 2000. An analysis has shown that central and local governments often use PPP to finance infrastructure projects.

Thailand

Public private partnerships have been employed since the 1980s. The primary impetus for PPP implementation in the 1980s, during when the country's GDP grew dramatically, was that the investment needed for economic infrastructure dwarfed the country's fiscal budget. This fiscal imbalance provided the private sector with opportunities to invest in the country's infrastructure, especially in transportation projects, particularly in Bangkok to alleviate traffic congestion in this metropolitan. PPPs in Thailand have evolved from the first generation (no PPP law until 1992), to the second generation (governed by the PPSU Act 1992), and on to the present third generation during which the Private Participation in State Undertakings (PPSU) Act 1992 has been reformed into the Private Participation in State Undertakings (PISU) Act 2013. Currently, the sectors actively engaging in PPPs are energy, telecom, and transport. To address the issues of PPP policy continuity and transparent implementation, the government's Central PPP Unit is now preparing its PPP Master Plan with a pipeline of strategic PPP projects that the government is committed to procure in the future.

Turkey

Despite an increase in expenditure, Turkey's infrastructure assets still lag behind other OECD and EU countries. Being a developing country, Turkey has a huge infrastructure investments pipeline. However, as in other developing countries, the fiscal budget remains an important constraint. Turkey's economic dynamics and investment policies have evolved significantly. Especially after the 1980s an increasing need for infrastructure and a lack of sufficient financial resources, led to the implantation of PPP as an alternative method in parallel with privatization initiatives. Turkey created a legal framework for PPP applications at the beginning of the 1980s in order to provide an enabling environment for engaging the private sector in better ways. In addition, the 10th Development Plan announced by the Turkish government includes a roadmap for the PPP applications in the country.

United Kingdom

During the past two decades the UK has played a leading position in the development and application of Public Private Partnership (PPP) based infrastructure procurement through its Private Finance Initiative model. The banking and economic crisis of 2007-09 has created major challenges to the use of PPP in the UK, making the sustainability of past levels of PPP investment and the future direction of PPP based infrastructure procurement uncertain. The book chapter from which this extract was obtained, summarises key developments in UK PPP up to the crisis; reviews the economic issues that have led up to the crisis; discusses the immediate impact of the crisis on the UK PFI and PPP market together with the transition arrangements that were put into place by the successive governments leading to the development of Private Finance 2 (PF2) by the current government. One of the main points of this chapter is that the UK PPP landscape has been characterised by two contradictory developments. On the one hand, the general approaches within which PPPs/PFIs could be implemented have evolved and become more differentiated; allowing a greater number of public sector clients to utilise these procurement mechanisms. On the other hand, the contractual framework of UK PPP/PFI and its regulatory setting have remained largely unaltered. There are some indications that the most recent modification of UK PFI, as envisaged by the PF2 programme, represents an attempt to address the more fundamental contractual shortcomings of UK PPP, by stipulating public sector equity provision and reducing the length of service contracts.

United State of America

PPP adoption in the USA has been affected by a series of rapid accelerations and subsequent withdrawals. To date, 33 states and 1 territory have authorised PPPs, but only 29 of the states have

actually experienced PPP on at least a project. However, recent trends suggest PPP growth is sustainable for a number of reasons, including a series of structural changes in project delivery options. The continued deterioration of the highways infrastructure provides for PPP to play a greater role to provide a speedy way to meet the needed capital improvements and maintenance projects. The dwindling of federal and State funds due to declining fuel taxes is another pressing factor that will also allow for more PPPs. More importantly, the increased reliance on the federal credit assistance programs and tools (e.g. The Transportation Infrastructure Finance and Innovation Act (TIFIA) program. Private Activity Bonds (PABs)) will provide for more PPPs since financing can be obtained at favourable terms. This factor by itself would provide for PPPs to be streamlined at the State level and would encourage more states and localities to authorize and use PPPs. Whereas the latest US budget identifies a tax-based approach to refill the National Highway Trust Fund, it also forecast a significant reduction of non-defence discretionary spending, which includes critical investments in infrastructure. This dramatic reduction of federal discretionary funds is expected to act as a powerful driver toward PPPs.

5. Future scenarios

The future of PPPs is shaped by the individual country's infrastructural needs. For example, in Canada, (Siemiatycki, 2016) over the past decade, the policy emphasis has focused on developing, expanding and rehabilitating hospitals, justice facilities and highways, hence these sectors have seen the most PPP activity. More recently, public transit such as subways, light rail lines, rapid bus systems and commuter railways have been identified as a key growth area for PPP activity, amidst an emerging recognition that road congestion is having a negative impact on the economy, environment and liveability of Canadian urban regions. Municipal infrastructure such as waste and water treatment plants, social housing, recreation and cultural facilities are other areas where there is an expanding interest in PPPs. Cash strapped local governments have increasingly sought to access private sector capital to finance their infrastructure needs.

PPP over the next 5, 10, 20 years will see increasing use in provision of needed infrastructure development particularly in the developing countries.

In respect of future scenarios and development, the following will need to be addressed (Brown *et al*, 2013):

- ▣ It is important to identify projects suitable for structuring, financing and sustaining PPPs (in order to deliver superior value)
- ▣ Competence is considered a highly relevant issue in PPP, with both public and private players appearing to struggle with the management of the entire PPP processes. In particular, PPP leadership competence is seen as a concern to PPP performance
- ▣ Public perception makes PPP a political-ideological debate; it is therefore unclear as to the extent the general public are (or should be) involved throughout the PPP process

□ Is there life after PPP? or indeed, is there any way out of PPP? Or is this a ride we can't get off? It may be perceived as “too difficult” to get off, but there is a need to redefine and renegotiate PPPs in the context of future change

□ Minimising risk and cost in cost in PPP – we must consider Corporate Social Responsibility

□ Does shared payment and ownership of projects enhance collaboration and value? What about the relationship between value and competition?

□ PPP in education seems to be only superficially covered – there is a need for construction to focus on the holistic perspective rather than simply process and construction management

□ How can BIM and PPP help each other?

□ Risk, risk thinking and risk management - how does this relate to flexibility?

□ There is an issue of technological change - PPPs lock us into long contracts and within a fixed context. Something which looks great today might not be in the long run.

“Towards New Innovative Collaborations” has also presented a reflection on the current thinking and perspectives of PPP (Brown *et al*, 2013). This was supported by additional commentary from an Industry Day workshop which used four themes to provide clarity on future priorities. From this, four areas were identified for future R&D, these being the need to:

- develop high level skills and specific expertise to make informed decisions supported by best practice evidence
- initiate a Building Down Barriers style approach to eliminate barriers, maximise integration and improve transparency
- instigate purpose-driven R&D on decision-making models that focus specifically on the delivery of value through innovation
- maximise openness and collaboration through best practice knowledge repositories and social media conduits.

Another set of views was consolidated as follows, based on specifically invited inputs at the initial stages of developing this PPP Research Roadmap, as solicited at the CIB TG72 meeting on 07 May 2014 at the CIB International Conference on ‘Construction in a Changing World’ in Kandalama, Sri Lanka. Inputs were invited on specific sub-themes to feed into the PPP Research Roadmap development – on current challenges, potential future scenarios and possible ways forward. The following summarise questions/ points raised and discussed:

- Should we **simplify** the contractual relationships and arrangements in PPPs?
Pros & Cons were discussed, including current complexities and risks of over-simplification (such as abuse).

- Lack of empirical **evidence** on how PPPs generated/ drove **innovations** (despite that being an important expected benefit). Do contractual complexities and lack of incentives ‘drive away’ innovations?
- Need to think broader – e.g. not ruling out innovative modalities of potentially beneficial partnerships between public and private sectors e.g. even in longer term and wider partnerships that may cover a project portfolio
- Risks of abuse of PPPs in some jurisdictions e.g. where attempts may be made to limit the number and type of bidders and misuse complex procedures to facilitate corrupt practices.
- High (but often under-estimated) impact of political factors on PPPs, e.g. impacting on the expected demand for a planned service (e.g. such planned ‘demand’ can be reduced by a parallel piece of infrastructure that is unexpectedly introduced), so remedies / compensation should be included in contracts where possible.
- Public sector involvement, sometimes increases to the level of interference, that could make it unprofitable for the private sector to deliver the expected value for money.
- Affordability of services and perceptions of PPP by the end-users and wider public needs more attention.
- Need to capture more ‘best practices’. The (*new*) International Court (*then*) being built in the Hague was cited as a good example.
- CSFs of such best practices include the exchange of expertise during delivery.
- Need to compare several PPP projects against traditionally procured projects, rather than simple independent case studies.
- Need to look beyond construction risks in PPP projects as the construction risks themselves have not been a major issue in most PPPs.
- Need to mobilise institutional investors since contractors are likely to pull out of SPVs in 4-5 years because of high WAC (weighted average cost of capital), hence leaving room for institutional investors to step in.

6. Development Strategy

Despite the generally strong contemporary political and institutional support for PPP at all levels of governments in many countries, PPP remains a contentious model of project delivery, with its future not entirely assured due to mixed experiences, some arising from inappropriate project choices or operational decisions, as well as due to inadequate capacities and poor practices.

There are this many barriers to the development of PPP. For example, Zou and Yang (2016) have identified barriers of Australian PPPs which is also resonate with those in many countries where PPP is in use.

The barriers listed are as follows:

- Australian PPP procurement processes are complex; some of this complexity is necessary to deliver the outcomes that Governments desire from PPP projects. Some relates to the Australian federal political system and to the tax regime. Consequently, PPP projects require significant upfront investment by new domestic entrants in recruiting staff with the requisite skills and knowledge.
- The global financial crisis impacted on the availability, cost, tenor and appetite for providing private finance to PPPs. In Australia, the post-global financial crisis environment resulted in tighter debt terms, reduced tenors of lending, prevalence of club arrangements for banks providing finance, and changes in the financial market risk allocation.
- PPP projects in some states have not typically included core services. They have focused on ancillary services which support operating the infrastructure. Compared with some international jurisdictions, the number of PPP projects undertaken in any year and the announced pipeline of future PPP projects in Australia is limited. The transparency of the pipeline has improved for infrastructure generally with the creation of Infrastructure Australia and its publication in May 2009 of the National Infrastructure Priorities. However, this document contains little information about which projects might become PPPs, and focuses only on those projects that are important nationally. The States procure most PPP projects, and they have additional, largely local priorities not addressed by Infrastructure Australia.
- The Request for Proposals (RFP) and any subsequent stage of PPP procurement processes require fully costed solutions supported by detailed information on design, construction, maintenance and financing. As a result, the level and/or amount of information required from bidders are significant and can easily become excessive if Governments request unnecessary information.
- Value for money in Australian PPP projects is assessed in two key ways: the Public Sector Comparator (PSC), and a range of qualitative factors. The PSC is an important tool to ensure that government is an informed buyer and has the knowledge to drive competitive outcomes during the tender process. However, there are limitations and the PSC has attracted significant criticism at times. In particular, it has been criticised for being a point in time estimate that is not adjusted for material changes to the underlying assumptions which may occur during the tender process.
- PPPs are complex projects and attract significant bid costs. Government recognises the importance of continually improving the bid process for PPP projects to minimise these costs. There is always a balance between minimising the process costs for tenderers and maintaining sufficient information requirements and competitive pressures to ensure a value for money outcome for government.
- The PPP model is complex and expensive to tender relative to other procurement methods. As such it is currently applied to projects of sufficient capital scale, generally over \$100 million.

From a broader global perspective, the most recent panorama of country-specific PPP backgrounds and priorities, strengths, weaknesses, threats and opportunities, is provided in the structured comparison of 21 countries/ jurisdictions in the above Section 4 on 'State of the Art' and in more detail in Akintoye et al. (2016). Apart from the above, one could also map the trends and discern interesting patterns by referring back to previous comparative panoramas, such as in: Ng et al. (2009) and Akintoye et al. (2013), both being Proceedings of CIB TG72 conferences.

7. Research Contribution

Doubts abound about the long-term performance of PPP are still abundant: it is often alleged to be a complex phenomenon and a risky business, hence PPP projects attract controversy and debate. Governments are taking steps to improve transparency by developing an ex-ante evaluation tool for PPP. Despite these efforts, transparency and accountability issues are not solved yet. Another problem is the fragmentation of PPP knowledge across public authorities. Although an important amount of knowledge and expertise has been obtained over the years through research, practice and innovation, more work is needed to address the barriers in PPP development. For example, there could be a reluctance of some key public officials to venture outside traditional procurement protocols, hence outside their comfort zones, being apprehensive of more perceived uncertainties, potential risks and workloads. Deeper research and development (R&D) could also lead to guidelines for: mapping an equitable and realistic balance of risks between public and private sector partners as well as a reasonable risk-reward scenario for the private player, along with adequate safeguards to avoid abuse of PPP relationships to secure unfair advantages.

There are ongoing research and development activities to overcome barriers that are associated with PPP developments.

For example in Europe, the following research list includes ongoing and recently completed projects supported by the EU funding:

COST Action TU1001 Public Private Partnerships in Transport: Trends & Theory: This is a European Cooperation in the Field of Science and Technology (COST) research action funding to develop cooperation and networking of European research activities in Public Private Partnership in Transport. The research action brings together researchers in Public Private Partnership from 18 European Universities and three other countries/ jurisdictions including the University of Hong Kong.

Business Models for Enhancing Funding and Enabling Financing for Infrastructure in Transport (BENEFIT): The project is funded from the European Union's Horizon2020 research and innovation programme. The project involved 14 European Universities. BENEFIT allows for a comprehensive analysis of alternative funding schemes (public, PPP and other) based on existing experiences in different transport sectors and geographical areas and their assessment with respect to economic development, value for public money, user benefits, life-cycle investment, efficiency, governance and procurement modalities, etc. providing lessons learned, identification of the limitations of the various schemes and the impact of the economic and financial crisis.

In Australia, some of the research outputs generated by Zou and Yang (2016) to resolve some of the barriers in PPP project development include:

- i. Education of new entrants in respect of Australian PPP procurement processes is necessary. For example, enhancing debriefing sessions so that bidders can obtain a better understanding of how they can improve their responses in future.
- ii. The need for the government to develop modified financing structures to adopt the challenging market conditions. A modified finance structure needs to use the benefits of private finance

- efficiency and risk transfer in PPPs, and also use the State's balance sheet to reduce the overall cost of finance.
- iii. There is an opportunity for government to consider extending the package of services, including both core and ancillary services on a case by case basis for all future PPPs. Increasing the scope of services included in future PPPs provides an opportunity for government to harness greater whole of life savings, consistent with their desire to improve operational efficiencies. When applied appropriately, greater private sector involvement in service delivery can also provide a catalyst for system wide reform and improving performance.
 - iv. The need to develop a communications strategy that demonstrates the benefits achieved from PPP projects and addresses general misconceptions about the PPP model is emphasised.
 - v. The Expression of Interest process needs to be reviewed to ensure clear communication of objectives to the market and a focus on the ultimate selection of a short-list of bidders that is most likely to deliver the best overall solution for the project. In particular, information requirements should closely match the evaluation criteria.
 - vi. Government needs to continue to refine the PPP bidding process by rationalising information submission requirements, shortlisting only two bidders where appropriate and avoiding extended 'best and final offer' processes where possible.

Another stream of research emanating from Hong Kong focused on the important contribution of enhanced and sustainable public-private participant relationships and teambuilding to the success of PPPs. (e.g.: Kumaraswamy et al. 2008; Zou et al., 2014). Relationship management is clearly a 'no-brainer' imperative in PPPs that are necessarily longer term and involve more players and uncertainties than most non-PPP projects.

There seems to be a need to develop a suite of streamlined models of PPP to suit different broad scenario types, including one for example, that will apply to smaller scale procurement, using the key commercial principles of a PPP to drive efficiencies while tailoring the procurement process for smaller scale projects. The development of such set of streamlined core PPP options will be based on the key commercial principles of a PPP, but should simplify the PPP procurement model, in particular segments/ domains where useful to match the priorities and contexts of different settings. Another scenario could be where there is much greater interaction with end-users, say in a service setting such as medical, educational, cultural or entertainment. The core PPP procurement model in this case could provide for early inputs and 'buy-in' from stakeholders, also improving relationships and thereby resilience, to adjust to changing technologies, trends and needs, e.g. Kumaraswamy et al. (2015).

8. Research Agenda

The research in PPP is continually emerging and has been switched from a pure construction perspective to a combination of topics from finance, law, public administration, construction and management. Current research topics include: (a) selection of financing models; (b) optimization of financial structure; (c) risk allocation and management; (d) regulatory and institutional frameworks; (e) behaviours of both sectors; (f) determination of concession period; (g) contract structure and key clauses; (h) evaluation of private partners; (i) performance indicators; and (j) price mechanisms.

Although, both developed and developing countries have moved towards an increased reliance on Public Private Partnerships (PPPs) for infrastructure development, there remains a difference in the level of maturity of PPP practices in these countries, also depending on the level of overall development. Therefore, the associated research needs would also be different.

Following the aforementioned development strategy for PPP, a research and development agenda is needed on a number of topics as categorised under the following themes.

Theme 1: Financing, and financial models and structure

- Finance and funding requires attention by investigating the most appropriate funding mechanisms for different PPP projects and developing a methodology for determining an appropriate discount rate to be used in assessing Public Sector Comparator.
- Assessing the feasibility of including a wider range of capital investment sources into PPP projects, including investment from the insurance industry, and the feasibility of securitizing real estate and financial assets of PPP cases, to activate funding for new PPP cases.
- New forms of PPP funding are emerging. For example, in Canada, many large Canadian PPPs receive substantial upfront public investment which can account for up to two thirds of the project capital costs as well as operating subsidies, whilst in Thailand quasi-equity instrument known as infrastructure fund as a new form of procurement has been introduced. In UK PF2 is introduced in which the Government now seeks to become a minority investor; this is intended to be managed by a new unit separate from the procuring authority to ensure better alignment of objectives and greater transparency. To what extent does the new funding arrangements for PPP projects impact on value for money, risk management, public expenditure off-balance sheet arrangement, pricing mechanisms, affordability, accountability, etc.?
- Issues for future research should also include: 1) the value balance in economics and finance from the end users point of view; 2) lifecycle analysis of the project and the second hand market including valuations (a) if the PPP is terminated or (b) refinancing options are sought offered midstream

Theme 2: Risk allocation and management

- Detailed examinations of the value for money proposition of PPPs are required in relation comparisons of actual risk events on PPPs and traditional build projects, and whether the PPP procurement model drives design innovations.
- Whilst there has been some research on risk ranking, the risk mitigation measures for PPP have yet to be fully explored in terms of the additional cost which the public sector (including users) has to pay for those measures to be put in place.
- Risk management in PPP has received attention in research. This needs to be expanded by developing new, and enhance current, theories for efficient risk allocation and develop mechanisms for applying such theories in practice; analyse risks associated with various projects, investigate past projects to statistically establish the likelihood of certain events occurring, and establish appropriate strategies to mitigate them; examine the relationship between the use of non-recourse finance and the skewed risk profile to which lenders are exposed; and develop quantitative risk evaluation techniques.

Theme 3: Transparency and Accountability including Regulatory and Institutional frameworks

- The democratic accountability of PPP requires further scrutiny. The world of PPP provides an example of this tendency: large and complicated public projects, growing responsibility and involvement of private firms, much needed technical expertise and experience, and the justification of infrastructure projects set the stage for debate. By investigating the role played by consultants and legal advisors in PPP, the de-politicisation can be underpinned with empirical data.
- There are a number of situations where the construction of new PPP infrastructure is not really necessary, but where future maintenance of the currently existing infrastructure must be carried out. Separate decisions are needed on what to do with each infrastructure asset, be it renovating and continuing use, scrapping and renewing, discontinuing and eliminating, or substituting with some other infrastructure, etc. Development guidelines to assist in such decisions therefore constitute a very important PPP research and development theme.
- Robust mechanisms with checks, balances and accountability at the highest levels are needed to avoid abuse of the necessarily closer inter-organizational and inter-personal operational arrangements and relationships. Being partners does not mean ‘cutting corners’ or ‘turning blind eyes’ to unethical strategies, bad practices or worse e.g. colluding for organizational or personal benefits. The need for transparency, including in all selection processes is critical to reduce disadvantages from asymmetric information availability as well as any potential abuse of process by any party. It is arguably less difficult to camouflage unfair or unethical practices in PPPs given the many more variables and unknowns over the long term, compared to non-PPP scenarios, hence the imperative for transparency, full disclosure and good governance throughout.

Theme 4: Public Policy and Private/Public Sector relationships and behaviours

- The involvement of people in the design of projects and partnerships is crucial in urban renewal; unlike in case of large infrastructure projects such as roads, airports, power where the people have a limited role in the governance of the projects and their outcomes. Best practices and model documents for PPP must be deployed for an urban management agenda to succeed.
- Relationships between the partnering public and private sector organisations, as well as the principal players in each, are critical to PPP success. Given the many unknowns and potential changes in these long terms contracts, good formal and informal relationships can help cope with deviations from expectations and contingencies. Indeed ‘relational contracting’ approaches or good relationship management at the very least, could boost chances of success. Securing and sustaining stakeholder commitment is also important, given the multiple stakeholders in PPPs and the public services that would usually be the main outcome. Excellent teambuilding and smooth team working are more important than in non-PPP scenarios for the same reasons.
- The use of PPPs further increases the complexity of infrastructure provision, owing to diverse dimensions like project finance, long term infrastructure planning, relational governance with private sector, technological complexity, stakeholder needs, and changes in the role of public administration. Often, each dimension is researched in-depth, with little recognition of overlaps between different dimensions. Therefore, there is an urgent need to research these dimensions

from multidisciplinary perspectives, which will require interests and participation of researchers having expertise not only in one dimension but also a motivation to expand horizons with multidisciplinary research.

- PPP markets in many developing countries are predominantly dominated by small numbers of foreign players' participation concentrated in telecom, ports and airports sector. On the public sector side, the usage of PPPs is more prominent in a few Central Government ministries and state governments. This indicates that need for research on fronts like entry strategies for foreign players in a PPP market, capacity building in public sector entities for involvement in PPP projects, bottlenecks faced by PPP models in laggard infrastructure sectors, and internationalization of resources in a global PPP market.
- In terms of public policy, it is necessary to develop a mechanism to match an organization's risk profile and propensity to the structure of the project delivery systems; examine the influence of the policy framework on the success of potential PPP projects; and establish protocols to appropriately engage stakeholder communities when considering PPP projects.
- Another possible research agenda is to investigate the extent to which part ownership of PPP projects (by users and other stakeholders) can contribute to its success during construction and operation. How can integrating users promote the success of the project in an environment of agitation, volatility, militancy and resistance to government or public projects? How to resolve affordability questions on PPP projects that do not get long-term funding, demands investigation. There are already complaints that some mortgage-linked or public utility type PPP schemes are too costly in relation to low income levels of some strata of society.
- At an international level, there may be a need to investigate the relationship between predictability of governments (stable and functional institutions, or otherwise) and investment in PPP. Since many PPP projects take time from planning to operation and thus cut across generations, where the initiators in the public and private sector may not be available during operation, there is need to investigate strategies and structures that are needed to capture and transfer the historical basis, experience and knowledge acquired on a project, with a view to ensuring its sustainability..

Theme 5: PPP Project Evaluation

- Due to the complexity of the contractual structure of PPP projects, the issue of transparency at the various stages of the PPP process, including the evaluation of PPP proposals, list of shortlisted bidders, performance of PPP projects at the construction and operation stages, is crucial and needs attention from researchers as well as the implementation authorities.
- Similarly, accountability issue in relation to PPP need to be given due attention by researchers.
- There are issues related to the governance and politics of PPPs, and whether appropriate evaluation mechanisms and incentives are in place to ensure that PPPs are only used when they deliver demonstrable value for money.
- The process management of PPP needs to develop further to incorporate transparent evaluation techniques for PPP tenders and new methods to assess the value for money in PPP projects.
- It is equally important to embark on applied research to develop appropriate evaluation mechanisms for PPP at various procurement stages including PPP feasibility studies, proposals evaluation framework, and a mechanism to evaluate PPP during the construction period and operation stage; and even at potential termination, buy-back or refinancing stages.

Theme 6: Contractual structure

- Although the practical relevance of standards in PPP has increased, academic contributions have been rare. The success of standards in PPP is likely to depend on the volume, size, and specificity of PPP deals, hence the simplification of PPP through standardization is not as straightforward as one might expect. For instance, both public and private project partners need time and repeated experience with standard contracts to become familiar with certain practices, making learning a crucial part of the deal. There is a need to further examine the use and impact of standard contracts (and the change therein over time) so as to find out what the actual contribution of standardization to PPP
- There is a need to develop a suite of standard forms of PPP contracts that include a certain degree of flexibility and techniques to assist ongoing contract management of 'simple' and complex PPP agreements. This could also benefit from relevant elements of 'relational contracting' approaches and 'integrated project delivery' / contractual partnering/ 'alliancing' type 'collaborative contracting' procurement protocols that give 'teeth' to relationship management, by formalising some cooperation modalities along with suitable safeguards and transparency.
- Dispute resolution mechanisms are also a common component of PPP concession contracts, as there is recognition that disputes between the partners in a PPP are quite common and can be costly to resolve. PPP contracts commonly contain provisions for negotiation and mediation as a first mechanism to settle disputes between the public sector sponsor and the private sector concessionaire, with more lengthy and expensive legal remedies as a final alternative. In spite of this, there are scenarios requiring renegotiation or termination of PPP contracts due to changing conditions or default of the concession consortium. The effectiveness of dispute resolution mechanisms in PPP project environment requires immediately attention.

Theme 7: PPP Performance Indicators

- The research and development (R&D) scope should be broadened to PPP stages other than preparation and procurement given that the number of PPP projects that has entered the operational stage is increasing.
- As more projects pass through the planning and construction phase and into operations, there is an interest in studying the performance of infrastructure PPPs over the entire lifecycle of the asset. In particular, it is useful to investigate how the terms specified in the concession agreement relating to operational efficiencies, facility maintenance levels, and asset quality at the point of hand back, are actually being met in practice.
- Furthermore, post award governance issues like performance monitoring, tariff changes and regulation have become critical areas. Improvement in these areas necessitates a substantial amount of cooperation with the international research community, for sharing of experiences on how these issues are addressed in various countries.
- In respect of infrastructure development, there is a need to explore mechanisms to facilitate innovation in design, service delivery and operation and maintenance; develop structured measures to quantify the life expectancy and value of both existing and new infrastructure assets; develop specific linkages between technical design and long-term project success.

- Appropriate PPP evaluation mechanisms along with appropriate performance criteria and quantifiable indicators are needed to assess the performance PPP projects that are currently at the construction and operating stages.

9. Conclusions

To-date, the use of PPP has been instrumental in building much needed infrastructure in a shorter span of time than would have been possible with public funding alone. In parallel with the maturation of this procurement approach, improved governance of these projects needs to be carefully reflected upon by governments. On the one hand, sufficient incentives need to be given to attract private investment. On the other hand, a situation where windfall profits are transferred to the private sector must be avoided.

Value-for-money should be ensured, both in terms of financial and quality considerations and over the long term. Indeed changes will be inevitable due to economic, social and technological developments over the PPP life-span. Therefore, it is imperative that the international research community comes up with far better ways for managing those changes. Finally, in expectation of the return of any associated assets and facilities to governments at the expiry of PPP concession periods, an improved approach for specifying the desirable states and conditions of such assets, needs to be developed in order that life-cycle sustainability is ensured.

Although PPP is becoming more widely used in public infrastructure, there remain some inefficiencies that arise in practice because of administrative risk, procedural complexity that distorts competition, and inefficient allocation of risks between the public and the private sectors. In order to address and resolve these shortcomings, interventions are required. Suggestions for improved competence and capacities of the public sector in relation to PPP have been identified to include improving the know-how and basic skills of public administrators deployed to develop and manage PPP projects; adopting adequate tools to assess the feasibility, affordability and sustainability of projects; developing standard contractual templates; designing appropriate procurement procedures to select the best-value partners; safeguards against unethical practices including collusion; and adopting adequate risk management practices to efficiently allocate and mitigate risks. As regards financial issues, interventions that can contribute to the successful implementation of PPP suggestions are offered including encouraging the development of alternative project financing schemes, such as bonds; providing security instruments to facilitate access to credit, thus enabling the success of financial closure for strategic infrastructure; increasing the involvement of public banks in order to obtain low-interest loans; and introducing smart forms of bank lending support.

Moreover, there is an ongoing need in both public and private sectors in many countries, particularly developing countries for capacity building in many areas of PPP including project prioritisation and planning, preparing bankable proposals, using appropriate financial models, understanding how their portion of the project fits into the overall national development framework, appraising projects on sound value for money basis, and administering projects fairly while demonstrating political goodwill in implementing globally acceptable sound laws and consistent policies. The countries aspiring to attract more PPP must also develop skills to communicate clearly and systems to ensure adequate disclosure and transparency. Many countries have therefore set up Central PPP Units that are charged with

developing relevant capacities. Their tasks thus include organising specialised courses for training on PPP, managing projects through their many phases and the whole lifecycle appraisal of projects. These are steps in the right direction and require teams of suitably positioned and well-equipped ‘champions’ at different levels in public and private sectors, as well as from academia, to move them forward along desirable PPP pathways. Well-informed academia focusing on this domain, can help guide this journey by providing independent unbiased inputs, also drawing on objective data collection and analyses, that can help achieve the right balance among all stakeholders including end-users of PPP services.

10. References

- Akintoye A, Liyanage C, and Goulding J (2013), Public Private Partnership (Edt), Proceedings of PPP International Conference, 18-20 March 2013, Body of Knowledge, University of Central Lancashire.
- Akintoye A, Beck M, and Kumaraswamy, M (2016) Public Private Partnership: A Global Review (Edt) Routledge, London, ISBN 978-04-415-72896-6
- Brown M, Akintoye A and Goulding J (2013) Public Private Partnership: Towards New Innovative Collaboration. University of Central Lancashire, UK, ISBN 978-1-901922-93-6
- Kokkaew, N (2016) PPP Development in Thailand. In Public Private Partnership: A Global Review by Akintoye A, Beck M, and Kumaraswamy, M (Edt) Routledge, London, ISBN 978-04-415-72896-6
- Carbonara, N, Costantino N and Pellegrino R (2016) Public Private Partnership in Italy: State of art, Trends and Proposals. In Public Private Partnership: A Global Review by Akintoye A, Beck M, and Kumaraswamy, M (Edt) Routledge, London, ISBN 978-04-415-72896-6.
- Kumaraswamy, M.M., Ling, F.Y.Y. and Anvuur, A.M. (2008) ‘Team-building for PPPs’, in the book: Public Private Partnership: Policy, Management and Finance, Editors: A. Akintoye and M. Beck, Blackwells, ISBN: 9781405177917, Sep. 2008, pp. 145-162.
- Kumaraswamy, M.M., Zou, W.W. and Zhang, J.Q. (2015) Reinforcing Relationships for Resilience – by embedding End-user People’ in Public Private Partnerships, Special Issue on “Resilience” of the Journal of ‘Civil Engineering and Environmental Systems’, Guest Editor: Dr Mark Milke, Vol. 32, No.1-2, pp. 119-129.
- Ng, S.T, Wong, J.M.W. and Kumaraswamy, M (2009) ‘Revamping PPPs’ Symposium proceedings (Edt), 28 Feb. 2009, CIB, UCLAN & CICID, HKU, ISBN 978-962-8014-16-3, CICID, HKU (The University of Hong Kong) and CIB.
- Reis, R. F. and Sarmiento, J. M. (2013). A ascensão e queda das PPP em Portugal, Parcerias Público Privadas: Experiências, desafios e propostas: 145-157. Rio de Janeiro: LTC.
- Sarmiento J M and Renneboog L (2016) Portugal Experience with Public-Private Partnerships. In Public Private Partnership: A Global Review by Akintoye A, Beck M, and Kumaraswamy, M (Edt) Routledge, London, ISBN 978-04-415-72896-6
- Siemiatycki M (2016) Public Private Partnerships in Canada. In Public Private Partnership: A Global Review by Akintoye A, Beck M, and Kumaraswamy, M (Edt) Routledge, London, ISBN 978-04-415-72896-6
- World Bank (2005) Private participation in infrastructure database.
<http://ppi.worldbank.org/reports/customQueryAggregate.asp> [accessed August, 2005]

Zou, W.W., Kumaraswamy, M.M., Chung, J.K.H. and Wong, J.M.W. (2014) Identifying the Critical Success Factors for Relationship Management in PPP Projects, *International Journal of Project Management*, Vol. 32, No. 2, pp. 265-274.

Zou P X.W. and Yang R J (2016) PPP Applications in Australia Infrastructure Development. In *Public Private Partnership: A Global Review* by Akintoye A, Beck M, and Kumaraswamy, M (Edt) Routledge, London, ISBN 978-04-415-72896-6