Financing infrastructure development within a regulated environment: Challenges for regulators

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1. Introduction

In the past, infrastructure was treated as a pure public good by both the public and the private sectors. This led to an overuse of infrastructure services, and thus greater problems with infrastructure stock deficit (Calitz and Fourie, 2007). This infrastructure gap has also been exacerbated by an increase in global economic growth, demographic trends, public health needs, safety needs and other needs such as a better quality of services demanded by citizens. All these factors have led to infrastructure requirements far in excess of the currently available financing resources (OECD, 2006 and Quiggin, 1996). The increase in demand for infrastructure services has put pressure on governments to increase investments in infrastructure (De Bettignies and Ross, 2004). This challenge is more prevalent in developing countries such as South Africa, with its widening income gap.

In response to the increased infrastructure demand, as a developmental state where infrastructure provision is a precondition for development, many South African state-owned enterprises (SOEs) and government departments have embarked on a massive infrastructure expansion programme. This has resulted in rapid tariff increases, especially for regulated services such as electricity. This has created public unhappiness as the public has to pay higher prices for the services under the 'user pays principle'. The high tariffs are believed to be as a result of inefficient and inappropriate financing approaches/models adopted by the different infrastructure implementing agencies. The public dissatisfaction with high tariffs has been a concern for government as more infrastructure projects are still to be built to meet the country's infrastructure needs in addition to the current projects, some of which are delayed.

According to the NEPAD Business Foundation (2012), South Africa's existing infrastructure may not meet the future demand for infrastructure, as has already been evidenced with the power supply shortages in 2008. South Africa's infrastructure deficit is currently estimated at R1.5 trillion. In 2012, Finance Minister Pravin Gordhan announced that R850 billion will be allocated to infrastructure investment over the two following years. According to Paton (2013), the projected cost of the South African government's infrastructure programme over the next 30 years is R4.3 trillion.

In light of the infrastructure needs, the country is now exploring whether private sector investment in public infrastructure is possible in ways that do not necessarily put too much pressure on government to take on increasing levels of debt, as well as to ensure that the impact of the prices to be paid by the consumer on the infrastructure service is minimised. In order to achieve this, ongoing engagement between government, banks and fund managers is imperative. This engagement is necessary for exploring the role that each party can play.

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It is further argued that what is needed is a detailed framework of how these projects are intended to be financed (Itumeleng, 2013).

This paper aims at initiating a discussion/debate about the problems that are prevalent within the infrastructure investment domain. It also presents a procurement or financing model that the country can adopt when implementing infrastructure projects. This discussion is necessary for contemporary infrastructure financing in South Africa as it is trying to seek ways in which the interests of both the government and consumers could be protected from high infrastructure project costs that may eventually result in high tariffs for the services.

The paper is organised as follows: Section 2 discusses the relationship between financing, tariffs and Allowable Revenue (AR); Section 3 discusses the differences between financing and funding; Section 4 looks at the different approaches for financing infrastructure projects; Section 5 focuses on the different financing approaches used in South Africa and discusses case studies of recent South African major projects; Section 6 discusses project overruns; Section 7 discusses cartels in the construction industry and their impact on regulated services, and Section 8 concludes.

2. The relationship between financing, tariffs and allowable revenue

The approach used to fund and to finance a project has an impact on the eventual allowable revenue (AR) and the tariff or the price that consumers have to pay for a regulated service. The tariffs are impacted mainly through the RAB and the weighted average cost of capital (WACC), which form the most significant component of the AR. The general AR formula is given in Equation 1 below. Equation 2 shows how the final tariff is calculated using allowable revenue.

Equation 1: Allowable revenue

$$Allowable\ Revenue = (RAB \times WACC) + D + E + C + F$$

Equation 2: Tariff calculation

$$Tariff = Allowable\ Revenue/volume$$

Where:

RAB = the Regulatory Asset Base. The RAB is the cumulative historical investment made by the utility. WACC = Weighted average cost of capital. It reflects the opportunity cost of the investments made by the investor. D = depreciation of the RAB over time. E = operational expenses incurred by companies. C = clawback and F= F-Factor.

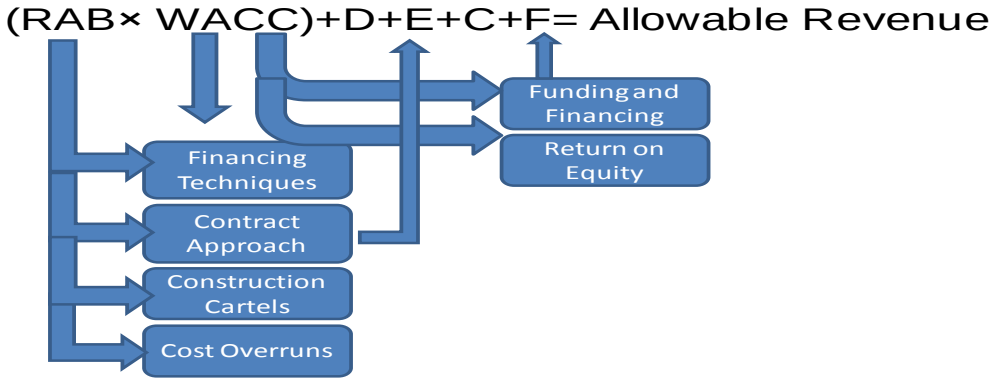
The RAB will grow by the amount of the net capital expenditure outlays made by the company. One reason why companies increase capital outlays is to expand capacity as the demand for the service increases. Therefore, if capital expenditure increases, RAB increases, and so does the AR and subsequently the tariff. An increase in capital expenditure has a direct impact on the RAB. The WACC is also affected by the rate of return on debt (K_d) and the rate of return on equity (K_e) for investors. In fact there are two ways in which investors' returns may increase: (i) if there is higher capital expenditure, investors will

get a higher return and (ii) if K_d and $K_e$increase, investors will naturally receive a higher return. Therefore, returns on infrastructure are also directly linked to the K_e and K_d components of the WACC. It is worth noting that the WACC component of the AR formula is affected mainly by the financing approach adopted by the company or the utility in question. An inefficient financing approach from a regulator's perspective may result in higher K_d and K_e thus increasing the value of the WACC component in the formula as proportions of debt and equity for financing will be reflected in the WACC component of the AR formula. Apart from the K_d and K_e other factors that may unnecessarily inflate RAB values are factors associated with:

- project overruns (time and cost)
- the formation of construction cartels, in this case companies may end-up paying unnecessarily high construction costs for their projects
- an incorrect choice of a contract or contracting resulting in firms paying higher capital outlays to contractors.

Figure 1 shows the factors that affect both the RAB and the WACC within the AR formula. The focus of this paper is mainly on these factors which eventually affect the final price paid by the consumer of regulated services.

Figure 1: Factors which impact Allowable Revenue



Source: Compiled by authors.

Note: F above refers to an F-Factor, which is additional revenue to meet debt obligations that may be granted by a Regulator. If the allowable revenue excluding the F-factor does not enable the applicant's regulated activity to operate with a debt service cover ratio (DSCR) acceptable to its financiers, then additional revenue may be allowed.

This factor is especially of interest to a regulator because it directly affects the final tariff that consumers eventually pay. Therefore, financing by companies and contracting approach must be efficient because it affects the AR and hence the final tariff. Each of the components that is affected by financing is discussed in later sections.

3. Explaining finance in the context of the RAB model

The Australian Energy Regulator (AER, 2011) investigated why utility prices in Australia were increasing. It found that price increases have resulted from the need to significantly increase investment, both to replace ageing infrastructure and to expand existing infrastructure. An increase in investment contributed to higher prices in the regulatory period as this impacted the RAB directly. It was also found that an increase in the assumed return on capital, which takes into account borrowing costs, has also contributed to utility price increases. This in turn affected the RAB, which affects AR and subsequently the price that consumers paid.

As mentioned earlier, the RAB is an important factor for regulated entities as it hugely influences the amount of revenue that a regulated entity is to receive as determined by a regulator. A regulator's decision on tariffs is normally based on the amount of revenue that would reasonably be required to recover a set of costs including the RAB (AER, 2011). Any factor that inflates the value of the RAB should be of interest to regulators and the public.

According to AER (2011), the RAB allows investors to earn revenue which covers three elements:

- an allowance for the depreciation of the RAB over time, calculated according to established regulatory techniques (i.e. a return of capital invested)
- a return to investors based on the value of the RAB (i.e. a return on capital invested) which has typically been calculated by multiplying the RAB by a WACC (i.e. an average of the cost of equity and the cost of debt), which is intended to reflect the opportunity cost of the investments made by the investor
- the forecast level of operating expenditure (OPEX) associated with the day-to-day operations of the network, which are compensated on a pay-as-you-go basis.

Evidence shows that the return on capital is typically the largest of companies' ARs (Meaney and Hope, 2012). The RAB is assumed to grow from year to year by the amount of net capital expenditure (adjusted for inflation). Therefore, for a given WACC, higher capital expenditure leads to a higher return on capital and, in subsequent years, a larger value for the depreciation term – both of these increase revenue requirements (AER, 2011). It is worth noting that the RAB, together with WACC, appears to be providing a guarantee to investors that they will earn a return not only on new CAPEX and OPEX, but also on their sunken investments in the network. Although the model has the potential to encourage investments, it can also introduce some regulatory risks if the new asset to be added to the utility's RAB is not prudently procured, as this may result in higher prices for the consumer. This is why a regulator will always have an interest in knowing how the asset has been procured or financed.

As mentioned earlier, an increase in CAPEX will increase return on capital (reflected in absolute terms in the WACC) for reasons stated above, and as such, this will increase the RAB. According to the AER (2011), the RAB may also increase due to other reasons, namely:

- **Network expansion**: this is underpinned by strong growth in demand for the service
- **Network asset replacement:** due to the need to replace ageing assets
- **Network input costs:** higher prices for key inputs are also expected to contribute to the increase in network capital expenditure,
- **Higher borrowing costs:** higher borrowing costs following the financial crisis are largely responsible for the increase in the WACC
- **Pass-through:** if actual capital expenditure or costs exceed what was forecast, licensees are allowed to recoup some of these costs in the next period.

It is for the above reasons that the regulator will always be interested in the approach or model used to finance an asset of a regulated entity. Also important for the regulator is the determination of the RAB value (i.e. what makes up the RAB) as it affects the final RAB figure that is taken into account when determining the AR. This is because the capital cost of the asset (as affected by the procurement methods used and the financing technique employed) has to be paid off through tariffs collected from the final consumer of the service. Therefore, the higher the asset cost, the higher the RAB, and subsequently the higher the price to be paid by the consumer. Therefore it is in the interest of the regulator and the public to keep the RAB and the WACC values as efficient as possible in order to protect the consumer. The best economic model for financing infrastructure is therefore the one that keeps these two components (RAB and WACC) as efficient as possible.

The table that follows gives a summary of the advantages and disadvantages of the RAB model. It is clear from the table that although the RAB approach is popular with many regulators, it does have shortcomings that may affect the consumer.

Table 2: Advantages and disadvantages of the RAB model

Advantages	Disadvantages
The regulator rewards investors with a return equal to the cost of capital.	The RAB model does not necessarily resolve the question of who ultimately funds the investments.
The regulator ensures that the regulated company is able to finance its functions by rewarding it with the revenue commensurate to the risk taken.	Since companies are allowed to earn their WACC on the RAB, if debt is cheaper than equity, the firm could earn a higher return by increasing its leverage (i.e. inflating K_d).
Investor benefit: The RAB effectively transfers equity risk to customers and taxpayers, as is evidenced by the Ke component of WACC.	Firms might be incentivised to increase their CAPEX rather that their OPEX as CAPEX is added to the RAB and earns a rate of return over time, while OPEX is not.

Source: (Meaney and Hope, 2012).

4. Funding versus financing

A distinction must be made between financing and funding, as these two concepts are used frequently in this paper. In most cases the two terms or concepts are used interchangeably, when in fact, they mean different things. Below is a discussion on the differences between funding and financing, and the different financing approached used for infrastructure projects.

4.1. Funding

Funding refers to the way in which the asset will be paid for once it has been procured. For example, an asset can be funded through the revenue stream that the asset generates during its operation phase. In this case funding refers to the monthly repayments made by the owner of the asset to a bank or other financial institutions as a repayment for the money raised for the construction of the asset. Common practice dictates that the owner of the asset collects money from users. This is known as the 'user pays principle' and occurs after the fact, meaning that **upfront** financing is required in order to construct a project, thereafter the 'user pays principle' applies (Deloitte, 2012). Sometimes an asset can be funded from the fiscus, especially when there will be no revenue to collect from end users of the asset. This is common when the asset is a public good, in which case excluding other people from consuming the service provided by the asset is difficult.

4.2 Financing

Financing refers to the way or approach in which money is raised to pay for the construction and/or maintenance of an asset. The broad categories of financing are equity and debt. Other financing approaches include financing instruments such as infrastructure bonds, unsecured bonds, commercial bank debt, guarantees and shares issued (Deloitte, 2012). Financing mainly refers to the sources of finance for the project, while funding refers to the repayments of the money used to implement the project.

4.3 The importance of the two concepts for infrastructure projects

These two concepts are crucial in implementing a project, especially in regulated industries as they impact on the affordability of the service to be provided by the asset. For regulated services, the main concern for regulators is how the project will be financed as financing of the project has a direct impact on the RAB and the final price that consumers pay. Although the funding of the project is also important for regulated services, in most cases these services are funded from the revenue stream collected during the operation phase of the asset. Nonetheless, inefficient funding of any project may affect the monthly repayments that the owner of the project will have to make to the bank or other financial institutions that financed the project.

4.4 Sources of financing and funding

According to Calitz and Fourie (2007), infrastructure projects can be financed with funds sourced from: (i) the fiscus, (ii) Loan finance: From private individuals or companies (iii) Public enterprises: usually finance their own investment, (iv) Equity investment: in which private businesses buy shares either as owners, co-owners or in partnership with government, (v) Development agencies: the loan finance is normally cheaper from these

institutions as they are meant to support development as they are normally backed by governments (vi) Donors: grants reduce the cost to who-ever has to pay for the infrastructure and (vii) User charges: if the benefits can be attributed to identifiable users, the users of the infrastructure then pay for the service received. Most sources of finance and funding for infrastructure projects fall into these categories. Table 3 below gives a summary of the different financing approaches versus the best way for funding the debt.

Table 3: Sources of infrastructure funding and financing

Who Finances		Who Funds			
		Tax payer	User		Donor
			As per benefit	Cross-subsidisation	
		1	2	3	4
Tax payers (Cash)	**A**	Both finance and funding comes from taxation (pure public consumption).	Taxpayers will provide the finance but users will pay (as per benefit).	Taxpayers will provide the finance. Some users will subsidise others.	Taxpayers will provide the finance. Donors provide some of the funding.
Lenders to government or government enterprises (loans or guarantees)	**B**	Loans provided by private investors will finance the facility. Taxpayers will fund the facility over time.	Loans provided by private investors will finance the facility. Users will fund the facility over time.	Loans provided by private investors will finance the facility. Some users will subsidise others.	Loans provided by private investors will finance the facility. Donors will partly subsidise taxpayers and users.
Private investors (equity)	**C**	Capital is raised through equity. Taxpayers pay (over time) to ensure equity providers receive an adequate return.	Capital is raised though equity. Users pay as per benefit to ensure equity providers receive an adequate return.	Capital is raised though equity. Users pay and partly subsidise others as per benefit to ensure equity providers receive an adequate return.	Capital is raised though equity. Donors will partly subsidise taxpayers and users.
Development agencies	**D**	Development agencies will lend money to host governments to	Development agencies will lend money to host governments to	Development agencies will lend money to governments to finance the	Financed and paid for by development agencies.

			finance the project. Taxpayers will fund the debt over time.	finance the project. Users will fund the debt over time.	project. Users pay and partly subsidise others to service the debt over time.	
	Donors (grants)	**E**	Grant finance: This eases the burden on tax payers.	Grant finance: This eases the burden on tax payers.	Grant finance: This eases the burden on Users subsidising other users.	Grants by sponsors (financed and paid for).

Source: Calitz and Fourie (2007).

Table 3 shows that funding a project can be done in different ways, depending on the source of finance used to finance the project. The table shows different combinations of financing and funding techniques that can be adopted for projects. For example, if the project is grant financed, the pressure on consumers of the service is reduced as grants are normally given free to governments by international development institutions.

The following section discusses the different approaches that a project or asset owner can use to finance and fund a project. It also discusses both the advantages and the disadvantages of these approaches.

5. Approaches to infrastructure financing

An infrastructure project can be financed on the basis of different approaches or methods. Each of these approaches has advantages and disadvantages.

5.1 Public finance

Public financing of a project refers to the financing of a project from the government's budget. Historically, governments have used surplus funds or issued debt (government bonds) to be repaid over a specific period as a means of funding and financing public sector projects. Governments could raise finance for public infrastructure projects in several ways, namely:

- Governments could issue debt (borrow) to finance an infrastructure project, but may also contribute its own equity.
- A sovereign guarantee is given by governments to lenders to repay all funds borrowed by a state agency implementing an infrastructure project. The problem with this approach is that it reflects as a liability in the government's balance sheet and that may increase government's borrowing costs in future, and
- Governments could raise funds through taxation and user charges. The user charges (funding) are only used to cover operational costs and not the capital costs if the project is financed through taxes (financing).

Table 4 below summarises the advantages and disadvantages of the public finance approach to infrastructure development.

Table 4: Advantages and disadvantages of the public finance approach

Advantages	Disadvantages
Public finance is a natural and necessary cost of democracy.	Tax payers bear the financing and funding costs because sometimes they are double taxed through user-pay mechanisms and taxes which raise funds for finance.
Public finance can limit the influence of interested parties and thereby help curb corruption to a certain extent.	It increases government's borrowing costs as it increases government's liabilities.
In most cases governments borrow at lower cost than private companies.	Project cost overruns do not face consequences as in the case of South African SOEs.

Source: Compiled from various sources.

Public-finance funded infrastructure projects have frequently resulted in a strained balance sheet and limited scope of the project implementation. Many governments have realised that this approach is no longer sustainable as it creates highly leveraged government balance sheets given the ever-increasing needs for new and better infrastructure services. As the need for services and better quality services has been increasing, many governments' budgets have not been able to cope with the increasing demands of their citizens.

This problem triggered the search for alternative sources of financing, which resulted in the birth of public-private partnerships (PPPs) (National Treasury, 2001).

The PPP concept brings together both the public and the private sectors into a long-term relationship in order to respond to the ever-increasing demand for infrastructure goods and services.

5.2 Public private partnerships

Goods such as infrastructure are now regarded as 'priceable' self-financing activities within or outside of government budgets, which was not the case in the past. This naturally allows for greater private sector involvement in infrastructure provision. This has created an incentive for both government and the private sector to form partnerships where infrastructure projects are concerned as one of the different ways of procuring an infrastructure asset (Calitz and Fourie, 2007). According to Grimsey and Lewis (2005), a PPP is a relationship between the public and the private sectors that brings together, for mutual benefit, a public body and a private company in a long-term joint venture for the delivery of high-quality public services, drawing on the best of the public and private sectors. PPPs provide additional resources for investment in the public sector and the efficient management of the investment.

PPPs can vary significantly in term and structure. Table 5 below gives a summary of the different PPP models employed by governments around the world. They are partially or completely funded through user charges with some government funds in other circumstances depending on the type of the contract between the two entities. Under PPPs, the private sector is required to raise long-term capital funds for financing the infrastructure

project. In this case project financing is normally used as a funding mechanism to repay the debt generated by the private party. The reason is that capital is raised to create a structure to attract investors and also to minimise risk between stakeholders, by transferring it to those who are able to manage it better such that the overall risk for the project is reduced. The main deciding factor when project finance is employed is the amount of revenue that the project will generate during operation. If the expected revenue is not enough to cover the project costs associated with the repayment of the principal, interest, dividends and operating expenses, the project will not go ahead and other financing mechanisms will need to be considered (National Treasury, 2001). The following table gives a summary of the different PPP schemes.

Table 5: Public private partnership schemes

Service contract	Modalities
Service contracts	The private party procures, operates and maintains an asset for a short period of time. The public sector bears the financial and management risks.
Operation and management contract	The private sector operates and manages a publicly owned asset. Revenues for the private party are linked to performance targets. The public sector bears the financial and investment risks.
Leasing-type contracts • Buy-build-operate (BBO) • Lease-develop-operate (LDO) • Wrap-around addition (WAA)	The private sector buys or leases an existing asset from the government, renovates, modernises, and/or expands it, and then operates the asset, with no obligation to transfer ownership back to the government.
Build-Operate-Transfer (BOT) • Build-own-operate-transfer (BOOT) • Build-rent-own-transfer(BROT) • Build-lease-operate-transfer(BLOT) • Build-Operate-transfer (BOT)	The private sector designs and builds an asset, operates it and then transfers it to the government when the operating contract ends, or at some other pre-specified time. The private partner may subsequently rent or lease the asset from the government.
Design-Build-Finance-Operate (DBFO) • Build-own-operate (BOO) • Build-develop-operate (BDO) • Design-construct-manage-finance (DCMF)	The private sector designs, builds, owns, develops, operates, and manages an asset with no obligation to transfer ownership to the government. These are variants of design-build-finance-operate (DBFO) schemes.

Source: Compiled from different sources.

Revenues for the project are obtained from the funding method used. Certain structural agreements within PPPs may sometimes dictate that the private sector pays concession fees to the government in exchange for the use of the assets and/or rights to provide a particular service (National Treasury, 2001). The PPP approach has its own challenges just like any other infrastructure financing approach. Table 6 gives a summary of both advantages and disadvantages of the PPP approach.

Table 6: Advantages and disadvantages of PPP projects

Advantages	Disadvantages
Eases the strain on government's	Transaction costs associated with PPP contracts are

balance sheet.	normally high and this discourages many potential small service providers from participating in the bidding process.
Introduces competition when bidding for infrastructure projects takes place.	Lack of a well-developed capital market can limit the development of a viable PPP market.
Restructures the public sector service by embracing private sector capital and practices.	Inappropriate risk transfer raising the perceived risk to investors, and resulting in a high cost of capital.
Achieves greater efficiency than traditional methods of providing public services.	PPPs hinder accountability as PPP costs to the government are not reflected in the government balance sheet.

Source: Compiled from various sources.

5.3 Corporate finance

Under this financing method, project sponsors will generally use their own credit to raise funds. This approach works better if the project is small in size, shorter and less capital-intensive. If that is the case, outside financing is not necessary as the company can afford to pay for the construction of the project from its own balance sheet. However, as with public financing, private companies tend to avoid this option, as it results in strained balance sheet capacity, and limits their liquidity should they decide to participate in potential future projects (National Treasury, 2001).

This financing mechanism introduces problems if used to finance infrastructure projects that provide regulated services. In most cases one finds that the regulated private party increases its tariffs for the services provided in order to raise enough revenue to cover its capital costs. Another challenge is when the asset is long- term in nature and the capital investment is to be recovered within a shorter period of time. Normally the asset is depreciated over a short period and the recovery of the investment is done within a very short period, whereas the asset is meant to provide the service for a longer term, for example, more than 25 years. The repayment of the debt used to finance the asset has to be made within a short period, while the asset will continue to provide the service for a longer period, thus putting unnecessary pressure on consumers. Subsequently, the utility is forced to ask for a higher tariff as the repayment of the asset is spread over a shorter period than the asset's lifespan. This creates a problem for the consumer, who has to pay a higher tariff, when the repayment could have been spread over the asset's lifespan, thus reducing the tariff to be paid by consumers. This problem is also encountered in PPP projects. Table 7 shows both the advantages and disadvantages of this financing approach.

Table 7: Advantages and disadvantages of the corporate finance approach

Advantages	Disadvantages
Works for smaller projects.	Strains the balance sheets of companies.
Shorter and less capital intensive projects.	Limits liquidity for future projects.
Reduces interest payments as some of the capital costs come from the firm's own balance sheet.	Term of corporate finance debt (excluding sovereign backed bonds) is typically 5 to 7 years, whereas infrastructure projects are longer than 7 years. This causes financing mismatch in cases where long-term debt cannot be placed in capital markets.

Source: Compiled from various sources.

5.4 Project finance

According to General Electric Commercial Finance (2006:1) 'Project finance can be defined as financing of an infrastructure project with myriad capital needs, usually based on non-recourse or limited recourse structure where project debt and equity used to finance the project are paid back from the cash-flow generated by the project'. The project is secured by a single asset generating the cash flows. The financiers are paid back by the revenue generated by the project only. So the risk to the investor is specific to the asset being funded and not to a project developer's balance sheet (Deloitte, 2012).

Project financing relies on the project's ability to generate revenue to raise funds. Project sponsors create a legally independent special purpose company in which they are the principle shareholders. The special purpose company usually has a minimum equity requirement (generally averaging between 10 and 30 per cent of the total capital required for the project) and it is required to raise debt at a reasonable cost. The final legal structure varies across different projects (National Treasury, 2001). Under this approach the private firms/sponsors establish a new project company to build own and operate a specific infrastructure project, the same way as in a PPP project. The equity contributed by each sponsor provides part of the capital financing needed for the project. In some circumstances the project company may raise debt. The main deciding factor for investors under this approach is the projected future revenue stream to be generated by the project and the project company's assets to repay all loans. If the revenue to be generated is not enough to cover the project costs, investors may not invest in the project.

This approach is normally used when the financial or technical capability is too large for one sponsor, so that the process requires or encourages a joint venture with certain interests. Table 8 summarises both the advantages and disadvantages of the project finance approach.

Table 8: Advantages and disadvantages of the project financing

Advantages	Disadvantages
Governments can share the financing burden with private financiers, as in PPPs.	Project finance carries a premium that is usually 200 to 400 basis points above Interbank lending rates because lenders only have recourse to a single asset and its cash flows. If that assert underperforms, the lender will be left exposed.
Government shares risk with the private sector.	Cumbersome and costly in terms of consultants and advisors required to ensure project bankability.
Punctual delivery of the project is more possible.	Associated with high financing/transactional costs.
Cash flows for debt repayment come from concessions or projects supported by government covenants.	

Source: Compiled from various sources.

5.5 Competitive bidding

Under this model the procurer (for example government) usually has a service or construction project in mind. In the case of infrastructure projects, government could opt for a competitive bidding means of procuring that service, where the service – ex post the infrastructure being built – is sold to the procurer by a chosen supplier. The basic idea of competitive bidding starts with some pre-qualification of bidders based on financial and technical criteria that reduce the number of bidders, but at the same time lower the risk of non-compliance by potential bidders (Mundhe, 2008). This form of procurement is associated with competition amongsuppliers. After important parameters (technical and non-technical) are specified, the short-listed bidders are asked to bid on various factors, depending on the nature of the project (Mundhe, 2008). The supplier that meets crucial criteria (for example: the lowest price) wins the bid. The most obvious feature of this model is competition for the market, which drives down prices. However, one should look closely at the disadvantages associated with it too, especially with regards to the procurement of big infrastructure projects.

The competitive bidding approach is, usually associated with engineering, procurement and construction (EPC) contracts which have fixed prices (Bajari and Tadelis, 2006). There is a consensus in the literature which associates these contracts with simple project structures. For instance these contracts are applied to projects that are easy to design with little uncertainty about what needs to be produced, and are accompanied by high levels of design completeness. In contrast, complex projects, which leave scope for project incompleteness, ought to be procured using cost-plus contracts (at the original cost plus any extra expenses incurred should there be any unforeseen expenses not included in the contract), and should be awarded through a negotiation with a reputable and qualified supplier. The reason for using competitive bidding is that the procurer can avoid costly and wasteful renegotiation that follows requests for changes in the project. Thus, while competitive bidding does have the advantage of unbiased awarding of projects, it fails to respond optimally to factors not included in the contract which have the potential to escalate costs (Bajari and Tadelis, 2006).

Table 9 outlines both the advantages and disadvantages of the competitive bidding approach.

Table 9: Advantages and disadvantages of competitive bidding

Advantages	Disadvantages
It promotes competition between suppliers, resulting in best 'value for money' for purchasers and users.	Leading suppliers may not tender, because it may be 1) expensive, 2) they might think the process will not be fair, or 3) they might have other commitments
It offers a kind of transparency that helps mitigate favouritism and corruption	Competitive tendering is not conducive to open communication. It stifles valuable coordination between the procurer and potential supplier before the plans and specifications are finalised.
It gives all suppliers the opportunity to win the business that is advertised	Competitive bidding is associated with a higher probability of renegotiation. This is because bidders under a competitive bidding process often tend to quote tariffs that are less than the long run marginal cost of providing the service.
There is no pass-through of additional costs to consumers, as prices are fixed prior the construction of the asset	One way a supplier can lower costs is by using cheaper labour and/or materials, thus sacrificing quality in the process
	It can take several years to choose a successful bidder. And if a supplier is unable to meet the requirement then the lengthy competitive tendering process may have to begin again.

Source: Compiled by from various sources.

As Cliffe Dekker Hofmeyer (2012) asserts, it is vitally important that great care is taken in **selecting the contractor** and in ensuring the contractor has sufficient knowledge and expertise to execute the project. Given the significant monetary value of infrastructure projects, and the potential adverse consequences if problems occur during construction, the lowest price should not be the only factor used when selecting contractor.

6. Infrastructure financing in South Africa

6.1 Introduction

This section discusses the different major infrastructure projects in South Africa that have been procured through a variety of approaches. It starts by discussing infrastructure financing in South Africa in general and case studies of different projects that have been/being implemented in recent years

The South African government has employed different financing approaches in recent years. The most commonly used approaches are the PPPs, government taxes and the 'user pays principle' approach. Until recently, the government has employed the competitive bidding approach, especially for renewable energy projects.

The South African government has established SOEs that implement large scale infrastructure development projects. They use their own balance sheet to finance their infrastructure projects and sometimes receive capital funding from government, either as a once-off lump sum, or periodically. Most of the SOEs are 100% subsidiaries of government (other than Telkom and for a period, South African Airways (SAA)) (Deloitte, 2012). These 100% state-owned SOEs benefit from **sovereign guarantees,** which enable cheap borrowing in global capital markets. For example, Eskom benefits from a R350 billion government guarantee as well as a loan/equity from the government of R60 billion.

By law, as in many developed countries, SOEs are not permitted to attract new private equity capital from private investors and are prohibited from floating equity instruments. Therefore SOEs are traditionally dependent on their balance sheet and debt finance for infrastructure build and up-keep. To implement this financing strategy, many SOEs turn to the 'bond' market or rely heavily on tariffs for the services they offer to the public. The drawback with using the bond market is that bonds are unsecured instruments dependent on the credit rating assigned to the issuer. There exists an inverse relationship between the credit rating of a bond and the cost of debt. As the credit rating falls below investment grade, lenders' willingness to lend decreases. As the debt–equity ratio increases, interest payments increase, resulting in a negative effect on the credit rating of the SOE in question (Deloitte, 2012). The decrease in the SOE credit rating makes it difficult to raise cheap capital and puts pressure on the SOE to request a higher tariff from the Regulator if the service provided by the asset in question is regulated. This raises the question of whether the current financing model is sustainable or not as most of these projects also experience project cost overruns and these costs are passed through to the consumer. As mentioned earlier, an increase in tariff has a negative impact on the consumer.

By turning to the bond market, SOEs have mainly overlooked other financing tools such as PPPs. However, some SOEs have begun employing PPPs as an infrastructure financing models – for example, Transnet in the development of its ports infrastructure.

6.2 Case studies of major projects in South Africa

This section discusses some of the projects that have been implemented or are yet to be implemented in South Africa and the methods used to finance these projects.

6.2.1 Gautrain Rapid Rail Link project

According to the Gautrain Annual Report (2013), the project started in 1998 and was completed in 2012. The project was financed through the PPP model with Mbombela being the special purpose vehicle (SPV) for the project. The railway line is 80km with 10 stations and has a possibility for extension in the future. Serrao and Van Schie (2011) reported that the amount of R30.5 billion that was spent during the construction phase was divided into R27.3 billion, which consists of government's contribution, R3.2 billion from private funding, and R2 billion from other private funding. The concession agreement was that Mbombela assumed the responsibility to design, build, operate and partially finance the Gautrain project. A 20-year concession was granted by the government with a 54-month construction period and a 15-year operating and maintenance period. The Gauteng provincial government was responsible for land procurement and milestone payments.

It is reported that 'the private contribution was financed through loans from a joint agreement between Mbombela Concession Company and First National Bank and Standard Bank'. Some finance was sourced from the Industrial Development Cooperation (IDC) and the Development Bank of Southern Africa (DBSA) to assist the strategic partners group (SPG), which is one of the shareholders in the Bombela Concession Company. User charges were only to cover operational and maintenance costs. Like many other projects, the Gautrain project also experienced problems, some of which led to delays and project cost overruns. The project cost overruns were estimated to be in the region of R5.4 billion, which translates to about 21% of the initial budget.

6.2.2 Gauteng toll roads

In this project, two financing options were investigated: PPPs, and the procurement of finance and development of the toll road by the State itself. The latter emerged as the best option (Department of Transport n.d.).

The highways were tolled in order to recover the construction, operation and maintenance costs of the project. Pienaar (2011) suggests that through tolling one gets finance more quickly than through taxes, which could take several years to raise the required funds. This is as a result of a number of competing projects for limited financial resources. However, there was no referendum conducted to see if all stakeholders agreed with this means of funding and this caused public resistance to the project.

The construction costs of the project escalated from R6.3 billion to R90 billion and some of the finance was raised from the capital and money markets, with the hope that it would be paid back from revenue generated by tolls (The Star, 2012). Public resistance to paying the tolls has negatively impacted the balance sheet of the South African National Roads Agency (SANRAL) as the revenue expected from the operation of the project was not collected, pending legal challenges brought to the state by the public. Toll fees remained uncollected for a long time, while the public was challenging state in the court of law about the impacts the tolling would have on the wider economy. The court eventually decided in favour of the state.

SANRAL (2012) reports that the public and political objection to tariffs expressed in 2007 were experienced when this was announced in 2011, which then resulted in an announcement by the Minister of Finance that there would be a reduction in the tariffs (Budget Speech, 2012). The objections experienced in the country have affected investor confidence, and as a result SANRAL's global and national ratings were downgraded in February 2012 to Baa1/P-2 and Aa3.za/P-1.za respectively, and again in May 2012 to Baa2/P-3 and A2.za/P-2.za respectively (SANRAL, 2012).

In addition to the abovementioned challenges and experiences, it is reported that the construction industry in South Africa was affected by the collusion of some companies between 2006 and 2010 during the construction of the stadiums for the 2010 FIFA World Cup stadiums and the Gauteng Freeway Improvement Project (Ensor, 2013). The collusion among the construction companies may have affected the final price paid for the construction of this project. If that can be proven, consumers would need to be compensated through a reduction in the price of tariffs/tickets.

6.2.3 Transnet's new multi-product pipeline

The Durban–Johannesburg Pipeline (DJP) was at a critical stage of its lifespan when Transnet decided to construct the new multi-product pipeline (NMPP) to address the inland security of supply of petroleum products. Among other things, capacity and age of the DJP necessitated the construction of the NMPP. The need to develop the NMPP was also pointed out by the Moerane Commission Report on fuel shortages in late 2005 (Transnet, 2010). The NMPP project is not complete yet but part of it was commissioned to transport diesel inland.

Financing of the NMPP was facilitated by Transnet from its treasury function, through a typical Corporate Finance structure. Transnet borrows from the capital markets in the form of bonds and allocates these funds along with profits from its other operating divisions to capital projects such as the NMPP; these funds are therefore co-mingled (mixture of Debt & Equity) funds. These bonds are raised on the back of an implicit Government Guarantee due to the fact that Transnet is state-owned. These co-mingled funds are then allocated to Transnet Pipelines, a division of Transnet, from Transnet Treasury for capital projects. In addition Transnet sought additional funds from the Government to assist with the interest during construction of the NMPP and was allocated 4.5bn under a Grant Funding Agreement.

The project completion date was moved from year 2010 to 2013 (Department of Public Enterprises 2012). The Estimated Total Cost escalated from R11.1bn in year 2008 to R23.4bn in year 2010 (Transnet, 2010). The Department of Public Enterprises (DPE) undertook a study to review the construction costs of the NMPP project. Various reasons were provided for the variation in costs. The findings of the review revealed that there were systemic failings that compromised the intended outcomes at different levels of the key role players and these are due to failings at Engineering, Procurement and Construction Management, main contractor levels and at the shareholder level (DPE, 2012).

The escalating construction costs were followed by the review of Transnet's tariffs which led to high tariffs, hence the unhappiness of the interested parties. Currently a prudency study is being conducted by NERSA.

6.2.4 Medupi Power Station

According to Eskom (2013) 'as a result of the longer than expected construction time, the cost to completion of Medupi is now expected to increase to a maximum of R105-billion (excluding interest during construction, transmission costs and claims against contractors), from the previous estimate of R91.2-billion. The increase will be funded from existing CAPEX allocations and will not impact electricity tariffs. The cost of Medupi remains within international benchmarks' (Business Day, 2013). However, according to the Free Market Foundations (2013) Medupi is more likely to cost between R145bn and R150bn, once opportunity costs, interest charged and the cost of Flue Gas Desulphurization (FGD) is included. At the price of R150bn for a 4,764MW station, which equates to R31.4m/MW, Medupi will be one of if not the most expensive coal-fired power station in the world (FMF, 2013).

According to Eskom, Medupi's first unit was supposed to start generating power in January 2010 but now is likely to do so in the second half of 2014 (FMF, 2013). This is, at the very least, 54 months late. The additional cost, of approximately R100bn over and above the original estimate of R52bn quoted in January 2007. The delay is causing Eskom to lose more than four and half years' worth of revenue from a 4,764MW station – about 169bn kWh of energy.

Eskom suffered credit rating downgrade by Moody's to Baa3. The reasons provided by Moody's are attributed to 'Eskom's standalone credit quality to uncertainty over the evolution of Eskom's investment programme and financial profile over the medium term' (fin24, 2013).

Project overruns at Medupi are linked to labour unrest and 'underperformance' by contractors. Among the demands made by the National Union of Metal Workers of South Africa (NUMSA) to Eskom are the rolling out of worker training programmes by the Medupi contractors and the eradication of poverty rates paid to workers (Politicsweb, 2012). The boiler problems were connected with inadequate post-weld heat treatment, and the replacement of welds which were made using unqualified procedures. The construction delays have been partially blamed on contractor Hitachi's failure to deliver top quality boilers at the plant.

Most of the projects discussed in the case studies above have experienced either cost or time overruns or both and this is creating the need for a better infrastructure procurement approach that is able to transfer most – if not all – project construction risks to the service provider instead of transferring them to the consumer. An example of such a model is the competitive tendering/bidding model as discussed in the previous section.

6.2.5 Renewable energy projects

In 2011 the Department of Energy announced the launch of a competitive bidding process for renewable energy procurement, known as the Renewable Energy Independent Power Producer Procurement (REIPPP) programme. Subsequently, the Regulator abandoned the feed-in tariffs process. The REIPPP programme makes use of competitive bidding and EPC contracts. In the ECP contract, contractors are obliged to turn over a full facility to developers. The completion of the facility is guaranteed at a fixed price and date, which is a feature of the REIPPP programme. This implies that contractors absorb all the risks and that failure to meet any contractual obligations results in monetary liabilities incurred by the contractor (Cliffe Dekker Hofmeyer, 2012).

The success of the South African REIPPP programme has been confirmed by the third round bids for renewable projects. The bids in the third window cost far less than what the Department of Energy expected. The cost for photovolcanic power dropped 68 percent to 88c/kWh and wind energy dropped 42% to 74c/kWh. The investment in the South African renewable projects rose from less than $30million in 2011 to $5.5 billion in 2012, which is a big increase within a short period. The outcome of the third round bids has encouraged the state to consider using the remaining funds allocated to round three for a new round (Munshi, 2013).

Many of the projects that were successful in the REIPPP (both rounds 1 and 2) are still in the construction phase. At this point it is not yet possible to compare the project cost overruns between projects procured through the REIPPP programme and the other procurement

approaches employed by the government. However, there has been one renewable energy project that has been successfully commissioned and was completed well before time (Cliffe Dekker Hofmeyer, 2012).

Auctions for renewable energy should be used cautiously and not only focus on 'lower-priced' bids. The key to success for competitive tenders in the REIPPP programme was that it incorporated a weighting of price and non-price factors, while auctions are awarded solely on the basis of lowest price (sometimes after a number of rounds) among qualified bidders. Running effective auctions might require even greater time, expenditure, transaction costs, expertise, and capabilities than running tenders (Eberhard, 2013). Thus, success in the REIPPP programme may not guarantee success in other sectors where infrastructure is needed.

It is clear from the above case studies that an important factor affecting financing of projects in South Africa is project overruns. The following section discusses this issue in more detail. As mentioned earlier, it is important to monitor and know the causes of project overruns as they the AR through the RAB and therefore impact negatively on the prices that consumers pay.

7. Project overruns

Project cost overrun is a result of many factors which include changes in project scope, changes in the economic environment, political factors and poorly written contracts, among other things. International evidence indicates that cost overruns occur in approximately 73% of infrastructure projects in general, while in PPP projects this figure stands at only 22% (Dahdal, 2010). Most of the cost overruns are a result of poorly written contracts, especially in PPP projects (Allen, 2001). However, even if the PPP contract is well written, should the government initiate some changes in the project scope, project costs will increase due to the private sector's increased bargaining power as it knows that it would be more costly for the government to trade with another contractor for the same project (Hart 2003).

Project cost overruns are experienced in both public and private sector procured projects. A study conducted by Allen (2001) in the United Kingdom revealed that project cost overruns are experienced in both publicly and PPP procured projects. In this study, six projects were compared: three procured through the traditional procurement method and the other three procured through PPPs. The traditionally procured projects overran by between 31% and 214%, while the PPP procured projects overran by between 60% and 600%.

As can be seen from the above, different studies give different findings about cost overruns between PPP and public sector procured projects. This is an indication that the method used to procure a project is not the only factor that influences project costs overruns; there must be other factors that play a very significant role in influencing the final project cost. The reasons given for these cost overruns by the public procurers are that public sector procurement tends to underestimate project risks and as a result, budgets for major projects have sometimes been prone to optimism bias. With regard to PPP procured projects, the cost overruns were mainly due to inflation increases and public sector procurers changing project scope (Allen, 2001).

7.1 Relationship between project delays, cost overruns and tariffs

Logically, any delay in implementation in itself will cause cost overruns for a project. There are two main types of costs that economists speak of: variable costs and fixed costs. Infrastructure projects will incur both. With regard to the former, since infrastructure costs are estimated for the planned duration of the project, should there be any time delays, there will be inflationary consequences and as such, construction costs will increase. With regard to the latter, certain overhead costs have to be met as long as the project remains incomplete; such costs include salaries and wages related to extended time of construction (Singh, 2009). All these additional costs increase the value of the asset, which eventually for part of the utility's RAB, especially for regulated services such as energy.

Moreover, a long delay may cause the depreciation of the asset, necessitating spending on repairs or replacement. In the regulatory environment this may significantly increase tariffs and thus result in the public's rejection of the project. Cost overruns may also lead to an increase in the capital-output ratio for the entire economy. Another important issue of project costs is the rate of return that the financers of the project expect from their investment; the higher the rate of return, the higher the value of the asset.

7.2 Reasons for project overruns

There are a number of reasons for project overruns given by different experts in the economic and engineering fields. This section discusses these reasons in detail.

Technical reasons: Bordat *et al*. (2004) distinguish between excusable delays (due to *force majeure)* and non-excusable delays (contractual issues). Contractual issues include planning and design deficiencies, such as incorrect estimates of work quantities. Contractor errors include unnecessary work: work that did not follow the design plans, and work that did not meet contract specifications.

Excusable delays are due to unforeseen circumstances including site conditions that differed from those described in contract documents. Majid and McCaffer (1998) found that materials, equipment, and labour-related delays are the major cause of contractors' performance delays.

Political reasons: Some delays and cost overruns are due to project planners and promoters misrepresenting timescales as well as cost/benefit projections in order to win political favour for the project and get it started. This type of delay can be explained using the principal-agent theory. The principal- agent problem arises when funders of infrastructure projects (ultimately tax payers) have limited information about the project as a whole because the project is separated by a chain of intermediaries including contractors, consultants, local governments departments and national bodies. In this case politicians who are more concerned with securing approval for flagship projects in the short term may push for its approval to gain public support, rather than looking for long-term value for money for tax payers.

Psychological explanations: Kahneman (1979, 2003) and Kahneman and Lovallo (1993) cite the planning fallacy as a factor. The planning fallacy refers to the tendency to be overly optimistic about the outcomes of planned actions. This in turn leads to 'optimism bias', which is the tendency to underestimate costs, completion times and risks and to overestimate the

benefits of planned actions which the constructor eventually fails to achieve. To correct for optimism bias, one needs to understand the technical and political reasons for project overruns. Once this is achieved, Kahneman and Lovallo propose a solution to 'optimism bias' called Reference Class Forecasting (RCF). RCF is based on the presumption that past projects tend to be more similar to planned projects than is normally assumed and are therefore a means of increasing the accuracy of forecasting.

Singh (2009) conducted an empirical study to identify factors that trigger time and/or cost overruns during the planning and implementation of infrastructure projects. He used a database of 850 projects completed between April 1992 and September 2008. This database spanned over 17 sectors in the Indian economy. He looked at the correlation between time and cost overruns using a simultaneous equation model to explore the direction of the causality, as it was thought that this relationship might be co-dependent. It was found that delays and cost overruns are still unacceptably frequent and large, and that delays cause cost overruns. Significant reasons for delays were: deficient project planning processes, the use of inappropriate procurement contracts, faulty contract management, several kinds of organisational-cum-institutional failures and long approval processes for projects. The study also found that bigger projects and projects with long implementation phases were more susceptible to cost overruns.

Table 10 shows that even internationally projects do overrun. This highlights the fact that project cost overruns are not a developing country phenomenon and that developed economies also experience this problem.

Table 10: International Infrastructure projects with the biggest historical project overruns

Project	Country	Procurement model used	% over budget
Canadian firearms Registry	Canada	GOVT	36917
Guangzhou City Transport Project	China	PPP	335
U.S. 101 Helicopter	USA	GOVT	330
Boston Big Dig	USA	PPP	324
Visegrad Hydroelectric Project	Yugoslavia 1985-1990	PPP	5142
Gezhouba Dam Project	China	PPP	337
Nanchang-jiujiang Highway	China	GOVT	255
Cuernavaca- Acapulco Toll Road	Mexico	GOVT	300
Sydney Opera House	Australia	GOVT	1400
N20 Patrickswell Cork	Ireland	PPP	370
Dublin Port Tunnel	Ireland	GOVT	261
Humber Bridge	UK	GOVT	276
Verrazano-Narrows Bridge	USA	GOVT	384
Copenhagen metro, stage 2A+2B, Nørreport- Vanløse	Denmark	GOVT	386
M50 South East Motorway	Ireland	GOVT	556

Source: (Financial Mail, 2013)

It is clear that project cost overruns have been more than 300% in most of these developed countries, with some going above the initial budget by more than 500%.

7.3 Project overruns for South African projects

In the case of South Africa, there are no identified empirical studies done to test project overruns thus far. However, Baloyi and Bekker (2011) conducted surveys for the financing of the 2010 World Cup stadia in South Africa. Ten stadia were either upgraded or newly constructed for the event. Nearly all projects experienced time delays and cost overruns, ranging from 5% to 48% (see Table 11 below). The cost overruns for the South African stadia projects were far less than those listed in the above table. It is worth noting that this does not suggest that all South African infrastructure projects over run as some are built and completed within budget.

Table 11: Budgeted versus indicated final costs of the ten FIFA 2010 stadia

Stadium	Initial Budget	Indicated Final Cost	Cost Overrun
Soccer City - Johannesburg	2.2 billion	3.7 billion	41%
Ellis Park - Johannesburg	240 million	253 million	5%
Moses Mabida - Durban	1.6 billion	3.1 billion	48%
Mbombela - Nelspruit	600 million	1 billion	40%
Green Point - Cape Town	2.9 billion	4 billion	28%
Nelson Mandela Bay - Port Elizabeth	2.1 billion	Not known	
Peter Mokaba - Polokwane	1.3 billion	Not known	
Royal Bafokeng - Rustenberg	360 million	483 million	25%
Mangaung - Bloemfontein	245 million	359 million	32%
Loftus Versfeld - Pretoria	122 million	131 million	7%

Source: Baloy and Bekker (2011)

A total of 18 factors which contributed to cost overruns were analysed, with the top ten factors contributing to more than 85% of the cost overruns identified. Most of the factors stated were either external or contractual. The table below gives the ranking of the different factors that caused cost overruns on the 2010 FIFA World Cup stadia.

Table 12: Factors causing project costs overruns

Cost overrun factors	Rank
Increase in material cost (inflation)	1
Inaccurate material estimates	2
Shortage of skilled labour	3
Clients late contract award	4
Project complexity	5
Increase in labour cost	6
Inaccurate quantity take-off	7
Difference between selected bid and the consultants' estimate	8
Change orders by client during construction	9
Shortage of manpower	9

Source: Baloy and Bekker (2011)

In terms of time overruns, a total of 34 factors were analysed, with the top ten factors contributing to more than 80% of the causes for delay. Most of the problems stated were client and contract related. The top five factors were: incomplete drawings, design changes, clients' slow decision-making, late issues of instructions, and shortage of skilled labour. Surprisingly, labour disputes ranked seventh considering that one would expect labour to be the top ranking factor given the number of labour strikes that took place during the construction period of the stadiums.

In addition to the above, it is worth noting the inclusion of these stadium projects in the Competition Commission's enquiry into collusion in the construction industry, which is further discussed in Section 8.

Tables 13 gives summaries of project cost overruns and the method used to finance some of the major infrastructure projects in South Africa. It is widely believed that project cost overruns are associated with the financing or procurement method employed.

Table 13: Project cost overruns in South Africa and their financing method

Project	Procurement model used	Initial Budget (R bil)	Estimated or final Cost (R bil)	% over budget
Gautrain	PPP	25.1	30.5	21
Kusile	Corporate financing and government guarantees	90	121	34
Medupi	Corporate financing and government guarantees	33.6	105	213
Gauteng Toll Roads	Corporate financing and government guarantees	6.3	90	1329
NMPP	Corporate financing and government contribution	11.1	23.4	111
OR Tambo	Govt	5.2	8.5	64
De Hoop Dam	Govt	7.9	20	153
FIFA Stadiums	Government/municipalities	8.1	18.4	126
N4 toll roads	PPP	2	3	50
Standard Bank Building in Rosebank	Private sector financed/self	1.1	2	82

Source: Compiled from various sources

It is clear from the above analysis that project cost overruns are not only influenced by the financing method used. The analysis shows that project cost overruns happen whether a project is financed by government, the private sector, PPPs or through corporate finance. This means that there are other factors that influence project overruns other than the financing method. These include an increase in material costs, inaccurate material estimates, shortage of skilled labour, client late contract award and project complexity. It is possible that the financing technique used to finance the project will also influence project cost overruns. The financing or procurement method used cannot be ignored because it is through this method that incentives aimed to encourage proper management of these factors can be built in order to ensure that cost overruns are kept at a minimum.

The general understanding out there is that public sector financed projects are more likely to overrun in terms of costs and time, but from the above analysis one cannot conclusively attribute cost overruns to projects that are financed by the public sector without empirically testing and analysing each project with its own control variables such as ‘contractual problems’, ‘labour problems,’ etc. This is because even projects procured through other methods like PPPs and private sector owned projects have experienced cost overruns similar to traditionally procured projects.

Nowadays, many companies use EPC contracts as a way of managing project cost overruns and other risks associated with project construction. Under EPC contracts, contractors absorb all the risks and failure to meet any contractual obligations results in monetary liabilities incurred by the contractor (Cliffe Dekker Hofmeyer, 2012). Such contracts were used as the main form of construction contracts by project sponsors bidding for projects under South Africa's REIPP. If such contracts are used, the completion of the facility is guaranteed at a fixed price and date and this feature of the EPC contract can go a long way in discouraging project cost and time overruns, which has become a problem within the South African construction industry.

When the regulator accepts a project into the RAB of a utility that has overruns in terms of construction costs, the only tool available to the regulator is to test for prudency/efficiency on the procurement of the asset once it has been completed. The problem with this approach is that it only takes place after the project has happened, and that may be seen by potential investors in the industry as creating uncertainty in terms of the returns the investor would get once its project has experienced cost overruns. However, in the absence of a better tool, a prudency test is a good instrument for protecting consumers from exorbitant project costs that may lead to high tariffs.

Given this challenging problem it is clear that new measures of dealing with project cost overruns need to be devised in order to protect the interests of the consumer and to create regulatory certainty. Such measures may include coming up with a certain threshold above which no extra costs will be allowed into a utility's RAB. This threshold can be in the form of a percentage increase from the original budget for the project, e.g. 10%, meaning that only 10% of the costs overruns would be allowed into the RAB. Anything above that will not be allowed. However, given the trends in project cost overruns as shown in the above tables, 10% percent may not be an achievable target, at least in the short to medium term. The question is, can a regulator set this target for licensees?

Another phenomenon that has hit the South African construction industry and has a big impact on project costs is the formation of cartels. Cartels influence project construction costs as they affect competition in the construction industry. The impact of these cartels significantly affects the final consumer of the service provided by the infrastructure asset constructed by these cartels. The following section discusses this new development in the South African construction industry.

8. Construction cartels and collusion in the South African construction industry

The Competition Commission ('the Commission') has identified a number of companies in the South African construction industry that are involved in cartels. These companies have managed their collusive agreements through:

(i) meetings to divide markets and agree on margins, (ii) different combinations of firms coordinated tenders over different projects, (iii) firms colluding to create the illusion of competition by submitting sham tenders ('cover pricing') to enable a fellow conspirator to win a tender, (iv) firms agreeing that whoever wins a tender would pay the losing bidders a 'loser's fee' to cover their costs of bidding, (v) sub-contracting to compensate losing bidders.

All these activities have a direct positive impact on the final value of the asset given the fact that the asset would have not been procured in a competitive environment.

The end result of collusive behaviour is high asset value that gets allowed into the RAB especially of regulated services like energy. The number of projects evaluated for price fixing is 300. These projects are valued at R47 Billion (Public Sector (R28 billion), private Sector (R19 billion)). Table 14 shows the fines imposed by the Competition Commission on the companies that violated the Competition Act.

Table 14: Fines imposed by the Competition Commission

Company	Fine (R)
Murray & Roberts	309 046 455
WBHO	311 288 311
Stefanutti	306 892 664
Aveng	306 576 143
Basil Read	94 936 248
Raubex	58 826 626
Haw & Inglis	45 314 041
Rumdel	17 127 465
Giuricich	3 552 568
Vlaming	3 421 662
Tubular	2 634 667
G Liviero	2 011 078
Hochtief	1 315 719
Norvo	714 897
Esorfranki	155 850
Total	**1 463 814 392**

Source: Financial Mail, July 2013.

In the South African context, the Government and the Presidential Infrastructural Coordinating Committee (PICC) would need to be circumspect in its infrastructure rollout with respect to the Strategic Infrastructure Projects (SIPs) to ensure the government and ultimately the consumer obtains 'value for money' on all projects to be implemented in the country.

In a recent development the municipalities involved in the stadium construction threatened to launch civil suits against the construction companies involved in the price fixing. The values of the 'overcharging' claims are shown in the table below.

Table 15: Municipalities involved in the stadiums' construction and the value of overcharging claims

Municipality	Amount (Rm)	10%	20%	30%
Nelson Mandela Bay	1967	197	393	590
Johannesburg	2027	203	405	608
eThekwini	557	56	111	167
Polokwane	1265	127	253	380
Cape Town	7255	726	1451	2177
Total	**13078**	**1308**	**2616**	**3923**

Source: (Mail & Guardian 2013).

The penalties levied by the Competition Commission exclude the potential litigation by the parties being overcharged. To this end, City of Cape Town is pursuing damages against the construction companies involved in bid rigging for the Cape Town 2010 Stadium (Engineering News 2013). SALGA (South African Local Government Association) insists that other cities affected in the 2010 stadium overcharging will also pursue damages (Mail & Guardian 2013).

Thus far, no claims of overcharging have been made by SOEs such as Eskom and Transnet. However, the South African National Roads Agency Limited (SANRAL) has applied for certificates from the Competition Commission that will make it possible for civil claims to be made against the construction companies that were involved in the construction of the Gauteng Freeway Improvement Project (Benjamin, 2013). In a case where a claim is made by the overcharged entity, and the claim is made against an infrastructure asset that is providing a regulated service, that claim would need to be taken into account when the respective regulator decides on the final value of the asset that will form part of the final RAB of the entity providing the service.

9. Conclusion

The objective of the paper was to stimulate debate about the problems that are prevalent within the infrastructure investment domain. It discussed pertinent problems linked to infrastructure financing, funding and their implications to the final tariff that consumers have to pay. Infrastructure expansion in South Africa has resulted in huge increases in tariffs in many sectors of the economy and that has created public unhappiness. Many believe that the increases in tariffs have been due to inefficient financing or procurement approaches/methodologies used to finance these infrastructure projects. The inefficient financing approaches are believed to lack incentives that encourage construction companies to construct projects at lowest costs possible as these assets are finally included into a utility's RAB which eventually affects the final price that consumers pay. These high

construction costs are also believed to be due to project cost and time overruns and the financing approach used to finance the project.

The study started by looking at how the financing approach used to finance a project affects a tariff and found that it affects a tariff through the RAB and the WACC. It went further to look at what affects the RAB value and the WACC. It concluded that the RAB that is allowed to enter the utility's RAB is affected by a number of factors such as project cost overruns, time overruns, and cartels in the construction industry. The WACC was shown to be affected by the financing techniques employed by the project owner. Some of these issues have to do with the contracting between the project owner and the construction company. If all these factors are not managed properly, it may lead to high construction costs and eventually result in high tariffs.

The study also found that project cost overruns are not only influenced by the financing method employed as is normally believed. Project cost overruns are experienced even if a project is financed by government through taxes, private sector, PPPs or through corporate finance. This means that there are other factors that influence project cost overruns other than the financing method used to finance a project. These include increases in material costs, inaccurate material estimates, shortage of skilled labour, client late contract award, project complexity, to name only a few. However, the financing method used cannot be ignored because it is through the financing method where incentives lie to encourage proper management of these factors that can be built in order to ensure that cost overruns are kept at a minimum.

In light of the PICC and government infrastructure plans, there are many gaps in feasibility, financing, construction and management of these projects. Since the user/taxpayer bears the burden for overruns and the like, regulators should ensure that the costs of these infrastructure projects are prudently/efficiently acquired to ensure that the government and the user/taxpayers receive value for money.

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