Analysis of Factors Affecting Implementation of Public-Private-Partnerships Projects in Sudan: Khartoum Study

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ABSTRACT

Public-Private-Partnerships (PPP) projects are created to improve the mutual distribution of costs, risks and profits between the public and the private sectors for infrastructure projects through appropriately utilization their side strengths while at the same time addressing their shortcome. Thus in order to improve the infrastructure in Sudan there is an essential need to apply PPPs procurement system. This study is carried out to analyze the impact of twenty six factors for PPP projects to be adopted in Sudan. These factors have been collected from previous researches and they have been grouped into six dimensions: 1) legal 2) risk management 3) project efficiency 4) project performance 5) financial and 6) political and environmental. A survey is conducted using an online questionnaire and also by distributing printed copies. This survey is focused on public and private organizations located in Khartoum, Sudan.

The survey results show that there are three significant factors that have the most impact for implementing PPP projects in Sudan. These are establishing new opportunities for private sector, the qualification of contractor and consultant, and PPP supporting in accelerating projects development. A conceptual framework for implementation of PPP projects in Sudan is developed, which has seven stages to be followed for the PPP procurement system to be adopted in Sudan.

Keywords: Public Private Partnerships, Project delivery method, Project procurement system, Sudan.

ÖZ

Kamu-Özel-Ortaklık (KÖO) projeleri, altyapı projelerinin kamu ve özel sektör arasında güçlü yönlerini uygun bir şekilde kullanarak ve zayıf yönlerini de işaret ederek ortak olarak maliyetlerin, risklerin ve karların paylaşıldığı projelerdir. Bu nedenle Sudan'da altyapı projelerinin geliştirilmesinde KOÖ projeleri temin sisteminin uygulanması gerekmektedir. Bu çalışma KOÖ projelerinin Sudan uygulanması için yirmi altı faktörün etkisini analiz etmek için gerçekleştirilmiştir. Bu faktörler önceki araştırmalardan elde edilmiştir ve altı boyutta gruplanmıştır: 1) Yasala 2) Risk yönetimi 3) Project verimliliği 4) Project performansı 5) Mali and 6) Politik ve çevresel. Çevrimiçi ve basılmış kopyaların dağıtımı ile bir anket çalışması yapılmıştır. Bu araştırma Sudan-Khartoum'daki kamu ve özel sektör organizasyonlarına odaklanmıştır.

Araştırma sonuçları Sudan' daki KÖO projelerinin uygulanmasında üç önemli faktörün etkin olduğunu göstermektedir. Bunlar, özel sektör için yeni fırsatların oluşturulması, müteahhit ve danışmanların yetkinliği ve KÖO sisteminin projelerinin geliştirilmesinin hızlandırılması destekleyici olduğudur. Sudan'daki KÖO projelerinin uygulanması için bir kavramsal bir çerçeve geliştirilmiştir. Yedi aşamadan oluşan bu çerçevede Sudan'da KÖO temin sisteminin uygulanmasına çalışılmıştır.

Keywords: Kamu Özel Ortaklık, Proje teslim yöntemi, Proje temin sistemi, Sudan

I dedicate this thesis work to my Parents Mr. Salih Elhadi and Mrs. Elham Osman also to my Siblings Wafa , Wala , Fatima and Hafiz.

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Thank you all.

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LIST OF ABBREVIATIONS

A/E	Architect/Engineer
AEC	Architecture/Engineering/Construction
ALPHA	Coefficient Alpha Cronbach
BLT	Build-lease-transfer
BO	Build-operate
BOOT	Build-own-operate-transfer
BOO	Build-own-operate
BOT	Build-own-operate
BROT	Build-Rehabilitate-Operate-transfer
BTO	Build- Transfer-Operate
CSFs	Critical Successful Factors
CM	Construction manager
CMR	Construction management at Risk
DB	Design-build
DBB	Design-Bid-Build
DBF	Design-build-finance
DBFO	Design-build-finance-operate
DBM	Design-build-maintain
DBO	Design-build-operate
DBOM	Design-build-operate-maintain
GC	General Contractor
GDP	Gross Domestic Product
IPD	Integrated project delivery

KPI	Key performance indicators
PFI	Private Finance initiative
PPP	Public Private Partnerships
TOR	Transfer of rights

Chapter 1

INTRODUCTION

1.1 Background

Public sectors, often lack experience and technical knowhow in the issue of implementing Public-Private-Partnerships (PPP) efficiently. However, for effective management of PPP, there is a need for government officials to be guided on how to apply PPP in various sectors of the society, for them to fully be sure that optimum service is delivered to the citizen. This is so due to the fact that private sector in most instances is fully aware about PPP when engaging in such issues with governments (Savas, 2000).

The lack of insufficient knowledge about the Public-Private-Partnership tool in the public sector has been clarified around the world in key numerous international institutions around the globe such as World Bank, European Union and United Nations with the aim of proffer amicable solution for this challenges matter facing the government's efforts in provision of adequate services to its citizenry. Many governments have acquired training, education and advocacy services from international institutions. A partnership could be comprehend as a voluntary collaborative agreement between two or more parties, in this case, however, parties engage come to work together hand in hand in order to accomplish a common objective (Ikejiofor, 1998).

1.2 Concept of Public-Private-Partnerships

PPP are a type of contractual layouts between governmental or state (public) in one hand and private sector investors in another hand for common goals which are constructing, collaborative provision, symbiotic and financing of public projects and facilities. These agreements argue that the public sector is fully responsible for setting up infrastructure for projects. However, government faces challenges such as funding, technical experience, and inability to motivate institution to participate in such projects, hence this necessitate seeking for collaboration with the private sector to deliver such facilities (Link, 2006).

PPP are created to improve the mutual distribution of costs, risks and profits between the public and the private sectors for infrastructure project through appropriately utilization their side strengths while at the same time addressing their shortcome.

1.3 Problem Statement

Sudan is one of the third world countries or developing countries, having poor infrastructure according to the traditional project deliveries used, the lack of financial resources and the limitation usage of PPP agreements. Therefore a need of PPP delivery system has become inevitable in order to help the government to meet its service delivery to the people by accessing the technical and financial capital in areas that the government would not successfully undertake without affecting service delivery in other basic areas.

1.4 Research Questions and Objectives

The specific questions raise by conducting this research are:

1) What are the most important factors that affect the implementation of PPP projects in Sudan?
2) How do these factors contribute to PPP implementation in Sudan?
3) What is the suggested general framework for applicability of adopting PPP projects in Sudan?
4) What is the strategy for implementation PPP projects in Sudan?

The objective of this study is to analyze the factors affecting the implementation of PPP projects in Sudan, and to answer the above research questions.

1.5 Research methodology

The research includes an extensive literature study, conducting questionnaires survey and interviews with Engineers, architects, project managers and general managers of organizations in public and private sector on the factors affecting PPP implementation in Khartoum capital of Sudan, analysis of this information to develop findings, and extending these for supporting decisional process about the adoption of PPP projects.

The questionnaires have targeted 100 respondents, the collected data was analyzed by using Statistical Package of Social Sciences (SPSS) vision 21.

1.6 Research limitations

This study will examine only the local organizations in Khartoum capital of Sudan as the biggest organizations are located in Khartoum. Thus the data obtained from Khartoum can be fairly generalized for Sudan.

1.7 Research outline

This study has categorized into Six (6) chapters, first chapter begins with introduction to the topic, then chapter Two (2) literature review covers the concept of Public-Private-Partnerships, it looks into general concept of PPP , and factors affecting the adoption of PPP projectss in previous researches, chapter three (3) identifies the methodology which has been used for this research, chapter four (4) shows a breakdown of analysis information for the data collected from issued questionnaire survey, chapter five (5) represents a suggested conceptual framework for the implementing of PPP projects in Sudan as well stages to implement PPP projects in Sudan, and chapter six (6) contains the conclusion and recommendations of this study, it includes the most important factors have impact on adopting PPP projects in Sudan, recommendations for applying this kind of delivery method, and recommendations for further researches in this area.

Chapter 2

PUBLIC PRIVATE PARTNERSHIPS

2.1 Introduction

Throughout the last decade, the support provided by private sectors through Public Private Partnerships (PPP) have dramatically increased in many ways for obtaining public sector facilities and services. For instance in Public Services like (treatment of waste Water, supplying Water), Social services (housing, schools, prisons), public infrastructure (tunnels, railways, airports, roads), Governmental offices and Communication Networks (Yescombe, 2007). Previous studies shown that the importance of PPP academically and profession practice. PPP agreements have unique characteristics such as several Stakeholders, sophisticated processes, High risks, relatively long Duration (Yuan et al, 2012).

Comprehensive literatures have been studied on factors affecting the implementation of PPP agreements , these factors can be divided to many categorizes such as Factor affecting the PPP projects success, the PPP projects efficiency, in term of economic perspective, and shearing the risks among partners as well as factors attracting the PPP projects to be applied (Beyene, 2014). This chapter provides first of all the Definition of Construction Delivery Method, Types of Construction Delivery Methods, Then basic concept of PPP, Types of PPP projects, Implementation of PPP projects in the Global, lessons learn from previous failure PPP Projects around the global, General

Procurement System in Sudan, and General Factors affecting adoption of PPP projects around the world.

2.2 Construction Delivery Methods

"A project Delivery method defines the sequence of event, the timing of major project participants' official involvement in the project, contractual relationship and obligation among project parties, and specific mechanisms for overseeing time cost, and quality" (Dorsey 1997; AIA-AGC 2004).

According to Korkmar et al. (2010) Design-Bid-Build (DBB), Construction management at Risk (CMR) and Design-Build are the main types of project delivery system. Owners, Designers (Engineers &Architects) and Contractors are involved in the most of construction projects. The owner is responsible to decide when a specific project is needed. Changing on the contractual agreement among the parties may occur due to the nature and size of the project. In some situations two or all roles may be presented by one party. These roles must be specific, clarified and understood to identify the contractual relationships between the parties, thus it will deliver the project in the most effective way (Hinze, 1993).

2.3 Types of Construction Delivery Methods

There are advantages and drawbacks for each construction method and it is recommended that a particular method should be applied when its advantages are obvious. Here are some forms of delivery system:

I. Construction Management at Risk.
II. General Contract Method.
III. Design/Build Method.
IV. Design-bid-Build method.

V. Integrated Project Delivery.

2.3.1 Construction Management at Risk

In CMR the Owner separately signs two contracts one with Design Company and another with construction firm. Designs, Plans and Specifications are provided by the design company, while the construction work and construction management services are performed by the construction firm (Mollaoglu-Korkmaz, 2013).

During design process, construction manager has importance participation and mostly the construction manager intends to assume the risk of construction as guaranteed price for the project. Here the construction manager works as a general contractor. Nevertheless, effective management efforts by the owner leads to manpower reduction in the project, and reducing cost disputation among parties (Konchar & Sanvido.1998).

To be notice in this kind of contract profits and losses of the project are shared by construction manager (Shrestha et al, 2012).

2.3.1.1 Merit of Construction Management at Risk

- Knowing the cost since the begin
- Owner is conscious about the process
- Comparing to traditional Design-Bid-Build, CMR is relatively faster
- CMR enhances good bonds with the constructor.
- Before finishing the design stage, the constructor can start the construction work (Mahdi and Alreshaid, 2005).

2.3.1.2 Disadvantages of Construction Management at Risk

- The owner has two contractors to be managed.

- According to the contract; policies, rules, agenda, and objection are different among the parties.
- Design may not consider the participation provided by construction.
- Comparing to design/Build, CMR is slower.

2.3.2 General Contract Method

This kind of contract is hold between the Client and the Main (General) contractor. The Architectural Design firm is usually represented the Client in building projects, While on the engineering projects the representative for the Owner is often the Engineer (Hinze, 1993).

According to Glendale Community College Newsletter (2005), Owners are customized with this type and it is the most popular delivery method, Furthermore the tasks in this kind are running in a linear process, so there is no overlap between the tasks. Bids will be issued after plans and specifications are done by Architects and Designers. The lowest bidder gets the contract, but the second & third lowest bids can be accessible until the contract is officially signed. Figure 2.1 shows the ccontractual relationships in General Contract Method.

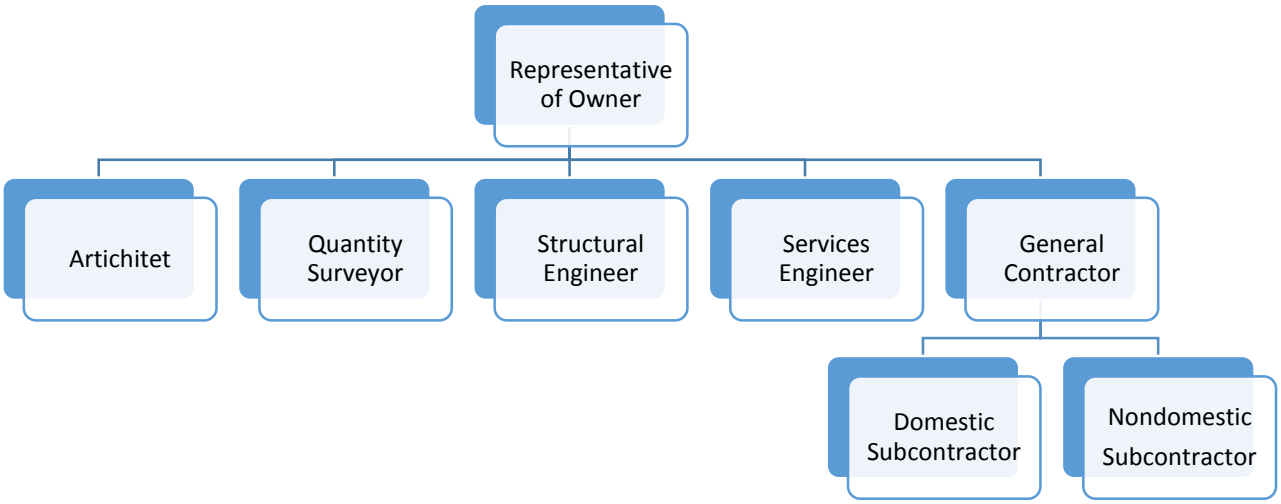

Figure 2.1: Contractual Relationships in General Contract Method Source (Murdoch and Hughes. 2007)

2.3.3 Design & Build Method

Through Design/Build contract the owner holds a contract with a single organization, according to this contract the design and construction work are performed by Design/Build Organization. The Design/Build Organization can complete the whole work, or sharing the work with subcontractors through a specific agreement. Design criteria must fallow owner requirements (Elwardani et al, 2006).

With urgent public services (infrastructure) needs and restricted budgets Design/Build Delivery system turns to be the first choice for contracting agencies. The single entity is responsible for design and construction work. This feature allows the designers and construction companies to work together for better solution offered to the owners. Needing for the owners manpower resource obviously is reduced because several contracts can be signed with one entity. As well time and effort which are consuming during project coordination and contracts administration are decreased (Spady et al, 2011).

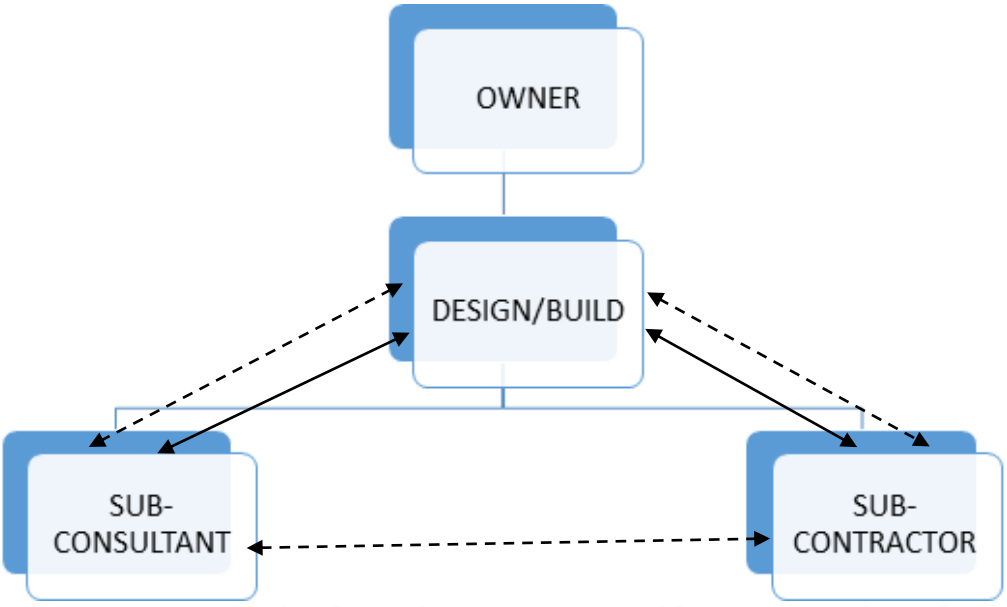

Figure 2.2: Contractual Relationships in Design/Build. Source (Spady et al, 2011)

Figure 2.2 shows the contractual relationships among the parties, the owner gives the authority to the Design/Build entity to be responsible for design and construction work, the contractual communication and obligation are drawn in continues lines, while the communication among Design/Build team are shown by dashed lines (Spady et al, 2011).

2.3.4 Design-Bid-Build

Design-Bid-Build (DBB) is a type of project delivery approach where the owner holds two separate contracts, one with the designer and another with the contractor. The designer would assist the owner to develop the program and is responsible for design and the development of drawings and specification. The contractor is responsible for means, methods, and actual construction of the project (Pishad-Bozorgi and Garza, 2012).

DBB is considering the popular procurement method in U.S, U.K and Singapore. DBB is the traditional delivery method, here the Owner sings a contract with Designer and Construction Company separately. The designer is to provide the drawing and specifications. On another hand the Construction company to perform the facility (Mosini and Davidson, 1992).

Hale et al (2009), claims that the Design-Bid-Build is a popular delivery system where the owner contracts with two entities. One is the architect/Engineer (A/E) company and another is the construction firm, the (A/E) firm furnishes the documents such as drawings, plans and specification according to the owner needs. Then these documents are taken by the owner to hold another contract with a construction company, to award the contract which is offered by the owner, many processes are done by the owner to choice the suitable construction company, the firm which offers the lowest bid based on the documents provided by the A/E, will sing the contract according to solicit bids approach. Figure 2.3 shows contractual relationship in DBB system.

Figure 2.4 represents the comparison among DBB, DB, CM and CMR Source.

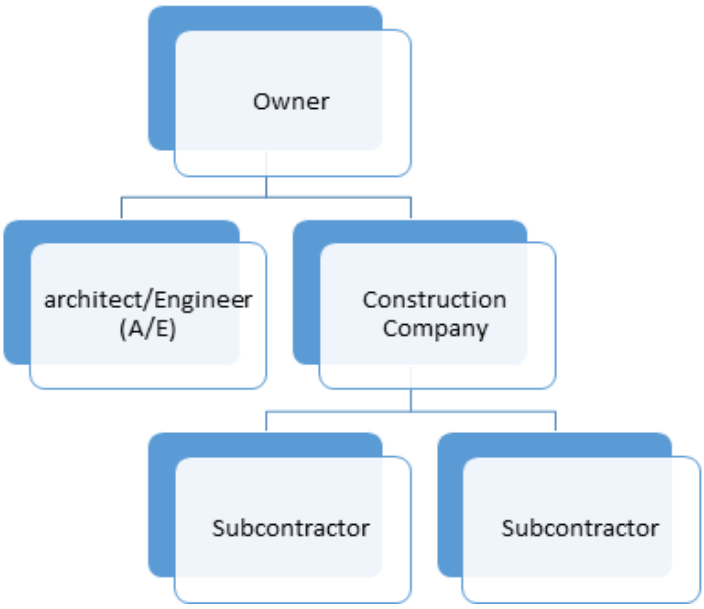

Figure 2.3: Contractual relationship in DBB system. Source (Hale et al, 2009)

Design Bid Build (DBB)
- Owners design and construct separately
- Sometimes owners perform design in-house
- Two separate contracts
- Construction cannot start until detailed design is complete
- Owner is responsible for schedule and cost growth

Design Build (DB)
- Owners design and construct simultaneously
- Owners hire design build contractor
- One single contract
- Construction can start before detailed design is complete (Gibson and Walewski 2001)
- Owner allocate risks associated with schedule and cost growth to the contractor (Gibson and Walewski 2001)

Construction Manager (CM)
- Owners give construction management responsibility to construction manager
- Can be used in any form of contracts

Construction Manager at Risk (CMR)
- Owners give construction management responsibility to construction manager
- Construction manager shares profit and loss of the project
- In highway projects, "CMR is an integrated team approach to the planning, design, and construction of a project" (Gransberg and Shane, 2010)
- CMR collaborates with the owner and designer during the design phase
- CMR acts as the general contractor during construction phase

Figure 2.4: Comparison Among DBB, DB, CM and CMR Source (Shrestha et al , 2012)

2.3.5 Integrated Project Delivery

Integrated project delivery IPD is an emerging construction project system that collaboratively involves key participants very early in the project time, often before the design is started. It is distinguished by a multiple contractual agreement that typically allows risks and rewards to be shared among project stakeholders. Because IPD is becoming increasingly popular, various organization are expressing interest in its benefits to the architecture/engineering/construction (AEC) industry (Elasmar et al, 2013).

Professional organizations like AIA and Associated General Constructions of America AGC over the years have set up standards, disseminating guidelines and enhance discussions among their members. These discussions highlight successful projects and point out obstacles to the set standards. Most importantly, the AIA has introduced some documents mainly for the purpose of defining IPD and explaining how its principles and techniques can be applied to construction (AIA, 2008). Figure 2.5 shows the contractual relationship in IPD system.

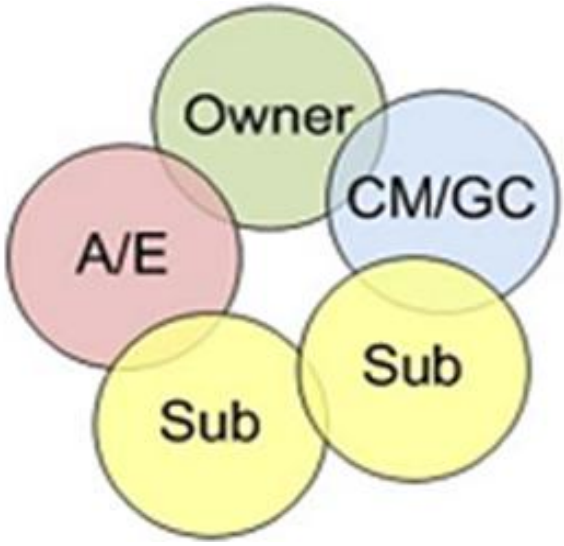

Figure 2.5: Contractual Relationship in IPD System. Source (Elasmar et al, 2013)

2.4 Concept of Public Private Partnerships

2.4.1 Background to PPP

The United States appears to be the first country which forms the term of "Public-Private-Partnerships" (PPP), initially in Educational Programs, funding has been provided by private sector to support the public sector, then in 1950s the private sector began to advocacy the public in utilities. In 1960s the term of PPP agreements have become a wide used for developing Urban Renewal, as well as in the field of international-development, PPP agreements are utilized to mention the collaboration between Government or aid agency and private-sectors in order to combat serious diseases like Malaria and AIDS. Then gradually some improvements have been accomplished in farming methods, or the promotion occurred due to the economic in general, these improvements and promotion can be characterized as strategies, policies and programme based for PPP concept (Yescombe, 2007).

2.4.2 Definition

Yescombe, (2007) cited that PPP can be defined according to these following key elements:

- The contract between public sector and private sector relatively is long-term-contract (PPP Contract);
- The private party is responsible for financing, design, construction and operate the service or facility for the public;
- User of the facility (service) or the public sector are committed to provide payments to the private sector during the contract duration, and
- The ownership can be remaining with the public party or at the end of the PPP contract would be transferred from the private party to the public party.

In 2007, the Canadian Council defined PPP as:

"A cooperative venture between the public and private sectors, built on the expertise of each partner that best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards."

Also referring to Urio (2010), PPP can be appeared in form of a design-build-finance-operate (DBFO) project, in such project the public sector particularizes a specific service to be delivered by the private sector, then the private sector is asked to equip design, build, finance and operate the scheme to provide the facility. By assigning the private sector responsibilities to operate the service, this would be a source for enhancing the efficiency in the facility.

2.5 Types of PPP

ESCAP (2011) outlined the conventional guideline of classifying the approaches, they include:

- Ownership of capital assets
- Responsibility for investment
- Assumption of risk
- Duration of contract.

Having these standards in mind, PPP models can be broadly grouped into five categories;

(i) Supply and management contracts

(ii) Turnkey Contracts

(iii) Affermage/Lease

(iv) Concessions

(v) Private Finance initiative and Private Ownership.

2.5.1 Supply and management contracts

This a contractual agreement for managing a part or whole of public enterprise by private sector. This type of contract allows for the input of private sector skills into design and delivery, operational control, labor management and the procurement of equipment. The public sector maintains its ownership of facility and equipment. Certain responsibilities relating to services are assigned to the private sector. No commercial risks are associated with the private sector, the contractors are paid fees to manage and operate services. The contract duration is usually short (three- five years). The period is usually longer for complex and large operational facilities like airport and port (Rossi and Civitillo, 2014).

2.5.2 Turnkey Contracts

The term turnkey refers to a traditional public sector procurement model for infrastructure facilities. It involves selecting a private contractor through a bidding process. The contractor charges a fixed fee for design and building of a facility, this one the vital criteria in selecting the winning proposal. The risks involved in design and construction phases are taken by contractor in this arrangement. The amount of investment by the private sector is low and for a short period of time. Strong incentives for early completion are lacking in this arrangement. This private sector is also known as Design-Build (Rossi and Civitillo, 2014).

2.5.3 Affermage/Lease

The operator (leaseholder) is primarily responsible for operating and maintaining infrastructure facility (which already exist) and services, the operator does not need to make any large investment. This arrangement is is often implemented in collaboration with others like Build-Rehabilitate-Operate-transfer. The duration of contract in such a case is longer and it requires a significant investment from the private sector.

Technical difference exist between affermage and lease system. In lease arrangement, the operator keeps revenue generated from users of the facility and make a specified lease fee payment to the contracting authority while in affermage arrangement, both the operator and contracting authority share the revenue generated from consumers (Rossi and Civitillo, 2014).

The operator takes lease of both infrastructure and equipment from the government under the affermage/lease arrangement, this lease period is for an agreed duration between the government and operator. Facilities which are fixed and land are usually leased for long duration the mobile assets. Lands which are meant to be developed by leaseholders are normally leased for a duration about 15-30 years (Rossi and Civitillo, 2014).

2.5.4 Concessions

In Concessions agreement, the government defines and allocate specific rights private companies to build and operate facilities for a defined period of time. The government however maintains ultimate of the facility with rights to supply services. Payment may take place in both ways i.e the concessionaire makes payment to the government for concession right granted to them while the government makes payment to the concessionaire based on agreement reached, these payments could be inform of payments geared towards making the project commercially viable/reduce the amount of commercial risk undertaken by the private sector, mostly in less developed or untested PPP market. The duration of a typical concession period between 5 to 50 years (Rossi and Civitillo, 2014).

In a Build-Operate-Transfer (BOT) concession type (including its others forms namely; Build- Transfer-Operate (BTO),Build-Rehabilitate-Operate-transfer (BROT), Build-Lease-Transfer (BLT) the concessionaire operates the facility for a specific period of time then converts the ownership to the public sector(government). The government controls all policies and allocates risks to the parties involved. The main source of revenue for the concessionaire under the BOT agreement is from managing and marketing the facilities constructed and in some cases renting out commercial space where applicable (Rossi and Civitillo, 2014).

2.5.5 Private Finance initiative and Private Ownership

Under this arrangement, the private sector is solely responsible for designing, construction and operating infrastructural facilities. The public sector acquires from the private sector through a long- term agreement. Hence PFI projects have direct financial obligations to government. Under PFI arrangement the ownership of assets at the end of contract is transferred to the public sector. PFI mode of contractual agreement reduces the likelihood of cost overrun risks in the design and construction process or when choosing an in efficient technology because the future earnings for the operator are dependent on controlling the cost (Rossi and Civitillo, 2014).

The main advantage desired by the public sector in PFI arrangement is that they are relieved from the responsibility of cost involved during design and construction, and the transfer of certain risks to the private, this also leads to achieving a better project design, construction and operation (Rossi and Civitillo, 2014).

LI et al (2005), cited that the UK government developed eight models of PPP :

1- Asset sales: this deals with the sales of excess government assets.
2- Sales of business: this type of PPP deals with the sales of shares of business owned by the state .The principles employed are either trade sale or flotation.
3- Private Finance Initiative.
4- Wider market: in this arrangement finance and skills from the private sector are employed for the efficient utilization of the public sector asset.
5- Joint Venture: both public and private sectors partners manage their asset jointly.
6- Partnership Investments: here, the public sector contributes in funding the investment made by the private sector. The public sector is entitled to part of the profit made.
7- Partnership companies: privately owned businesses are introduced into business owned by the state. The public interest in this arrangement is guaranteed though legislations, regulations etc…
8- Policy partnership: individuals from the private sector are vitalized in developing and implementing policies for the public sector.

2.6 Implementation of PPP projects in the Global

Comprehensive literatures have been studied in order to achieve a deeply understanding about implementations of PPP projects across the world. Kwak et al (2009) cited that different models have been implemented according to the changes which have been occurred to economic sector especially in the advance countries, for example in the U.K the Design-Build-finance-Operate(DBFO) form is the most popular model has been applied for construction projects. In the year 2011 Reinhardt reveled that although the U.S could be considered one of the innovatornof the PPP term, in spite of that it was not a leader country in term of PPP CSFs (Critical Successful Factors), this may be due to the reason that PPP have been good adopted in transportation sector only.

Since the form of Build-Own-Operate-Transfer (BOOT) has been replaced with mode Design-Build-Finance-Operate (DBFO) in 2000, there has been a huge implementation of PPP projects in Australia, latterly Australia is considered one of the leader of adoption PPP agreements across the global (raisbeck et al 2010).

Amjad and Macleod (2014) in their opinion that the implementation of PPP arrangements in Pakistan for education sector has a well impact on the devolvement of the educational quality. Gernet (1982), cited that china has applied the PPP since the time of the brith of the Christ for iron and salt mining work.

Rossi and Civitillo (2014), revealed that in 1970s there was an agreement between the French and British governments to construct a public tunnel channel, but unfortunately they failed to accomplish that. After that the tunnel was financed, constructed and operated by a private sector. In additional there is a huge partner between public party

and private party in aspect of the organizing, controlling and management of the occasions in the world like the Olympic Games.

Edwards et al (2004), claimed that around £35.5 billion was spent by the U.K government on 563 PFI agreements. According to Lossa and Antellini (2008); Rossi and Civitillo (2014) ,the use of PPP deals are relatively slow down in Italy due to three main factors:

1- Sophisticated administration processes and the deformations of competition which called "right of pre-emption", so it is discouraged private entities to joint in bidding;
2- Difficult regulations and policies in contracts in allocating risks due to civil low which applied in Italy; and
3- the high administrative risk characterizing the adjudication procedures.

Roy (2010), cited that during 2007 to 2012, India, has spent (US$ 186billion) in PPP agreements for infrastructure projects. Cabinet-Office (2010) revealed that the investment of PPP agreements are twic 10 ¥ trillion in Japan for the period between 2010 – 2020. Alves (2010) claimed that €17 billion for road and railway projects have been accounted for PPP contracts. According to PCC (2009) between 2008 and 2015, PPP constitute approximately (NTD 3.99 Trillion) of infrastructure projects which are constructed in Taiwan. HM-Tresury (2011) cited that the U.K is planning to invest around £ 200 Billion in infrastructure projects during 2011 to 2015, hence the private sector will be the main investor in these projects.

Since PPP were first introduced in the U.K. back in 1997, it has been recognized as an effective way of delivering value for money public infrastructure and services. PPP now accounts for about 15 and 8% of infrastructure spend in the U.K. and Australia respectively Banks 2005. On the other hand, PPP also plays a significant role in the infrastructure development of developing countries. Fig. 2.6 presents the annual private investment between 1990 and 2006 in the public services of developing countries (World Bank, 2008).

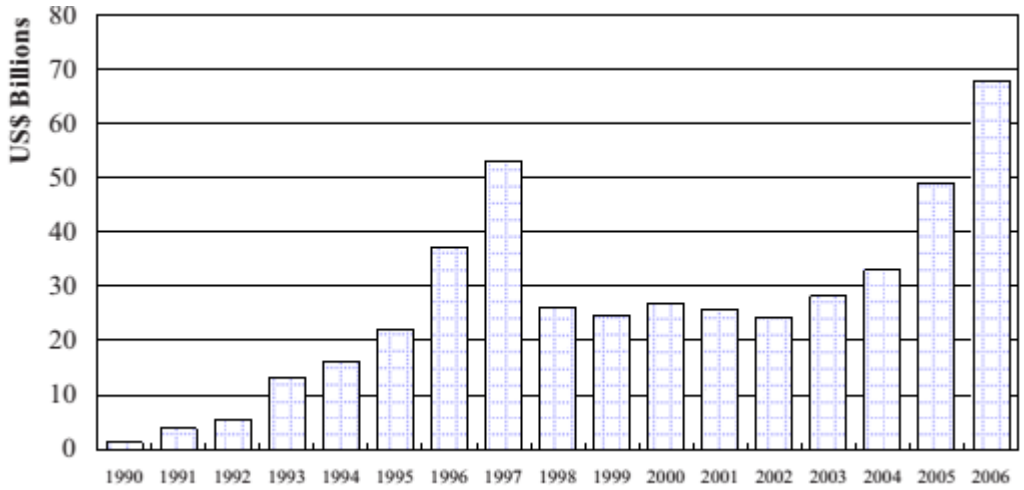

Figure 2.6: Annual participation from private sector in infrastructure project in developing countries for the period between 1990 to 2006. Source (world Bank, 2008)

Gurgun et al. (2014) devolved a table contains the mechanism and model for applying PPP in certain countries/region which are in Continental, Europe, U.K, U.S, China and Turkey shown in Table 2.1 .Table 2.2 shows the participation of PPP in different sectors for certain countries/region Continental, Europe, U.K, U.S, China and Turkey.

Table 2.1: Some PPP models across the global source (Gurgun et al. 2014).

Country/region	PPP models
Continental Europe	DBOM, DBO, BOOT, BOO, joint venture (Deloitte 2006)
U.K.	PFI, joint venture, concessions, outsourcing, sales of equity stakes in the state-owned business (Akintoye et al. 2003)
U.S.	DB, DBFO, DBF, concession, BOT, DBM, DBOM (U.S. Department of Transportation Federal Highway Administration 2010)
China	BOT, concession, equity transfer of state-owned enterprises (Meng et al. 2011)
Turkey	BOT, TOR, BO, BLT (Eliguzeloglu, 2012)

Table 2.2: PPP sectors in Continental, Europe, U.K, U.S, China and Turkey
Source (Data from Deloitte Research 2006; World Bank 2013; Yondem 2012).

Country/region	PPP sector opportunities
Continental Europe	Transportation, water, wastewater and waste, education, housing/urban regeneration, hospitals, prisons, defense
U.K.	Transportation, water, wastewater and waste, education, housing/urban regeneration, hospitals, prisons, defense
U.S.	Transportation, water, wastewater and waste, prisons, defense
China	Transportation, water and sewerage, telecom, energy
Turkey	Power, highway and roadside facilities, marinas, harbors, airports, health facilities, water and sewage, border gates.

2.7 Lessons learn from previous failure PPP Projects around the global

Ogunlana 1997, cited that some lessons have been gathered from the failure of BOT-Type transporting project which was supposed to be constructed in Thailand. Abdul-Aziz 2001 in his opinion the failure of the national sewerage project in Malaysia is due to six main reasons: 1) Transparency; 2) low equity-debt ratio ; 3) over-lavish provided by government to the concessionaire for safety nets ; 4) inefficient and management errors occurred by the concessionaire; 5) in short period there was frequent changing of the concession firm; and 6) strongly unsupported coming from public.

Asian Business 1996 cited that there have been 11 main factors explain why many PPP projects have been deactivated in many countries, these factors are ;

1) Big difference between Public and Private parties anticipations.
2) Ambiguous objectives and obligations laid out by government.
3) Complexity in making decisions.
4) Inadequately in defining each sector authority.
5) Poorly and insufficient legal/institutional framework.
6) Lack of risk management.
7) Lack of integrity by public sector.
8) Bad domestic market.
9) Lack of attracting private sector to involve in long term financial contract with reasonable rate.
10) Poor transparency.
11) Insufficient competition among private parties.

Chua et al 1999 revealed that there are four factors affecting the implementation of construction projects these factor are:1)the nature and characteristics of the construction project 2) Contractual arrangement 3)parties in the construction project and 4) interacting process in the construction project.

2.8 General Procurement System in Sudan

Construction contributes about 4% to the total GDP of the Sudan, thus, the importance of the construction sector to the Sudanese economy is undeniable. The sector seems to experience higher volatility than other sectors and the economy as a whole in terms of rates of growth. No doubt, several sectors of the Sudanese economy supply the construction sector with inputs required for construction works. In reverse, the construction sector fulfills the needs of all the sectors for construction products. The nature of the linkage between construction output and the entire economy in the Sudan has not been examined. It is not yet known whether the construction sector leads lag the economy or vice versa. (SER, 2007).

The application of input-output analysis to the economic context of the Sudan is hindered by the lack of relevant information required for the analysis. Thus, the Granger causality appears to be more appropriate for studying the relation between the construction sector and other sectors of the economy in the Sudan (SER, 2007).

According to (http://www.raya.com/) the most popular procurement system in Sudan is traditional delivery system (Design-Bid-Build or Design-Build) weather for private or governmental ownership.

2.9 General Factors affecting adoption of PPP projects around the world

Yitmen et al (2012) developed a framework to analyze the applicability to adopt the PPP arrangements in Turkey, this framework has grouped to eight dimensions which are; Technical, Economical and financial perspective, Cultural aspect, political and legal framework , Social dimension, and Environmental. Each dimension contains a number of factors.

Zhang (2005) classified the factors impact on the PPP projects in general to four packages 1) Financial aspect 2) technical 3) Environmental ,Health and Safety and 4) Managerial Role. Each one of these packages contains relevant factors for example Financial like: Revenue schedule and local financing (Table 2.3 shown these factors), technical perspective such as: maintainability and need for using the local materials and equipment (Table 2.4 presented technical factors), Health and Safety package includes: ISO 14000 Certification and safety and Health Management system (Table 2.5 contained Health and Safety factors); and Managerial package like : structure and cultural of the organization and qualification of the private sector (Table 2.6 included Managerial factors).

Table 2.3: Financial factors according to Zhang classification source (Zhang, 2005)

Financial Factors		
Sound financial analysis	Abilities to deal with fluctuations in interest/ exchange rate	Government's control on tolls/tariffs
Total investment schedule	Creative financial packages	Schedule of revenues
Payment and drawdown schedules	Local financing	Financial strength of the participants in the project company
Equity/debt ratio	Concessionaire's ability to get supplementary external finance	Strong financial commitments from shareholders
Sources and structure of main loans	Currencies of loans and equity finance	Construction period
Sources and structure of standby financing facilities	Currency of revenues and payments	Concession period
Attractiveness of main loan agreement	Financiers' abilities (especially the leading bank's)	Financial institution guarantees
Attractiveness of standby loan agreement	Minimal financial risks to the client	Insurance cover
Attractiveness of shareholder agreement	Internal rate of return	Sharing of profits with the client
Low financial charges	Net present value	Less financial guarantee required from the client
Fixed and low interest rate financing	Tariff/toll setting up and adjustment mechanism	Ability to address commercial risk (e.g., supply and demand risk)

Long-term loan financing and minimizing refinancing risk	Low toll/tariff levels.	

Table 2.4: Technical Factor according to Zhang classification source (Zhang, 2005)

Technical Factors	
Qualifications and experiences of key design and construction personnel	Design and construction quality control schemes
Competencies of designer/ sub designers, contractor/ subcontractors	Construction technologies and methods
Quantities, conditions and ownership of plants and equipment	Constructability
Design standard	Maintainability
Design life	Value engineering potential
Conforming to design requirements	Construction programs and abilities to meet them
Conforming to client's requirements	Material schedule
Additional facilities/services beyond client's requirements	Use of local equipment and materials
Structural aspects	Construction cost schedule
Geotechnical and foundation aspects	Insurance package for construction and operation
Electrical and mechanical systems	Tariff/toll collection technology
Architectural/aesthetics aspects	Operation and maintenance policy
Quality management and assurance systems	Operation and maintenance cost schedule

Table 2.5: Health, Safety and environmental factors according to Zhang classification source (Zhang, 2005)

Health, safety, and environmental factors	
Qualifications/experience of safety, health and environmental personnel	Environmental policy and management plan
Management safety accountability	ISO 14000 Certification
Past health and safety performance	Conformance to laws and regulations
Past environmental performance	Protection of flora and fauna
Safety and health record/ accident rate	Protection of items of cultural/archeological values
Safety and health policy and management system	Construction/demolition waste disposal
Noise mitigation and handling of dangerous/ emergency situations	Control of air and water pollution
Safety planning for handling hazardous materials	

Table 2.6: Managerial factors according to Zhang classification source (Zhang, 2005)

Managerial Factors	
Location of home office registration/main place of business	Ability to address counterparty risk (default by other parties)
Constitution of the management, their qualification and experience	Communication and documentation systems
Leadership and allocation of responsibilities in the consortium	Partnering and negotiation skills
Organizational culture and structure	Trade union record
Contractual relationships among participants	Project management skills
Working relationships among participants	Staff training regime
Coordination system within the consortium	Dispute resolution system within the consortium

Tang and Shen (2013) analyzed eighteen factors linked to the stakeholders' needs, this study was conducted in Hang-Kong by issuing a survey to collect data from different Stakeholders across public and private sectors (Table 2.7 presented Tang and Shen factors), then the study has fixed up four background variable which are : 1) Factors relating to type of PPP project; 2) factors linked to nature of PPP project; 3) factors relevant to the role plays in PPP project; 4) Factors examining the working experience in PPP project.

Table 2.7: Tang and Shen Stakeholders briefing Factors source (Tang and Shen 2013)

Stakeholders briefing Factors	
Experience of the client	Sufficient consultation with stakeholders
Clear management structure	Experience of stakeholder group
Knowledge of client's responsibility	Balance of the needs/ requirements of different stakeholders
Skillful guidance and advice from project manager	Knowledge of consultants
Holding workshops for stakeholders	Knowledge of statutory and lease control of the project
Good facilitation	Team commitment
Selection of briefing team	Honesty
Clarity of roles of stakeholders	Openness and trust
Open and effective communication	Agreement of brief by all relevant parties

Chan et al (2010), in his opinion that 18 factors are affecting the adoption of PPP on the People's Republic of China, these factors are considering as critical success factors and they have grouped into five classes :1) Stable macroeconomic environment2) Shared responsibility between public and private sectors 3) Transparent and efficient procurement process 4) Stable political and social environment and 5) wise government control. (Table 2.8 shown chan et al factors).

Table 2.8: Chan et al factors affecting adoption of PPP projects source (Chan et al 2010)

• **Stable macroeconomic environment**	• **Transparent and efficient procurement process**
1- Sound economic policy	1- Competitive procurement process enough potential bidders in the process
2- Favorable legal framework	2- Transparency procurement process (process is made open and public)
3- Stable macroeconomic condition	3- Well-organized and committed public agency
4 -Appropriate risk allocation and risk sharing	• **Stable political and social environment**
5- Available financial market	1 -Political support
6 -Multibenefit objectives	2- Social support
• **Shared responsibility between public and private sectors**	3- Strong and good private consortium
1- Shared authority between public and private sectors	4- Good governance
2- Commitment and responsibility of public and private sectors	• **wise government control**
3- Project technical feasibility	1- Government involvement by providing guarantee
4- Thorough and realistic assessment of the cost and benefits	

Li et al (2005) classified the factors contributed to achieve successful PPP projects in U.K to five packages: 1) effective procurement system 2) project implementability 3) warrantee provided by government 4) appropriate economic circumstances and 5) obtainable financial market. This study has shown that a strong and good private consortium; appropriate risk allocation; and available financial market are the most importance factors have impact on successful PPP projects in U.K. (Table 2.9 presented Li et al factor in U.K).

Table 2.9: Factor affecting adoption of PPP in U.K source Li et al (2005)

• **Effective procurement**	4- Commitment and responsibility of public and private sector
1- Transparency in the procurement process	5- Strong private consortium
2- Competitive procurement process	• **Government guarantee**
3 -Good governance	1- Government involvement by providing a guarantee
4- Well-organized and committed public agency	2- Multibenefit objectives
5 -Social support	• **Favorable economic conditions**
6- Shared authority between public and private sectors	1- Stable macroeconomic conditions
7 -Thorough and realistic assessment of the costs and benefits	2- Sound economic policy
• **Project implementability**	• **Available financial market**
1- Favorable legal framework	1- Suitable and adequate financial market
2 -Project technical feasibility	
3 -Appropriate risk allocation and risk sharing	

Yuan et al (2012) issued a survey which structured 48 factors to identify the perception of the stakeholders about factors affecting performance management and measurement for PPP . these factors have been sorted to five classes 1) Inputs of construction project physical construction project characteristics 2) Financial and market package ; 3)Invention learning and knowing package 4) stakeholders and 5) applicability of the construction project. The study developed 5 key performance indicators (KPI) model, which used 41 project performance indicators (PIs). The model has shown that (affordable procurement; design, planning and scheduling stage provided by public sector; effectively and efficiency process control within private party; and the level of satisfaction for public and private parties) are strongly influenced on the performance improvement.(Table 2.10 presented performance factors according to Yuan et al).

Table 2.10: Factors affecting the performance of PPP projects source (Yuan et al 2012)

• **Physical characteristics of projects**	• **Requirements of stakeholders from the perspective of financing and marketing**	• **Requirements of stakeholders from the perspective of stakeholders**
1-Type of construction	1-Sound financial analysis	1-Public client's satisfaction
2-Level of design complexity	2-Sustainable profitability	2-General public/Social satisfaction
3-Level of construction complexity	3-Increased marketability	3-Good relationship among the concessionaire, subcontractors, and suppliers
4-Level of technological advancement	4-Financial ability of whole shareholders	4-Good relationships within project team
5-Concessionaire's knowledge of PPP	5-Perfect tariff/tolls or price adjustment mechanism for the project	• **project process**
6-Government's knowledge of PPP	6-Financing cost	1-High quality control

7-Competitive tender procedure	7-Realistic schedule of investment and revenue	2-Safety management
8-Standard PPP contract with enough flexibility	8-Insurance coverage	3-Health control
9-General public/social support	9-Construction and concession period	4-Environmental protection
10-Stable and favorable macroeconomic conditions	• **Requirements of stakeholders from the perspective of innovation and learning**	5-Effective risk management system
11-Stable and favorable legal environment	1-Investment in research and development of new technology	6-Facility management
12-Stable and favorable political environment	2-Establishment of learning organization	7-Stress/Conflict management
13-Commitment and responsibility between public and private sector	3-Employee training	8-Resource utilization (material and equipment)
14-Project technical feasibility, constructability, and maintainability	4-Technology innovation (e.g., designing, construction, planning, etc.)	9-Contract management
15-Appropriate risk allocation, risk sharing, and risk transfer	5-Technology transfer	10-Prominent technical management and skill
	6-Financial innovation (i.e., creative financial package)	11-Interface management between organization and stages
		12-Cost management (during construction and operation periods)
		13-Time management (during construction and operation periods)
		14-Good governance

Ismail and Ajija (2012) established a questionnaire to analyze the impacts of 18 factors for adopting PPP projects in Malaysia, then comparing the most importance CSFs in Malaysia with CSFs in Hang-Kong, U.K and Australia. This study found out that good governance; public and private parties commitments; favorable legal framework; good economic policies; and appropriate financial market are the most importance in adopting PPP in Malaysia. (Table 2.11 included Ismail and Ajija factors).

Table 2.11: Factors influence on PPP projects in Malaysia source (Ismail and Ajija ,2012)

Critical success factors	
Stable macro-economic condition	Project technical feasibility
Favorable legal framework	Shared authority between public and private sectors
Sound economic policy	Political support
Available financial market	Social support
Multi-benefit objectives	Well organised and committed public agency
Appropriate risk allocation and risk sharing	Competitive procurement process
Commitment and responsibility of public and private sectors	Government involvement by providing guarantee
Strong and good private consortium	Thorough and realistic assessment of the cost and benefits
Good governance	Transparency procurement process

Chapter 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology adopted to analyze the factors affecting implementation of PPP projects in Khartoum, Sudan. The critical success factors affecting the adoption of PPP projects in several countries are studied which helped to assemblage a cohesive questionnaire.

3.2 Data source

According to Naoum (2001) to accomplish goals for a study, it is important to give type of method would be used a good attention. A questionnaire survey is considered as the main source of data. Data is collected from questionnaire issued to large organizations in Khartoum. In additional face-to-face interviews with the participants are conducted. The questionnaires are designed to be specific, direct, simple, clear and easily readable by all participants. In some cases the researcher recorded the interviews with managers.

3.3 Questionnaire survey

The questionnaires aim to collect a particular information through Public and Private Organizations. Thus the questionnaire is suitable for both sectors. The aim of the survey is to analyse the influence of twenty six factors for applying PPP projects in Khartoum. These factors have been collected from literature review.

In order to conduct a reliable survey the questionnaires are issued to people at various positions in the organizations. The positions are; engineers, architects, project managers and general managers.

The questionnaire started with a brief introduction about the PPP concept, then the questionnaire divided to 3 parts. Part (A) constitutes the personal and organization information, this part contains basic and general information about the organization and participants, most of the questions in this part are multiple choice type questions. Part (B) includes general information of the project, in this part the questions are YES and NO type questions and multiple choice type questions. Part (C) consists questions related to the twenty six factors that are planning to be analyzed. These factors are categorized by the researcher into six dimensions according to previous researches:

1- Legal Factors (Yitmen et al, 2012).
2- Risk Management (Li et al, 2005).
3- Project Efficiency (Yitmen et al, 2012).
4- Project performance (Yitmen et al, 2012).
5- Financial (Zhang, 2005).
6- Political & Environmental dimension (Zhang, 2005).

These twenty six factors are prepared mainly using close-ended questions (Strongly agree; Agree; Neither Agree or Disagree; Disagree; and Strongly Disagree). According to Glasow (2005) the closed-ended questions are easy to be answered by the respondents and easy to be analyzed by the researcher. To sum up Part (A) has 5 questions, Part (B) has 4 questions; and Part (C) has twenty six close-ended questions and two open-ended questions.

3.4 Research Dimensions

3.4.1 Legal

The support provided by a legal and regulatory framework is defined to be a way to help for investing in complicated and relatively long-term agreements, reducing cost of transaction, confirming that regulatory controls would be satisfied, developing legal and economic techniques to ensure that the contract problems would be solving in a better manner (EPEC,2010).

According to Yitmen et al. (2012), following should be included in PPP legal frame:

1) Provisions which could help in adopting PPP and running its functions, such as (legal right required to establish a PPP company, the ability of PPP company to make a subcontract with subcontractor to help in constructing the product or facility).

2) Provisions which allow public sector to supply the project financially, such as (commitment for long term contract to supply facility by public disbursement).

3.4.2 Risk Management

Based on their perception many researchers have defined meaning of risk depends on the needs or the outcomes of their research. For example Cooper and Chapman (1987) give a definition for risk as the possibility to loss or gain economically or financially, physical hazard, or delay happen to consequence of a particular action due to uncertainty event.

Xenidis and Angelides (2005) conducted that having multiple stakeholders, complexity, large scale project, long duration of PPP contract, result that PPP projects would be judged as full of risks. Thus allocating risk among parties have a vital influence for PPP projects to be successful.

3.4.3 Project efficiency

PPP have discovered a new combination, which comes from mixing efficient productivity and efficient allocation, this combination makes PPP better than the service could be offered by public sector. The description of productivity efficiency in term of PPP is used to explain "value of money" (Chan et al 2010).

3.4.4 Project performance

Performance evaluation which used for decision making process across organization has given well attention to be documented in order to better use in the field of management accounting. (Hakanir and Harris, 2005).

Identified the objectives should be done before performance planning. This would lead to have completed and effective performance management. The ultimate objective of applying PPP is reaching best value of public facility, service or product could be offered. (Zhang,2006). Gransberg and Ellicott (1997) conducted that the best value could be defined as maximum outcomes would be achieved through infrastructure project devolvement. For PPP best value consists "quality, efficiency/effectiveness, and value of money (VfM) and standards of performance". (Akintoye et al, 2003).

3.4.5 Financial

Applying effective PPP model should maintain to the parties involved a good economic sense for their success, thus this would lead reasonably to assign the roles, responsibilities sharing, allocating risk and cost between the public and the private sectors. Often PPP delivery method is suitable for a limited resource or recourse project, and this project can be financed by debt fund, thus funders guarantee the project based on project asset and cash flows, in contrast lenders do not have recourse to the owners of the project (Zhang, 2006).

FIDIC (2011) mentioned that in order to attract private investors to have partnership with public sector, a PPP project must obtain following characteristics: 1) self-sustainable, 2) financially fertile, 3) financially profitable for all parties. This mainly depends policies of government, the economic circumstances and competition strength. (Grilo et al, 2005).

3.4.6 Political & Environmental

Stable government politics have significant interaction with the economic and the components of technology. Zhan (2005) considered a lack of political support provided by government to be a potential divider for PPP project. (Duffield ,2005) conducted that sensitive politics might be a reason to break down a PPP project.

Table 3.1: Shows the six research dimensions

Dimensions	**Factors**
Legal	1- Favorable legal framework (Yitmen et al., 2012).
	2- Strong Institutional Framework (Yitmen et al., 2012).
Risk Management	1- Risk that may occur during the project construction processes or before, such as (inappropriate design, late completion, changing in design) (Li et al., 2005).
	2- Financial risk these include (rate of interest, changing in the rate of hard currency, decreasing in inflation) (Li et al, 2005).
	3- Reduction of the profit of the private sector (Li et al., 2005).
Project efficiency	1- How simple the Construction Design is (Yitmen et al., 2012).
	2- Applying New construction Technology (Yitmen et al,. 2012).

	3- The qualification of contractor and consultant (Yitmen et al., 2012).
	4- The degree of planning details (Yitmen et al., 2012).
	5- PPP supporting in accelerating projects development (Yitmen et al., 2012).
Project performance	1- Improving the buildability (Yitmen et al., 2012).
	2- Financial Strategy of the Project (Yitmen et al., 2012).
	3- Coordination between the Public & private Sectors (Yitmen et al, 2012).
	4- The quality required and the Project Duration (Yitmen et al., 2012).
	5- PPP can improve government integrated solution capacity (Yitmen et al., 2012).
Financial	1- Establishing new opportunities for private sector (Zhan, 2005).
	2- Improving maintainability (Zhan, 2005).
	3- Reducing the total project cost (Zhan, 2005).
	4- Solving the public sector budget restraint problems (Zhan, 2005).
	5- Solving limitation of recourse or nonrecourse for public funding (Zhan, 2005).
	6- Transformation of technology to local companies (Zhan, 2005).
Political & Environmental	1- Government Poor support (Zhan, 2005).
	2- Motivation and support provided by the Government (Zhan, 2005).
	3- Truth (Zhan, 2005).
	4- Political Pressure (Zhan, 2005).
	5- Social and community Support (Zhan, 2005).

3.5 Population of research

The population of this research consists mainly two sectors (Public and Private Sectors) located in Khartoum. The data is collected from seven governmental organizations and nineteen private organizations.

3.6 Data collection

Questionnaires are designed, and issued to organization located in Khartoum from the period between February, 2015 to March, 2015.

Out of one hundred questionnaire copies distributed, fifty nine copies are returned back, three of them are unfortunately unfilled, and fifty six copies are used for the analysis. 56% is representing the response rate for the questionnaire survey.

3.7 Data Analysis

3.7.1 Factor Loading

Factor loading is representing of how much a factor could explain a particular variable in factor analysis, thus factor loading represents the correlation of the variable and the factor (Livesley. et al., 1998).

Using "Ensuring Practical Significance" approach ,the first suggestion is not based on any mathematical proposition but relates more to practical significance (Livesley. et al., 1998).

Ensuring Practical Significance is a rule of thumb used frequently as a means of making a preliminary examination of the factor matrix. In short, factor loadings greater than ±.30 are considered to meet the minimal level; loadings of ±.40 are considered more important; and if the loadings are ±.50 or greater, they are considered practically

significant. Thus the larger the absolute size of the factor loading, the more important the loading in interpreting the factor matrix. Because factor loading is the correlation of the variable and the factor, the squared loading is the amount of the variable's total variance accounted for by the factor. Thus, a 0.30 loading translates to approximately 10 percent explanation, and a 0.50 loading denotes that 25 percent of the variance is accounted for by the factor. The loading must exceed 0.70 for the factor to account for 50 percent of the variance. The researcher should realize that extremely high loadings (0.80 and above) are not typical and that the practical significance of the loadings is an important criterion. These guidelines are applicable when the sample size is 100 or larger. The emphasis in this approach is practical, not statistical, significance (Livesley. et al, 1998).

3.7.2 Reliability (Coefficient Alpha Cronbach) (*α*)

According to Cronbach, (1951), "Reliability can be expressed in terms of stability, equivalence, and consistency. Consistency check, which is commonly expressed in the form of Cronbach Coefficient Alpha".

Cronbach's alpha is often used when having multi-items scales (e.g., measurement procedure, such as a survey, with multiple questions). It is also a versatile test of reliability as internal consistency because it can be used for attitudinal measurements, which are popular among researchers (e.g., attitudinal measurements include Likert scales with options such as strongly agree, agree, neither agree nor disagree, disagree ,strongly disagree). However, Cronbach's alpha does not determine the unidimensionality of a measurement procedure (i.e., that a measurement procedure only measures one construct). This is because getting a high Cronbach's alpha coefficient (e.g., 0.80) when testing a measurement procedure that involves two or more constructs.

3.7.3 SPSS Software

The questions are analyzed by using (Statistical Package for Social Science) SPSS. Using SPSS, pie charts and bar charts are plotted, and percentages and frequencies for each question in part (A) and (B) are computed. Part (C) SPSS is used to calculate the mean score and Standard deviation for each factor.

3.7.4 Relative Importance Index (RII)

Following formula is used to calculate Relative Importance Index (RII) (Mbamali ,2012):

The researcher classified the variables into 5 groups on Likert Scale

$$\text{RII} = \frac{\sum \text{Fx}}{\sum \text{F}} * \frac{1}{\text{K}}$$

RII : Relative Importance Index

x : Point on Likert Scale (1,2,3,4, and 5)

F: Frequency of choices selected by respondents

K: Max point for likert scale (5).

When ranking factors or items using RII, the highest value takes the 1st rank, the following one takes the 2nd rank and so on until the lowest rank (Mbamali ,2012) .

The following limitations are used in the interpreting of RII results in accordance with (Mbamali ,2012).

RII < 0.60 ⟶ refers factor or item is low rating.

0.60 ≤ RII ≤0.80 ⇨ refers factor or item is High rating.

RII > 0.80 ⟶ refers factor or item is Very High rating.

Chapter 4

ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter represents the analysis and discussion of the data gathered from the questionnaires. The data is analyzed by using Statistical Package for Social Science software, SPSS version 21. Relative Importance Index, RII is computed to rank the twenty six factors.

4.2 Response Rate

As shown in Table 4.1 the questionnaires targeted a sample of one hundred respondents, of which fifty six copies are returned back, with a response rate of 56 %.

Table 4.1: Response Rate

Kind of Survey	**Number of Targeted Respondents**	**Response**	**None-Response**	**Percentage of Response**
Questionnaire	100	56	44	56 %

4.3 Demographic Information

The questionnaires are issued to professionals who hold positions in the organizations contacted, such as; Engineer, Architect, Projects Manager, and General Manager. The questions are asked to determine; qualification, years of working experience in the

construction industry, nature of the organization, specialization of the private organization, and position of the respondent in the organization.

Figures 4.1-4.3, Table 4.2 and Table 4.3 show the breakdown of the above information collected about the respondents.

4.3.1 Education Qualification

Figure 4.1 represents the level of education for participants, which can be categorized two levels; Master degree holder and Bachelor of Science or Engineering. The findings revealed that thirty eight out of fifty six respondents are Bachelor degree holders. In the other hand Master degree holders are constituted eighteen out of fifty six.

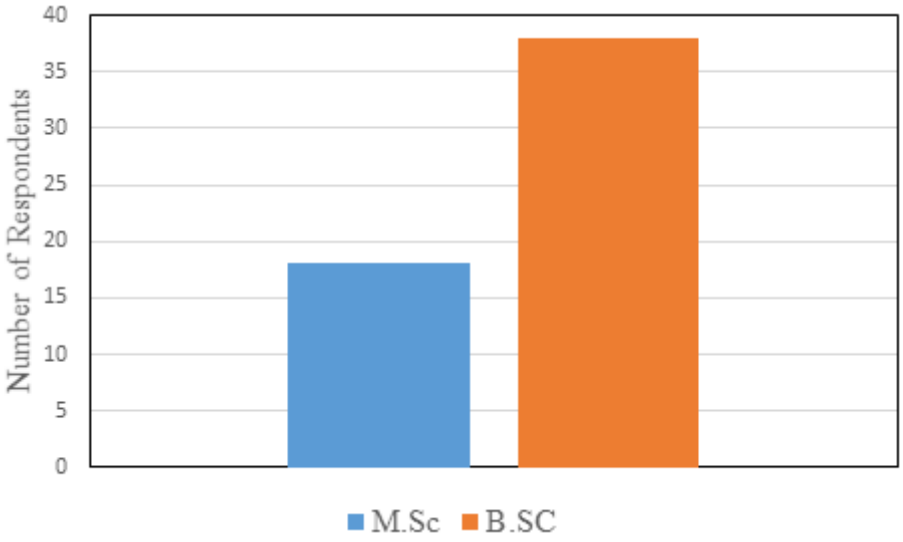

Figure 4.1: Education Qualification

4.3.2 Organization's years of experience in the Construction industry

As shown in Figure 4.2, 17.9 % of the respondents mentioned that their organizations have 0-7 years working experience in construction industries, 26.8% of the organizations have 8-14 years working experience, 25 % mentioned their organization have been operating in construction fields for 15-20 Years, while 30.4 % goes to the

organizations which have more than 21 years working experience in construction industry.

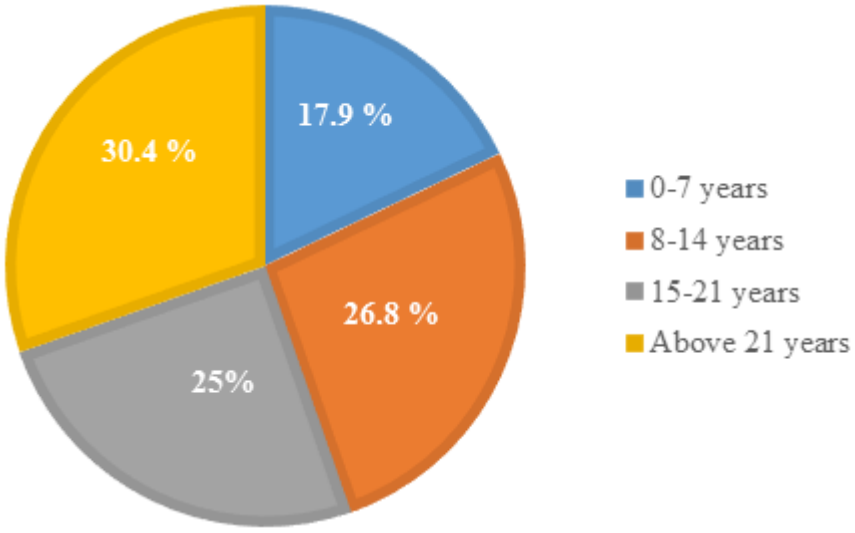

Figure 4.2: Organization's years of experience in the Construction industries

4.3.3 Nature of Organization

The respondents from private sector made up thirty one. In contrast the respondents who have been working in Public sector constituted twenty five. As shown in Figure 4.3.

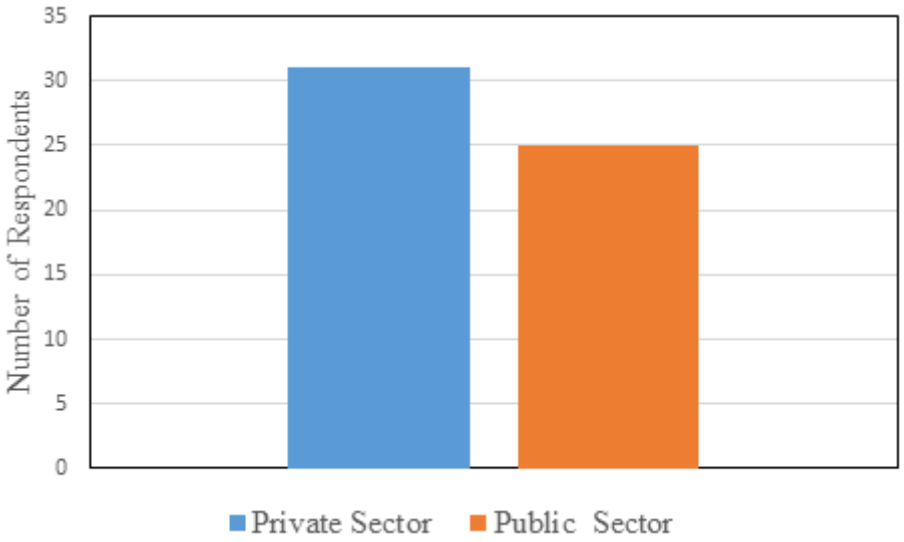

Figure 4.3: Nature of Organization

4.3.4 Specialization of Organization

As shown in Table 4.2, 25% of respondents are working in construction company, 21.4 % of the respondents are working in consulting company, while 8.9 % of respondents have revealed they are working in construction and consulting company.

Table 4.2 : Specialization of Organization

Specialization of the Private Organization	Frequency	Percent	Valid Percent	Cumulative Percent
Construction Company	14	25.0	45.2	45.2
Consulting Company	12	21.4	38.7	83.9
Construction and Consulting company	5	8.9	16.1	100.0
Total	31	55.4	100.0	

4.3.5 Position in Organization

Most of respondents are whether engineers or architect. 42.9% of the respondents are engineer, 35.7% of the respondents are architect.

Table 4.3: Position in Organization

Position in the organization	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Engineer	24	42.9	42.9	42.9
Architect	20	35.7	35.7	78.6
Project Manager	7	12.5	12.5	91.1
General Manager	5	8.9	8.9	100.0
Total	56	100.0	100.0	

4.4 PPP Concept in Sudan

4.4.1 Background of PPP Terminology

The respondents are asked whether they have a background about the PPP Terminology or not. 69.9 % of respondents are mentioned they have knowledge about what is mean by PPP Terminology, while 30.1 %) of respondents are responded that they do not have background about PPP Terminology. Show in Figure 4.4.

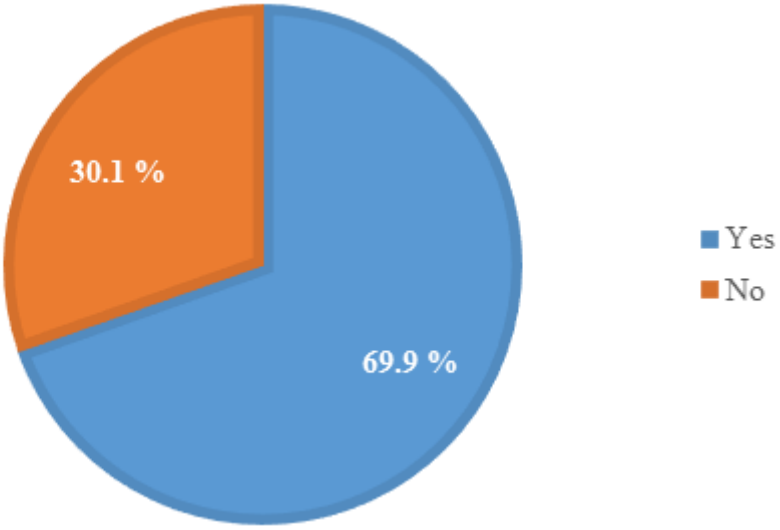

Figure 4.4: Background of PPP Terminology

4.4.2 Experience in PPP projects

Only nine respondents are mentioned that they have an experience in PPP projects that due to lack of usage of PPP agreement in Sudan.

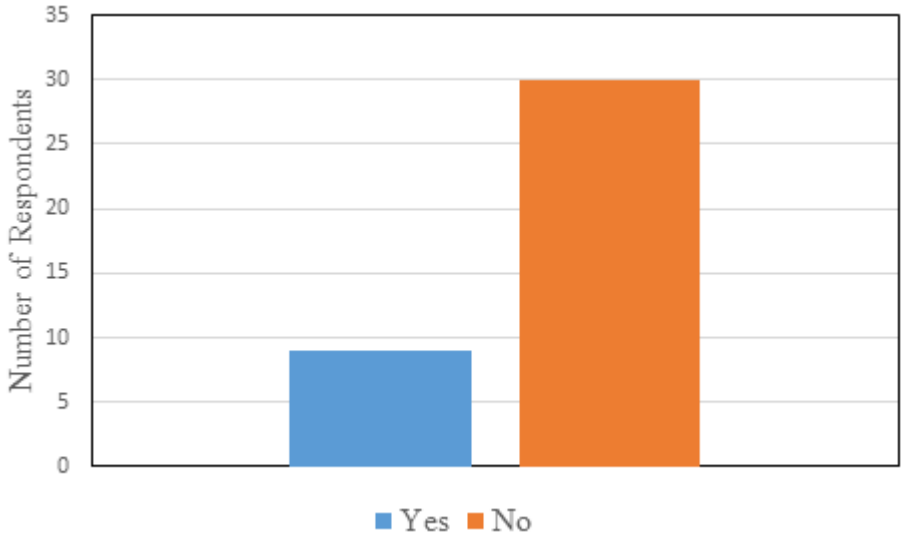

Figure 4.5: Experience in PPP projects

4.4.3 Enhancement in Project Performance by applying PPP

Respondents who had working experience in PPP projects were asked to rate impact of adopting PPP arrangement in project performance for projects from their experience. Two of them answered that was no impact on project performance. Two of them said there was little impact on project performance. One mentioned that there mentioned that there was positive impact and the rest stated there was significantly positive impact. The results are presented in Figure 4.6.

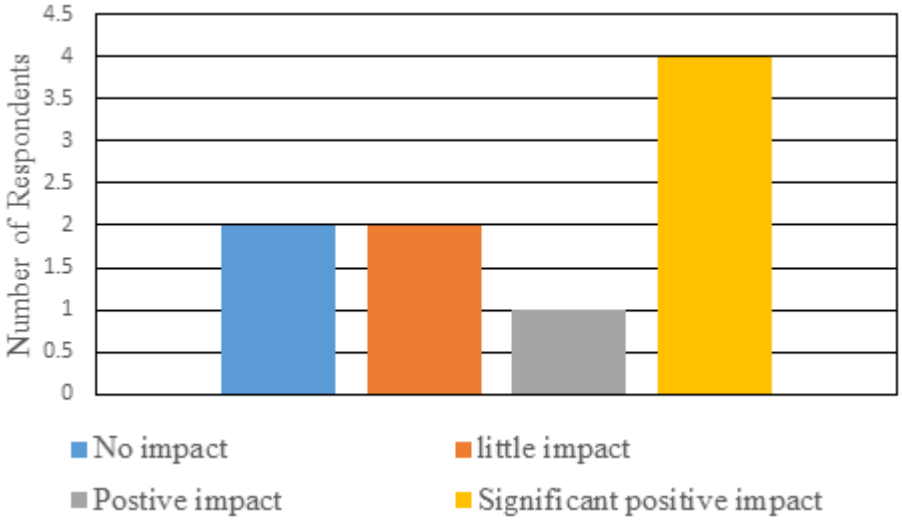

Figure 4.6: Enhancement in Project Performance by applying PPP

4.4.4 Effectiveness of adopting PPP

Respondents have asked to rate the effectiveness of adopting PPP projects. 3.6% of the respondents responded that there is no effect of applying PPP arrangements, 62.5% of the respondents stated that applying PPP arrangements would have effect, while 33.9% of the respondents mentioned that significant effect would be gained when applying PPP arrangement. The results are shown in Figure 4.7.

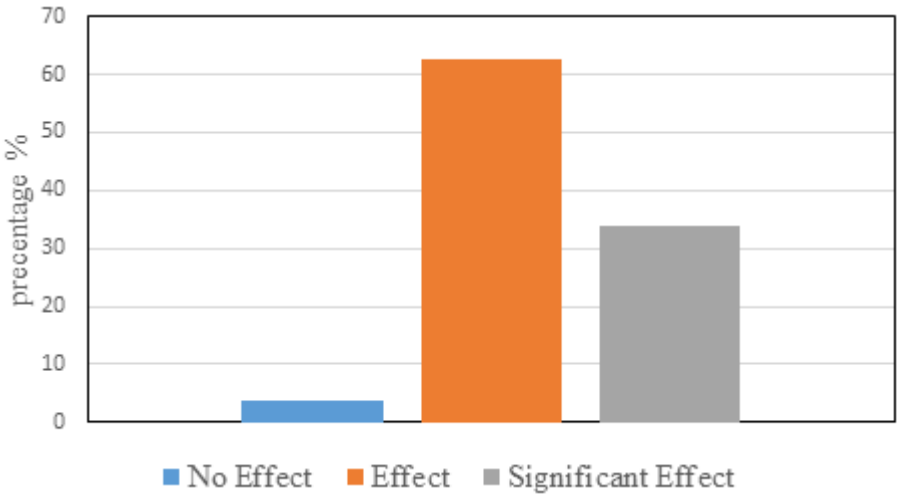

Figure 4.7: Effectiveness of adopting PPP

4.4.5 Impact of adopting PPP in Sudan

The respondents have been inquired to determine whether applying PPP arrangements in Sudan would have positive or negative effect. 96.4 % of respondents answered that applying PPP arrangements in Sudan would have positive impact on infrastructure, while 4 % of respondents stated negative impact would be taken place when applying PPP agreements for infrastructure in Sudan. This is represented in Figure 4.8.

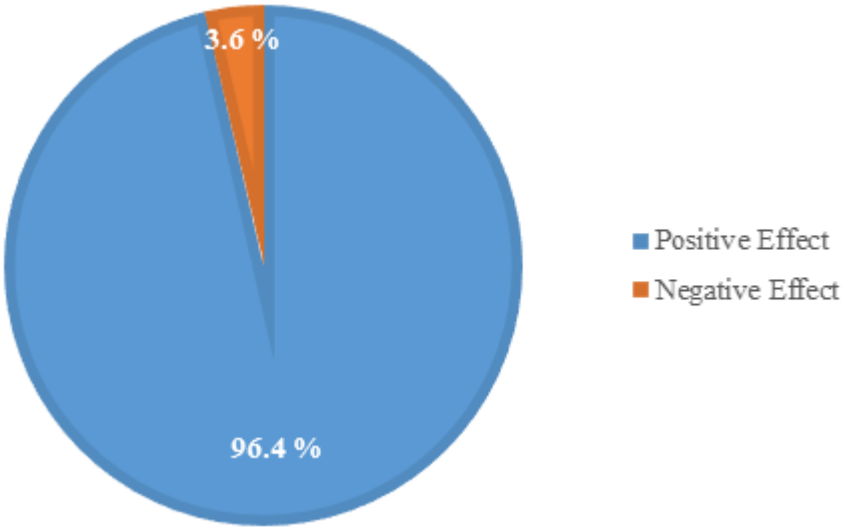

Figure 4.8: Impact of adopting PPP in Sudan

4.5 Factors analysis

4.5.1 Factor loading and reliability coefficient (Cronbach α)

Loadings are assigned to each factor according to "Ensuring Practical Significance" (Livesley. et al, 1998). Reliability coefficient is calculated for each dimension. Loading factors range between 0.700 to 0.820 which indicates that all factors have impact on variables (dimensions). Establishing new opportunities for private sector, the qualification of contractor and consultant, and PPP supporting in accelerating projects development are 0.820, 0.815, and 0.803 respectively. These factors have the highest factor loading. While financial dimension and project efficiency dimension are 0.763 and 0.761 successively, these factors are considered as the highest reliability coefficients α. As shown in Table 4.4.

Table 4.4: Factor loading and Reliability coefficient (Cronbach α)

Group	**Factors**	**Factor Loading**	**Cronbach α**
Legal Dimension	1- Favorable legal framework	0.716	0.709
	2- Strong Institutional Framework	0.702	
Risk Management dimension	3- Risk that may occur during the project construction processes or before, such as (inappropriate design, late completion, changing in design).	0.718	0.734
	4- Financial risk these include (rate of interest, changing in the rate of hard currency, decreasing in inflation)	0.785	

	5- Reduction of the profit of the private sector	0.700	
Project efficiency dimension	6- How simple the Construction Design is?	0.731	0.761
	7- Applying New construction Technology	0.722	
	8- The qualification of contractor and consultant	0.815	
	9- The degree of planning details	0.730	
	10- PPP supporting in accelerating projects development	0.803	
Project performance dimension	6- Improving the buildability	0.745	0.760
	7- Financial Strategy of the Project	0.781	
	8- Coordination between the Public & private Sectors	0.784	
	9- The quality required and the Project Duration	0.752	
	10- PPP can improve government integrated solution capacity	0.735	
Financial Dimension	1- Establishing new opportunities for private sector	0.820	0.763
	2- Improving maintainability	0.741	
	3- Reducing the total project cost	0.701	
	4- Solving the public sector budget restraint problems	0.796	
	5- Solving limitation of recourse or nonrecourse for public funding	0.777	

	6- Transformation of technology to local companies	0.743	
Political & Environmental Dimension	1- Government Poor support	0.755	0.756
	2- Motivation and support provided by the Government	0.764	
	3- Truth	0.797	
	4- Political Pressure	0.757	
	5- Social and community Support	0.704	

4.5.2 Respondents view on PPP factors

Most of respondents are strongly agree with establishing new opportunities for private sectors is important factor for adopting PPP projects in Sudan, which is similar to a survey conducted in Malaysia showing that new opportunities offered to private sector is significant factor to implement PPP projects in Malaysia (Ismail and Ajiji, 2012). The results are presented in Table 4.5.

Favorable Legal Framework is considered as a vital factor to apply PPP projects in Malaysia (Ismail and Ajiji, 2012). In contrast, this factor has medium impact to adopt PPP projects in Sudan according to respondents view. The results are presented in Table 4.5.

Respondents agree with financial risks which is an important factor to apply PPP projects in Sudan. This may be due to the fact that the rate of currency is fluctuated from time to time in Sudan. Thus this may have negative impact on attracting private sector initiatives to invest with public sector organization in infrastructure projects.The results are presented in Table 4.5.

According to Zhan (2005) in order to have successful PPP projects, a good relationship between public and private sectors should be maintained, as respondents view coordination between the Public & private Sectors as a major factor to implement PPP projects in Sudan. The results are presented in Table 4.5.

Transferring technology from private sector is seen as a minor factor by the respondents, while Zhan (2005) conducted that a new technology transfer from the private sector to the public sector is considered as a worthy for adopting PPP projects. The results presented in Table 4.5.

Table 4.5: PPP factors as respondents view

Factor	**Strongly Disagree**	**Disagree**	**Neither Agree or Disagree**	**Agree**	**Strongly Agree**
Favorable legal Framework	8.9 %	8.9 %	21.4 %	26.8 %	32.1 %
Strong Institutional Framework	5.4 %	14.3 %	25 %	37.5 %	14.3 %
Risk that may occur during the project construction processes or before, such as (inappropriate design, late completion, changing in design)	5.4 %	12.5 %	19.6 %	37.5 %	23.2 %

Financial risk these include (rate of interest, changing in the rate of hard currency, decreasing in inflation)	3.6 %	10.7 %	12.5 %	25 %	46.5 %
Reduction of the profit of the private sector	7.1 %	23.2%	23.2 %	30.4 %	14.3 %
How simple the Construction Design is?	3.6 %	8.9 %	23.2 %	39.3 %	21.4 %
Applying New construction Technology	3.6 %	10.7 %	25 %	33.9 %	26.8 %
The qualification of contractor and consultant	5.4 %	3.6 %	14.3 %	26.8 %	50 %
The degree of planning details	0	12.5 %	25 %	39.3 %	23.2 %
PPP supporting in accelerating projects development	5.4 %	0	25 %	17.9 %	51.8 %

Improving the buildability	3.6 %	3.6 %	28.6 %	46.4 %	16.1 %
Financial Strategy of the Project	3.6 %	3.6 %	14.3 %	39.3 %	35.7 %
Coordination between the Public & private Sectors	0	12.5 %	14.3 %	30.4 %	41.8 %
The quality required and the Project Duration	1.8 %	12.5 %	14.3 %	33.9 %	37.5 %
PPP can improve government integrated solution capacity	3.6 %	8.9 %	23.2 %	39.3 %	25 %
Establishing new opportunities for private sector	1.8 %	7.1%	7.1 %	41.1 %	42.9 %
Improving maintainability	0	10.7 %	17.9 %	46.4 %	21.4 %
Reducing the total project cost	3.6 %	21.4 %	26.8 %	26.8 %	17.9 %
Solving the public sector budget restraint problems	3.6 %	8.9 %	10.7 %	32.1 %	44.6 %

Solving limitation of recourse or nonrecourse for public funding	3.6 %	7.1 %	14.3 %	39.3 %	35.7 %
Transformation of technology to Local Companies	3.6 %	10.7 %	17.9 %	37.5 %	30.4 %
Government Poor support	5.4 %	14.3 %	14.3 %	19.6 %	44.6 %
Motivation and support provided by the Government	1.8 %	12.5 %	12.5 %	37.5 %	33.9 %
Truth	1.8 %	12.5 %	8.9 %	26.8 %	44.6 %
Political Pressure	5.4 %	1.8 %	25 %	32.1 %	33.9 %
Social and community Support	5.4 %	16.1 %	28.6 %	37.5 %	%12.5

4.5.3 Mean Score, Standard Deviation and Relative Importance Index (RII)

4.5.3.1 Legal

Table 4.6 shows that the mean score for favorable legal framework and strong institutional framework are 3.65 and 3.42 respectively, and the standard deviation 0.68 and 1.092 respectively. Favorable legal framework is taken the 1st position in Relative

Importance Index, having greater than 0.6 and less than 0.8. So it is referred as high rated factor.

4.5.3.2 Risk Management

In Table 4.6, mean score for risk management is between 3.2 and 4.01, while standard deviation is relatively high for these three factors which is more than one. Financial risk including rate of interest, changing in the rate of hard currency, decreasing in inflation is ranked as the 1st position for this dimension, and it is a very high rating factor.

4.5.3.3 Project efficiency

The mean score for the qualification of contractor and consultant is 4.1250, while applying new construction Technology is 3.6852 and standard deviation for the degree of planning details is 0.96278 as represented in Table 4.6.

4.5.3.4 Project performance

Coordination between the public & private sectors is ranked as 1st position for this dimension, having 0.8 in RII which indicates that this factor is very high rating. 4.0132 and 1.04511 are mean score and standard deviation for Coordination between the Public & private Sectors as shown in Table 4.6.

4.5.3.5 Financial

Establishing new opportunities for private sector is scored 0.84 in RII which is the highest value among the twenty six factors. This indicates that this is the most important factor conducted in this survey and it is a very high rating factor. Mean score and standard deviation are 4.1607 and 0.96816 successively as shown in Table 4.6.

4.5.3.6 Political & Environmental

Truth is stated as the 1st position for this dimension, scoring 0.81 in RII which indicates that this factor is a very high rating factor. Motivation and support provided by the Government is ranked on the 2nd position as represented in Table 4.6.

Table 4.6: Mean Score, Standard Deviation and Relative Importance Index (RII)

Group Name	Factors	Mean		Std. Deviation	RII	Ranking
		Statistic	Std. Error			
Legal	Favorable legal framework	3.6545	0.172	0.68	0.73	1st
	Strong Institutional Framework	3.4259	0.148	1.0920	0.68	2nd
Risk Management	Risk that may occur during the project construction processes or before, such as (inappropriate design, late completion, changing in design).	3.6182	0.154	1.1465	0.73	2nd
	Financial risk these include (rate of interest, changing in the rate of hard currency, decreasing in inflation)	4.0182	0.158	1.1783	0.8	1st
	Reduction of the profit of the private sector	3.2182	0.159	1.1815	0.65	3nd
Project efficiency	How simple the Construction Design is?	3.6852	0.141	1.0429	0.75	3rd
	Applying New construction Technology	3.6964	0.146	1.0941	0.74	5th
	The qualification of contractor and consultant	4.1250	0.150	1.1291	0.83	1st
	The degree of planning details	3.7321	0.128	0.9627	0.75	3rd
	PPP supporting in accelerating projects development	4.1071	0.150	1.1229	0.82	2nd

Project performance	Improving the buildability	3.8148	0.124	0.9126	0.76	4th
	Financial Strategy of the Project	4.0370	0.137	1.0087	0.8	1st
	Coordination between the Public & private Sectors	4.0182	0.140	1.0451	0.8	1st
	The quality required and the Project Duration	3.9286	0.146	1.0930	0.77	3rd
	PPP can improve government integrated solution capacity	3.7321	0.140	1.0529	0.75	5th
Financial	Establishing new opportunities for private sector	4.1607	0.129	0.9681	0.84	1st
	Improving maintainability	3.8148	0.124	0.9126	0.76	4th
	Reducing the total project cost	3.3519	0.154	1.1353	0.68	6th
	Solving public sector budget restraint problems	4.0536	0.149	1.1187	0.81	2nd
	Solving limitation of recourse or nonrecourse for public funding	3.9643	0.141	1.0611	0.79	3Th
	Transformation of technology to local companies	3.8036	0.147	1.1023	0.76	4th
Political & Environmental	Government Poor support	3.8545	0.174	1.2969	0.77	3rd
	Motivation and support provided by the Government	3.9091	0.145	1.0762	0.78	2nd
	Truth	4.0566	0.155	1.1336	0.81	1st
	Political Pressure	3.8909	0.146	1.0830	0.77	3rd
	Social and community Support	3.3571	0.142	1.0690	0.7	5th

Chapter 5

CONCEPTUAL FRAMEWORK AND STRATEGY FOR IMPLEMENTITATION OF PPP PROJECTS IN SUDAN

5.1 Introduction

This chapter provides a conceptual framework for implementing of PPP projects in Sudan developed by the researcher. This model of framework represents critical factors which have vital impact to implement PPP projects in Sudan. The framework consists of PPP cycle, phases and stages, requirement, dimensions and important factors for each dimension. The study is based on six dimension:

1- Legal Factors,

2- Risk Management

3- Project Efficiency

4- Project performance

5- Financial dimension

6- Political & Environmental

In additional the researcher also developed a strategy involving seven stages for implementation of PPP projects in Sudan.

5.2 PPP Life Cycle, Phases & Stages, and Requirements for Sudan

5.2.1 Preliminary

Preliminary is considered as the first cycle in PPP project. In order to complete this cycle a specific phase must be done which is preparing documents such as (regulations

and policies). Preparing documents is depended on some requirement. These requirements are Legal structure, Institutional capability, and Local polices.

5.2.2 Identification of Project

After the first cycle (preliminary) has been done, identification of project is required. This stage determines the appropriateness of the project which will be constructed. In order to achieve this stage some requirements must be clarified, these requirements are Willingness & desire earning, Barriers & constrains, Interest of private sectors, Facility or service actual cost, and Revenue of PPP project.

5.2.3 Project Evaluation

Project evaluation cycle contains recognizing the type of PPP that would be implemented and distinguishing the structure of PPP. Particular demands should be given attention. These demands are sharing risks, Package of PPP contract, Cost & budget, what expect from PPP, and Needs of assessing facility.

5.2.4 Design & Agreement

In order to accomplish this cycle, three phases should be achieved. These stages are Facility & project design, Define procurement process, and Define funders & national responsibility. To insure these some requirements have been met. These demands are Integrating & involving PPP with design, Procurement method for selecting & design, Guarantees required by funders, and Assessment of financial and socio-economic.

5.2.5 Tendering & Procurement System

Tendering and Procurement system is the fifth cycle in purpose to construct PPP project. This cycle has mainly four stages which are Tendering processes, Assessment & evaluation, Discussion & negotiation, and signing the contract. Accomplishing this cycle needs specific demands which are Transparency, and documented all details (Recording).

5.2.6 Project Implementing

The final cycle to establish PPP projects is the project Implementing. This cycle comprises five phases which are Constructing facility & project, Operating service or facility, Controlling & monitoring service or facility, Managing the contract, and Evaluating the facility progress. By applying effective collaboration among parties, and effective environment to apply facility, the accomplishment of this cycle can be met.

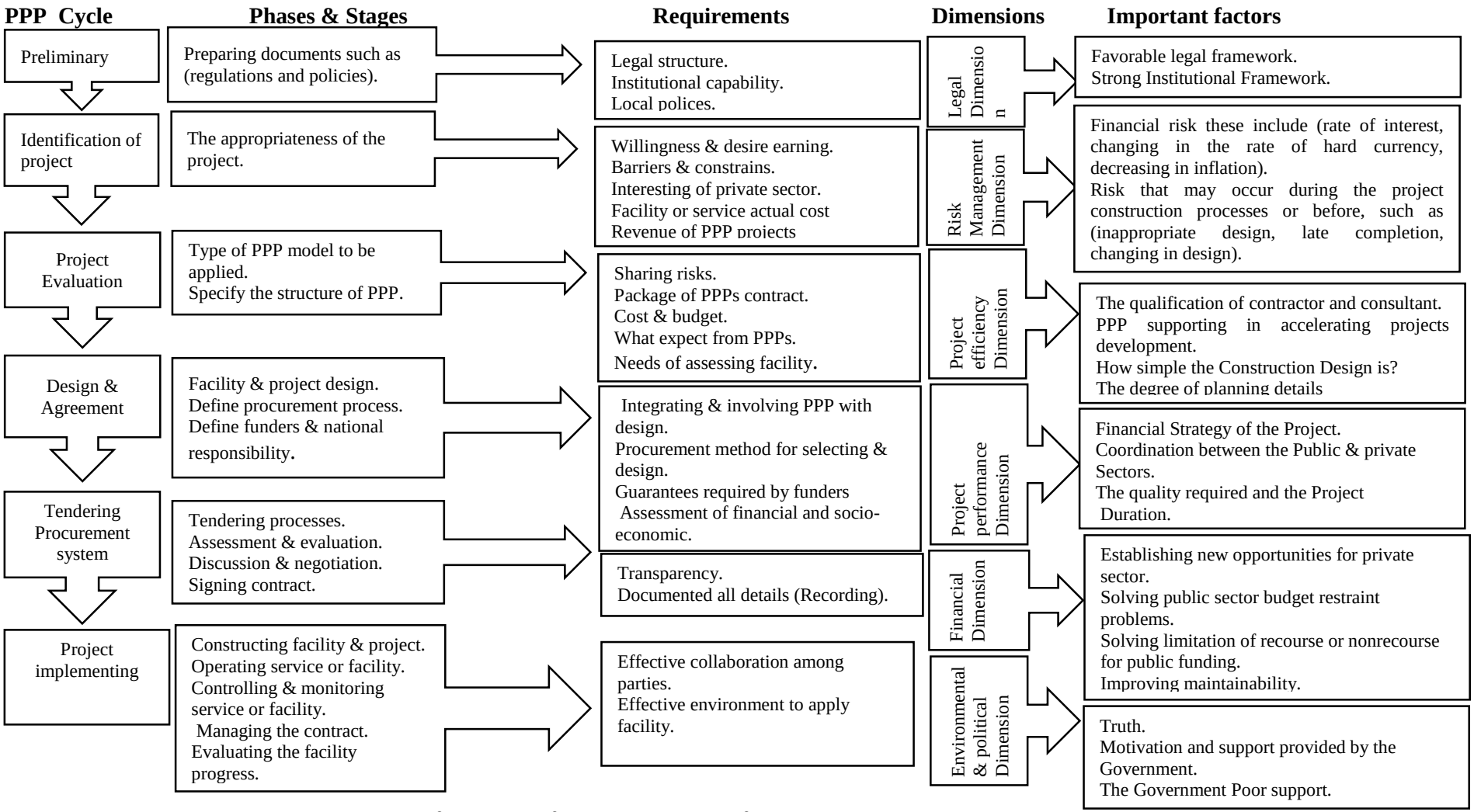

Figure 5.1: Conceptual framework for implementing of PPP projects in Sudan

5.4 Strategy for implementation PPP projects in Sudan

As shown in Figure 5.2. In order to implement PPP projects in Sudan Seven (7) stages should be followed in order to insure the applicability of this delivery method. Firstly Defining PPP basic concept among Public & Private sectors, this stage can be done through giving Meaning of the partnership, Attractive private sectors to invest in public facilities, and Raise the awareness of PPP advantages among the pasties (private, public and user of services). Second is Studying previous PPP projects for some countries, for example Malaysia PPP model and Ethiopia PPP model. Thirdly Establishing Standards of PPP legislations and laws. This means Establishing agencies to be responsible for preparing and evaluate PPP arrangements, Developing a nation PPP strategy, Allocating and dividing Risk among parties, and Adopting legal frame and legislation to be paralleled with nation strategy to better use of PPP . Fourth is Identifying PPP models to be suitable for Sudan. This could be achieved by Developing a nation model. Fifth is Educating ministries and private sectors. Sixth is Setting up a control unit to be in charge of all PPP projects. This unit should be responsible of Monitoring and controlling all Processes from preliminary stage until the end of PPP Contract, and developing the performance measurement system. Finally by following pervious stages appropriate PPP market with stable Flow of PPP arrangement will be met.

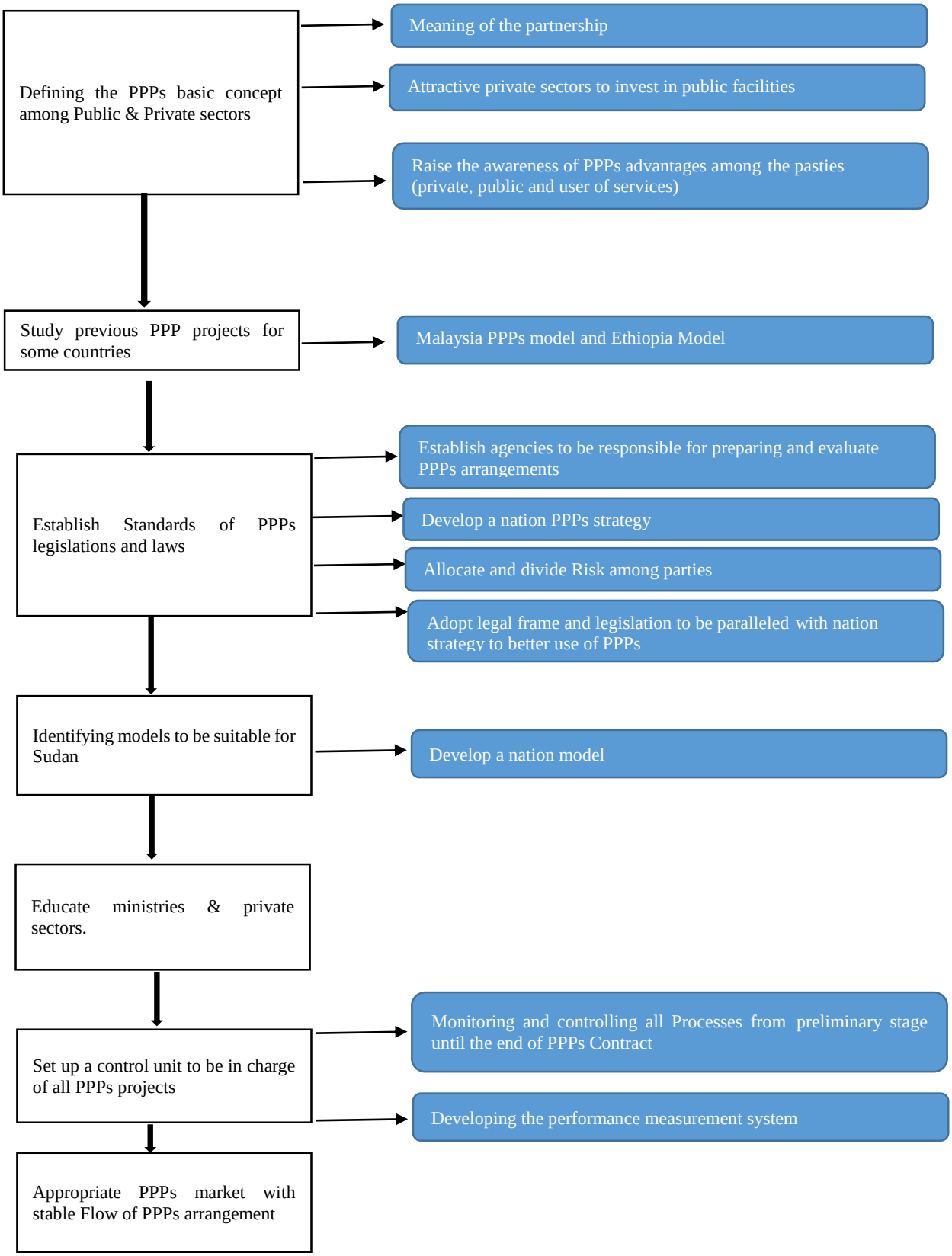

Figure 5.2: Strategy for implementation PPP projects in Sudan

Chapter 6

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

To sum up, Sudan has a poor infrastructure due to the lack of financial resources and the limitation usage of PPP agreements according to (www.raya.com). Therefore a need of PPP projects have become inevitable in order to help the government to meet its service delivery to people. This study has been conducted in order to analyze the factors which affects in adopting PPP projects in Sudan, thus assisting Sudan government to implement PPP projects by answering these four research questions:

1) What are the most important factors that affect the implementation of PPP projects in Sudan?
2) How do these factors contribute to PPP implementation in Sudan?
3) What is the suggested general framework for applicability of adopting PPP projects in Sudan?
4) What is the strategy for implementation PPP projects in Sudan?

- Data is gathered from questionnaires survey, which are issued in Khartoum capital of Sudan, in order to analyze the factors affecting the implementation of PPP projects in Sudan.
- Twenty six factors are collected from previous researches, these factors are categorized into six dimensions.
- Conceptual framework for the implementing of PPP projects in Sudan is represented in chapter five (Figure 5.1). This figure shows the life cycle, stages,

requirement, dimensions, and important factors for each dimension for PPP projects in Sudan.

- Favorable legal framework, Financial risk including rate of interest, changing in the rate of hard currency, decreasing in inflation, The qualification of contractor and consultant, Coordination between the Public & private Sectors, Establishing new opportunities for private sector, and Truth these are the most important factors for legal , risk management , Project efficiency , Project performance , Financial , and Political & Environmental successively.
- These important factors should give a well attention in purpose to implement PPP projects in Sudan.
- Strategy should be followed in order to adopt PPP projects in Sudan, this strategy is represented in chapter five (Figure 5.2).

6.2 Recommendations

6.2.1 Recommendations for applicability of PPP projects in Sudan

Depended on the outcomes of this study, following recommendations would be useful:

- Sudan is a promising country with vast resources and land, the only way to establish infrastructure project (that most needed) is through real partnership between private and public sectors. That partnership should be boosted professionally and raising the level of awareness and adherence.
- Applying this delivery method in agricultural, industrial and infrastructure projects
- Understanding the project type and its complexity in the selection of an appropriate delivery methods
- The guidelines and recommendations provided by the government better based on a win-win strategy.

- Private sectors should have good relations with the governmental organizations, to work on some infrastructure projects. This would have effect in the economy of Sudan, increasing the circulation of money.
- The government should give attention for PPP projects in order to develop construction sector in Sudan.
- Establish a firm regulations, roles and policies to protect private investors and funders rights.
- Attract international companies to have partnership with Sudanese government for infrastructure projects.
- In order to have a partner with local private companies, specific qualifications must be met by these companies.
- Provide supportive legal framework with applied regulations, cooperative management methodologies, provide clear and punctual payment system, and solve security issued issues in some parties in Sudan.
- Dividing the risk among parties in a fair and clear way.
- Establish a law to support the applicability of PPP projects in Sudan.
- There must be a transparency between public sector and private sector.
- The government should allow good profits for private sector by controlling the taxes duties and decreasing the investment interest in Sudan.
- Reducing the complexity of the partnership agreements, because of instability in Sudan which demands a lot of flexibility from the side of the project management.
- The government should encourage the private investors on the benefits attached to PPP as a means of project implementation.
- Reducing the gap between the private and the public sector.

- Maintain proper selection for all stakeholders assigned to control the project.
- Conducting workshop and seminars in order to raise the awareness of PPP projects advantages.

6.2.2 Recommendations for further research

Regarding to PPP projects a lot of aspects can be covered for further studies in Sudan including the following:

1- This research has limited to Khartoum capital of Sudan for further research more cities can be covered for example selecting one city from each state of Sudan so that the collected data could give a good picture for the further study.

2- This research was focused to analyze the factors which can affect the implementation of PPP projects in general. Further study can focus on specific area for example analysis of factors affecting the implementation of PPP in highways, water treatment, transportation, airports, agricultural, industrial, and dams.

3- Avoid using online survey due to lack of technology interactivity among Sudanese community.

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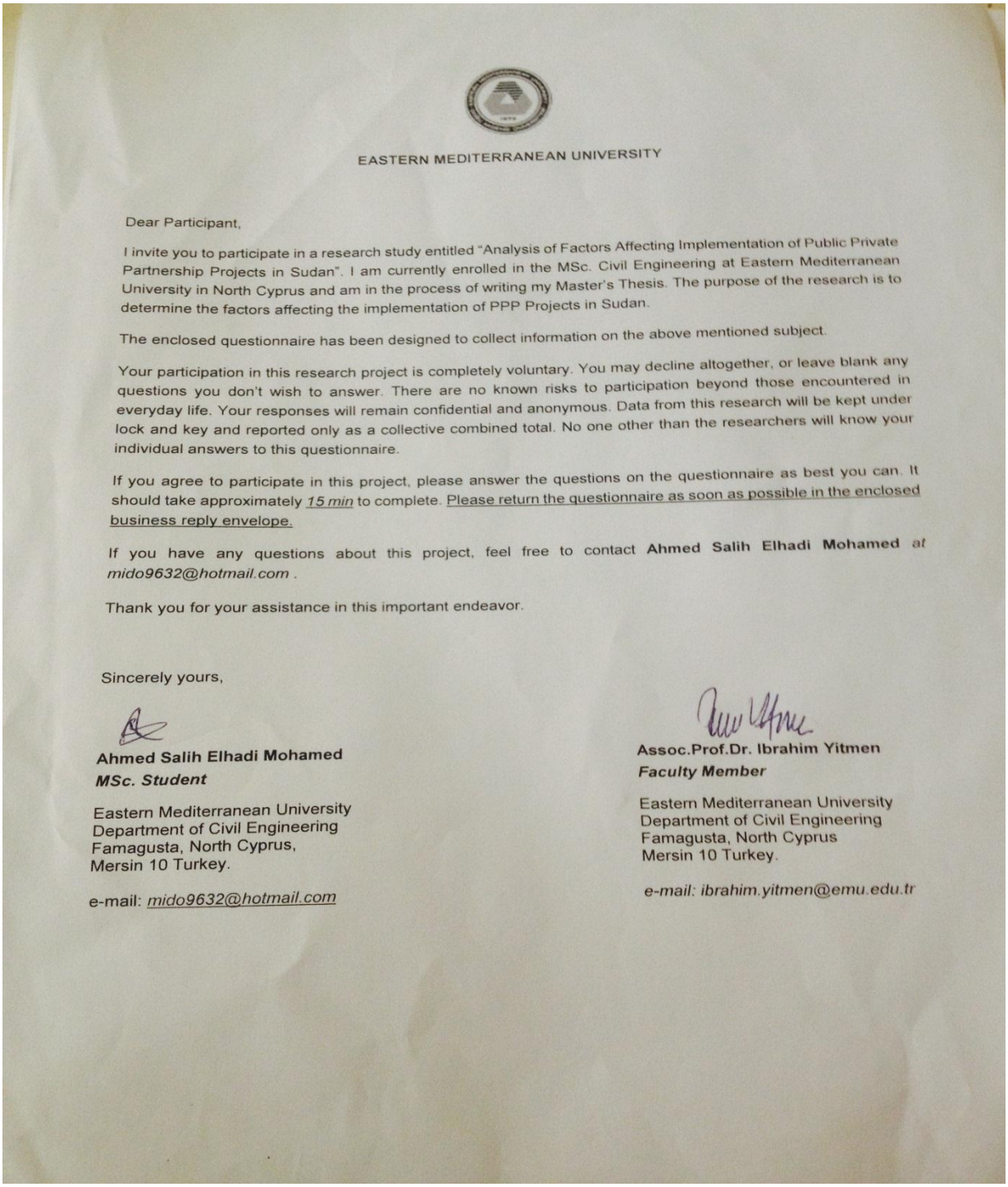
APPENDICES

Appendix A: Questionnaire Cover Page



EASTERN MEDITERRANEAN UNIVERSITY

Dear Participant,

I invite you to participate in a research study entitled "Analysis of Factors Affecting Implementation of Public Private Partnership Projects in Sudan". I am currently enrolled in the MSc. Civil Engineering at Eastern Mediterranean University in North Cyprus and am in the process of writing my Master's Thesis. The purpose of the research is to determine the factors affecting the implementation of PPP Projects in Sudan.

The enclosed questionnaire has been designed to collect information on the above mentioned subject.

Your participation in this research project is completely voluntary. You may decline altogether, or leave blank any questions you don't wish to answer. There are no known risks to participation beyond those encountered in everyday life. Your responses will remain confidential and anonymous. Data from this research will be kept under lock and key and reported only as a collective combined total. No one other than the researchers will know your individual answers to this questionnaire.

If you agree to participate in this project, please answer the questions on the questionnaire as best you can. It should take approximately *15 min* to complete. Please return the questionnaire as soon as possible in the enclosed business reply envelope.

If you have any questions about this project, feel free to contact **Ahmed Salih Elhadi Mohamed** at *mido9632@hotmail.com* .

Thank you for your assistance in this important endeavor.

Sincerely yours,

Ahmed Salih Elhadi Mohamed
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Appendix B: Questionnaire Survey

DEPARTMENT OF CIVIL ENGINEERING EASTERN MEDITERANEAN UNIVERSITY, TURKISH REPUBLIC OF NORTHERN CYPRUS

Analysis of factors affecting implementation of PPP projects in Sudan

PUBLIC PRIVATE PARTNERSHIP (PPP)

Concept of Public-Private-Partnerships:

PPP are contractual arrangements between public sector organizations and private sector investors for joint, symbiotic and collaborative provision and financing of public projects and services. These arrangements arise out of the realization that although the public sector is responsible for the delivery of infrastructure projects, it often encounters financial, technical and institutional limitations in availing such projects hence the necessity of collaborating with the Private sector in provision of such services (Link, 2006).

Public-Private Partnerships are designed to enhance the mutual sharing of costs, risks and benefits of infrastructure projects between the public and the private sector by exploiting the strengths of either side while simultaneously overcoming their limitations.

DEPARTMENT OF CIVIL ENGINEERING EASTERN

MEDITERANEAN UNIVERSITY, TURKISH REPUBLIC OF

NORTHERN CYPRUS

(A) PERSONAL & ORGNAIZATION DATA

1-Organization name (optional)…….

Kindly make a tick on the suitable answer

2-Kindly tick on your Educational qualification

I. PHD [ ]
II. M.Sc [ ]
III. B.Sc / B.Eng /B. Tech [ ]
IV. Other specify……..

3- For how long the organization has been operating?

I. 1-7 years [ ]
II. 8-14 years [ ]
III. 15-21 years [ ]
IV. Above 22 years [ ]

4- To Which sector does the organization belong?

I. Private sector [ ]
II. Public sector [ ]

5-kindly if it is a private sector make a tick on the section it belongs to;

I. Construction company [ ]
II. Consulting company [ ]

6- What is your position in this organization?

I. Engineer [ ]
II. Architect [ ]
III. Project manager [ ]
IV. General manager [ ]

(B) PUBLIC PRAIVATE PARTNERSHIP IN GENERAL

7- Do you have any background about what is Public-Private-Partnerships Project Delivery Method?

I. Yes [ ]
II. No [ ]

8- If yes, have you ever been a partner in any Public-Private-Partnerships project?

I. Yes [ ]
II. No [ ]

9- If you were a partner of PPP Project, to what degree does the Public-Private-Partnerships enhanced your organization performance?

I. Very Good Degree [ ]
II. Good Degree [ ]
III. Moderate Degree [ ]
IV. Little Degree [ ]
V. No Degree [ ]

10- To what extend do you agree with the effectiveness of Appling the PPP Project Delivery Method?

I. Very effective [ ]
II. Effective [ ]
III. Not effective [ ]

11. If PPP Project Delivery Method is to be applied in Sudan in a wide range, will it have effects on our infrastructure?

I. Positive effect [ ]
II. Negative effect [ ]

12. In your own opinions, what are the benefits of PPP Project Delivery Method?

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(C) Factors can affect PPP projects in Sudan

13. Indicate to what extend the institutional/ legal framework impacts the success of PPP Project Delivery Method in Sudan?

No	Degree	Factors	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
1		**Favorable legal framework**					
2		**Strong Institutional Framework**					

14- Please kindly tick (√) on the level of Risk management that could influence both (Public & private) sectors according to Sudan

No	Degree	Type of Risk	Strong Agree	Agree	Neither agree nor disagree	Disagree	Strong Disagree
1		**Risk that may occur during the project construction processes or before, such as (inappropriate design, late**					

	completion, changing in design).					
2	**Financial risk these include (rate of interest, changing in the rate of hard currency, decreasing in inflation)**					
3	**Reduction of the profit of the private sector**					

15- To which Degree you think these factor can effect on PPP Project Efficiency?

(In Sudan)

No	Degree	Factors	Strong Agree	Agree	Neither agree nor disagree	Disagree	Strong Disagree
1		**How simple the Construction Design is?**					
2		**Applying New construction Technology**					
3		**The qualification of contractor and consultant**					
4		**The degree of planning details**					
5		**PPP supporting in accelerating projects development**					

16- Rate these factors according to their influence to PPP project Performance?

(In Sudan)

No	Degree	Factors	Strong Agree	Agree	Neither agree nor disagree	Disagree	Strong Disagree
1		**Improving the buildability**					
2		**Financial Strategy of the Project**					
3		**Coordination between the Public & private Sectors**					
4		**The quality required and the Project Duration**					
5		**PPP can improve government integrated solution capacity**					

17- In term of Financial perspectives rate the influence of these factors (In Sudan)

No	Degree	Factors	Strong Agree	Agree	Neither agree nor disagree	Disagree	Strong Disagree
1		**Establishing new opportunities for private sector**					
2		**Improving maintainability**					
3		**Reducing the total project cost**					
4		**Solving the public sector budget restraint problems**					
5		**Solving limitation of recourse or nonrecourse for public funding**					
6		**Transformation of technology to local companies**					

18- Rate the influence of Political & Environmental of PPP projects in Sudan ?

	Degree	Factors	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
1		**the Government Poor support**					
2		**Motivation and support provided by the Government**					
3		**Truth**					
4		**Political Pressure**					
5		**Social and community Support**					

19- List others factors that you think may have effects on PPP project Delivery Method in Sudan?

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20- What recommendations would you suggest in order for PPP project to be applicable in Sudan?

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Thank you very much for having participated in this vital research work.

Appendix C: Organizations Involved In This Study

Public organizations

National High Authority

Ministry of infrastructure

Ministry of transportation

Dam's implementation unit

Customs services

University of Khartoum

Khartoum airport authority

Localities of Khartoum

Ministry of investment

Private organizations

DAL Group

ESD Company

Beyton Construction Company

Rest Point Consulting Company

Sudan pile for bridges and roads

Khateb & alami consulting company

Pertro energy Construction Company

Murtada Maaz Counsluting Company

Sudanese Centre for Engineering and environmental studies

Taqwa Construction Company

Style Construction Company

CCC Construction Company

WSAM PIPES Company

Trwoda Engineering Company