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UNIVERSITY OF THE WITWATERSRAND



THE VALUE CONTRIBUTION AND ROLE OF FACILITIES MANAGEMENT IN THE DESIGN PROCESS FOR OFFICE ACCOMODATION SERVICE TYPE PPP PROJECTS

BY

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MASTER OF SCIENCE IN BUILDING BY ADVANCED COURSEWORK AND RESEARCH:

A RESEARCH REPORT SUBMITTED TO THE FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT, UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE MASTER DEGREE OF SCIENCE IN BUILDING (MSc)

SUPERVISOR: PROF. DAVID ROOT

OCTOBER 2016 (RE-SUBMIT)

DECLARATION

I declare that this dissertation is my own unaided work. It is being submitted to the Degree of Master of Science in Building (Property Development and Management) to the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University.

……

(Signature of Candidate)

…….. day of ……..., ……

(day) *(month)* *(year)*

DEDICATION

I dedicate this to the Almighty God and to my late father and mother – Rev. Canon Manasseh Shole and Mrs Nonthutuzelo Shole – for all their sacrifices in ensuring I receive a quality education.

ACKNOWLEDGEMENTS

I would like to thank my supervisor Professor David Root for his meticulous scrutiny and constant support in guiding this research.

The Department of Construction Economics and Management team, who gave of their time and supported me throughout the programme. A special thank you to Associate Professor Samuel Azasu.

My family: For the love, support and understanding over the years. A special thank you to my sisters Gwen and Busisiwe Shole, as well as my nieces Molemo and Boitshepo Menyatso and Kgalalelo Shole.

ABSTRACT

In 1997, the South African government introduced Public Private Partnerships (PPPs) as an innovative procurement mechanism, in the form of a policy to regulate the delivery of public assets and services over a protracted period or concession. PPPs involve private sector entities in the form of a consortium or Special Purpose Vehicle (SPV), which signs a Project Agreement with Government and takes responsibility for delivering the infrastructure and long-term service though funding, designing, building, operating and maintaining the asset or service for the duration of the concession period.

The benefits of this type of procurement arise from the transfer of risk to the private entity, incentivising the entity to deliver value for money (VFM) and creating value by delivering innovative and integrated project solutions, which aim to reduce the whole life cost and maximise functionality of an asset.

The aim of this research is to examine the role of facilities management at the design stage in the delivery of office accommodation through the Public Private Partnership (PPP) model and how this could reduce maintenance costs throughout the whole life of the asset.

The research consists of one case study on a large and complex office accommodation-type service PPP project. It focuses on the three design defects identified, namely, the reinforced concrete floors, roof skylights and grey water tanks, and how these led to further maintenance costs that could have been avoided if proper facilities management was implemented in the design phase of the PPP.

The data obtained is self-report interviews, peer review journals, public and private sector issues project documentation and expert opinions.

The findings of the research indicate that the early involvement of facilities in the design phase can potentially mitigate the risk of design defects, reduce the cost of maintenance during the operational phase, improve communication with the professional team and increase the level of accountability. On the other hand, if these conditions are not met the design process suffers, as in this specific case of the headquarters of the accommodation serviced PPP project.

The research proved that these is limited literature on the collaboration of facilities management and design in the South African economy, as it is an emerging market which is constantly facing new developments and changes. However, the research proves due to the governance structures of PPPs, the organisation of the different private sector parties in the project development shows limited interaction.

This research yielded a number of recommendations for further study of assessing the viability and feasibility of a fully integrated design solution and due to the limited literature in office accommodation service-type PPP projects other case studies of a similar nature must be analysed, in conjunction with further quantitative and qualitative research to confirm the validity of the findings.

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ABBREVIATIONS AND ACRONYMS

DBFO	Design, Build, Finance and Operate
D&C	Design and Construct
DFI	Development Finance Institution
DFID	Department for International Development
DIRCO	Department of International Relations and Cooperation
FM	Facilities Management
GPG	Gauteng Provincial Government
GTZ	German Development Bank
IAFM	Imbumba Aganang Facilities Management
IAPP	Imbumba Aganang Private Party
LCC	Life Cycle Cost
LTA	Lenders Technical Advisor
MFMA	Municipal Finance Management Act
NT	National Treasury
O&M	Operations and Maintenance
OSC	Operations Subcontractor
PFMA	Public Finance Management Act
PPI	Producer Price Index
PPP	Public Private Partnerships
RSA	Republic of South Africa
SPV	Special Purpose Vehicle
USAID	United States Agency for International Development

1. INTRODUCTION

1.1. Background to the study

Governments throughout the world, with limited public funds, often utilise the public private partnership (PPP) procurement model to meet the demands of their citizens in delivering public infrastructure and services (Ibrahim, Price and Dainty, 2006). The public procurer enters into long-term contractual agreements with the private sector for the financing, design, construction, maintenance and operation of an asset. The motivation is to ensure value-for-money (Siemiatycki and Farooqi, 2012), project success, life-cycle management, transfer of risk and accountability.

However, as PPPs are a means of using private finance and skills to deliver capital investment projects traditionally provided by the public sector (El-Haram and Agapiou, 2002), Jensen (2011) argued that one of the problems in the building industry is a limited degree of learning from experiences of use and operation of buildings. The missing link between PPP and facilities management (FM) involvement in design is the lack of development of professional FM and limited knowledge transfer from building design to building operation.

Hence, strategies methods and barriers for the transfer and integration of operational knowledge into the design process need to be discussed (Jensen, 2011) to improve the integration of FM in design. It is argued that building clients must take a on a leading role in defining and setting up requirements and procedures. Involvement of professional facilities managers in the design process is an obvious strategy, but increased competencies are needed among building clients, designers and the operational staff (Jensen, 2011).

Post South Africa's democratically elected government in 2004, PPPs have become increasingly popular in the delivery of public infrastructure and services and widely adopted as an alternate procurement method more than other countries on the continent. Although PPP-type procurement was extensively used for

engineering and infrastructure projects such as water, energy, roads and bridges, in South Africa (SA) PPPs have been extended to building projects like hospitals, schools and recently office accommodation.

As the first South African flagship PPP government office building was built in 2003, there has only been limited research carried out into the procurement model as well as the impact of providing an integrated project delivery process. Furthermore, very little has been written about and documented on the effect of early consideration of outsourced facilities management at the design phase in PPP projects and its impact throughout an assets life cycle in reducing maintenance costs. Knowledge transfer and the development of professionalism in FM is required to amend this situation.

The consequence of this, in not knowing or not being able to demonstrate the impact of the direct involvement of the external facilities manager in the design stage in reducing maintenance problems during the operational phase of a facility, means neither will it be able to determine the economic efficiency nor how value for money is achieved in accommodation service type PPP projects.

This research report re-assesses and analyses the role of the facilities manager as the in operation and design within the PPP framework. The impact and link between PPP and FM's involvement in the design phase. This is the purpose of this research. The research will focus on a large and complex office accommodation-type service PPP project.

1.2. Research motivation

The research proposal seeks to evaluate the integrated development approach of facilities design and management in the delivery of Government office accommodation, by utilising Public Private Partnerships (PPP) as a procurement model in order to meet asset optimisation.

The research was motivated by:

- The need to establish whether direct involvement of facilities management in the design stage of PPP office accommodation projects can significantly reduce the maintenance problem during the operation (concession) period of a facility; and

- Although a large number of academic papers have been published with PPPs as subject matter, there is a lack of systematic review of the public procurement of facility management (Wang, 2014).

This research paper will thus make a contribution to the general body of knowledge of PPPs, while also achieving economic efficiencies in the delivery of integrated large-scale development projects in South Africa by adopting innovating procurement methods.

1.3. Statement of the problem

The role of facilities management (both operations and maintenance) is central to reviewing the scope of design as part of the team of professionals, in ensuring that there is a reduced need for major repairs and alterations that would otherwise occur at the operations phase (Arditi and Nawakorawit, 1999). It has been further argued by Wang *et al.* (2013) that considering facilities management (FM) at the early design stage could potentially reduce the efforts for maintenance during the operational phase of facilities.

However, few efforts in the local building industry have involved facilities managers in the design phase of PPPs, due to limited learnings experiences the development of the professional facilities management can be seen as the links to bridge between building design and building operation. However surprising as it has been suggested that the early adoption of facilities management will contribute to reducing the needs for major repairs and alternations that will otherwise occur at the operational phase.

1.4. Research question

The consequence of not being able to demonstrate the impact of early consideration of facilities management at the project design phase, in order to reduce premature degradation of assets leads to the primary research question, which is intended to demonstrate that early involvement of facilities management in the design phases of PPP office accommodation projects is beneficial in the long-term.

From this, the primary research question is:

- *Can the direct involvement of facilities management in the design stage reduce maintenance costs during the operational phase of a PPP serviced office accommodation facility?*

1.5. Research objectives

Several research objectives need to be achieved in order to adequately answer the research question. These are:

- To establish whether the early involvement of facilities management at the design stage in a PPP procurement model minimises maintenance needs further down the line.

- To identify how facilities management principles can be better integrated into the design phase of PPP projects.

1.6. Delimitations

PPPs in South Africa have a relatively short history of less than twenty years post the democratically elected government. This is despite the country having a huge infrastructure backlog prior to 1994, hence have set out boundaries for this study, including the subject areas the author will not investigate and literature which will not be reviewed..

The researcher has defined the parameters of the research as the following due to the limited amount of research in office accommodation:

- The financial efficiency of PPPs locally and globally.
- The economic efficiency of whether an office accommodation service PPP project delivers value for money (VFM) in creating innovative and integrated project solutions.
- If delivering an integrated development approach will demonstrate cost savings for accommodation service type PPP projects.
- The availability of a PPP secondary market, due to the level of maturity of the sector. Based on a research study done by Deloitte (2013) the PPP secondary market emerged in the UK 2000/2001, when equity investors in earlier PPP projects found buyers for their equity positions, which allowed them to realise their returns prior to the end of the concession period.
- Traditional procurement methods compared to PPP procurement. Rather, it will look into the application of PPPs in office accommodation delivery.
- The different types of solutions available in aspects of design, building, operation and transfer.

1.7. Methodology

The nature of the study was exploratory and consisted of a single case study. The case study undertaken was large and complex enough to obtain substantial information. It focused on the three design defects identified, namely, the reinforced concrete floors, roof skylights and grey water tanks, and how these led to further maintenance costs that could have been avoided if proper facilities management was implemented in the design phase of the PPP.

In this research, a systematic approach was undertaken in analysing PPPs. The research study is structured with a strong basis on the literature review conducted to identify PPPs as observed in previous research from both the private and public sector's perspective. This then established a foundation for the study to support the development of self-report interviews. A comprehensive review of related

literature and critical industry reports from public and private sector project documentation and expert opinions.

1.8. Structure of the dissertation

Chapter 1: Introduction - The introductory chapter introduced the researcher's area of study, including a full statement of the aim, research questions, hypothesis to be tested as well as research objectives and an explanation of why the subject matter is worth studying.

Chapter 2: Literature review - The section reviewed literature on public-private partnerships, as well as infrastructure projects, facilities management, design and integration. The area of study is defined first, indicating other comparisons or previous research done, then identifying further research areas and developing a list of mitigating factors.

Chapter 3: Methodology - This section discussed the methods of research conducted, as well as how the data was collected, the sample size, specific case study and analysis thereof. The methodology is based on a case steady strategy that primarily makes use of qualitative methods. This is due to it being exploratory in nature. The case study will focus in particular on the three design defects identified, namely, the reinforced concrete floors, roof skylights and grey water tanks. The main type of data used in the case study analyses is through interviews and expert opinion. Supporting data will be extracted from peer review literature, public and private sector issued project documentation.

Chapter 4: Data presentation and analysis – This is based on reporting the facts that were researched. The main focus of this section is to interpret the results that analysed in the results section. The researcher has also indicated the relation of the findings to the goals and questions and that were stated in the introductory chapter (Saunders, M., Lewis, P. and Thornhill, A. 2012).

Chapter 5: Conclusions and recommendations - This section draws the conclusions and recommendation from this research. It discusses the findings

from the case study design in the PPP market including the design integration of facilities management. It also identifies possible areas of further research.

2. LITERATURE REVIEW

2.1. Introduction

This chapter explores the role of the public and private sector in the delivery of accommodation services PPP projects. Firstly it outlines the approach of public-private partnerships. To provide context, gives a detailed overview of the PPP procurement process and its governance structures. Thirdly provide a critical review on facilities management, design and integration from relevant, credible and reliable literature. In conclusion, the literature review will provide an analysis of design integration in facilities management

2.2. The role of the private sector in the delivery of public services

Funding new public infrastructure for cities has always been among the greatest challenges for government officials and planners (Walder and Amenta, 2003). Coupled with the risks of delays and cost overruns based on traditional planning, procurement and project management techniques were often blamed for non-delivery and poor performance. As a result, integrated procurement strategies combining private-sector management and financing formed the core of hundreds of deals, which have delivered public projects in the United Kingdom. These transactions are referred to as “PFIs” (Private Finance Initiatives) or “PPPs” (Public Private Partnerships).

The concept of private finance initiatives (PFI) as a way of managing and delivering public facilities and services, later than know as public-private partnerships (PPP), was introduced into the United Kingdom (UK) in the early 1990s. Under the PFI/PPP scheme, a special purpose vehicle (SPV) from the private sector is generally responsible to design, build, finance and operate a public projects for 20 to 30 years (Meng and Harshaw, 2013) in achieving value for money and improve efficiencies.

It is for this reason that in many countries with limited funds available for infrastructure, governments have opted to invite private sector entities to enter

into long-term contractual agreements for the financing, construction and/or operation of capital intensive projects to the public's benefit (Grimsey and Lewis, 2002).

The global shift from public to private financing of infrastructure development has led to a search for alternative and innovative procurement techniques. A public-private partnership is one such innovative procurement strategy for infrastructure development (Merrifield, Manchindi and Allen, 2002). Thus, as a result, the most prominent feature of public procurement strategy during the last three decades has been the introduction of private finance and services in sectors, which, traditionally, have been the responsibility of the public sector. This strategy has taken on various contractual forms, generally endorsed under the umbrella of public-private partnerships (PPPs).

Essentially, two PPP approaches have been widely used by governments for the development of infrastructure systems: The first is a finance-based approach that aims to use private financing to satisfy infrastructure needs, the second is a service-based approach that aims to optimise the time and cost efficiencies in service delivery (Aziz, 2007). Furthermore, government procures services to be delivered by the private sector to ensure efficiency, equity, accountability (Wang, 2014) and offer better value for money (VfM) than conventional procurement (Grimsey and Lewis, 2002).

2.3. Public Private Partnerships Governance & Structure

2.3.1. Definition of Public Private Partnerships

PPPs are an arrangement where the private sector supplies assets and services that were traditionally provided by the government by using private finance and skills to deliver investment projects. In a PPP procurement model the private sector has the primary role of finance, design, construction, maintenance and operation of state assets.

The main legislation governing PPPs at the national and provincial levels of government lies in the Public Finance Management Act (1999) (PFMA) and

Treasury Regulation 16. Municipals PPPs are governed by the Municipal Finance Management Act (2003) MFMA) and its regulation, as well as the Municipal Systems Act (2003) (MSA).

Treasury Regulation 16 of the PFMA allows PPPs to be developed with a range of characteristics. These all involve transferring risk to the private party for designing, financing, building and operating infrastructure services .Within the Act, PPPs are defined as a means of commercial transaction between and

2.3.2. The structure of PPP agreements

Grimsey and Lewis (2002) defined PPPs as agreements where public sector bodies enter into long-term contractual agreements with the private sector for the delivery of public sector infrastructure facilities by the private sector, and or the provision of relevant services.

Although PPPs are an evolving concept around the world, they are in contrast to the traditional public procurement method, which involves the public sector purchasing an asset. In contrast, the PPP system involves the purchase of a range of services defined in a service-level agreement done through a concession contract (Loosemore, 2007).

The PPP contracting structure is illustrated in Figure 2.1., which is a network of private sector companies that surround the Special Purpose Vehicle (SPV) or Private Consortium (Concessionaire) (Demirag, I., Khadadoo, I., Stapleton, P. and Stevenson, P. 2012).

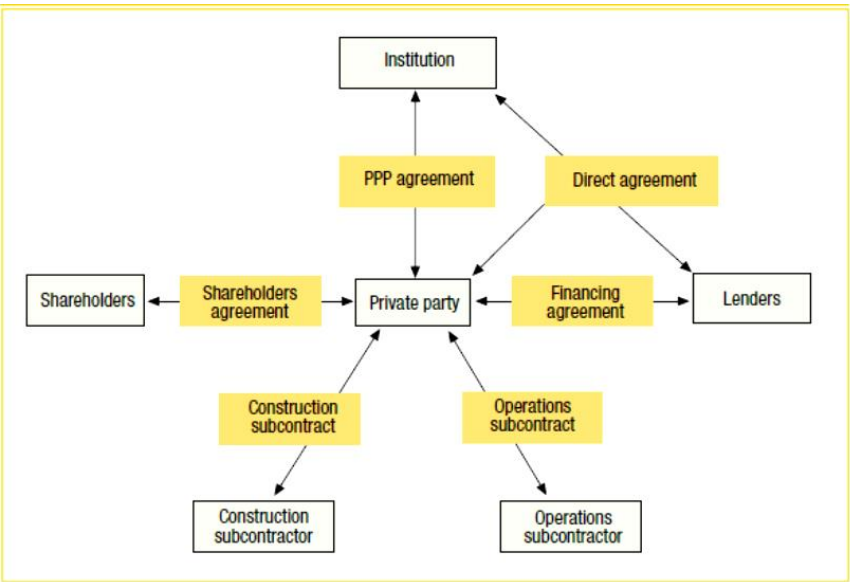

Figure 2.1. Structure of a typical PPP contract (Source: National Treasury PPP Manual, 2015)

As per Figure 2.1, shows the SPV or Concessionaire is appointed by the Government under a formal legally binding contract, whereby the SPV signs a project agreement that makes it responsible for delivering the infrastructure and long-term service though funding, designing, building, operating and maintaining the asset or service for the duration of the concession period (Loosemore, 2007; Demirag *et al.*, 2012).

Loosemore (2007) further explains that the private consortium is normally formed by a joint venture (JV) between a range of organisations including contractors, facilities managers, banks, investors and suppliers, who are willing to commit equity and/or resources to the project. Payments to the SPV to fund debt services normally commence after completion of construction – when the services have been made available to the public. During the operating period, the SPV receives income based on the usage of the facility.

As per Figure 2.1 above, illustrates the construction contractor can have sub-contracting arrangements in providing specialist services. Equity investment is usually made into the SPV by several equity investors. For some, their interest is purely in the financial return from the investment, but others are also subcontracting companies. These latter investors thereby have profit sources both from the construction or facilities management contracts and the financial return

on their investment. In practice, much of this ‘equity’ is subordinated debt (Demirag *et al*. 2012).

As further explained by Demirag (2012), the SPV or Consortium signs a loan agreement with a potential lender (commercial bank) and or a development financial institution (DFI) to raise senior and mezzanine debt as well as for the balance of the financing.

The aim of investing in a PPP project for the private sector companies is to achieve a return on their investment in generating sufficient future cash flows to cover initial capital costs and finance charges, thereby providing enough profit to invest in future projects and pay shareholder dividends (Loosemore, 2007).

2.3.3. The PPP secondary market

The secondary market for PPP assets, according to a Norton Rose Fulbright (2010) research study, arose largely as a result of contractors needing to free up equity tied up in existing projects in order to bid for and develop new projects. The early participants in the secondary market at the end of the 1990s and the early 2000s enjoyed limited competition and relatively high returns on their investments as a result, enhanced by their ability to refinance their investments at a lower cost following acquisition. A number of infrastructure funds quickly seized the opportunity and specialist secondary market-focused funds were established to take advantage of the perceived low risks and high returns associated with investing in PPP.

Such was the demand for these assets that certain construction companies holding substantial equity stakes in the projects they had developed now became the subject of takeover speculation by investors who saw an opportunity to acquire a large portfolio of PPP assets in one swoop, and hive out the construction side of the business as a second step.

As the competition for assets rose, the margins for investors began to come under increased downward pressure. At the same time, in an attempt to allay public concerns that the government was enabling the private sector to get rich off the

back of projects intended for the benefit of the public (and which were being funded through public money), owners of PPP assets were required to share their refinancing gains with the government, thereby further limiting the potential upside for investors.

The relatively transparent and certain nature of returns on these investments meant that the ability of a bidder to win an auction for a PPP asset became increasingly (some say exclusively) dependant on that bidder's cost of capital. Consequently, following the credit crisis, the number of active buyers in the market contracted sharply. This was due, amongst other things, to the lack of debt and the inability of infrastructure funds to obtain further funds from investors or, in certain cases, reluctance on the part of the fund managers to draw down committed funds from increasingly cautious investors (Fulbright, 2010).

The availability of a secondary market in South Africa is still at the developmental stage, based on the potential quantum of PPP equity available to the market. The secondary market has the potential of attracting investors with a well-defined exit route, which would allow bidders to sell most of their equity stakes once projects are operational. A further benefit to the South African market would be that developers could recycle their equity through the PPP secondary market, in order to fund a large number of projects instead of tying-up the equity for the full concession period (Deloitte, 2013).

2.3.4. The developing South African PPP market

In 1997, the South African National Roads Agency's N3 and N4 toll roads were the first projects to enter the PPP market, followed by the first two Correctional Services private prisons in 2000, which were successfully implemented long before the South African National Treasury established the PPP Unit.

Based on these successes and lessons learned, the PPP Unit delivered the first office accommodation service type PPP, namely the Department of Trade and Industry head office, in 2003 with a 25-year concession. The transaction was criticised for its high development costs in comparison to a traditional

procurement model. This may have been due to a number of factors, such as Treasury officials' lack of prior experience in the delivery of PPP office accommodation procurement.

The research findings demonstrate that, although PPPs in South Africa have a relatively short history, of less than twenty years, in comparison to that of developed countries, such as the United Kingdom (UK) and United States of America (USA), the local PPP market has matured. South Africa is known as the most advanced, diverse and productive economy in Africa, and the only one known to procure government office accommodation PPP projects. The demand for PPP procurement office accommodation is on the increase, as evidenced by the iconic Gauteng Provincial Government Kopanong Precinct project, which will lead to state-of-the-art inner city re-development in Johannesburg. The Kopanong Government Precinct via a Public Private Partnership will bring all head offices of the Gauteng Provincial Government departments within walking distance of customers while also regenerating investment in the Johannesburg Central Business District (Source: .http://www.did.gpg.gov.za).

2.3.5. PPPs: Are they a panacea for service delivery?

Literature has demonstrated that the nature of PPP projects in South Africa forces government to not only look at a defined construction cost, but also at the maintenance and full life-cycle costs of large infrastructure projects as an effective ways of leveraging government money through private sector financing and enabling governments budgets to go further.

Benefit aside these are no quick fix as in South Africa PPPs have long delivery gestation periods and lead times. They typically take a while to reach financial close and the process has been erratic in the past in terms of political will, which, for example led to the cancellation of the outsourced PPP prison tender in 2011 (Creamer, 2011). Due to the complex nature of PPPs, there may also be an issue around the varied skill levels required – or lack thereof – from both the private and public sector alike.

In a research study conducted by Engineering News in 2010 on the outlook for PPPs, it became apparent that both the public and private sectors are committed to the improvement of infrastructure delivery.

PPP projects offer an alternative procurement model in comparison to the traditional form of procurement, which is challenged by service delivery and budget constraints. Furthermore, the PPP option provides private-sector expertise know-how by instilling a new discipline with regards to financial, operations and accountability matters (Holman, 2010).

To date, according to the National Treasury's database, adjusted for the Department of Energy's (DoE) Renewable Energy Independent Power Producer (REIPP) procurement programme, South Africa has the greatest cumulative experience of PPPs in Africa, with over seventy-two (72) PPPs reaching financial close at national, provincial and municipal level, since 1994. There's also a projected pipeline of some 70 projects under active consideration and planning in all spheres of government.

South Africa's main distinguishing success factor in the delivery of PPPs in comparison to other developing countries is its sound treasury, constitutional and governance arrangements as well as a well-developed private sector (Grant Thornton Strategy Solutions, 2015). The National Treasury has built on almost two decades of PPPs and developed a framework and manual defining the contract between public sector and private sector.

The main operational conclusion that can be drawn from this is that although the South African government is new to PPPs, there is a definite need and demand for them in addressing service delivery backlogs and financing rundown public facilities and services, which had received increasing public criticism in the past.

2.3.6. Benefits of Public Private Partnerships

Governments have looked at PPPs to radically improve infrastructure networks and enhance service delivery. This alternative procurement method – which involves risk-sharing and responsibility with private firms but ultimately retaining

control of public assets – will improve services while avoiding the pitfalls of privatisation of unemployment, higher prices and corruption (Rwelamila and Phungula 2009; Farlam 2005).

South Africa's National Treasury believes that PPPs could offer a number of benefits to the South African public, including reduced financial, operational and technical risk exposure for government, as well as the fast and cost-effective execution of projects and the freeing up of scarce public funds for use on other social spending demands. (Holman, 2010). By sharing the cost and risk of projects with private companies, government can make its limited budget stretch further to tackle critical needs in other sectors.

According to Farlam (2005), PPPs bring efficiency of business to public service delivery, by allowing governments to retain ownership while contracting the private sector to perform a specific function such as building, maintaining and operating infrastructure like roads and ports, or providing basic services like water and electricity. Both private and public sector stand to benefit from the contractual agreement. Government earns revenue by leasing state-owned assets or alternatively pays the private sector for improved infrastructure and better service delivery. Often, the private sector can do the job more efficiently, which can lower prices and improve rollout. The private operator is reimbursed by either government or consumers for doing this work, at a profit.

Wang (2014) argued that from the viewpoint of the public sector, PPPs are an innovative, "buy-now-pay-later" procurement method, which releases State from the management of design, construction, operation and financing of public infrastructures.

With regards to the private sector, PPPs indicate an extended construction project, in which a long-term comprehensive contract, in the form of a concession, with the public sector secures long-term revenue and a relationship with the government. The combination of these traditionally segregated phases of public projects, such as design, construction and operation, requires the private party to consistently manage the whole life of the project. The private sector thus has to

adopt a whole-life costing vision to plan and manage the project, so as to deliver integrated services to the public.

Under the new role of bidding for whole-life cost in PFI procurement, the construction industry is expected to improve design innovation and budget "more for less", in order to reduce the long-term running costs of the infrastructure. In theory, PPPs should also bring value for money to the private sector and the end-users of the infrastructure. The integrated whole-life project management of PPPs brings more risks as well as opportunities to the private sector.

Brewer, Gajendran, Jefferies, McGeorge, Rowlinson and Dainty (2013) further argued that a principal advantage in PPP projects has been the purported increased innovation generated by successful consortia.

2.3.7. The negative impact of Public Private Partnerships

The South African climate has increasingly been receptive to public private partnerships (PPPs), especially considering that the first PPPs were established in the mid-2000s with a pipeline schedule of nearly 140 existing and projected projects. However, despite the country's success in the implementation of PPP projects, there have been failures in the delivery of correctional services facilities.

In 2011 the South African government cancelled a much-delayed PPP process for four new prisons, which would have added 3,000 additional beds to the Paarl, East London, Nigel and Klerksdorp correctional centres. The reasons for the cancellation were based on a number of financial and operating problems with the PPP model, including the fact that it conflicted with policy stipulating that security and custodial services of the State cannot be handed over to third-party agents (Creamer, 2011).

The PPP procurement process was initiated in 2003 with the appointment of a transaction advisory team appointed to study the feasibility in partnership with the private sector. The request for qualifications was released in 2007 and the tender closed in 2008.

As a corrective measure, private companies claimed compensation from government for the costs incurred for submitting their bids (Cokayne, 2011). The cancellation of the prison tender created the perception of instability in the PPP market and resulted in a decline in business confidence.

2.4. Accommodation Service PPP Projects

The specific characteristics of accommodation service PPP projects are generally complex in nature, with multiple factors and a multi-discipline consortium. This includes a need for deep understanding and experience of the risk allocations within the PPP scope.

The South African government has preferred the PPP model to procure office accommodation as the private partner can manage the asset, as well as raise debt and provide equity, allowing the State to buy now and pay later.

2.4.1. PPP procurement process for office accommodation projects

This section outlines the generic PPP project procurement cycle process and the tasks the National Treasury undertakes at each stage. The PPP project cycle enables the three regulatory tests of affordability, value for money, and risk transfer to be applied at every stage for procuring and managing a PPP agreement.

The key stages of the PPP procurement process are illustrated in Figure 2.2.

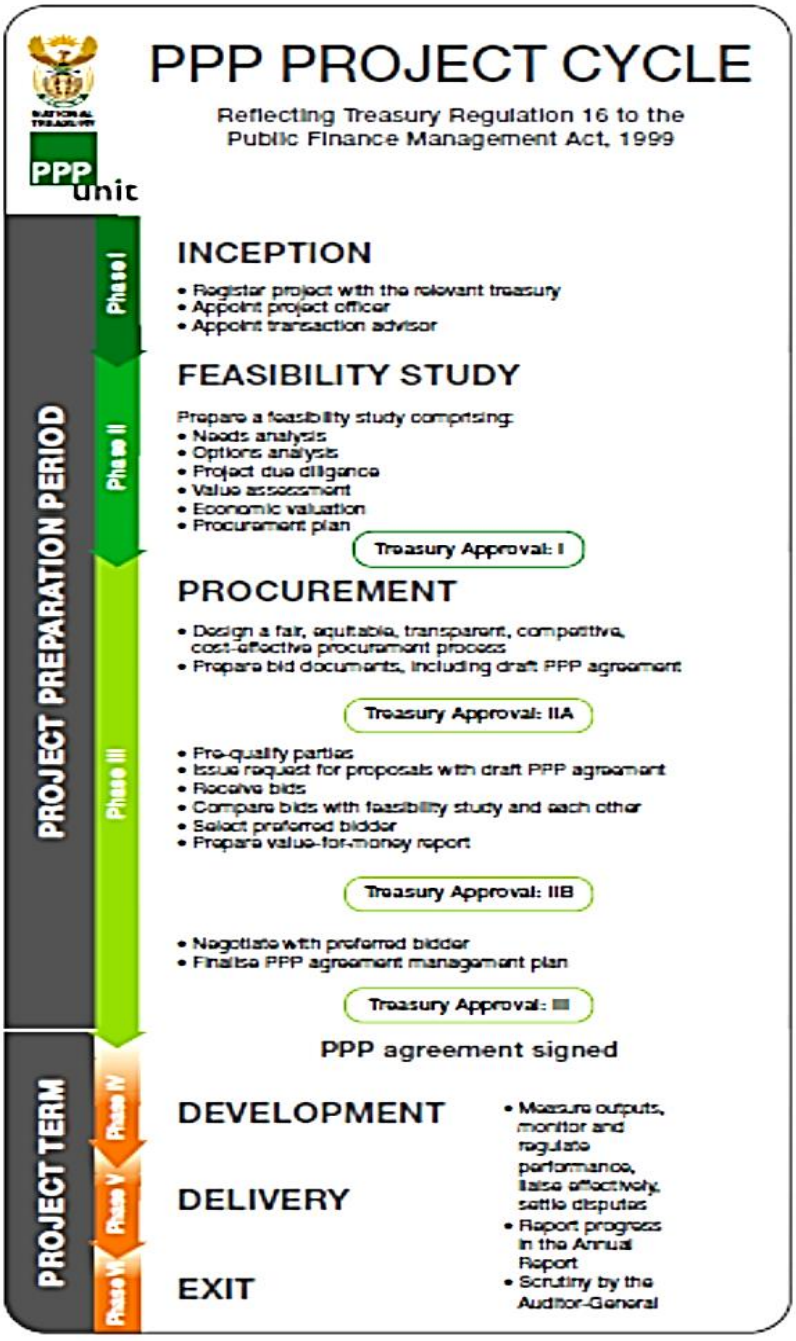

Figure 2.2. The key stages of PPP Procurement. Source: National Treasury PPP Manual, 2015)

PPP procurement commences with the project inception, whereby the government institution starts a review of user requirement needs. Once the institution has identified a project, to determine whether the proposed PPP is in the best interest of the government it proceeds to the investment option appraisal step by undertaking a feasibility study.

The feasibility study determines the type of project to procure, defining the scope of the project as well as its affordability. At this stage, before issuing any procurement documentation for a PPP to any prospective bidders, the institution must obtain approval from the relevant treasury body. The procurement documentation will include the output specifications. Once Treasury Approval IIA is achieved, as illustrated in Fig. 2.2 the institution may advertise the project to the market and carry it out in a way that is fair, equitable, transparent, competitive and cost-effective. At this stage the institution evaluates the bids, but prior to appointing the preferred bid, the institution must submit a report for approval to the relevant treasury, demonstrating how the criteria of affordability, value for money and substantial technical, operational and financial risk transfer were applied in the evaluation of the bids.

After the procurement and adjudication procedure, the institution selects its preferred bidder and the institution commences negotiations with the consortium on the contractual PPP agreements.

At financial close, the PPP project moves into implementation stage. The institution does not commence the unitary payment before the project facility has been commissioned and accommodation service is operational.

At the commissioning phase, the government department inspects the facility and approves as it being available. Subsequently, the project moves into its operational phase, where the institution's primary role is to ensure that it receives the services it is paying for in the form of a unitary payment (Rintala, 2004).

In comparison to the delivery of PPP projects as described above, in a traditional accommodation process the government department initially obtains budget approval from National Treasury for the design and build of a new building. Once the budget approval is granted, the user department will appoint a team of professionals through an open tender. These professionals, such as architects, quantity surveyors and engineers, will develop a design solution for the facility. Once a detailed design is complete and all necessary documentation complete, a bidding process is undertaken to select the best contractor to build the facility.

Then, only when the building is near completion will the user department appoint a number of operational and maintenance service providers, over a limited period such as five years. Once the service contract ends, in line with the National Treasury procurement regulation, a competitive bidding process is undertaken (Rintala, 2004).

2.5. Facilities management

Since the late 1980's, globally, there has been rapid development in facilitates management and over the last two decades it has evolved into a new discipline and profession in the construction and property industry (Meng, 2013 cited Tay and Ooi 2001). However, Meng (2013) and many other authors argue that facilities management is usually considered as a post construction service, and that the direct involvement of FM specialists as a key aspect of design function is often absent or minimal.

However in defining facilities management, literature explains it as the responsibility of coordinating numerous disciples to ensure an efficiently running organisation and optimal working environment in delivering a coordinated real estate solution.

Furthermore, most authors and industry leaders have defined the concept of facilities management, with each providing their own view. For example, the International Facility Management Association (IFMA), defines facility management (FM) as "a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, processes and technology" (International Facility Management Association, 2015), whereas the British Institute of Facilities Management (BIFM) defines facilities management as the "practice of coordinating the physical workplace with people and work of an organisation".

Other industry leaders have described facilities management as a complex area, bringing together services related to asset management, building operations and maintenance and business support services (Kadefors, 2008). Further, Enoma,

(2005) defined the responsibilities of facilities management as the hard issues of a building being the equipment, furniture, processes, people and their safety environment.

2.5.1. Overview of the South African facilities management market

In South Africa, both public authorities and private companies increasingly outsourced their facilities management services to external suppliers. Such outsourcing began in mid-1992 and has grown steadily since.

A comprehensive survey and research study carried out by Frost and Sullivan[1] in 2010 of the South African facilities management market estimated that about thirty (30) percent of the total volume of facilities management services was outsourced, leading to fierce competition amongst service providers for shares of a limited market.

The results of the report highlight that the FM market lacks the skills that are most pertinent in management and those requiring technical skills, in building maintenance and repair, electrical and lighting, plumbing, Information Technology (IT) support and HVAC (heating, ventilation and air conditioning) expertise are severely lacking. One of the challenges identified in the research is in the FM industry there is a limited development of professional facilities management and being formally recognised, this is due to a lack of accredited training courses.

Whilst facilities management as an outsourcing management function offers numerous advantages, such as cost savings and efficient facilities, most end users are unaware of its benefits because it is simply not recognised as a professional formal industry.

Despite its limited recognition, the demand for facilities management among end users, especially in the public sector, will increase based on the current maintenance backlog and required infrastructure development. The rising demand

[1] Frost and Sullivan is a consulting firm which provides market research and analysis, growth strategy consulting, and corporate training services across multiple industries

for facilities management services will accelerate the process of formalising the industry and regulate competition levels, which will result in the formation of several innovative business and job opportunities.

2.5.2. Facilities management (FM) in Public Private Partnerships (PPP)

Facilities management in PPPs should meet two sets of conditions: To maximise the consortium's profitability and to meet the client's minimum service specification (Brewer *et al*, 2013 cited Campbell and Ridley, 2001).

Facilities management or Operations and Maintenance (O&M) in the PPP context presents government with certain efficiencies. As a result, it is generally the Facilities Management provider or Operations Subcontractor (OSC) who is then penalised, directly or indirectly, for failing to meet minimum service requirements, and the FM provider is usually publicly identified if any such unfortunate circumstances arise. It is therefore perhaps not surprising that FM contractors have been noted as adopting pro-client stances during the design phase of PPP projects, in order to specify the highest quality products and materials, and therefore reduce their risk during the operational phase (Brewer *et al.*, 2013).

In previous studies relating to the early involvement in FM under the PPP procurement model authors such as El-Haram and Agapiou (2002) identified the key strategic significance of FM in the long-term focus of PPP type projects, by highlighting the specific responsibilities of a facilities manager during a PPP project include (1) reviewing and assessing the design from maintenance, operational and serviceability point of view; (2) identification and selection of the optimum maintenance and replacement strategies; (3) identification and selection of the optimum operating scenario and (4) liaison with the design and construction team to select the cost effective design option that will optimise whole life costing.

2.5.3. Integrated approach of facilities management and design in PPP

Many facilities managers contribute to the design process for new buildings. Wang *et al.*, (2013) further argued that considering facilities management at the early design stage could potentially reduce the efforts for maintenance during the operational phase of facilities and significantly reduce the needs for major repairs and alterations that would occur at the operational phase. Brocher (2003) highlighted that the importance of communication between facilities management specialists/teams and designers at the design stage is underlined by the observation that designers do not return to assess the performance of buildings they are responsible for.

Hence in theory in FM specialist can be involved in the design process of any involvement is more prominent and suitable in the design process of PPP projects (Weng, 2013). As previously defined a PPP project, is whereby one project company takes a single point of responsibility of design, build, and finance, maintain and operate for a specified period. Whereby the designer, contractor and FM provider integrate together (Fig. 2.3). As literature illustrates the involvement of the FM in this type of project should result in good communication and the FM specialist playing a significant role in the team.

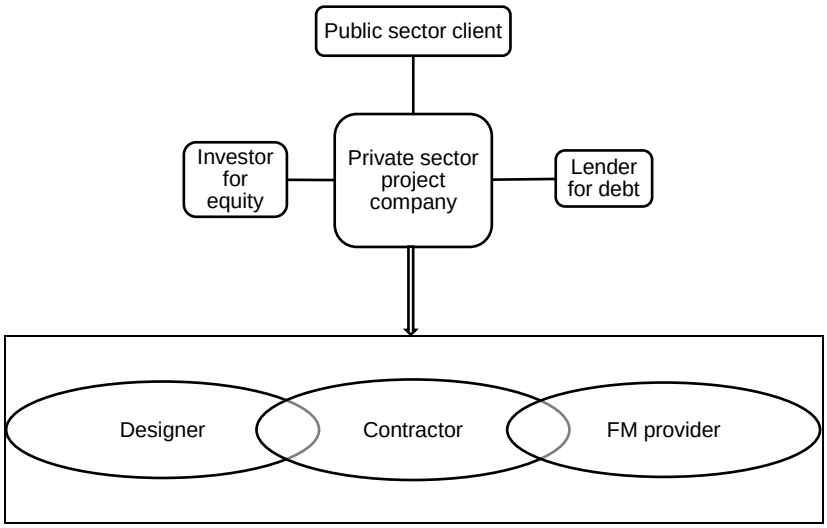

Fig 2.3 Integrated approach of facilities management, design and construction under a PPP procurement framework

Furthermore, as an alternative, in implementing corrective measures for the failure to integrate facilities management in the design phase in a PPP project, Brown, Hinks and Sneddon (2001), provided an alternative in establishing a facilities management-led approach, which could fundamentally change the gearing of office accommodation workspace provision. For a facilities management organisation, the long-term commercial interest is linked to the long-term success of the performance of the asset they will eventually manage. Hence, multiple strategies are required to improve and encourage the integration of facilities management in design.

2.6. Design management

The design of a building or facility has two functions, as design is both protective and supportive in terms of the activities that the facilities are intended to shelter (Brocher, 2003). Design is defined by Kotler and Rath (1984), as cited by Cooper and Press (1994), as the process of seeking to optimise consumer satisfaction and company profitability through the creative use of major design elements (performance, quality, durability, appearance, and cost) in connection with products, environments, information and corporate identity.

The definition above indicates that design is a collaborative process that brings together the end-user requirements with company strategic objectives, ensuring it interfaces with the consumer's environment in creating aesthetically pleasant spaces.

In PPP projects, the design team consists of a multidiscipline of professionals all centered in the built environment – architects; quantity surveyors; engineers (i.e. civil, structural, mechanical, civil); facilities and construction management; consultants; contractors; suppliers; subcontractors; manufacturers; and the planning supervisor usually required by law, who may come from any discipline (Enoma, 2005), generally creating a complex governance structure.

All of the above disciplines are coordinated by the Principal Agent or lead Project Manager (PM), who ensures that the design process is effectively managed. The

PM will monitor progress, measure performance and implement control mechanisms.

Furthermore, in all PPP projects the client allocates the design aspects of the building to the private party including all associated risks. This is because the professional team are the best positioned to manage the design and construction process and eliminate fragmentation.

2.6.1. The effect of design on maintenance

A study carried out by Ali, Keong, Zakaria, Zolkafli and Akashah (2013) argued that any negligence during the design phase could result in difficulties in building maintenance, thus increasing the building life cycle cost[2] in the future. This statement indicates that maintenance issues often arise when the building performance does not meet the standard and quality designed, resulting in buildings that are difficult or costly to maintain.

The effect of poor design in newly completed buildings is termed as defects, whereby the building specifications are not achieved, resulting in non-conformance and non-compliance. Defects are categorised as either patent defects or latent defects. Ali *et al.* (2013) defined patent defects as the aspect of building work caused by normal wear and tear, while latent defects are referred to as arising from poor construction workmanship. Design defects are evidence that maintenance decisions were not incorporated during the design phase, especially in the selection of materials and products including installation mechanisms.

2.6.2. The role of facilities management in design

Traditionally in the built infrastructure development, interaction and communication between project management (PM) teams, those involved in the planning and design of an asset and those in facilities management (FM) are usually limited (Wong, Kumaraswamy, Mahesh and Ling 2014). In contrast,

[2]Life Cycle Costs are defined by the British Standards Institute as 'costs of an asset or its parts throughout its life cycle', while whole life costs are defined as 'all significant and relevant initial and future costs and benefits of an asset throughout its life cycle.' (Meng and Harshaw (2013)

Enoma (2005) argued that FM involvement at the design stage will add value to a facility by ensuring less 'rework', emphasising value for money, as well as efficient control of the supply chain and team work.
However, according to Fergusson (1993), increased stakeholder integration on projects can bring major improvements to the performance of a project. From the private party perspective, the integrated project delivery model has been expected to play a major role in increasing the integration of information between project stakeholders (Lehtinen, 2012). The PPP model is an integrated design and operations solution, which encourages project alliance and partnering.

Furthermore, literature demonstrates that few efforts in the construction industry have involved facility FM into the design phase.

Wang *et al.* (2013) argued that there have been rare effective approaches or processes to engage facilities management (FM) in the design stage. It was suggested that early engagement of FM would contribute towards reducing the needs for major repairs and alternations that would otherwise occur at the operational phase (Wang *et al.* (2013) cited Becerik-Gerber *et al.* (2012) and Erdener (2003).

2.6.3. The benefits of involving FM in the design phase

Previous literature and studies for example Meng (2013) have shown that the concept of involving FM specialists in building design, has over the years received increasing attention from practitioners and researchers in the last decade and found to be useful for the improvement of cost efficiency and effectiveness from a long term perspective.

The benefits of the early involvement of FM has been identified from authors, for example, Barrett (1995) identified that proactive FM involvement during the design phase of the project could improve service provision during the operational phase. This could improve and speed up the procurement process as it would ensure that the commissioning, testing, training, and facility operations will not be

treated as an afterthought, resulting in unanticipated changes that cost time and money (Trinh, 2002, p. 115 cited in Brewer *et al.*, 2013).

Baldwin (2003) stated that early involvement of facilities management in the design phase was seen as an "added value" in providing longevity into the final design solution, as in the PPP design consortium to include professional team and facilities management, and as such the operator will ensure that operational performance is delivered.

Furthermore, Enoma (2005) argued that the early involvement of facilities management in the design process reduces the long-term cost of procurement with regard to design alterations and rehabilitation, ensuring that the facility is easy to manage, maintain and control.

In a recent study Meng (2013) investigated the involvement of facilities management specialists in building design based on a United Kingdom model by interviewing industry experts and gaining an understanding of how design integrates with FM in todays practice.

Based on the series of interview the consensus was that FM specialists, especially facilities managers, should be involved in the design process. This is due to the overall benefits to all stakeholders summarized as (1) reduction in operating maintenance costs because of the achievement of a better building, which can be operated and maintained more effectively and efficiently; (2) more emphasis on the whole life cost, rather than focus on the capital cost and (3) identify errors and failures early in the process to provide inspiration for designing more robust buildings.

2.6. 4. Barriers to the involvement of FM in the design phase

Based on the author's knowledge and experience, Brochner (2003), El-Haram and Agapiou (2002), and Jensen (2009) provided limited literature only single case studies to demonstrate early FM involvement in the design of a PPP project. The

limitations in study research create a barrier in gaining a further understanding of how design integrates with FM (Meng, 2013).

Furthermore the identified gap in knowledge exists due to the relatively short history of facilities management, still in its infancy stage. In Meng's (2013) research study it identified that many FM practitioner are not knowledgeable and experienced enough, which makes FM in involvement in the design process a barrier. Moreover there is the ignorance of early FM involvement because of the design team's low priority to function and practicality and the perception that FM is usually considered to be a post construction service.

While limited literature is documented on this subject, Enoma (2005) argued that the main barrier to the involvement of FM in design is the cost of operating the building. When a new building is procured, the investor or developer establishes the most cost-effective option and facilities management costs are not affected by this decision.

2.7. The extent of FM integration in the built environment

This section discusses the extent of integration achieved in accommodation service type PPP projects as well as whether fragmentation exists among facilities management and design project teams.

2.7.1. Integration of facilities management and design of PPP projects

According to Lehtinen (2012), integration is defined as the collaboration or coordination of activities that enable the flow of information and knowledge vertically, between project phases; horizontally, between different stakeholders; and longitudinally, between projects.

Integration, according to Tatum (2009), is thus achieved in the built environment by sharing information and knowledge vertically between the phases of a project (such as from operations input to design), and horizontally between design disciplines (such as in the spatial coordination between different design disciplines).

Baiden *et* al., 2006 cited that the effect of integration on project team effectiveness encourages the delivery of integrated delivery solutions for development projects. Therefore, integration is the remedy and corrective solution for fragmentation, however, the construction industry has been widely criticised for its fragmented approach to successful project delivery and its failure to integrate effective teams. This has resulted in project cost and time overruns and as a result resources are used to rectify the resulting defects.

The design, construction and operational phase are treated as separate hubs of activity and the different teams tend to work towards individually defined objectives that are often in conflict with one another (Baiden, Price and Dainty, 2006). Hence, the trend in developing integrated solutions can be traced back to the 1980s with the emergence partnering strategies such as Public Private Partnerships in delivering infrastructure projects. Limitations on the availability of public funds led government to invite private sector entities to enter into long-term concession and contractual agreements for financing, construction, maintaining and operating infrastructure and development projects throughout their lifecycle (Brady, Davies and Gann, 2005).

2.7.2. Integrated delivery models in accommodation service PPP project

According to Lehtinen (2012), various integrated project delivery models have been developed such as public private partnerships (PPP), integrated design and delivery solutions and project alliance. While each of these has different features and characteristics, all have a common goal – to create a motivating operational environment for increasing the integration of information and knowledge between different stakeholders and project phases, in order to improve the output quality and operational efficiency in projects.

PPPs are characterised with (1) promoting public sector initiatives that encourage commercial investment in facilities and services, (2) giving better value for money, and (3) transferring significant risk and the management of projects and services to the private sector.

PPP projects allow private companies to build, own and operate public projects such as schools and hospitals on behalf of the public sector. The goal is to give better value for money by delivering better services in combining the strengths of the public and private sectors working in partnership, each focusing on the areas in which they do best (Nisar, 2007).

According to Lehtinen (2012), PPPs have a definite impact on integration between design and construction. The leading role and early involvement of the main contractor and subcontractors enables a strong perspective on constructability in the design phase. This makes it easier for construction companies to get utilisable building information models to the site as they are able to influence how models are produced.

The second benefit is that communication between designers and contractors can simplified. Even though different organisations have a separate contract with the construction company, they are also able to communicate directly with each other about design and constructability issues.

Thirdly, the life-cycle perspective is strongly shown in material and product decisions during the construction phase. The construction companies surveyed found more synergies in their operations and maintenance by choosing products that impact on the lifecycle project costs.

2.8. Concluding remarks

Although there is limited literature of the involvement of facilities management in the design phase for PPP office accommodation service projects, the aim of the literature review was to provide a holistic view of Design, FM and PPPs.

Literature details the purpose of PPPs to maximise efficiency, accountability and risk transfer in providing integrated projects with the solution of extending the traditional life cycle of an asset and achieving value for money.

The definition of FM highlighted in PPPs development projects reveals that facilities management and design teams exist as individual competent units within

their organisationally defined boundaries. FM adds value in PPPs at the bid stage, by actively engaging with the building contractors and the design teams through attending design team meetings and value management workshops, where output specifications are detailed. Furthermore, FM affects the supply chain management and future maintenance planning.

Research has indicated that the development of professional facilities management (FM) is the missing link needed to bridge the gap between building operation and building design. However, to date little has been written about the role of the operation and maintenance organisations and the implications of them being involved in the design stage of PPP.

The long concession period of a PPP project creates an opportunity for all role players in the built environment sector to learn from experiences in the design and operation of buildings. Literature review identifies that aspects of facilities management and maintenance should be considered during the different stages of design.

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3. RESEARCH METHODOLOGY

3.1. Introduction

This chapter discusses the research methodology adopted to examine the integration of facilities management and design in the development of accommodation service PPP projects. Firstly, the research problem is defined. Secondly, the research strategy is explained and the choice of research method is discussed. The research technique used consisted of a qualitative method of study through interviews and expert opinion. Supporting data will be extracted from peer review literature, public and private sector issued project documentation.

3.2. Research problem

The purpose of this study is based on establishing and identifying whether the role of facilities management at the design stage in the delivery of office accommodation through the Public Private Partnership (PPP) model and how this could reduce maintenance costs throughout the whole life of the asset.

The identified gap in knowledge that exists in accommodation service PPP projects and integrated facilities management in the design process resulted in the use of one case study in data collection.

The study is exploratory and consists of one case study. The case study undertaken was large and complex enough as the largest procured head office accommodation serviced PPP to obtain substantial information and it focused on the three design defects and how they led to further maintenance costs that could have been avoided if proper facilities management was implemented in the design phase of the PPP.

The research aim can be broken down into the following research objectives, which are:

- To establish whether the early involvement of facilities management at the design stage in a PPP procurement model minimises maintenance needs further down the line.

- To identify how facilities management principles can be better integrated into the design phase of PPP projects.

3.3. Research technique

The type of study to be undertaken will use a qualitative approach as this ensures credibility, through the well founded and relevant data that collected through the research (Saunders *et. al.*, 2012). The qualitative research method is generally used in an exploratory subject area whereby only a limited amount of knowledge exits.

The qualitative method includes interviewing experts in the subject matter face-to-face and an identified case study, which will further provide a qualitative view. This method of study is appropriate as it is based on previous research in the field, whereby interviews were conducted and case studies analysed (Li *et al.*, 2005; Abednego and Ogunlana, 2006; Ng and Loosemore, 2007; and Ke *et al.*, 2010).

3.4. Research methodology principles

The nature of qualitative research is exploratory in nature, which is a valuable means in asking open-ended questions to discover what is happening and to gain, insights, gather and analyse information (Saunders *et al.,* 2012) about facilities management's early involvement in development projects. The research was conducted through literature review and in-depth individual interviews to gather perceptions from experts in PPPs, facilities management and design.

As described by Saunders *et al.,* (2012) exploratory research has the advantage of being able to be flexible and adaptable to changes, furthermore the data gathered in qualitative research tends to be complex in nature, thus making data analysis often difficult.

3.5. Research strategy

The nature of this is report exploratory and the research methodology approach is structure thorough a framework assembled to clearly articulate what is aims to achieve and how it aims to achieve it. Having identified the research problem the

study population, sampling procedure, sample size, method and data collection and method and tool for data analysis need to be defined.

The data was collected from interviews with facilities managers, pre-construction and post-construction role players. Different professionals were selected, as the project under study is the iconic and complex Department of International Relations and Cooperation (DIRCO) head office, procured through the PPP model. The DIRCO head office service accommodation was selected as the most suitable case study for establishing the role of facilities management in the design phase. The strategy for one case is based on the identified gap in knowledge that exists in accommodation service PPP projects and integrated facilities management in the design process.

The identified interviewees have vast knowledge and experience with the PPP project in the provision of both design and facilities management. The project is now in its sixth year of operation and thus all information will be available and in its original form.

3.6. Research method

Qualitative data was collected relating to the design, operations and maintenance of the DIRCO building by the professional experts involved, though the method of face-to-face interviews which were done orally with voice recorder and later transcribed. The interviews focused on how the early involvement of facilities management reduces maintenance problems. A list of the specific defects that caused high-maintenance costs was provided.

Furthermore, the interviews were used to capture the respondents' opinion and in-depth knowledge in the subject and to gain an understanding of the design solution, the development process and the structuring of the consortium.

3.6.1. Study population

In this research the interviewees are selected from the project company appointed to finance, design, construct, maintain and operate the DIRCO building, e.g. design firm, FM Company, technical advisor, consultant and consortium board member. All the interviewees have difference level of skills and background ranging from public sector, banking, telecommunications, healthcare, retail, industrial and commercial offices. Furthermore the interviews hold both international and local experience. In total there were four experts interviewed in which their roles include, architect, facilities manager, client representative and technical advisor. The purpose of the interview was to gain a detailed understanding and perspective on early FM involvement. All interviews were conducted face-to-face individually. The interviews were semi-structured, which allowed the interviews to express their views and opinions (Meng, 2013).

3.6.1.1. Case Study

According to Saunders *et al.*, (2012) a case study explores a research topic or phenomenon within its context, or within a number of real-life contexts. The case study strategy has the ability to generate answers of how facilities management principles can be integrated into the design phase of PPP office accommodation projects, as well as to gain a deep and rich understanding of the research. Hence the case study strategy is utilised in exploratory research, and uses qualitative methods in collecting and analysing data, in the form of interviews, document analysis.

The researcher selected a single case study strategy in exploring the existing theory and establish a way to challenge as the DIRCO head office facility is a multi-purpose commercial office development consisting of a guest house (residential), as well as conferencing facilities, restaurant and offices. That makes this a unique case. (Saunders *et al.*, 2012).

3.6.1.2. Case study selection

The research focused accommodation service PPP project on the newly built facility for the Department of Foreign Affairs, known as the Department of International Relations and Cooperation to be used as its headquarters.

The Imbumba Aganang Consortium's role is to service the provision of the building over the duration of the design, construct, finance, maintain and operational cycle. The research further focused on the involvement of maintenance and operation during the design phase in establishing integration solutions for the seamless delivery and reducing the cost of maintenance problems

A number of office accommodation PPPs were reviewed and given consideration as possible case study subjects, such as the Department of Trade and Industry (DTI), the Department of Education (DOE) and the Department of Environmental Affairs (DEA) but the arguments for the DIRCO head office were justified due to the identified gap in the research field, limited literature and information with regards to the involvement of FM in the design process for PPP projects. Furthermore the selected case study is large and complex enough to conduct an in-depth study.

3.6.2. Methods of data collection

Primary data was obtained using semi-structured and in-depth interviews. The respondents were selected as each is an authority on the subject, thus ensuring the information provided would be valid and reliable. This was crucial as the aim of this research is to generate a thorough analysis of whether the early engagement of facilities management during the design and planning stage actually reduces the cost of maintenance over the life of such an accommodation service PPP project.

Research interviews were conducted with the design and construction team, the facilities management company, the consortium technical advices and a member of the bid development and also principal investor including an industry expert. The main building contractor and government officials did not wish to be surveyed and instead referred me to the Private Party consortium members.

The identified respondents, all representatives of the consortium, provided the required information for a detailed understanding of the subject matter, as each is representative of a particular accommodation service PPP project. The discussions focused on issues pertaining to the development of office accommodation PPPs, their impact on design, operational costs, the South African facilities management market's level of maturity and using the PPP model in providing integrated solutions.

3.7. The Department of International Relations and Cooperation (DIRCO)

3.7.1. Introduction

This section introduces and presents the Department of International Relations and Cooperation (DIRCO) case study, while focusing on the development of the PPP office accommodation project.

3.7.2. Background

At the initial stage of the DIRCO PPP office accommodation development process, the Imbumba Aganang consortium members came together in 2005 to bid for the PPP project, with the aim of securing a 'design, build, finance, operation and maintenance' contract. The consortium established a profit-maximising entity in the form of a special purpose vehicle (SPV) and its fundamental aim in a PPP project was to achieve long-term economic efficient income in the form of a monthly unitary payment in undertaking this project.

3.7.3. Introduction of DIRCO (Department of Foreign Affairs)

DIRCO is South Africa's foreign affairs government department, responsible for the formulation, application and implementation of South Africa's foreign policy, which is derived from South Africa's domestic priorities.

It acts as the head office for South Africa's diplomatic missions abroad, the first and foremost body responsible for advancing South Africa's foreign policy objectives and in this regard engages with foreign governments and multilateral institutions, as well as business communities and civil-society organisations.

3.7.4. Design development - description of site

The DIRCO building is a large, multi-level structure in concrete and glass, with imposing, repeated spines and large staircases as the visible exterior elements. It is set back from Soutpansberg Road and surrounded by over 15 hectares of landscaping. The total floor space is 138,570 m^2, designed to accommodate about 2,500 employees and incorporates a state of the art conference facility, designed to house the African Union and South African Development Community's conferences (University of Pretoria, 2015).

3.8. Ethical considerations

Ethical issues are important to consider throughout the difference stages of the research.

The initial requirement was to obtain ethical requirements clearance from the University, and thereafter from all the participants involved in this research. Once ethical clearance was granted by the University, permission to conduct the study was obtained from the members of the Imbumba Aganang SPV consortium. In addition, permission was obtained from the officials at DIRCO, although I was denied permission to take actual pictures of the building. These were thus sourced online instead.

The project data and information is in the public domain due to it being a state-funded development and hence there was no ethical risk related to publishing it.

3.9. Summary

The purpose of the research is to examine how facilities management principles can be integrated into the design phase of building construction, for government office accommodation PPP projects in particular. The aim was designed to determine whether the early engagement of facilities management and maintenance teams during the design phase improves the sustainability of the building throughout its life cycle, in understating the seamless approach of

integrated solutions in accommodation serviced PPP projects delivery and procurement.

From the literature review, it is evident there is a limited amount of research available on the subject manner of PPP office accommodation services projects. As the study is explorative in nature, the relevant research method used was that of qualitative data collection. The technique thus included interviews, case studies and document analyses.

The selected research strategy was based on a single case study, namely that of the DIRCO PPP office accommodation head office in Pretoria, which provided a holistic view of the subject of PPPs and FM specific to the South African context.

The identified case study was selected for its uniqueness, complexity and size, as this provided the researcher with the ability to analyse different building aspects and assess the specific aspects of design performance that impact on maintenance down the line.

4. ANALYSIS OF EXPLORATORY STUDY

4.1. Introduction

This chapter discusses and analyses the findings of the DIRCO case study in the context of PPPs. Firstly, it comments on the data collection process, Secondly, provides an analysis of the research conducted. Thirdly, it explores the three design defects identified, and how these led to further maintenance costs.

4.2. Population and sampling procedure

The aim of this research was to establish whether the direct involvement of facilities in the design stage of PPP office accommodation projects can significantly reduce the maintenance problem during the operation (concession) period of a facility.

In addition to identifying specific design-related defects, critical issues are addressed that arise from the maturity level of PPPs in the South African market, especially in the office accommodation sector. Furthermore, ascertaining the partnership levels between design and operations, the possibility of fragmentation between the various parties was explored.

The research focused on a single case study, of the O.R. Tambo – DIRCO building, head office of SA's foreign affairs department. It sought to identify a sample of potential design-driven defects, specifically based on discussions with the architect, facilities manager, client representative and technical advisor in establishing whether FMs where involved in the design phase.

It should be noted that the research findings only relate to one case study it is not representative of all office accommodation PPP projects and further quantitative research is required to validate these findings. However the knowledge gained on office accommodation PPP projects in the course of this research indicate there is limited literature on the impact and link between PPP and FM's involvement in the design process.

4.3. Data collection

Four research interviews were conducted face-to-face and recorded. They were later transcribed for accuracy, in order to gather relevant, current data in line with the identified research problem and objectives from respondents selected due to their capacity of providing reliable and valid information.

The identified respondents are all representatives of the consortium company appointed to finance, design, construct, maintain and operate the DIRCO building and hence critical in providing the researcher with a detailed understanding of the subject matter as representatives to accommodation-service PPP projects. All the interviewees have difference level of skills and background ranging from public sector, banking, telecommunications, healthcare, retail, industrial and commercial offices. Furthermore the interviewees hold both international and local experience.

In total there were four experts interviewed in which their roles include, project architect from TC Design, general manager from facilities management company, consortium company client representative (board member) and technical advisor a PPP industry expert. The purpose of the interview was to gain a detailed understanding and perspective on early FM involvement. All interviews were conducted face-to-face individually. The interviews were semi-structured, which allowed the interviews to express their views and opinions

The discussions focused on the following key issues (1) whether early FM involvement in design exists in this project; (2) what are the benefits of the early FM involvement; (3) did the project communication contribute to the project success and the (4) and the impact of using the PPP model in providing integrated solutions.

Further, through engagements with the architect, facilities manager, client representative and technical advisor whereby a number of critical design defects were identified. These include persistent roof leaks of the skylight room since the inception of the service period, structural movement of the main entrance

reception and flooding in the basement due to the misalignment of pipe work of the grey water tank.

The identified design defects all had a financial and inconvenience impact on operations.

4.4. Research findings

Literature review has documented that the role of facilities management is central to the design process of a building project. In this research study, the analysis of the interview results show that FM specialists can be involved in the design process by reviewing the scope of the design as part of the team of professional, in ensuring that there is minimum maintenance during the operational phase.

The general consensus during the interviews was that there are positive benefits of the early involvement of facilities management in making it easier to operate and maintain a facility. The interviewees indicated that there was early FM involvement in the design process in this project. The FM specialists were involved in the original bid preparation process, played a key role in design decision making and attended design meetings. According to the respondents in this research the, benefits of early FM involvement makes it easier to maintain and operate a building, by providing technical solutions.

The findings of the research indicate project communication contributed to the project success and improves relations with the entire professional team and increased the level of accountability. Furthermore, the interview results shows that the PPP projects are more suitable improving an integrated solution, this is because FM specialists are most likely to get involved in the design phase.

4.5. Analysis of design defects

A detailed site report was conducted, based on a thorough investigation into the skylight roof areas, the main reception porch, and the grey water tanked areas.

4.5.1. Case 1: Main reception porch on the north side of the building

The entrance stairs and paraplegic ramp systems demonstrated settlement movement from the main structure. This was evident from the movement in the tiling joints and the structural joints. The tiling had also shown extensive cracking in typical settlement lines indicating the shifting settlement underneath, largely due to movement caused by foundation conditions.

As per site visit, the ground sagging was caused by inadequate soil conditions in and around the main reception porch structure. Furthermore, it was identified that the water retention of the compacted fill was not sufficiently drained to dispel saturated soil conditions.

In the interview with the General Manager of the facilities Management Company it was noted that this was identified as an early design risk and the recommendation to remedy it was to excavate, compact fill, provide a jacked pile system underpinning and correct by filling it to control the settlement.

4.5.2. Case 2: Main reception, VIP and canteen roof skylights

The constructed roof skylights above the main reception and canteen area have, since the commissioning of the building in 2009, shown leaks through the concrete slab structure.

As described by the General Manager and Architect, the skylights were designed and constructed with a patent glazing system of single flush panes, fixed to a rigid structural frame under. The structural glazing silicon sealer was then applied between the frame and the glass and the joints were waterproofed.

The edge up stand details consisted of structural frame and aluminium glazing beads. Then the raised parapets were torched on waterproofing to the underside of the patent glazing frame with a cover strip.

The design of the system and fall of the glazing, including the edge fixing detail were problematic as water ingress was possible though the parapet edging at the cover flashing.

Before remedial works were undertaken a few years after inception, in 2013, there was evidence of accumulated rain around the up stands and in some cases the full bore outlets were not discharging water from the roof area around the up stands.

Furthermore, the durability of the silicon was inadequate as it deteriorated over time through the attrition of heating and cooling. In addition, the structural integrity of the silicon glazing would contract and expand, which allowed further water ingress.

Remedial repairs were undertaken to retrofit the deflection of water run-off by covering the roof with a polycarbonate roof structure over the existing cover. This solution alleviated the persistent water ingress through the numerous joints and up stands.

4.5.3. Case 3: Grey water system in the parking basement

In keeping in line with preferred green design principles, the building's water model included the following systems:

- A grey water system, used to capture water in large storage tanks in the basement and re-circulate it to the toilets for flushing.
- A retention dam was built in order to control outflow into the municipal storm water system.

The grey water system defect arose from incorrect design of the tank, which was lower than the dam, meaning the grey water could not over flow into the retention dam as intended. As a result, there was persistent and continuous flooding in the parking basement.

The remedial action taken by the Design and Construction consortium involved rerouting the piping inlets to the concrete holding the tanks, as well as repairing the flanges into the tanks and sealing them closed. This allowed the outflow to enter the municipal storm water system as intended and prevented further flooding in the basement after heavy rains.

4.6. Concluding remarks

The aim of this research was to examine the role of facilities management at the design stage in the delivery of office accommodation though the Pubic Private Partnership (PPP) model and how this could reduce maintenance costs throughout a buildings life cycle.

This research analysed a single case study, namely the DIRCO - O.R. Tambo Building and identified, through consultation with the facilities manager, three critical design defects that impacted on operations due to the lack of involvement from facilities during the design phase. During the course of the research, based on discussions with the interviewees it became apparent that there is an increasing recognition of the importance of early FM involvement in achieving project success, mitigating risk of design defects, and reducing the cost of maintenance during the operation phase.

However, it must be noted that the research findings relate to a sample of building design defect elements based on one case study and thus not necessarily representative of the entire office accommodation PPP project environment. Further quantitative and qualitative research is thus required to confirm the validity of these findings. This is recommended as an area for future study.

In South Africa, the PPP market is still developing, hence more theoretical research is required, in establishing an alternative PPP organisation structure especially in comparing the financial viability of a facilities management-led PPP solution in comparison to the traditional contractor-led PPP model in achieving value for money principles.

This is an important aspect to consider as PPP projects allow private companies the opportunity to design, build, fund and operate public projects on behalf of the public sector with the ultimate goal of achieving value for money.

As previously discussed, Lehtinen (2012) argued that the direct involvement of facilities management in the design phase in PPPs can enable a strong perspective

during construction and also significantly reduce maintenance problems during the operational phase of a facility.

It must be noted that it was evident a good relationship had been established throughout this specific project's duration, especially during the design phase. The members interviewed indicated that an open and mutual understanding relationship was established between the private party and the public partner.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter draws conclusions from the research as a whole and makes recommendations based on the findings.

5.2. Review of the research aims and objectives

The aim of this research was to examine the role of facilities management at the design stage in the delivery of office accommodation through the Public Private Partnership model and how this could reduce maintenance costs throughout a buildings life cycle. The findings of the research indicated that there is an increasing recognition of the importance of early FM involvement which can potential mitigate the risk of design defects and reduce cost maintenance.

The nature of the study was exploratory and consisted of a single case study. IN this research a systematic approach was undertaking in analysing PPP, facilities management and design elements. The research study was structured with a strong basis on the literature review conducted with the support of self-report interviews.

The research aim was divided into two main objectives:

The **first objective is to establish whether the early involvement of facilities management at the design stage in a PPP procurement model minimises maintenance needs further down the line.** On the basis of the series of interviews with the apportioned consortium members this exploratory study indicates the importance of early FM involvement and its increased use in today's practice, especially in the implementation of PPP projects. From the limited amount of literature review document analyses indicates that if facilities management is not involved in design, various problems may occur during maintenance and operation. For example the facilities management General Manager interviewed in the study encountered a design default in the design of

the skylights, which they had to conduct e major repairs and alterations. Had FM being consulted in this incident it would have minimised maintenance.

The **second objective of the study is to identify how facilities management principles can be better integrated into the design phase of PPP projects.** The direct involvement of facilities management in the design phase in PPPs can enable a strong perspective during construction and operation, hence more theoretical research is required, in establishing an alternative PPP organisational structure especially in comparing the financial viability of a facilities management-led PPP solution in comparison to the traditional contractor-led PPP model in achieving value for money principles. This is an important aspect to consider as PPP projects allow private companies the opportunity to design, build, fund and operate public projects on behalf of the public sector with the ultimate goal of achieving value for money.

5.3. Research findings

The research findings indicate that early involvement of facilities management in the design of office accommodation PPP projects enhances accountability, and communication with the professional enhanced created an environment of mutual understandings and openness.

Literature review argued early FM involvement mitigates the risk of design defects down the line, whilst also reducing the cost of maintenance during the operation phase.

Further, the South African Facilities Management profession is in its developmental phase stage so much more needs to be done from an educational point of view. With the increase in complex commercial developments taking place locally, the importance of the role of a facilities manager during the briefing, planning and design phase becomes critical in minimising the maintainability problems faced during the occupancy phase.

5.4. Conclusions and recommendations

The research findings have limitations based on the analysis from the literature review and transcribed face-to-face interviews illustrate that a more integrated approach is required to involve facilities management in design decisions, and that maintenance should form part of the full construction package.

Further, PPPs in service accommodation can and should be an important vehicle for achieving a host of benefits, particularly in reflecting the notion of office complexes as tools of the work and not as only places where work is done. It must be noted that the DIRCO project is a finance, design, construct, maintain and operate project which is typical of any PPP project.

Moreover, it must be emphasised that the research findings relate to a sample of building design defect elements based on one case study and thus not necessarily representative of the entire office accommodation PPP project environment. Further quantitative and qualitative research is thus required to confirm the validity of these findings. This is recommended as an area for future study.

However, during the course of the research it was found that there is limited literature on the impact and link between PPP and FM's involvement in the design process, more especially on office accommodation PPP projects, including driving integrated design solutions between the architect, contractor and facilities manager. This is recommended as another area for future study.

5.5. Future research

The South African PPP market is still developing, and as a result more theoretical and quantitative research is required, particularly in office accommodation service-type PPP projects.

The research findings relate to a sample of design defect elements, which are not necessarily representative of a typical PPP project. As a result, other case studies must be analysed, in conjunction with further quantitative and qualitative research conducted to confirm the validity of the findings.

It should also be noted that further research is essential in assessing the viability of a Facilities Management-led PPP in comparison to the traditional contractor-led PPP model in achieving value for money and other PPP principles.

Moreover, as value for money is a core principle of PPPs, research is required to investigate whether this also translates into developing affordable and sustainable serviced infrastructure, as intended.

However, during the course of the research it was found that there is limited literature on the impact and link between PPP and FM's involvement in the design process, more especially on office accommodation PPP projects.

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APPENDICES

Appendix 1: Interview transcripts

General Manager

George Bisset: General Manager of Imbumba Aganang Facilities Management (The Operations Subcontractor)

What was involved in the design of the skylights, and the application of green design principles?

The lead architect was responsible for the design elements of the skylights – the main principle was to achieve an energy-efficient building with natural light, meaning that the building utilises as little electrical power as possible, ultimately reducing the Department's electricity bill.

Elaborate on the design principles of developing an energy-efficient heating, ventilation and air-conditioning system.

The output specification was for cooling towers and chillers, which were not appropriated for this type of building.

The specification should have been for packed air-cooled chillers

What other energy-efficient mechanisms and green designs were implemented?

- There are motion sensors for the lights.
- LED energy-efficient lights.
- The escalators are installed with motion sensors and programmed to go into 'idle" mode when not in operation and stop. When a passenger approaches the escalator it senses this and starts to go into "motion".
- Glass panels that emit lighting into the building thought clever use of technology. The glass panels have a unique function. On the northern façade, the external portion shades the area of glass immediately below it; then the top surface, clad in reflective steel, serves to bounce natural light back into the top glazed portions, providing a trafficable surface for access to clean the façade.

How did you work with the other professional team members and construction team members?

An Infrastructure Asset Management and Facilities Management consultant was part of the professional team on a consultancy basis.

Was there involvement of facilitates management in the design phase?

Yes there was involvement of facilities management in the design phase from a feedback, reporting and consortium member function.

If there was, in your view was this beneficial? And if not, what was the reason of non-involvement?

Yes it was beneficial to have a facilities management consultant involved at the design phase and as part of the professional team, otherwise there would have been more defects. However, the facilities management consultant was only a one-member representative and my opinion is that a bigger and more skills-diverse team would have been more beneficial during the design and planning stage.

Can facilities management principles be integrated into the design phase for development projects and, more so, PPP projects?

Yes, facilities management principles can be integrated into the design phase and form part of the professional team and issue approvals.

On the issue of natural lighting – was this for aesthetic reasons or was this part of the energy-saving mechanisms?

In achieving economic use of light and reducing power utility, the issue of natural lighting was for both aesthetic and energy-saving purposes.

Was a lot of money spent on glazing?

Yes, it cost a lot of money.

What were the main building defects that are design related?

- The greywater storage tanks in the basement. The system continually overflowed, with re-circulated water causing flooding in the basement parking.

- The retention dam on site was not competent enough to control outflow into the municipal storm water system.
- The consistent water seepage after rain from the skylights, due to incorrect bonding application between three different materials namely, metal, glass and concrete.
- The lifting of concrete paving tiles and blocks due to ground lateral movement, soil creep and erosion.
- The appearance of efflorescence on concrete slab in the basement parking has been a problem since the building was commissioned and as a result the "whitish" crystalline deposits stain member's cars. In this building, the source of the efflorescence is from the movement of groundwater into the building foundations through capillary action.
- The main defect is the location of the building – although a thorough investigation and assessment of the ground conditions was done in establishing whether the site location was suitable for building, the DIRCO building was built on a high water table area.
- With regard to the escalators, an inferior brand was used for the motors, which resulted in 11 escalators being non-functional from commission stage. They were subsequently replaced.

The grey water system in the parking basement was a green design, please explain if this has reduced maintenance costs?

The grey water system has reduced the water utility bill, because of the use of re-circulated water to flush toilets, instead of using municipal domestic water.

Further, other creative smart water uses the collection of rainwater and borehole water in watering the gardens, although this is not economical due to the high maintenance costs of the irrigation system.

The roof skylights are an energy-efficient mechanism, please describe the maintenance principles associated with the maintenance of skylights?

The slope of the roof skylight was designed, manufactured and installed in such a way that makes it “self-cleaning”, although continuous monitoring is done for the expansion joints. There is a ten-year guarantee on the product.

How did the architect’s design influence the maintenance of the building?

In general, the architect’s design did influence the maintenance of the building, but the building was not designed to be maintenance-friendly, due to the increased maintenance costs.

How did you work with the architect?

It was a partnership relationship.

Was the project a success?

Yes, definitely. A most successful PPP.

How did the project communication contribute to project success?

In the planning and design early stages of the contract, communication was good, but it decreased during construction because of interference from the client.

Would you have maintained and operated the building differently?

Maintaining the building as per the Operations Subcontract Agreements coupled with a penalty regime.

Project Architect

Mark Pencharz, an architect with TC Design

How did the design of the OR Tambo – DIRCO building evolve?

TC Design Architects, in joint venture with ACG Architecture, were appointed to design the OR Tambo building to house the Department of International Relations and Cooperation head office. The building was built in 24 months, and construction commenced in May 2007. The building represents a concept of bearing gifts and the idea of a "wrapped gift".

As, TC Design we received various awards for excellence and innovation from industry bodies.

What was the design philosophy?

The brief to us was to create an iconic structure that is "mouth-watering" at a glance with emphasis on bringing together different cultures, the meeting of nations, creating an African United Nations that talks to foreign policy issues, democracy, freedom and a building that captures the true sense of the South African heritage.

Did you design both the steel and concrete structure?

No, those were designed by the civil and structural engineers.

What was involved in the design of the skylights, and the application of green design principles?

The idea behind the skylights was to introduce natural light and minimise the use of electrical power in the building, to reduce the electrical bill. The skylight has louvres that turn and blow fresh air into the building through the atrium.
Green roofs were planted to be environmentally bio-diverse.
The main aim of doing all of this was to be create an environmentally friendly building.

Was the design of the roof structure complex?

Yes, but nothing we couldn't handle. We have the expertise.

Elaborate on the design principles of developing an energy-efficient heating, ventilation and air-conditioning system.

The air-conditioning system was designed by the mechanical engineer, but the principle behind it was to create air-controlled areas and compartmentalise zones.

What other energy-efficient mechanisms and green designs were implemented?

- Installation of the grey water system – using re-circulated water for the flushing of toilets.
- Collecting rainwater for irrigation purposes.
- Lighting motion sensors in offices, as well as the boardroom and conference rooms.

Did you come up with the South African (theme) design idea of the building?

That was a brief from the client.

The main auditorium is of world-class standard. Were you involved in the design of the internal space of the auditorium?

Yes, we were.

The audio-visual system was specifically designed, especially the translation/interpreter rooms, how were they accommodated in terms of noise transmission and creating a sound-proof barrier?

We were the lead architects in designing the overall auditorium, but due to the specialist requirement, we called in the services of an acoustic engineer to deal with noise absorption.

What is different and unique about his auditorium?

The wooden head-wrap design above the auditorium.

Who drove the overall design process?

I did.

How did you work with the other professional team members?

The relationship with the professional team was good.

However, I want to emphasise that during the bidding process there was no consultative process between the designer and client, which means that as the designer, you have to almost second guess what the department likes or doesn't like.

Was there involvement of facilities management in the design phase?

Yes there was a representative from the consortium, but there was limited FM oversight during construction.

If there was, in your view was this beneficial? And if not, what was the reason for non-involvement?

The role of facilities management is critical in the maintainability of the building,

Can facilities management principles be integrated into the design phase for development and PPP projects?

Green building design involves and brings facilities management to the fore-front.

On the issue of natural lighting – was this for aesthetic reasons or as part of the energy-saving mechanisms?

It was for energy-saving purposes.

Was a lot of money spent on glazing?

Yes, it was very expensive. But the results are definitely worth it.

How was the traffic noise on Soutpansberg Road reduced?

The building was designed to absorb external noise.

Was the project a success?

Yes it was.

How did the project communication contribute to project success?

Communication was everything in this project. Without it, we would not have delivered this state-of-the-art building.

Would you have designed the building differently?

To be honest, yes.

Consortium Board Member

Shanaaz Jardine: Board Member: Imbumba Aganang Private Party (Concessionaire – SPV Company)

What was the role of the concessionaire (IAPP contract management?)

The concessionaire, known as the SPV, manages the design, construct and maintenance of the building.

At what stage of the PPP lifecycle does the concessionaire get involved?

Concessionaire gets involved from the Request for Proposal stage.

How did you work with the other professional team members?

The team worked well to achieve the common goal that is to design, construct and maintain one of the biggest government buildings in South Africa.

Was there involvement of facilities management in the design phase?

There was limited involvement of facilitates management (FM) at the design phase. This was a good learning for future PPPs. It is important for FM to get involved from the design phase, as the ultimate risk of the building resides with the FM companies.

If there was, in your view was this beneficial? And if not, what was the reason of non-involvement?

The limited involvement was not beneficial. After the event, it was understood that certain design specs were not in the building. Certain items were not budgeted for. Life cycle cost was not accurate. There were many omissions and duplications in the Initial Major Maintenance budget. In a nutshell, FM was not aware of the possible operational and financial risks that they would be exposed to, had they been involved from the design phase.

Can facilities management principles be integrated into the design phase for development and PPP projects?

It absolutely can, as the insight of operating a building will most definitely influence the design.

From an integrated solution point of view, was the project a success?

Yes the project is currently a success, there were many learnings to be taken and obstacles to overcome, but the project is running smoothly.

How did the project communication contribute to project success?

Communication, as in everything, is of the utmost importance, keeping everyone up-to-date facilitated many processes and assisted in getting things done timeously.

PPP Industry Expert

Peter Aborn, Project Officer for the Gauteng Provincial Government Kopanong Precinct

Assessment of interview objectives:

Does an office accommodation service PPP project deliver value for money (VFM) in creating innovative and integrated project solutions?
Yes it does deliver value for money, but this does not necessarily mean that the project is affordable.

Does an integrated development approach demonstrate cost savings over the duration of the contract and ensure that the facility is efficiently maintained?
In previous PPPs I've been involved in the facilities manager is crucial, especially in the planning stage as they give factual advice with regards to sustainable solutions.

In your view, how can facilities management principles be integrated into the design phase of PPP projects?
The facilities manager should form part of the professional team, along with the other consultants. The early involvement of FM at the design stage minimises maintenance in the long term.

Can the direct involvement of the facilities manager in the design stage reduce maintenance problems during the operational phase of a facility?
Yes, of course it does!