

INVESTIGATING THE PRUDENTIAL DETERMINANTS OF INFRASTRUCTURAL INVESTMENT APPRAISAL TECHNIQUES IN AIRPORTS COMPANY SOUTH AFRICA

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ABSTRACT

Academic literature advocates that infrastructure contributes significantly to a country's economic development. In the South African context, airport infrastructure is one of the contributors to the economic development of the country. The South African government has limited financial resources, to service public infrastructural needs; therefore, the national government implemented the Sustainable Infrastructure Development Symposium [SIDSSA] initiative on 23 June 2020 to accelerate the delivery of country infrastructure. However, project appraisal was identified as a key governmental challenge - particularly in the public investment management space - and many projects were funded prematurely. This perspective has motivated a host of academic literature to analyse airport infrastructure investment decision making process, based on financial and non-financial factors. Consequently, this current research was conducted, using an exploratory qualitative methodology, to explore the appraisal techniques mostly used in infrastructure investment decision making at the Airport Company South Africa [ACSA]; determinants of infrastructural investment decision making; and to make recommendations for prudential infrastructural investment appraisal techniques for ACSA. The primary data was collected from 10 ACSA senior and professional employees, both current and previous members of investment committees.

The findings concur with academic literature, which identify the best infrastructural investment appraisal techniques as Net Present Value and Internal Rate of Return, the appraisal techniques that assess the time value of money, specifically, receiving a rand today is more valuable than receiving a rand in the future, due to uncertainties. Additionally, the study revealed that ACSA needs to consider both financial and non-financial factors when making an investment decision, namely, alignment with company strategy, compliance with regulations and standards, project lifecycle, sustainability, project value, financial position, and competitive advantage.

Ultimately, as a result of this current study, the research recommends that the ACSA management do not deviate from their current appraisal techniques. However, ACSA needs to enhance the investment decision making process, by using external project valuers for selected projects. Additionally, it is recommended that ACSA offer investment management training courses timeously; conduct a random independent review on project risk, introduce an audit, to inspect if the investment decision process is not contributing to inefficiency; and lastly,

pursue several less regulated infrastructural projects, such as warehouses, lounges, hotels, office space, retail stores, and parking lots, especially those projects in the airport landside, compared to airside infrastructure projects, accommodating aircraft movement.

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LIST OF ABBREVIATIONS

ARR	–	Accounting rate of return
ANS	–	Air navigation services
ATC	–	Air traffic control
ATI	–	Air transport infrastructure
ACSA	–	Airport Company South Africa
CAPEX	–	Capital expenditure
CBA	–	Cost-Benefit Analysis
DCF	–	Discounted cash flow
FIFA	–	Fédération Internationale de Football Association
IATA	–	International Air Transport Association
IMF	–	International Monetary Fund
IRR	–	Internal Rate of Return
MDB	–	Multilateral development bank
NPV	–	Net Present Value
PRASA	–	Passenger Rail Agency of South Africa
SOEs	–	State-owned enterprises
SIDSSA	–	Sustainable Infrastructure Development Symposium
UFT	–	Underground Freight Transportation
USD	–	United States Dollar
WACC	–	Weighted average cost of capital

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

An airport represents one of the fundamental constituencies of the aviation industry, and the economy at large (Air Transport Action Group [ATAG], 2005). Regardless of whether an airport is an international or regional hub – or operates as a mere individual aviation port, the airport infrastructure promotes travel and tourism (Khan & Rasheed, 2016), promotes international trade and commerce, and acts as a driver of economic development (International Civil Aviation Organization [ICAO], 2013). Although the contemporary aviation sector is a recent creation, with the Wright brothers widely acknowledged as the pioneers of mechanised aircraft in 1903, the sector has witnessed enormous growth in the form of technological innovations, product design, and quality (Petrescu et al., 2017).

Changes in the airport infrastructure are constantly influenced by the development of aircraft (Adamík & Kazda, 2022). Airport management companies categorise their infrastructure programmes according to two streams, namely, landside and airside infrastructure (Kumar, 2020). Stephens and Ayo Agunbiade (2019) aver that the increasing investment is in airside projects, namely, enhancing the capacity of the airport infrastructure to handle aircraft movements, by the realigning of runways, construction of new runways, apron development, and modernisation of air traffic control facilities. However, Gibbons and Wu (2021) assert that the landside projects tend to correlate positively with airside infrastructure investment, with its focus being the prioritisation of passenger experience, by increasing retail space, passenger terminal and ground handling infrastructure, parking, and security, among others.

In its genesis, the airports management sub-sector was mainly a government function (Vogel, 2019). However, Offord (2016, p. i) maintains, "...around 500 commercial airports worldwide [are] now having some form of private sector participation in their management...". The main reasons for the change in the management of airports are market forces and economic liberalisation of the sector (Tolcha et al., 2021). Currently, airports management is mostly a commercial business line, undertaken by private capital and, decreasingly, by government agencies (Graham, 2023). African Development Bank studies suggest that the infrastructure

needs of the African continent are equivalent to \$130–170 billion a year, requiring a capital private investor to inject \$68–\$108 billion (African Development Bank [AfDB] Group, 2019).

Airports have always had a wide range of private businesses operating within their boundaries, from ground handlers to retail concession operators. Air transport infrastructure [ATI] comprises airports, air traffic control [ATC] centres, as well as the organisations involved in coordinating their provision and use. Airport operators allocate space and resources between airlines, their handling agents, and commercial concessionaires. They determine how airport ground-handling services are provided. Generally, the responsibility for security, fire, and rescue, are vested in the airport operator (Hussain, 2010), while the provision of air navigation services [ANS] involves airport and en-route ATC, which is usually managed separately from airports. Airport management, however, provides the ANS and ATC, with infrastructure within the airports for them to operate (Janic, 2000).

Effective financial management is essential to the economic health of businesses (Brigham & Houston, 2016). The aviation industry body, International Air Transport Association [IATA] (International Civil Aviation Organization [ICAO], 2019), asserted that the global investment needs for airport infrastructure, particularly for airport expansion and construction projects, are estimated at USD 1.8 trillion from 2015 to 2030. The major infrastructure expenditure items are terminal buildings, apron space, freight, passenger terminals, and ground transport interchanges (Adeniran & Fadare, 2018).

However, within the shores, Airports Company South Africa [ACSA] is a classic example of a state-owned company that generates its revenue from commercial activities (Airports Company South Africa [ACSA], 2023a). ACSA comprises aeronautical and non-aeronautical revenue sources for commercial activities. Aeronautical revenues include airport landing, aircraft parking, and passenger fees, while commercial revenues from commercial activities include car parks, retail, hotels, restaurants, warehousing, offices space and commercial concessions, as well as advertising (Dlamini, 2016). Additionally, ACSA is a commercial SOE. However, since the beginning of the first term of President Ramaphosa, the government has demonstrated its inability to fund most of the national infrastructural needs, due to fiscal pressures (Cook, 2020). Timilsina et al. (2020) acknowledges that developing countries, especially least-developed countries, are faced with a lack of physical infrastructure necessary for economic growth.

In an attempt to curb the lack of physical infrastructure, the national government implemented the Sustainable Infrastructure Development Symposium [SIDSSA] initiative on 23 June 2020 (Republic of South Africa [RSA], Investment and Infrastructure Office [IIO] within The Presidency, 2020), with the objective of accelerating an infrastructure-led economic recovery plan. Currently, the government is evaluating 270 infrastructural projects that require a total investment value of R2.3 trillion (approx. USD 140 billion), which also includes airports infrastructural projects (RSA, IIO, 2020). Regarding the management of airports, a report by consulting firm, Airports Council International [ACI] (ICAO, 2013), states that the emphasis is on commercial viability and profit-making, which compels airport management companies to always take (or want to take) prudential management decisions on all assignments, including assessing investment decisions of infrastructural development projects. Freestone (2009) asserts that airport commercialisation involves the transformation of a public utility into the adoption of more business-like management practices, while part of their commercial development includes airport shopping malls that form part of its property portfolio.

According to ACI (ICAO, 2013), a tacit expectation exists in the sector, namely, airport investments must be prudential at all times, as it contributes positively to the commercial success of airports. Although infrastructure development is a continuum, spanning various project types, this current study was limited to analysing the appraisal investment techniques and factors to be considered by ACSA management to make informed decisions on capital projects investment. There is a fundamental reason for analysing the appraisal investment techniques together with financial and non-financial factors, supporting prudential investment decisions on infrastructure development projects.

Sheard (2014) argues that airport management companies must develop infrastructure prudentially, implying that the airports' capital expenditure plans must be consistent with prudential frameworks, and prioritised in line with its affordability. Additionally, such prudential plans must incorporate a rational understanding of the risks involved. Prudential capital investment appraisal techniques require that airport management be aligned with the overall organisational strategy and resources from decision making. The full spectrum of infrastructure asset investment must be structured as attractive investment opportunities, adding an element of risk-return profiles that are best suited to match investors' return

expectations and liability structures (Croce et al., 2015).

A dire need exists to investigate prudential determinants of infrastructural investment appraisal techniques, which the Airports Company South Africa (ACSA) commonly uses for decision making, as well as to gain an in-depth understanding of factors to be considered by the investors, to avoid being trapped by fake investments (Atmaningrum et al., 2021). The airport infrastructure is part of transport infrastructure, considered a key ingredient for economic growth and development (Ncanywa & Stuurman, 2018). Nguyen et al. (2020) state that transport infrastructure facilitates the strategic economic growth of countries, which requires a huge amount for investment.

1.2. Research problem

Adequate supply of infrastructure has been viewed as a global economic development contributor in the academic literature (Calderón & Servén, 2010). Kadyraliev et al (2022), Dinlersoz and Fu (2022) also mentioned that infrastructure investment is widely used by governments particularly in in developing countries to boost economies and promote growth. The government has limited financial resources, dedicated to infrastructural needs; therefore, the national government selects a few infrastructural projects for a given period. The World Bank (Calderón et al., 2018) has suggested the use of private investors, to curb the inadequate supply of infrastructural needs, and also expressed concerns over the governance of public investment management systems, which are considerably lower at the project level (appraisal, selection, evaluation and management).

According to Fay et al. (2017), project appraisal was identified as a key governmental challenge, particularly for public investment management in sub-Saharan Africa. The World Bank, Inter-American Development Bank, and the International Monetary Fund [IMF], detected that many such funded projects were prematurely funded, because of parliamentary amendments to annual budget laws, as the appraisal and evaluation were conducted at the weakest stage for public investment (Taliercio & Estrada, 2020). Hall and Mutshutshu (2013) conducted a study with selected South African state-owned companies [SOEs], on employed capital budgeting techniques. The results revealed that 43% of the respondents preferred Net Present Value (NPV) and Internal Rate of Return (IRR) techniques (NPV was perceived as

more popular than IRR).

However, Hall and Mutshutshu's (2013) study did not reveal the list of SOE participants, who were utilizing the appraisal techniques ten years ago. De Jager's (2017) study expands the scope on capital budgeting techniques, used in SOEs across African countries, in different sectors, and reveals that the appraisal techniques, mostly used in SOEs, are Net Present Value [NPV] and Internal Rate of Return [IRR]. De Jager (2017) highlights factors that affect the decision making as non-financial factors. Additionally, De Jager (2017) raises the concern that smaller organisations are using non-discounted cash flow.

The Airports Company South Africa [ACSA] owns and manages nine South African airports (Graham, 2023). However, infrastructure investment in the airport management sector is impaired by challenges. Academically, studies that focus on the aviation sector, specifically ACSA commercial infrastructural investment decision making, are limited. Additionally, ACSA's prudential capital-investment appraisal techniques, mostly preferred in the transport sector, should be analysed, due to the economic infrastructural value expected. Consequently, a need exists for the investigation of both financial and non-financial determinants, when making an infrastructural investment decision within Airports Company South Africa [ACSA].

1.3. Research questions

The research questions to be answered by the study are:

1. What are the appraisal techniques mostly used in infrastructure investment decisions at ACSA?
2. What are the prudential determinants of infrastructural investment decision making within the ACSA?

1.4. Research objectives

The aim of this current study is to investigate the prudential determinants of infrastructural investment appraisal techniques in Airports Company South Africa [ACSA]. The specific objectives that the study seeks to address are:

1. To explore appraisal techniques mostly used in infrastructure investment decisions at ACSA.

2. To understand the prudential determinants of infrastructural investment decision making within ACSA.

1.5. Scope and significance of the study

The findings of a study conducted by Calderon et al. (2018) revealed an infrastructural gap in sub-Saharan Africa, in terms of access to infrastructure quantity, and Public Investment Management, implying that the countries' institutions must implement transparent and accountable management systems, to enhance growth. The system should offer guidance in the appraisal, review, and selection of projects. The current study, however, was limited to the Airports Company South Africa. ACSA has seen massive infrastructure investments in the past fourteen years, indicating the continuous use of investment appraisal techniques for infrastructural projects. The theoretical literature (see section 1.2 above) was conducted ten years ago, hence there is a need still exists to reaffirm the status of the utilised investment appraisal techniques, as other organisations are using the non-discounted cash flow method (De Jager, 2017). In addition, it is prudential for management to consider other determinants, when making an investment decision, particularly for commercial infrastructural projects, which were not mentioned before.

Development finance is a scholarly study, with practical application aimed at devising strategies and policy infusion for the development of society (Organisation for Economic Co-operation and Development [OECD], 2014). For economic development to be far-reaching and produce multiplier effects, development finance strategies could be applied at airport management level (United Nations [UN] Inter-Agency Task Force [IATF] on Financing for Development, 2016), characterised by interventions that are geared at using theoretical-based or other development institutional agencies, as catalysts for infrastructure decision making. At the core of Rational Choice Theory is the need to understand the IRR appraisal techniques, particularly for decision making. Frederickson et al. (2018) revealed that Rational Choice Theory tends to apply mathematical tools, such as Modified Accounting Rate of Return, Profitability index, Discounted Payback period, Accounting rate of Return, Net Present Value and Internal Rate of Return to evaluate (by analysing the relationship) the suitable proposed capital investment, to achieve the organisational objectives.

Following from the above, the topic under study is the assessment of prudential infrastructure investment decision making by management in the aviation sector, with special reference to ACSA, the leading airport management company, and a state-owned entity, implying that ACSA contributes significantly to the national agenda in their prudential infrastructural decision making process. In this study, the researcher provides broader information on the airport infrastructural investment decision making process, particularly that of ACSA. Additionally, the researcher suggests uniformity consideration, in the form of factors to be considered when making an investment decision. The intention would be for each investment committee member to read the consolidated factors to be considered, thereby adding value to their decision-making process. Although ACSA investment committee members were limited in number (due to the COVID-19 impact, employee retirement, and the limited number of years served as investment committee members), previous members, who serve as infrastructural investment committee members were considered for this current study, to gather information.

In the past decade, South African development policy has shown consistent adherence to Keynesian demand-side economic planning, with major emphasis on using infrastructure development as a stimulus for economic development (Sibeko & Isaacs, 2020). The aviation sector was a major receiver of capital outlay, especially in the build-up to the 2010 Fédération Internationale de Football Association [FIFA] World Cup during which the South African government injected approximately US\$1.57 billion and US\$523 million into the development of new stadiums, as well as upgrades to existing ones (Humphrey & Fraser, 2016).

Subsequently, studies have argued that traditional infrastructure investments are beneficial for economic growth (Barro, 1990). At the same time, public policy experts maintain that all policy projects must be monitored consistently, and evaluated eventually (Sibeko & Isaacs, 2020). In the finance sphere, the need for auditing and monitoring is acute, especially given the fact that finance easily falls prey to rent seeking (Grafton & Williams, 2020). However, a study such as this has several practical applications. Among others, the research results and findings could be applied by the industry, to improve project investment decisions in the airport environment and the transport sector, in general.

1.6. Organisation of the study

The research report consists of five chapters:

Chapter 1: Introduction to the study – The researcher introduces the research proposal topic, background to the problem statement, aim, objectives, the research questions, and the rationale for the study, as well as the organisation of the study.

Chapter 2: Literature review – The researcher provides other authors’ views of infrastructural investment, prudential determinants in infrastructural appraisals techniques, as well as financial and non-financial indicators. The theoretical framework is followed by empirical evidence from sectors and SOEs, to comprehend the South African SOEs’ appraisal techniques, together with its limitations. In addition, the chapter is concluded with a schematic diagram, reflecting the study objectives.

Chapter 3: Research Methodology – The researcher provides the procedure followed to conduct this current study. The methodology involved the research design, type of data, population and sampling, data collection method, data analysis, reliability and validity, as well as the ethical considerations.

Chapter 4: The data analysis and interpretation of the results are presented with discussions of empirical findings (providing answers to research questions) representing the findings of the primary research. The findings are traced back to the reviewed literature, to identify similarities with, or divergence from, the existing trends that could form the basis for further studies.

Chapter 5: Conclusion and recommendations – The researcher provides a summary of the key findings, based on the results of the data analysis, as well as the literature reviewed in the study. In addition, the limitations of this current study are detailed, and recommendations proposed, based on the findings.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

In this chapter, the researcher reviews the literature regarding appraisal techniques and other factors used as tools to be considered, when making investment decisions. The chapter commences with the key concept utilised in this current study, Investment overview by ACSA, including the description of traditional appraisals, and the discounted cash flow method. This current study is grounded in Rational Choice Theory. The rational choice theory of Frederickson et al. (2018) indicated that rationality is still the basis for decision theory and the modern decision theory rationality concept of rationality take into account various familiar class of procedures for making choices. The theoretical framework is followed by empirical evidence from sectors and SOEs, to comprehend the South African SOEs' appraisal techniques, as well as its limitations.

2.2. Definition of the key concepts

2.2.1. Capital budgeting

Mollah et al. (2021) define capital budgeting as a multi-faceted process activity, designed to assist with the selection of investment projects considered viable and worthy of pursuance. Sekwat (1999) defines capital budgeting as a crucial process that compels management to prudentially allocate resources for capital investments. It is argued that local government decision makers tend to rely more on capital budgeting, to set out their strategic needs for their communities, despite matching their long-term plans with their infrastructure priorities. Capital budgeting is aimed at adding value to the business owners, by insisting on the recovery of initial investments made in the projects.

2.2.2. Cost-benefit analysis

Mishan and Quah (2020) define cost-benefit analysis [CBA] as a systematic and analytical process of comparing the project or programme's social benefits and costs, to evaluate the desirability of such a project or programme. De Rus (2021) defines cost-benefit analysis as a tool, used to assist in the selection of projects that increase social

welfare. For example, individuals stand to benefit when the project is implemented, by offering them benefits, such as access to water, electricity at a lower cost and, mostly importantly, job creation during the construction period, or lifetime of the project. De Rus (2021) asserts that the governmental cost benefit analysis is similar to the financial analysis of a private firm (CBA includes financial, social, and environmental benefits analysis)

2.2.3. Discount Cash Flow [DCF]

Lilford et al. (2018) define discounted cash flow [DCF] as a valuation method, used to calculate the net present value, or to estimate the value of an investment, based on future expected cash flows (income fewer operating costs) for a project, deducting initial capital invested, taxes, and royalties. These cash flows could be calculated in both real and nominal money terms. The analysis of DCF operates beneath the time value of money principle. Time value of money assumes that the money to be invested now is worth more than the identical sum in the future, due to its potential capability to generate earnings. Vayas-Ortega et al. (2020) state that the Discounted Cash Flow [DCF] method is mostly used in company valuation, with its well-known limitation, namely, extreme sensitivity to key inputs such as Weighted Average Cost of Capital [WACC] and Free Cash Flow [FCF] estimations that were not unambiguously obtained.

2.2.4. Net Present Value [NPV]

The Net Present Value [NPV] is a calculation, analysing the present value of all expected future cash flows to be generated from the life of the project, including initial investment outflows (Romprasert & Jermstittiparsert, 2019). Similarly, Arabkoohsar and Sadi (2020) define NPV as the variance between the present value of cash inflows and outflows. Dai et al. (2022) state that NPV is uncomplicated, as it converts the money from the future to the present value. According to Gaspars-Wieloch (2019), NPV places a judgement between the current value of cash inflows and outflows over a period, which determines the financial viability of the project, should the company wish to invest in the project and realize the return. NPV technique in capital budgeting is used to identify the projects with the highest value proposition for the business. Espinoza et al. (2020) state that the market scenario, as well as the technical uncertainty, compel the investors/decision makers to choose the highest potential returns, assessing or predicting the value of capital investment on the projects, consistent with the project risk profile. The net present value

could also present the potential amount to be raised by the firm, at the required company rate of return, inclusive of the initial capital investment required. At the end of the projects' life, the shareholders will receive an investment return (Romprasert & Jernsittiparsert, 2019).

The NPV determines the financial viability of the project, should the company wish to invest in the project and realize the return. NPV is expressed in monetary values, while other costs and benefits cannot necessarily be priced monetarily, for example, convenience and time costs, implying that such benefits and costs, therefore, are excluded from the NPV calculation. Aviantara (2020) further explains that NPV is a merit of innovation, to measure the created economic value, considering the investment required. NPV is used to discount the future cash flows after-tax, against the weighted average cost of capital [WACC], which is the weighted average of the costs of debt (after taxes).

2.2.5. Internal Rate of Return (IRR)

Mellichamp (2017) explains that the Internal Rate of Return [IRR] is a metric, used in financial analysis, to estimate the profitability of potential investments. The IRR is a discount rate that makes the net present value [NPV] of all cash flows equal to zero, in a discounted cash flow analysis. This financial indicator for capital budgeting is used to give guidance to the 'profitability' of the investment, but does not indicate the costs, or benefits size of a project; therefore, if the IRR is higher, the investment or project is preferred. According to Mellichamp (2017), the IRR, which is a widely used profitability measure, is the Discount Rate that yields Net Present Value [NPV] = 0 for a stream of positive and negative cash flows, at least one of each sign, and with no explicit financing payments.

However, Mellichamp (2017) asserts that the disadvantage of IRR is the lack of parameters, such as a project finance rate, or the enterprise rate [ER], for instance, Return on Investment of the overarching investment group to serve as a measure of opportunity cost. Gallo (2016) adds that, for a complete picture of what the investment return would be, the IRR should always be use in combination with the NPV. According to Qi et al. (2022), the Modified Internal Rate of Return [MIRR] was introduced because of the IRR limitations of multiple, or non-existent internal rates of return. Qi et al. (2022) add that the MIRR opts to reinvest the cash-flow generated by the project, incorporating realistic

rates. Additionally, Xie and Chen (2021) assert that the MIRR calculation is straightforward, and its equation has one real root, backed by reasonable assumption. Qi et al. (2022) concur and state that the MIRR facilitates a simple decision rule; the project should be accepted, when the MIRR is greater than the cost of capital (hurdle rate), and rejected, when the MIRR is lower than the cost of capital.

2.3. Theoretical framework

2.3.1. Rational choice and decision-making theory

The rational choice theory of Frederickson et al. (2018) is a neoclassical economic theory applied in the public sector. Decision making is considered to play a crucial role in management. Frederickson et al. (2018) highlight that Rational Choice Theory tends to apply mathematical models, to test the relationships between preferences and objectives, implying that mathematical tools, such as accounting rate of return and payback, could evaluate the capital investment proposals suitable to achieve the organisation objectives.

Schoemaker and Russo (2016) define decision making as a process, in which an individual, group, or organisation concludes future actions, to support a set of objectives. Furthermore, Frank, Souza, Ribeiro and Echeveste (2013) mentioned that investment alternatives selection requires variety of criteria that should be evaluated to provide a solid and reliable basis for decision-making. Decision making almost involves choices requiring human element to use facts and information when deciding on world around them (Uzonwanne, 2016). The rational choice theory of Frederickson et al. (2018) indicated that rationality is still regarded as a central concept in decision theory, but modern conceptions of rationality take into account various keys in describing and understanding decision theory rationality, that is defined as a particular steps and very familiar class of procedures for making choices for modelling, cost-benefit analysis, performance measurement, risk analysis purpose.

Keast and Towler (2009) assert that students must understand the quantitative and analytical techniques, employed by managers, to make informed decisions, as these serve as a guide in a complex business decision. Rational Choice Theory influences the forces of the market and the decision makers use the mathematical model for the survival of the organisation. In general, Rational Choice Theory states that any individual(s) could

depend on rational calculations to make rational choices, serving his/her/their expected own best interests' outcome.

In Wittek's (2013) relaxed assumption of full rationality, individuals/companies are fully informed (implying that all the factors are outlined) about all their decision alternatives, the probabilities of their outcomes, as well as the consequences, with no perceptive limitations about the information. Wittek (2013) adds that individuals would base their decisions on cost-benefit calculations, to select alternatives that generate the highest expected utility. However, management might choose to use NPV as their rational appraisal technique, to inform their investment decision, as per Table 2.1.

Table 2.1: Net Present Value interpretation

Project should be rejected when NPV is negative	$NPV < 0$
May accept the project when NPV is zero	$NPV = 0$
May accept the project when NPV is greater than zero	$NPV > 0$

- When the NPV is less than zero, it means that the projects are not profitable, implying that the company's value will decrease; therefore, the company should not invest in the project.
- When the NPV is equal to zero, it implies that the total value of the profits coming from your investment is equal to the total cost amount. Management, therefore, uses non-monetary factors, such as intangible benefits created, to decide on the investment.
- When the NPV is greater than zero, it is an indication that the project will yield profit and increase the company's value.

Alternatively, when the company has chosen between mutually exclusive projects, the project with the higher NPV should be selected (Henshaw & Smith, 2000).

Halabi (2019) concluded that organization management should encourage greater use of rationality in the decision-making process at all levels by taking the factors that affect rational decision making in our consideration.

2.4. Overview of investments by the Airports Company South Africa

The Airports Company South Africa SOC Ltd [ACSA] owns and manages nine airports, including the three main international gateways of King Shaka international, Cape Town international, and O.R Tambo international airports (Airports Company South Africa [ACSA], 2019). Its mission is to develop and manage excellent airports, which translates to infrastructure investment. Over the years, ACSA has been consistent in its infrastructural investment commitment. The ACSA integrated report (2019) indicated the commitment to spend R30 billion on infrastructure development over the ensuing five years. Additionally, R19 billion was reserved for new capacity development, while R11 billion was budgeted for refurbishment and replacement work, specifically, commercial efficiency, which represents ACSA's normal operation before the COVID-19 pandemic.

In 2019, ACSA launched a massive R4.5 billion mixed-use property development, located in the western precinct of OR Tambo International Airport. The development will enable ACSA to realise their investment return from new offices, a hotel, conference facilities, retail space and additional transit-related services (Airports Company South Africa [ACSA], 2020). In April 2019, Carin Smith of News24 reported on an interview held, where Fundi Sithebe, ACSA chief operating officer, indicated that the company should expand airport infrastructure in the country, bearing in mind the use of the most cost-effective ways, such as Public-Private Partnerships [PPPs] (Smith, 2019). In order to achieve cost-effective methods for infrastructure development, the company should analyse the suitability of its infrastructural project appraisal techniques, when making commercial infrastructural investment decisions on the project. Therefore, ACSA continues to set aside funds for capital projects, to achieve the desired infrastructure. Capital projects are grouped into various categories, such as capacity project, commercial project, refurbishment, efficiency, and statutory projects. Below, Table 2.2 reflects the audited total capital expenditure from financial year 2017/18 until 2021/22.

Table 2.2: Total capital investment (actual audited expenditure)

Description	FY2017/2018	FY2018/2019	FY2019/2020	FY2020/2021	FY2021/2022
Total Capital expenditure	R914 million	R1,3 billion	R1,1 billion	R770 million	R546 million

Source: Airports Company South Africa [ACSA] (2022) Integrated Report

2.5. Investment appraisal techniques

2.5.1. Discounted Cash Flow

Net Present Value [NPV], Internal Rate of Return [IRR], Modified Internal Rate of Return [MIRR], Profitability Index [PI], and Payback Period [PP], were identified to be included under the discounted cash method, due to the inclusion of time value of money concept. As Airports Company South Africa is a state-owned company, and categorised under the transport sector, their investment decisions ought to be couched in prudential terms, particularly using cost-benefit analysis. Cost-Benefit Analysis is a commonly used method for transport projects, when evaluating associated costs and benefits (Zahed et al., 2017). Araújo and Sutherland (2010) contend that the Cost-Benefit Analysis [CBA] framework is a commonly used method for project evaluation, especially to assess large public projects. Nguyen et al. (2020) mention that CBA further enables decision makers to compare alternative project options, based on single output values from investment appraisal techniques, such as Net Present Value [NPV]. The interest of all stakeholders affected by a project are considered, in respect of costs and benefits, including indirect and longer-term effects; therefore, it is important to ensure that the Cost-Benefit Analysis is as comprehensive as possible (Nguyen et al., 2020). The NPV valuation techniques component of Cost-Benefit Analysis is inherited from capital budgeting (utilised for long-term investment opportunities of more than a year). It is traditionally accepted that firms should employ Internal Rate of Return [IRR] and Net Present Value [NPV] from Discounted Cash Flow [DCF] techniques, to select and rank capital investment projects. Historically, these methods have been termed sophisticated, regarding time value of money and future cash flows, as well as project risk.

According to Hopkinson (2016), analyses of project Net Present Value [NPV] and NPV Risk Models reveal that the possibility of project continuity depends on a benefit justification outweighing the cost. Using the NPV modelling approach to discount all future cash flows against current values also assists in project selection and approval decisions. Additionally, the fact that NPV models highlight high and low risk projects enables an organisation to differentiate between financially viable projects. This author adds that the financial strength of the organisation business case could be expressed in its own financial terms. NPV is simply calculated by considering the time value of money, implying that, when the NPV is >0 , the investment project should either be

implemented or waived. NPV method assumptions consist of irreversible and retrieved investment characters, as the decision point is based on static and certain conditions from the estimated data results (Shih et al., 2020). Once the company commits to long-term investment, management tends to seek solutions to minimise future risk levels. NPV differentiates cash flows that occur earlier in time, as more valuable than cash flows that occur later. The discount factor applied in an earlier cash flow is different from cash flow to be generated much later.

As alluded to by Qi et al. (2022), the Modified Internal Rate of Return [MIRR] was introduced to offset IRR limitations, such as the failure to identify the size of the projects, when performing the valuation (Dai et al. 2022). The IRR considers the time value of money, while the MIRR was an improvement on the IRR; therefore, the MIRR also incorporated time value of money (Xie & Chen, 2021). The MIRR introduced a reinvest concept to cash flow generated by the project, by incorporating realistic rates. For the company to reinvest its capital, a positive projected discounted cash flow would be expected. This is similar to the discounted Payback Period [PP], which furnishes the number of years required to break even, after the initial expenditure, by discounting future cash flows, and identifying the time value of money (Babu et al., 2019; Dai et al., 2022).

Satria and Soegoto (2018) posit that the Profitability Index [PI] is only obtained after the the Net Present Value [NPV] (the value of the predicted future cash flow to be received from the investment) is determined. Only at this stage, would the NPV be compared with the amount of investment value of the project. However, Gurau (2012) maintains that the profitability index is an important financial matrix that provides valuable insight into the company's management team, and facilitates their ability to turn an investment into income.

2.5.2. Traditional methods

Traditional methods include the Accounting Rate of Return and Payback, while the adjustment for the time value of money is excluded (Vadapalli, 2020).

2.5.2.1. Payback method

The payback period is usually represented in terms of a number of years (Babu et al., 2019), and is simply a payback period method estimating the time required to recoup the initial investment, or the point at which the cash flows reach break-even point (Shih et al., 2020). Ardalan (2012) differentiates how the NPV and payback periods do not use the exact cash flow line, as the NPV values are based on discounting considerations. The payback period is calculated from the project net proceeds of the operations of the project. The project proceeds are net of costs, before depreciation, and after taxes. Their application of discount rate account for time value of money is not applied (Vadapalli, 2020).

2.5.2.2. Accounting Rate of Return (ARR)

The Accounting Rate of Return is also known as Average Rate of Return (Babu et al., 2019). Imegi and Nwokoye (2015) assert that ARR is used to estimate the return on investment that the project should yield. The rate of return is expressed as a percentage of the earnings of the project investment. The return is measured in terms of the average profit earned by the project for the duration of the project. The method helps to overcome the disadvantages of the payback period method. It works on the criteria that any project with an ARR, higher than the minimum rate established by the management, be considered, while those below the predetermined rate are rejected.

Ross et al. (2005) state that the main disadvantage of ARR is the use of accounting numbers (instead of cash flows), ignoring the time value of money. illustrates the discounted cash flow and non-discounted cash flow capital budgeting techniques, usable for project investment decision in Figure 2.1 below.

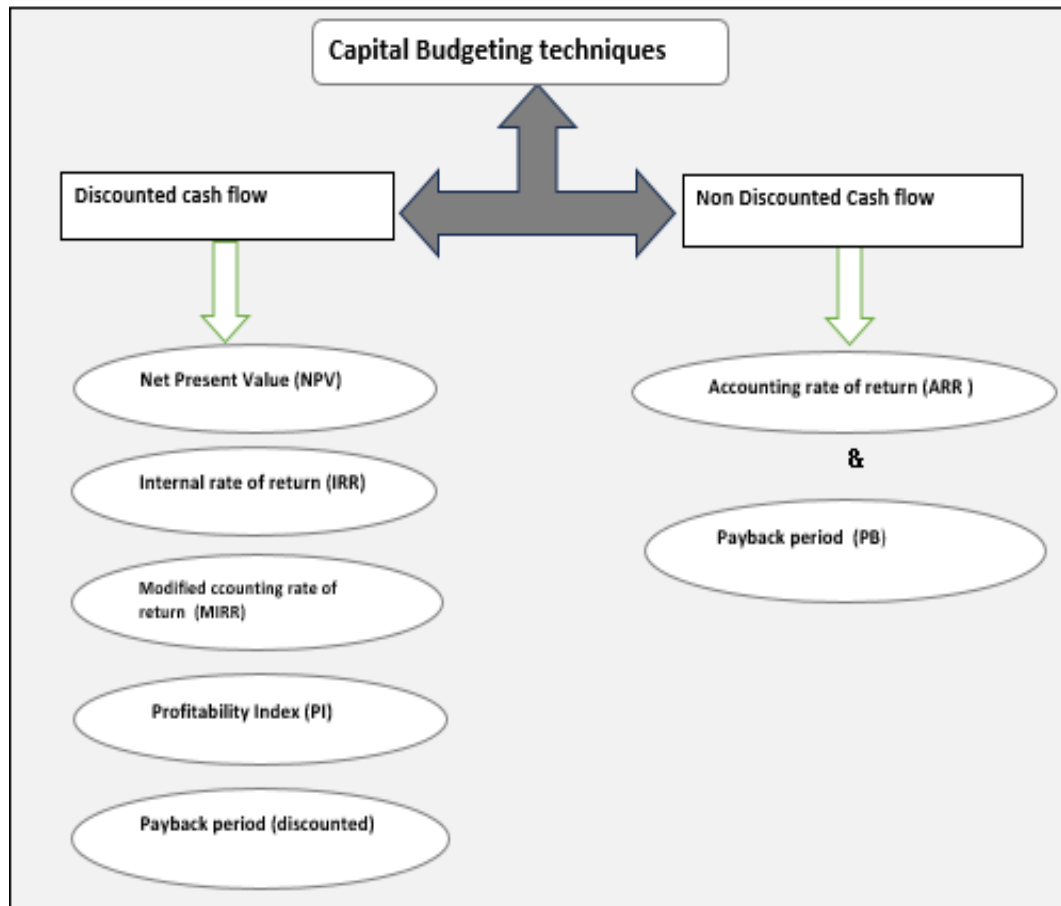


Figure 2.1: Author’s Capital Budgeting Techniques

2.6. Empirical literature on capital investment decision

Despite the investment appraisal techniques that other economic sectors (not mentioned in this current study) employ, empirical evidence suggest that most companies tend to include time value of money in their investment decision making (Ahamed & Haleem, 2020; Hine, 2014; Shaban et al., 2017). Previous studies of De Jager (2017), as well as Espinoza et al. (2020) provide an overview of supporting evidence on capital investment techniques utilised by other sectors, followed by the capital investment appraisal techniques used by the state-owned entity.

2.6.1. Capital investment techniques utilised by other sectors

Hine (2014) states that IRR is often utilised to determine how robustly a project would tolerate future uncertainty and a greater possibility of changes in assumptions; therefore, it is frequently used for initial project screening. The IRR cannot discriminate between mutually exclusive projects; therefore, the NPV is required to compare alternative solutions of the same project. According to Ahamed & Haleem (2020), managerial teams tend to use NPV, while CFOs rely on the IRR and Profitability Index [PI], as their

preferred capital budgeting method, when making decisions over capital budgeting. The study compared the capital budgeting techniques, in relation to the optimism and overconfidence of managers, as well as CFOs.

Kengatharan and Clamenthu (2017) state that the use of NPV, as well as IRR, at listed manufacturing companies in Sri Lanka are influenced by a positive relationship between the effectiveness of investment decision, and capital investment appraisal practices. The size of the firm was used as a key factor to determine the relationship. Although their study reveals that the NPV and IRR are usable in the manufacturing sector, and for the long run, it does not indicate whether this investment appraisal method is used for big or small value projects. Ye and Tiong (2000) explain that both the NPV and IRR are discounted cash flow techniques or methods that incorporate the time value of money to inform decisions; however, such cash flows are based on input assumptions of the project, and the actual cash flows could differ substantially from the projected cash flows.

The study of Shaban et al. (2017) reveals that most large firms utilise NPV budgeting techniques, which translates to a need for huge company investment amounts, as it ensures high reliability and reduces risk to the lowest possible level. Their study further reveals that the second preferential evaluation technique is payback period, followed by IRR, ARR, and PI. These authors collected primary data in the form of a survey with 66 companies in the industrial sector of Jordan. Smaller firms' analyses revealed that they preferred to use the payback period and IRR differently from large firms.

Siziba and Hall (2021) examine the evolution of capital budgeting technique application in firms in India, the UK, the USA, and South Africa. Of the 83 capital budgeting techniques, longitudinal studies analysed from 1966 to 2016 reveal that firms employed six capital budgeting techniques, namely, NPV, IRR, payback period, ARR, return on investment, and real option valuation. The applicable research methodology is a longitudinal analysis that has an allowance in comparison of sample data capabilities. Additionally, the longitudinal analysis requires a unique set of conditions, such as researchers relying on the same group of subjects, scheduled at certain points in time, over years. The possibility that some subjects may not be able to participate in the future is high, because of various reasons, such as refusal, or incapacity, which reduces the usable data to be drawn.

These authors observed that the USA and South African firms increasingly use NPV to evaluate capital investment, while continuously excluding PBP and ARR. Most importantly, these firms continue to use DCF and non-DCF methods, particularly for capital investment decision making in both developing and developed countries. The nature of capital projects was not revealed.

2.6.2. Capital investment appraisal techniques used by the state-owned entity

Inyang and Egbunike (2019) investigated an application of investment appraisal technique, sourcing data from 20 selected public establishments (ministries) in Cross River State, Nigeria, to make capital investment decisions. The authors employed a descriptive survey methodology and developed a self-administered questionnaire with their selected sample. The study findings revealed a cognizance of whether investment appraisal methods selected were suitable for the capital projects, namely, only projects of large value, independent, and mutually exclusive, with future net positive cash inflows, may utilise the Net Present Value investment appraisal method. These authors further recommend that the investment appraisal method only is insufficient; instead, the nature of the capital project should also be considered, to ensure that both financial and non-financial factors are considered, before the capital projects are selected. The capital investment appraisal method will allow capital investment decisions that are suitable for the overall strategy of the organisation. In addition, the findings suggest that the investment appraisal method alone does not offer enough qualitative information; instead, a framework, such as cost-benefit analysis framework, should be used, where both financial and non-financial factors are considered. The inclusion of non-financial factors could yield detailed information on the appraisal techniques method.

De Jager's (2017) study on capital budgeting techniques, employed by state-owned enterprises (SOEs) in Africa, uses primary data, due to the limited available secondary data. Additionally, the study concentrated on specific African state-owned enterprises, engaging in substantial capital investment projects. De Jager's (2017) findings reveal that the largest number respondents always use NPV and IRR in their capital budgeting process, while most SA SOEs prefer NPV to IRR.

Espinoza et al. (2020) concur that large infrastructure projects require large capital investment; however, they disagree with the application of NPV techniques, as these tend to be slow in generating positive cash flows. Additionally, NPV downplays future liabilities, leading to risk misallocation among various investment partners, which, in turn, discourages much needed investment for infrastructure projects. Espinoza et al. (2020) suggest the use of the Decoupled Net Present Value (DNPV) method that considers risk-as-a-cost, leading to lower-than-expected cash flows.

Sengupta (2009) asserts that NPV is the most reliable evaluating tool for projects and investment; however, the modified Internal Rate of Return has been developed to overcome IRR shortcomings. The use of NPV and IRR techniques for infrastructural investment decisions by management represents alignment with rational decision-making theory and rational choice theory.

2.7. Determinants for capital investment decisions

Managers, who are faced with decisions that directly involve the infrastructural investment decision from the above-mentioned studies, assert that both financial and non-financial factors need to be considered (De Jager, 2017).

2.7.1. Type of infrastructural project

Airport infrastructure types are mainly categorised as aeronautical and non-aeronautical infrastructure. Aeronautical infrastructure, known as capacity projects, is defined by Dlamini (2016) as the ability to accommodate air traffic, and is determined by the facilities with the lowest capacity, namely, terminal, and apron or aircraft parking. The capital investment for capacity projects is recoverable through airport tariffs.

The Airports Company South Africa [ACSA] is a state-owned enterprise [SOE], as well as a monopoly (Airports Company South Africa [ACSA], 2023a). The economic regulator, however, prohibits ACSA from abusing its monopoly position, by protecting consumers, promoting safe, efficient, reasonable interests, ensuring economical and profitable operation, while encouraging ACSA to improve its facilities. The Regulating Committee has the authority to limit aeronautical charges, via a price cap formula; therefore, all the revenue generated from both non-aeronautical and aeronautical services

are recorded under a single till regulation (Airports Company South Africa [ACSA], 2023c). The higher the income generated from non-aeronautical services, mostly located at the airside, the more it assists in lowering the tariffs for five years of the permission period. Non-aeronautical or commercial infrastructure projects are expected to generate enough revenue to recover the initial capital investment (Akoodie & Cloete, 2020).

Non-aeronautical income is generated from commercial activities, such as car rental concessions, advertising, retail operations, car parking, property leases, and hotel operations (Dlamini, 2016). The application of suitable infrastructural appraisal techniques becomes critical, as opposed to capacity projects, where the infrastructure development is highly motivated by capacity constraints.

2.7.2. Company strategy

Ardalan (2012) asserts that a firm's future strategic directions are defined by capital budgeting decisions. According to Ye & Tiong (2000), strategic capital investment decisions are crucial to a business firm. Therefore, the investment decision makers should understand the company's strategic goals or objectives, to ensure that the infrastructure investment project is aligned with the company's strategy.

2.7.3. Capital cost

An assessment of the investment opportunities of a container-size Underground Freight Transportation (UFT) system, by Zahed et al. (2017), revealed that substantial capital cost is the greatest challenge with which decision makers are faced. However, the cost-benefit analysis financial indicators, such as the Net Present Value of the system, and the benefit-cost ratio, indicated that this system would be economically beneficial to transport freights for a proposed route.

2.7.4. Regulation

It is prudential for organisations to take an informed infrastructure investment decision, based on regulations that are initiated by such project investment proposals. The Economic Regulator, Environmental Competition Commissioner, and any other statutory body, play a significant role; therefore, infrastructure investment decision makers should remember not to oppose competition commissioner rules. The Competition Act (Republic of South Africa [RSA], Act No. 89 of 1998) oversees the promotion of a

competitive environment that is conducive to business trading. Additionally, decision makers need to assess whether ACSA is permitted to own and operate the project, or else market demand determines the service provider. The Competition commissioner ensures that consumers receive competitive prices and product choices. Although some regulations should be considered, Freestone (2009) avers that airport non-aeronautical infrastructure investment tends to be less regulated, compared to aeronautical infrastructural investment, consequently allowing airport management companies the opportunity for entrepreneurial innovation.

2.7.5. Cost-benefit analysis

According to Dalcher (2016), executives make important strategic choices for the company, by relying on their team's ability to create reliable and detailed business cases. A detailed business case justifies the undertaking of a project, wherein the cost of development, benefits, and project risk are documented. Business cases incorporate uncertain event assumptions that may, or may not occur during a project, as every investment proposal attracts some level of risk. Risk is an important component, worthy of assessment within the prospects of an investment.

2.7.6. Capital infrastructure financing sources

According to Dash (2018), bank loans remain the most widely used conventional source of funding infrastructure, while syndicated loans, MDB financing, and a range of financial instruments, with varying risk and return features, are often considered for infrastructure financing. ACSA management needs to consider different sources of funding during investment decision process. Below table indicate different funding sources.

Table 2.3: Summary of types, sources and instruments of infrastructure financing

Types of Infrastructure Investments							
Economic Infrastructure				Social Infrastructure			
Greenfield Investments (Higher Risk) (e.g., construction, design, build and operation risk)		Brownfield Investments (Medium Risk) (e.g., operating toll road with significant capital investment)		Secondary Stage Investments (Low Risk, Low Return, well-established cash flows) (e.g., post-construction investments)			
Financing Options							
Financing instrument (equity/debt)	Equity			Debt			
	Listed	Unlisted		Capital Market		Private Debt	
Investment vehicle (public-private)							
Investment route (direct)	Infrastructure stocks	Infrastructure project/SPE	Government infra bonds	Corporate bonds	Project bonds	Loans to infra companies	Project loans
Examples of Funds (indirect)	Infrastructure stock fund	Private equity/mutual fund	Municipal bond fund	Infrastructure bond fund	PPP fund	Infrastructure debt fund	Infra-structure loan fund
Sources of Infrastructure Finance							
Public				Private			
Governments	Sub-national	Development Institutions	Corporate finance		Project finance		
			Public Companies	Private Companies	Non-PPP	PPP	

Source: Adapted from Fig. 4 & 5 in Inderst and Stewart (2014) and Fig. 2 in Inderst (2016).

Woetzel et al. (2017) argue that State Revolving Funds and Infrastructure Banks are institutions created and operated by state governments, funded primarily by grants from the federal government, to assist on certain projects in the form of loans, loan guarantees, lines of credit, or bond insurance. Ultimately, companies can raise capital in three main ways, namely, net earnings from operations, borrowing, or issuing equity capital, in a world that has made progress in infrastructure funding (Woetzel et al., 2017).

Debt and equity capital are commonly obtained from external investors, and each comes with its own set of benefits and drawbacks for the firm. Various studies, such as Dash (2018), Khmel and Zhao (2016), as well as Orlova et al. (2020), agree that the main sources of capital infrastructure funding include, equity, debt, and government grants, while they further agree that financing from alternative sources have important implications on the projects' overall cost, cash flow, ultimate liability, and claims to project incomes and assets. Of all the sources of funding, Common stock is considered a more expensive source of funding, against the preferred stock, which has a fixed component of dividend. At the same time, Debentures are the cheapest source of finance, as it can easily be converted into shares (Khmel & Zhao, 2016).

While assessing sources of capital infrastructure funding, it is imperative to define Capital Structure. According to Orlova et al. (2020), Capital structure refers to the portion of money that has been invested in a business. Capital structure has four components, namely, Equity Capital, Reserves and Surplus, Net Worth, and Total Borrowings (Orlova et al., 2020). It represents the risk capital, staked by the owners, through the purchase of the Owners Company’s common stock. In the following schematic diagram, the researcher illustrates all the key concepts used in Chapter 2, the theoretical framework, as well as how managers rely on appraisal techniques and other factors to guide their rational decision over the company investment, linking back to the research question.

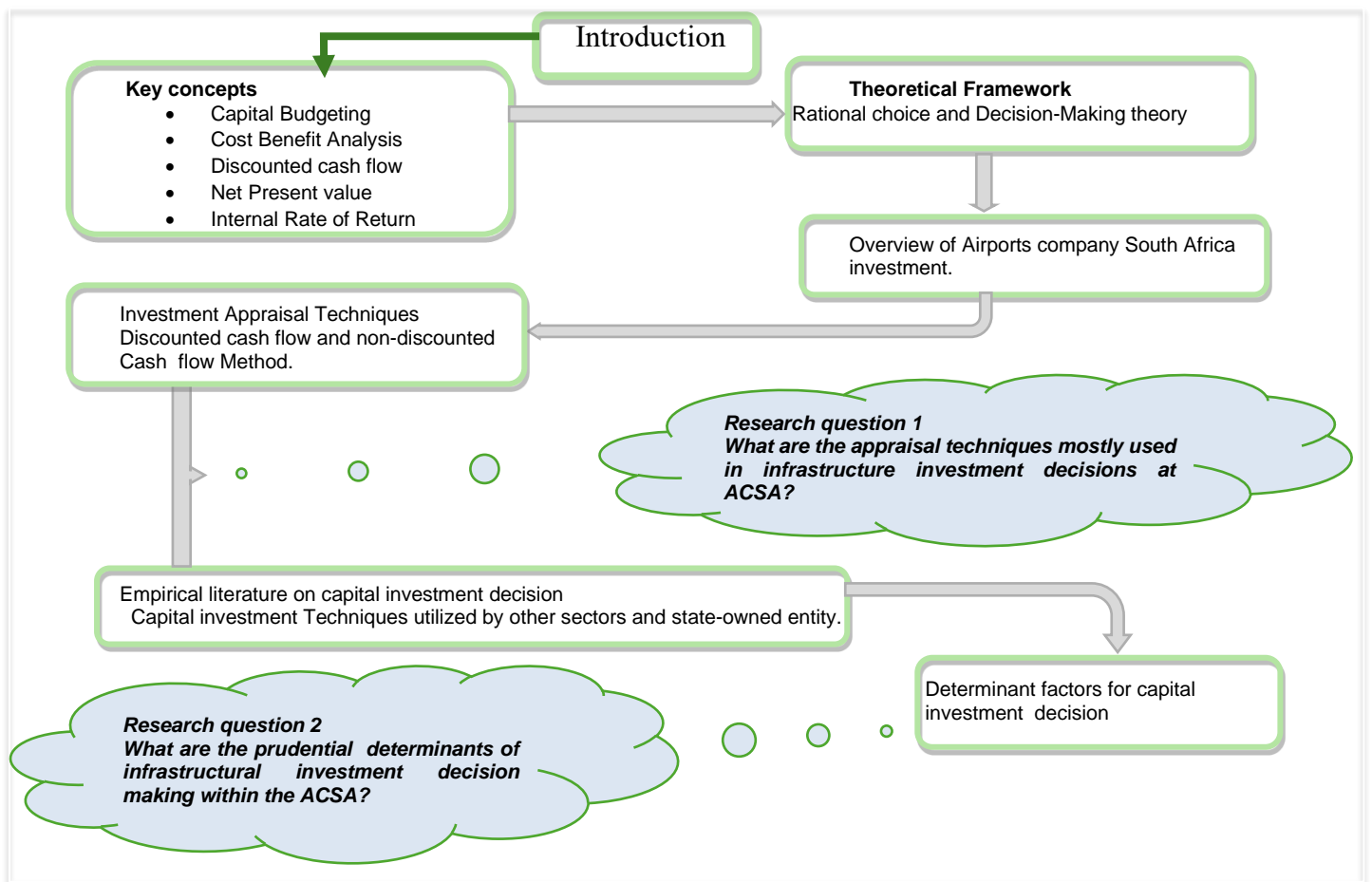


Figure 2.2: Author’s chapter 2 schematic diagram

2.8. Summary

In this chapter, the researcher provided a review of literature related to infrastructural investment, prudential determinants in infrastructural appraisals techniques, as well as financial and non-financial factors. In the following chapter, the researcher presents the research methodology of this current study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

In this research methodology chapter, the researcher elaborates on how the research investigation was conducted, specifying the research methods and tactics used to collect the data, identifying the target population, as well as explaining the sampling method and sample size. Additionally, the researcher provides details about the data collection instruments, the sampling process, as well as the reliability and validity of data. The chapter is concluded by a discussion of the *unit of analysis* and the emerging themes, which provided the findings of this current study. This approach, therefore, establishes this current study as a scientific, evidence-based, exploratory qualitative undertaking.

3.2. Research approach

Creswell and Creswell (2017) define research approaches as the plans and procedures for a research project, with detailed information about data collection, data analysis, and its interpretation. In addition, the basis for the selection of a research approach, is formed from the nature of the research problem, as well as the major issues being addressed. Asenahabi (2019) asserts that the choice of a research study design should be based on the nature of research, and not randomly selected without justifiable reasons.

There are three types of research approaches, namely, quantitative, qualitative, and mixed methods. Creswell and Creswell (2017) describe all the research approaches, starting with the quantitative approach as an experimental design, in which the researcher tests a theory. Secondly, with a qualitative approach, the researcher attempts to establish an understanding and the meaning of a phenomenon, from the views of participants. This implies that it is largely exploratory and, at times, ethnographic, requiring a preliminary understanding of the nature of the social, human problems of individuals or groups, by studying how shared patterns of behaviour are developed over time. The last research approach is the mixed methods approach, during which the researcher gathers both quantitative and qualitative data. In addition, the inquiry is based on collecting diverse types of data, in order to gain a complete understanding of a research problem, from both quantitative and qualitative data sets.

In this current study, the researcher adopted the qualitative approach, as the aim was to probe the commercial-infrastructure investment appraisal techniques employed by ACSA, when making investment decisions. In addition, the decision to use this method was motivated by the objective to gain a clear understanding of various views and perceptions about the variables connected to commercial infrastructural investment decisions, as articulated by the research participants, thereby establishing this dissertation as an exploratory research study. The intention of this current study was to build on existing literature; therefore, according to Bolomope et al. (2021), infrastructure investment decision-makers should be concerned with market forces, as well as a reliance on the mathematical models. The main aim was to highlight the underlying (social) phenomena, which presented the opportunity for an in-depth study of the research problem. The research questions for this current study were aimed at revealing a frequently used clearer appraisal technique, as well as its prudential determinants of infrastructural investment decision making by the management within ACSA.

To address this current study's objectives, the researcher interacted with ACSA participants through interviews, to collect new primary data. According to Mokhele (2018), ACSA's mandate is to acquire, establish, develop, maintain, manage or operate principal airports in South Africa, which differs from any other SOE, such as the Passenger Rail Agency of South Africa [PRASA], with a mandate to deliver commuter rail services in the metropolitan areas of South Africa, long-distance inter-city rail, as well as bus services within and around the borders of the RSA (Madzivhandila, 2019). Therefore, the prudential determinants of infrastructural investment decision-making vary, in terms of regulations, mandate source of capital, and type of infrastructural project. Studies of this nature are limited, particularly when targeting a company such as ACSA. From the literature perspective, Keast and Towler (2009) assert that researchers must understand the quantitative and analytical techniques employed by the managers, to make an informed decision, as they rely on those techniques in a complex business decision.

3.3. Research design

3.3.1. Population of the study

Shukla (2020) defines population as a set, or group of all the units on which the research findings are to be applied. The Airports Company South Africa [ACSA] was the population, as seen through the prism of market structure analysis. The Airport Authority

(2023) confirms that South Africa has 90 commercial airports, of which the ACSA airport footprint covers six major international airports, and three domestic airports, positioning ACSA as the biggest airport management company in South Africa. Indiza Airport Management (Pty) Ltd. (2023) is ranked second in the index, with merely three airports in its portfolio. Several unheralded airport management companies, including Ntiyiso (Wonderboom airport), are ranked in third place, followed by a litany of smaller airport management companies, located at minor airports.

3.3.2. Sampling procedure

Shukla (2020) defines a sample as any subset of a population, with similar characteristics, or types of elements, of the population. Similarly, according to Obilor (2023), a sample is simply a subset of the population, from which the researcher could derive conclusions that will apply to the entire population. Creswell and Creswell (2017) emphasise that the objective of qualitative research is to select suitable participants or sites, to assist the researcher in understanding the problem and the research question. Similarly, Obilor (2023) adds that, in a qualitative study, sampling assists individuals to understand deep, complex situations, events, or relationships. In qualitative research, purposive sampling is used to ensure that only relevant individuals, with experience in the central phenomenon are nominated. Therefore, in this current study, the target population included all ACSA employees, who had been involved in infrastructural projects investment decision making for large, medium, or minor capital projects. Additionally, Creswell (2013) suggests that guidelines for a sample size in qualitative studies range between 20 and 30 interviews.

Creswell (2013) raises the issue of saturation, which is a point at which the researcher in qualitative data collection discontinues the data collecting, when the fresh data no longer generated new information. To maintain the relevance of the sample size, only 10 participants within ACSA management, with infrastructural investment authority, were considered. The targeted participants were ACSA employees, both current and former employees' members of investment committees. This is consistent with purposive sampling in qualitative research, which maintains that a researcher could identify and recruit participants, who were considered capable of providing relevant, comprehensive, and detailed information regarding the topic under scrutiny. In this instance, the researcher is in the employ of ACSA, and additionally, is acquainted with all the role

players in project and infrastructure finance. Therefore, the researcher, consistent with purposive sampling, interviewed all selected participants for this current study, thereby making it an exploratory qualitative investigation. Shukla (2020) advises that the researcher must select the sample carefully, to facilitate the collection of accurate data for research.

3.3.3. Data collection method & instruments

In this current study, the researcher utilised primary data collected through interviews. According to Sileyew (2019), primary data are obtained from the original source of information, while secondary data are collected from various secondary sources, such as reputable journals, books, various articles, periodicals, proceedings, magazines, newsletters, newspapers, and websites. In this current study, interviews were used as a means of data collection; however, qualitative research data collection is not limited to interviews. Creswell and Poth (2016) clarify four main types of qualitative research data collection instruments, namely, observations, interviews, documents reviews, and audio-visual materials. Interviews were deemed suitable for the purpose of this current study, which translates to the research of exploring the experiences of people involved with infrastructural investment decision making. The researcher requested ethical clearance from the University of Cape Town (UCT) Ethical Clearance Committee, before the commencement of data collection. The Ethical Clearance Committee granted approval on 16 October 2022.

The researcher collected primary data through face-to-face and telephonic interviews with the participants, aided by a semi-structured interview schedule of questions. Consequently, the interaction between the researcher and the participant was essentially a conversation, an open-ended discussion, and a personal engagement session. This approach was adopted from the research counsel of Knox and Burkard (2009), who opined that, in the anthropological approach, such conversations are highly probing and interactive, leading to the involvement of the interviewer into the world of the participant. Similarly, Creswell and Creswell (2017) explain that engaging interviews, especially employing general unstructured and open-ended questions, comprehensively elicit views and opinions from the participants.

Data collection was conducted to be in line with the objective of the study, consistently,

as well as ensure that the collection process would answer the key research questions. The interview schedule (Appendix 3) was divided into 4 sections, starting with general information about the participants, followed by the appraisal techniques, used mostly in infrastructure investment decision making at ACSA. The third section comprised the prudential determinants of commercial infrastructural investment appraisal techniques in ACSA, while the last section outlined recommendations regarding the prudential infrastructural investment appraisal techniques that ACSA could apply, as well as the determinants of commercial infrastructural investment appraisal techniques.

The ultimate purpose of this current study was to gain in-depth awareness of ACSA's commercial infrastructural investment decision-making. The interview questions were standardised to ensure that all the participants received the same set of questions, with provision for additional probing questions, as a semi-structured interview technique was employed. However, the study used both structured questions, as well as impromptu, open-ended questions, to obtain a comprehensive knowledge and understanding of the participants' experiences. Brinkmann et al. (2014) assert that rigorous qualitative research instruments remove bias and ensure that the research outcomes are objective.

3.3.4. Data analysis

Data analysis relies on the collected data and the development of an analysis from the information of the participants (Creswell, 2009). In this current study, the researcher employed a thematic qualitative data analysis method, to ensure that the findings of the research were objective, valid, and reliable, using existing standards, as well as the framework of qualitative research data analysis. Creswell and Creswell (2017) describe the following data analysis steps of the thematic analysis method, usually applied to a set of texts, such as transcripts of interviews, while the researcher closely examined the data to identify common themes (topics, ideas and patterns of meaning) that repeatedly emerged, and engaged in the interpretation of the data.

The researcher followed the sequential qualitative data analysis steps suggested by Creswell and Creswell (2017):

- **Step 1**
The researcher organised and prepared the data for the thematic analysis. This step involved transcribing the interviews, scanning all relevant material, and arranging the data logically.
- **Step 2**
The researcher read, applied a simple analysis of the data collected and made general sense of what the participants disclosed to fully capture the overall impression.
- **Step 3**
The researcher then began a thorough analysis coding process of all the data obtained, by organising the material into codes.
- **Step 4**
The researcher used the coding process of labelling to organise the qualitative data into various identified themes. Additionally, the researcher observed the connections between codes. Subsequently, the researcher developed codes for the descriptions, and arranged them in sequential order.
- **Step 5**
The researcher articulated the detailed meaning of each theme, and clarified how it would help the audience to understand the data, through a detailed discussion, from the perspectives of multiple participants.
- **Step 6**
In this final step, the researcher provided an interpretation from the qualitative research outcomes. The researcher compared the research findings with information taken from literature or theories.

The data analysis steps mentioned above require that the researcher to be organised when handling the data. NVivo qualitative data analysis software (Lumivero, 2023) provides all the necessary tools and features for all stages for thematical analysis, allowing the researcher to import the full text of each participant, review the data collected, and compose initial notes. This follows after repeated ideas, concepts, or elements have been clarified, allowing the formulation of codes, as well as the grouping of codes into interconnected themes for final interpretation.

3.4. Validity and reliability

Leung (2015) explains that validity in qualitative research is a means of appropriateness, relative to the tools, processes, and data (methodology, the sampling, and data analysis). In addition, when the research questions are valid for the desired outcome, the results, together with the conclusions are valid for the sample. A simple meaning of validity is that it is the truth-value for research findings. When research has high validity, it produces results that correspond to real properties, characteristics, and variations in the physical or social world. Gibbs (2018) describes qualitative reliability as the research approach that is consistent across other diverse researchers, compared with various projects.

In this current study, the researcher utilised qualitative techniques to analyse the data collected through semi-structured interviews, with the aid of an interview question guide that was administered by the researcher. A qualitative approach is employed in a study to support social science with rich and thick descriptions of the findings of the study, while the qualitative research interview seeks to describe the meanings of central themes in the life world of the participants. Yin (2003) suggests that the researcher should document the interview process as comprehensively as possible.

3.5. Limitations

The study was restricted to ACSA, as the entity that is mandated to advance South Africa's national agenda of economic growth and development, in the form of airport infrastructure. This prevented the researcher from generalising the airport management companies in SA. According to Baron (2008), identifying the limitations of a study is useful for readers, as it provides a method of acknowledging possible errors, or any challenges with the interpretation of the results of the study. This approach allows the researcher the advantage of accessing information, to analyse and interpret the data faster, within the expected research completion date.

The data collection was conducted at the time when the COVID-19 pandemic was still a concern in the country, which caused delays in data collection. To mitigate this challenge, the researcher made provision for the interviews to be conducted with the participants, using online platforms to collect the data. The researcher assessed the situation and addressed it according to the need, subject to the availability of the participants. However, the language used in the

interview guide may not have been fully comprehended by a few participants, leading to distortion of the feedback. The researcher partially developed the interview guide, with reference to previous studies, in an attempt to limit distortion.

3.6. Ethical considerations

Ethical behaviour is important in research, as in any other field of human activity. Certain ethical considerations surface in research, especially the issues of plagiarism, and honesty in the reporting of the results. However, when the research involves human subjects, in both biological and social sciences, additional issues emerge. Dooly et al. (2017) aver that the researcher should consider all relevant ethical issues, namely, potential harm, obtaining informed consent, and ensuring the confidentiality of all parties involved in the research, prior to the implementation of the research project. Given the possible sensitivity of some information to be collected from the participants of this current study, the researcher requested permission to conduct the study from ACSA, and informed consent was requested from each participant.

3.7. Summary

In this chapter, the researcher provided an account of the research methodology utilised in this current study. This involved a discussion of the qualitative research design, a description of the population and sampling procedure, an explanation of the data collection method through semi-structured interviews, as well as the data analysis process. Additionally, the researcher discussed how reliability and validity of the study, as well as ethical considerations were ensured. The following chapter contains the results, as well as the interpretation and discussion thereof.

CHAPTER FOUR

RESULTS AND INTERPRETATION

4.1. Introduction

In this chapter, the researcher presents the results and interpretation, based on a qualitative thematic review. The main purpose of this current study was to investigate the prudential determinants and appraisal techniques employed by ACSA infrastructural investment decision makers. The study was aimed at answering the following two research questions, in line with the study's objectives:

1. What are the appraisal techniques mostly used in infrastructure investment decisions at ACSA?
2. What are the prudential determinants of infrastructural investment decision-making within ACSA?

To respond to the above questions, the primary data were collected from ten (10) ACSA participants, through semi-structured interviews. Subsequently, a thematic analysis was utilised to assess the findings, and the results are presented in line with the study's research questions. Ultimately, the reported results, which are qualitative in nature, are paralleled to literature.

4.2. Participants' profile

The researcher collected data from ten (10) participants, using an interview guide. The participants were ACSA employees, both current and former members of investment committees. Each participant indicated that his/her academic background and experience assisted in the commercial infrastructural decision-making process. All the participants were involved in the decision-making of projects, which made them relevant to be purposively selected to participate in this current study.

Table 4.1: Participant’s profile

Participants	Job Category	No. of projects in the last five years	Gender	Education	Age
Participants 1	Senior Management	Between 20 and 30 projects	Female	Quantity survey	Between 40 and 50 years
Participants 2	Group Management	Between 15 and 20 projects	Female	Post Graduate studies in Economics	Between 40 and 50 years
Participants 3	Group Management	Between 07 and 12 projects	Male	Engineering background and MBA	Between 30 and 40 years
Participants 4	Middle Management	Between 20 and 30 projects	Male	Bachelor of Commerce (B.Com.) Accounting, Economics	Between 40 and 50 years
Participants 5	Group Management	Between 40 and 50 projects	Male	Bachelor Town and Regional planning.	Between 40 and 50 years
Participants 6	Senior Management	Between 10 and 15 projects	Female	Master’s in finance and development	Between 30 and 40 years
Participants 7	Specialists	Between 07 and 10 projects	Male	Commercial Law post graduate studies	Between 30 and 40 years
Participants 8	Group Management	Between 100 and 150 projects	Male	Bachelor of Architectural Technology and MBA	Between 40 and 50 years
Participants 9	Specialist	Between 70 and 100 projects	Male	Master of Business Administration	Between 30 and 40 years
Participants 10	Group Management	Between 5 and 10 projects	Female	Master’s in human resources development	Between 50 and 60 years

4.3. Appraisal techniques in commercial infrastructure

The participants were requested to disclose the appraisal techniques mostly used in commercial infrastructure investment decision-making within ACSA, and whether the infrastructural investment decision-makers were consistent in using such appraisal techniques. The following appraisal techniques were identified: Net Present Value, Internal Rate of Return, Payback Period, and Weighted Average Cost Capital + 2%.

4.3.1. Net Present Value [NPV]

An NPV calculation allows individuals to understand the value of their infrastructure investment, based on the expected future cash inflows and outflows, including the initial capital investment discounted to the present. The NPV calculation from the discounted cash flow method, indicates whether the proposed project return is positive or negative, and ultimately, the positive NPV is accepted. The participants were of the opinion that ACSA management utilised NPV, as implied by the following extracts:

“We are using the NPV for existing and new projects. There are other methods, but they are not reliable. So, we are using NPV and then we also use the WACC +2%.” (Participant 1)

“I think ACSA is using NPV and I'm saying that on the fact that all the commercial projects that I've worked on, we've had to make sure that the business case gives clarity if NPV resulted to positive or negative investment decisions. We also looked at weighted average cost capital or WACC plus 2% in some instances.” (Participant 7)

“We use NPV and IRR. Internally, NPV is obviously the most superior one that we use versus IRR. Whether we use it consistently, I think previously we did not. But I think as the organization we've moved to a point now where it is mandatory for projects to be independently valuated from EMS team.” (Participant 8)

Romprasert and Jernsittiparsert (2019) emphasise that NPV places a judgement between the current cash inflow and outflow values over a period. Shou (2022) states that the NPV methodology, among several evaluation methods, enjoys the highest prevalence. Additionally, the NPV method enables investors to evaluate the efficacy and appeal objectively, including comparing investment projects that differ in scope, duration, and predicted profit.

The findings revealed that ACSA's infrastructure investment management not only relied on one appraisal technique for investment decisions, as it used a combination of methods to make informed decisions. This finding concurs with that of a study by De Jager (2017) on capital budgeting techniques employed by state-owned enterprises (SOEs), which revealed the use of NPV and IRR, although NPV was preferred above IRR.

4.3.2. Internal Rate of Return [IRR]

The IRR is compared to a company's cost of capital, to assess the viability of the proposed commercial infrastructural investment projects. When the IRR is greater than, or equal to the cost of capital, the company management would consider and accept the project as a good investment. Some participants highlighted the usage of the IRR as the minimum

required rate set by the company. Their responses from interviews were supported by the following statements:

“The company calculations on internal rate of return are an important consideration, since it ensures that the projects shareholders’ investment factor makes sense on IRR calculations.” (Participant 6)

We use ... IRR, although it has its drawbacks.” (Participant 9)

Goedhart et al. (2015) highlight that executives, analysts, and investors, mostly rely on Internal-Rate-of-Return (IRR) calculations. Projects with the highest IRRs are considered attractive and given a higher priority, as they reveal the project’s yield. The IRR calculation reveals the annual growth rate that the initial investment is expected to generate. According to Goedhart et al. (2015), disaggregating the effect of various components of the IRR, provides an accurate assessment of past results, which could lead to future investment decisions.

However, Gallo (2016) asserts that a rule of thumb is always to use IRR in combination with NPV, to facilitate a complete picture of what the investment return would be. Financial theory advocates for the utilisation of NPV, instead of IRR, because the IRR calculation may provide incorrect results, when projects are mutually exclusive (Bennouna et al., 2010; Du Toit & Pienaar, 2005; Ryan & Ryan, 2002).

4.3.3. Payback Period [PBP]

Payback Period indicates the exact period wherein the infrastructural projects’ initiative will recover the initial capital investment, after which the company will start to generate profit. Two participants described PBP with the following statements:

“Their payback period is what ACSA is using right now.” (Participant 2)

“Payback period assist the organisation to see how long it will take to reach breakeven point.” (Participant 3)

Contrary to the findings, an apparent need exists for investment decision-makers to consider other appraisal techniques, as PBP is limited to the number of years it takes to recover the capital; however, there is also a need to predict expected return. Gitman et al. (2015) consider the amount of time suggested for an organisation to recover its initial

expenditure for an investment, when dealing with PBP. Payback Period does not give conviction to the question of whether the investment is financially viable or not, due to the absence of the time value of money being captured (Kenton, 2019), consequently, prohibiting the use of PBP singly in the investment appraisal decision-making process.

4.3.4. Weighted average cost capital plus +2% [WACC]

WACC translates to the cost of financing a project in the future. The participants indicated that the WACC +2% is an appraisal technique, used in commercial infrastructure within ACSA, as per the following statements:

“There are other methods that are used, but not very reliable. So, we are using NPV and then also we use the WACC +2%.” (Participant 1)

“I think the principle of WACC plus 2% safeguard shareholders investments.” (Participant 4)

Other participants mentioned that the WACC, or any other appraisal technique, employed within ACSA, serve as a tool to assist investment decision-makers, which requires the capital investment decision-makers to understand the business, in general. The findings further revealed that, since the WACC represents the amount of money paid by the shareholders or investors to fund the operation, ACSA management has taken a prudential decision of an additional 2% for the commercial investment transaction return. According to Dobrowolski et al. (2022), regarding the risk characteristics of the enterprise operation, WACC controls the minimum expected rate of return on an investment, in line with the funding structure of the source.

The participants indicated that ACSA infrastructure decision-makers are exposed to NPV, IRR, PBP, and WACC +2%. Although the literature identifies other appraisal techniques, such as Accounting Rate of Return [ARR], ACSA participants were not interested in these methods, as they were convinced that the current appraisal techniques serve the objectives. Adeniyi (2004) asserts that traditional capital budgeting techniques include ARR and PBP, while the discounted cash flow method comprises NPV and IRR.

4.4. Prudential determinants of commercial infrastructural investment decisions

The participants were requested to identify both financial the non-financial factors that should be regarded as prudential determinants of commercial infrastructural investment decisions. The

non-financial factors identified from the thematic analysis include, *alignment with company strategy, regulations and standards, project life cycle, sustainability, protect value, financial position of the business, competitive advantage, and governance through audit.*

4.4.1. Alignment with company strategy

Alignment with company strategy is key to achieving a company's objectives. Hough and Liebig (2013) define strategic alignment within the organisation as a process, in which all business units of an organisation are aligned to the same objectives, for the fulfilment of the company's strategic vision. This implies that the proposed infrastructural project must be aligned with company strategy, to ensure that the investment decision-makers contribute to company strategic goals, when investing in such projects. Some participants expressed the following regarding alignment with company strategy:

“The alignment determines what the strategy should be. Therefore, we exist because of the Aviation Act (regulation). It translates to us as a state-owned entity what we are expected of in terms of the mandate, and then that mandate translates into the strategy.” **(Participant 10)**

“It is alignment to company strategy. So, for us once one of the strategies is to grow non-aeronautical revenue which is where commercial then comes in, but then in that we also look if the initiatives support strategy objectives.” **(Participant 7)**

“The first thing would be the company strategy as you don't want to invest in a commercial project that is not aligned with your company's strategy.” **(Participant 8)**

The findings concur with that of Ye and Tiong (2000), who suggest that strategic capital investment decisions are crucial to a business. The findings of a study by Alkaraan and Northcott's (2006) on strategic capital investment decision-making revealed unsurprising results, namely that non-financial/strategic criteria are of particular significance in strategic investment decision-making, which further highlights the importance of corporate strategy. In addition, Ghonim et al. (2022) assert that positive, effective

decision-making is a result of strategic alignment.

4.4.2. Regulations and standards

Any business environment, including ACSA, is subjected to its industrial regulations and standards, which compel the company to conduct its affairs accordingly. Koop and Lodge (2017) define regulation as a set of rules intended to guide human behaviour. Regulation, prompted by the infrastructural initiative from agencies, such as the South African Civil Aviation Authority [SACAA], Competition Commission, and Airport Economic Regulator, must be taken into consideration. Some of the participants' responses are included below:

“I think what is most important is regulation, from National Treasury and Competition commission.” (Participant 4)

“The regulations and standards or Planning parameters are important.” (Participant 5)

The findings concur with those of Bhavsar et al. (2022), which revealed that airports are exposed to a broad spectrum of standards, regulations, and rules, developed by external agencies. Agencies, such as the Competition Commission, are empowered by the Competition Act (RSA, 1998) to investigate abuse of dominant positions and mergers, including the control and evaluation of restrictive business practices. The South African Civil Aviation Authority [SACAA] is another entity with the objective to control and regulate civil aviation within the Republic, ensuring civil aviation safety and security. The findings of this current study suggest that ACSA is not exempted from these rules and regulations.

4.4.3. Project life cycle

The project life cycle includes Front-End Loading [FEL], known as Pre-Project Planning [PPP]. Front-End Engineering Design [FEED] covers feasibility analysis, conceptual planning, programming design and early project planning. This is conducted during the implementation phase, while in the initial project phase, the business unit is expected to conduct research, to strengthen their business case. The participants alluded to the fact that the management should understand the project life-cycle phases, to ensure that they would know when to commit their investment. One participant indicated that all projects

should go through the project life cycle, as the prudential determinants of commercial infrastructure. Participant 6 stated the following:

“So, we make sure that all projects go through a particular life cycle. This serves as a gate control. Let's start off by asking if the project initiative has a linkage to corporate strategy. Normally what we call an FEL one”.

The responses received concur with the study findings of Dalcher (2016), which emphasised that project life cycle serves as a management tool, to focus on the allocation of resources, indicating the availability of key individuals, and the integration of activities. Lapidus et al. (2022) highlight that the stages of Pre-Project Preparation and Design Development are the essential elements required to reach implementation of an investment and the construction phase of the project. Newman (2019) argues that FEL phases of a project lead up to the Final Investment Decision (FID).

4.4.4. Sustainability

Organisations like ACSA are mandated to address economic, social, and environmental concerns over infrastructural projects, as early as the initial stages of the project (Wilburn & Wilburn, 2020). The findings of a study by Babatunde et al. (2022) revealed three aspects of sustainability, namely, economic, environmental, and social factors. Additionally, the three top-ranked economic factors were, whole life costing, low maintenance costs, and supporting the local economy, while the environmental factors were, biodiversity, energy use during the operation, and the construction stage. One of the participants mentioned the sustainability element as follows:

“With regards to sustainability elements, on several of our projects we are trying to get A Green star rating. So, sustainability is very important in being a good corporate citizen. There are energy usage efficiencies that can be gained through some of these sustainability elements within projects and obviously from an environmental perspective. We are a state-owned entity, so, there is a developmental mandate that we hold when we spend on infrastructure projects. I think there is also a requirement to illustrate our job creation, in terms of transformation and of impact.” (Participant 3)

The findings revealed that ACSA consider sustainability factors in their investment decision-making process. Larsson and Larsson (2020) state that extensive business

collaboration, with both internal and external stakeholders' arrangement, plays a key role in new management practices, particularly in infrastructure with long-lasting environmental and social effects. Therefore, collaboration substantially increases the implementation complexity of construction and infrastructure projects. Wilburn and Wilburn (2020) state that government is interested in a reporting structure that incorporates United Nations 2030 Sustainable Development Goals (SDGs) and is pressuring corporations to align to the disclosure of Environmental, Social, Governance (ESG). Infrastructural projects' contribution to ESG enhances the investment decision (Babatunde et al., 2022).

4.4.5. Project value

Project value refers to the integration of economic and non-economics factors during investment decisions, such as the number of jobs to be created during project development, and the financial returns, outlining the substantial project benefits. Participant 2 expressed the following:

“The project value, what are the other benefits to be realised matters highly when you are making the investment decision, including the financial returns.” (Participant 2)

According to Kozarkiewicz (2016, cited in Bartusik & Walas-Trębacz, 2019, p. 89), project value represents the benefits resulting from project implementation in its broad economic and non-economic context, as well as project-related activities, its significance, and the profitability of the project. Regarding the contribution participant 2, the findings of a study by Vuorinen and Martinsuo (2019) conclude that the stakeholders' expectations create three project value dimensions, namely, environmental and social value, systemic value, and financial value, based on their prioritisation of project value strategies. However, national government supports the concept through the Framework for Infrastructure Delivery and Procurement Management (FIDPM), which became effective in October 2019, promoting the value-for-money concept throughout all the infrastructure delivery and procurement processes to ensure the optimal use of resources. Martinsuo et al. (2019) indicate that the success of a project cannot be assessed merely in terms of goals achieved at project completion stage; therefore, the success should be measured in terms value and costs gained during the project life cycle compared to the original value expected by various stakeholders.

4.4.6. Financial position of the business

Proposed infrastructural projects may reflect positive financial viability, implying that the company will generate adequate revenue to cover the initial investment; however, this is only possible to transact when the company is in a good financial position (when funds are available) to invest. A statement of financial position is a financial report that provides information about the financial position of a reporting entity. Participant 7 expressed the following:

“Financial position of the business is good, meaning some of the project’s execution depend on the company financial status”.

This finding concurs with the findings of Patil and Bagodi (2021), which revealed that the condition of financial statements, technical analysis, insider information, and current economic indicators, were influencing factors in the investor’s investment decision. In addition, Graham and Morrell (2016) emphasise that understanding the financial statements of airports is important, particularly financial ratios, to assess an airport’s financial strengths and weaknesses.

4.4.7. Competitive advantage

An airport prime spot offers the business an opportunity to generate additional revenue (by offering additional airport services). The developments of airport conference centres could be accompanied by hotels and filling station services, as per the following extract:

“The airport or the locations give us that competitive advantage.”

(Participant 1)

According to Karuna (2007), competition reveals the extent to which a company and its rivals would challenge each other to win customers. Listra (2015) elaborates on the business intentional objective of competition to enhance the competition. This finding on the competitive advantage concurs with that of Graham and Morrell (2016), who acknowledge that the level of competition within airport groups could have major implications for the financial well-being of an airport operator. Therefore, effective competition with certain services needs to be intentional within the context of the internal management of an airport.

4.4.8 Governance through audit

The participants indicated that the governance process is important at the various project life-cycle phases. Before the final investment decision, the company internal process must be followed, including the consensus authorisation from various divisions, such as capital cost estimate approval, as well as approval from other company committees, namely, the project board committee and the business case signoff. This facilitates the audit process, which examines the company internal process, to ensure compliance with all the requirements. Two participants expressed the following statements:

“Audit is important, because the investment committees are tasked with approving the investment behind the project, and there still needs to be an approval from both internal and external stakeholders, meaning the regulating committee as well as the customer as the user of such facilities, in order to satisfy the internal standard process. Furthermore, audit must be conducted to evaluate what was promised versus what is achieved.”

(Participant 4)

“We have internal audit even to verify if the project follows the company standard process.” **(Participant 9)**

Drogalas et al. (2016) acknowledge that the main driver of corporate disclosure has been the internal audit, which increases the confidence between managers and shareholders through the quality of financial information, and to ensure transparency. The findings of the study of Vadasi et al. (2020) suggest that the effectiveness of the internal audit originates from internal audit professionalisation, implying that, as it progresses, it complies with company auditing standards, and holds professional certification evidence of improved corporate governance.

The study findings of Moutinho and Lopes (2011) concur with this current study's findings, revealing strong evidence to consider non-financial factors, which tend to influence the investment decision, leading to the viability and success of the project. Additionally, the findings of a study conducted by Al-Mutairi et al. (2018) highlight non-financial factors, such as strategic planning, corporate image, employees' capabilities, and environment protection during evaluation decisions.

4.5. Recommendations for prudential infrastructural investment appraisal techniques and determinants

The participants were asked to recommend the best appraisal techniques, as well as which determinants should be considered by commercial infrastructural investment decision makers. Among the participants, consensus was reached on, competency to deliver, appraisal techniques input assumptions, Discounted Cash Flow [DCF], and risk assessment.

4.5.1. Competency

The consensus gathered from the participants revealed that the ACSA management needed to match the skills required (such project management, teamwork, communication and time management) with the proposed project, as failure to analyse the skills set, leads to project failure, rendering such investment fruitless to the organisation. Wong (2020) defines competencies as the abilities, skills, and personal characteristics needed by a ‘successful’ or ‘superior’ manager. The participants acknowledged competency as follows:

“Projects require the competence to be delivered on time and within budgeted costs”. Participant 6

Participant 10 stated:

“You cannot just have one without the other. You can calculate a pay back, period, but if you still don't have the competence to deliver project on time within scope and within budget, you are never going to see the value of this technique even with the IRR”.

The recommendation of participant 10 is in line with the findings of the study by Moradi et al. (2020) on project managers’ competencies in collaborative construction projects, which suggested a need for project managers to have appropriate competencies, such as group capabilities, language proficiency, and leveraging diversity. Similarly, Irfan et al. (2021) revealed that planning and competency have a substantial positive influence on the success of public sector projects.

4.5.2. Appraisal techniques input assumptions

Based on the feedback from the participants, it was clear that the discounted cash flow method is technical in nature, and to understand all the financial model per business case,

would be challenging. However, understanding the input assumptions utilised in the financial model, would make the results from the model easier to accept, and usable in their decision making. An input assumption required for discounted cash flow is any factor relating to a project that is true, real, or certain estimate of future events, such as interest rate (consumer price index) and the discounting rate. Participant 7 stated:

“we need to focus more on what feeds into appraisal techniques rather than those calculation results”.

The findings regarding the importance of assumptions for a selected appraisal, concur with those of a study by Kramna (2014), which suggests that key input factors could alter the valuation results considerably in discounted cash flow valuation.

4.5.3. Discount Cash Flow [DCF]

The consensus gathered from the participants revealed the importance of understanding the capability of the discounted cash flow. The key factor is the time value of money, which is ignored by other traditional appraisal techniques, such as Accounting Rate of Return. Participant 5 expressed the following view on the discounted cash flow method:

“I think it is important to state that the NPV and IRR are results of discount cash flow method or DCF. It is the most reliable and the most robust appraisal methodologies out. In obvious so I would not even recommend a change”.

Lilford et al. (2018) define Discounted Cash Flow [DCF] as a valuation method employed to calculate the net present value, based future expected cash flows, less the initial capital invested, taxes, and royalties. Such cash flows can be calculated in both real and nominal money terms. Literature from both state-owned entities and other sectors revealed the similar preferential use of NPV and IRR from the DCF method. De Jager’s (2017) findings concur with the survey findings of Ahamed and Haleem (2020), indicating the utilisation of NPV and IRR as preferred. Additionally, Kengatharan and Clamenthu (2017) assert that the use of NPV and IRR is highly influenced by a positive relationship between effectiveness of investment decision and capital investment appraisal practices in a listed manufacturing companies in Sri Lanka.

4.5.4. Risk assessment

The participants indicated that almost all infrastructural projects hold certain risks, which might be a barrier for financially viable projects. Risk could be identified as the lack of project management skills, schedule delays, compliance and regulatory risks, changes in company leadership, and economic factors. Conducting risk assessment offers management another element to consider, when making an investment decision. Participant 7 recommended risk assessment as follows:

“Assessing risk profile for particular project is crucial”.

Bhavsar et al. (2022) highlighted the uniqueness of airport construction projects and its complexity, compared to other infrastructure, motivating for further identification of risk factors from internal and external environments. The response of participant 7 concurs with the findings of Distefano and Leonardi (2014), who describe risk assessment as a tool that supports company decision-making. In addition, Capitanul et al. (2014) introduce a new approach for airport investment risk assessment to minimise risk, which considers the degree of uncertainty in the prediction of project activity levels, due to huge investment required for airport infrastructure development projects.

4.6. Conclusion

In this chapter, the researcher presented the primary findings of the study, based on the data collected from the study participants. The findings were grouped and analysed in four main themes. The first theme provided a brief profile of ACSA participants in this current study. The second outlined the current appraisal in use, and the third identified non-financial factors to be considered, when making an investment decision. The final theme revealed the recommendations. The summary, as well as the conclusions and recommendations of the study, are presented in the following chapter.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

The previous chapter of this current study was focused on presenting and discussing the findings, based on the qualitative data collected. In this chapter, the researcher provides the summary of the findings and conclusions of the study, based on the research objectives. Recommendations, limitations, and avenues for future research are also provided, based on the data analysis, informed by the primary data collected.

5.2. Summary and conclusions

This current study was aimed at investigating infrastructural investment decision-making within the Airports Company South Africa, as it contributes towards the country's economic development. The academic literature highlights the supply of infrastructure as a global economic development contributor (Calderón & Servén, 2010). This is important, particularly that, currently, the country is in dire need of SOEs, such as ACSA, to support the national agenda economically, given the limited financial resources dedicated to airport infrastructural needs.

ACSA is mandated to acquire, establish, manage, develop, operate, maintain, and control any airport, or part thereof. Generally, the company is known to facilitate the air traffic movement, backed by its infrastructural facilities (Mokhele, 2018).

This study's findings are summarised, in line with the two research sub-questions, formulated from Chapter 1 as follows:

1. What are the appraisal techniques mostly used in infrastructure investment decisions at ACSA?
2. What are the prudential determinants of infrastructural investment decision-making within ACSA?

5.2.1. The appraisal techniques mostly used in infrastructure investment decision at ACSA

The most used appraisal techniques for infrastructure investment decision-making within a company were identified in the literature as Net Present Value [NPV], Internal Rate of Return [IRR], Payback Period, and Weighted Average Cost Capital [WACC]. This current study revealed that ACSA relies on more than one appraisal technique, with NPV identified as a superior appraisal method, followed by IRR. The participants further expressed the need to consider WACC, which controls the minimum expected rate of return on investment, protecting shareholders' outlays. Although the Payback Period method was not considered critical, the participants highlighted the need to indicate the actual time it would take for the project to recover its initial cost.

5.2.2. Prudential determinants of infrastructural investment decision-making within Airport Company South Africa

The findings from the literature revealed strong evidence to consider non-financial factors that tend to influence the infrastructural investment decision-making, leading to the viability and success of the project (Al-Mutairi et al., 2018; Moutinho & Lopes, 2011). The findings of this current study revealed the need for infrastructural projects to align with the company strategies, regulations and standards compliance, the identification of the project life cycle phase, project sustainability, project value, as well as how the project value triggers various project authorisation levels.

Additionally, the study findings highlighted the need for investment decision-makers to understand the airport business environment, emphasising the financial position of the business. Although some business cases might show higher returns, in the absence of financial resources, the implementation of the project is limited. Understanding the competitive advantage and security coverage was identified as an important factor.

5.2.3. Recommendations relating to the prudential infrastructural investment appraisal techniques that ACSA can apply

The findings of this current study revealed recommendations relating to prudential infrastructural investment, as well as other determinants to be considered during decision-making. These include competency or skills to deliver on project expectations, the dire need to understand the inputs assumptions thoroughly, resulting in appraisal technique results, with an understanding of the discounted cash flow methodology. The findings are

consistent with rational choice theory, which Frederickson et al. (2018) classified as a neoclassical economic theory applied in the public sector, and important for management decision making. Frederickson et al. (2018) alluded that Rational Choice Theory tends to apply mathematical models, to test the relationships between preferences and objectives, suggesting mathematical tools such as NPV and IRR. The final finding highlighted that ACSA needed to conduct risk assessments.

5.3. Recommendations of the study

The recommendations of this current study are based on the main code and the analysis illustrated. The following are recommendations that suggest how ACSA management could improve their infrastructural investment decision-making process:

1. The use of NPV, together with IRR or WACC, and the Payback Period method, is consistent with other literature findings, which indicate that, as a rule of thumb, management should depend on more than one appraisal technique, and further acknowledge that NPV and IRR calculations consider the time value of money. ACSA management depended on the appraisal techniques parameter; therefore, the NPV outcome could be negative, positive or zero, while the IRR must reach an organisation accepted percentage. Consequently, the management should not deviate from such practice.
2. While ACSA's investment committee comprises various professionals with one objective, to make an informed decision about the infrastructural investment projects, it is prudent for the organisation to always offer employees a financial investment management refresher training course, as ACSA is the largest state-owned airport aviation management company in South Africa.
3. The investment committee must use a template, which is designed in a way that highlights the priority prudential determinants checklists for the projects, as this would enhance transparency and accountability.
4. The investment committee must consider using external project valuers to re-evaluate selected projects. Similarly, for the supply chain management department, an external company should come in and audit the procurement (tender) process on a particular project. The external valuator should review the evaluated tender pack, including all the evaluation forms, justifications, as well as how scoring was executed, with a view to assessing whether they would arrive at the same result.

5. The study findings revealed that ACSA is highly regulated; however, ACSA management should consider forming a private subsidiary, or pursue business transactions exempted from red tape.
6. There is need for ACSA management to audit their infrastructure investment decision process, to determine whether they are efficient and not contributing to project implementation delays.
7. ACSA management should consider writing and publishing (for public consumption) various articles about infrastructural investment decision-making at the airport, to support other small governmental airports, as a point of reference.
8. An independent review on project risk should occur.

5.4. Limitations and avenues for future research

This current study was limited to Airports Company South Africa, as an SOE; therefore, the findings of the study cannot be generalised to other South African airport aviation management companies. ACSA is a state-owned entity, and a major player in airport aviation management companies in South Africa, operating in several geographical locations. Studies from other airport aviation management companies might offer a different set of findings, due to their company size, type, and geographical location. Therefore, it is recommended that a study be conducted, covering all airport aviation management companies in South Africa, including the private companies, to investigate the most used appraisal techniques and prudential determinants of infrastructural investment decision-making. It is also recommended that future studies analyse the inputs and assumptions, feeding into the most appraisal techniques used for infrastructural investment decision making within ACSA.

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APPENDIX 3: Interview questions

<p>UNIVERSITY OF CAPE TOWN</p> 	<p>Confidential</p>	
<p>Signed by Student: Ndadza Phindulo</p>		<p>Date 17/09/2022</p>
<p>Questions</p>		
<p>Interview questions</p>		
<p>SECTION A (PROFESSION)</p>		
<p>1. How many commercial infrastructural decision making project you work on? And does your academic background assist your commercial infrastructural decision making project?</p>		
<p>SECTION B APPRAISAL TECHNIQUES</p>		
<p>2. What are the appraisal techniques mostly used in commercial infrastructure investment decision making within ACSA with reference to (NPV, and accounting rate of return, IRR and Payback period? And why? Is ACSA using the above appraisal techniques consistently in their commercial infrastructural investment decision making?</p>		
<p>3. What are the other appraisal techniques that ACSA is not utilizing for commercial infrastructure investment decision making deemed to be important, please explain?</p>		
<p>4. What types of commercial infrastructure projects existing within ACSA? With the current appraisal techniques do you think ACSA will still maintain main airport aviation management company market share? Share your views</p>		
<p>SECTION C PRUDENTIAL DETERMINANTS OF INFRASTRUCTURAL INVESTMENT DECISION MAKING.</p>		
<p>5. What are the prudential determinants of commercial infrastructural investment decision (e.g. type of infrastructural project, company strategy, capital costs, regulations)</p>		
<p>6. Does ACSA investment committee render appraisal techniques higher than other determinates? give more information</p>		
<p>7. In terms of project value, are all the commercial infrastructural project decision making process subjected to any project value?</p>		
<p>SECTION D GOVERNANCE</p>		
<p>8. Is ACSA being audited on chosen appraisal techniques used for commercial infrastructure project including the applicable guidelines or policies?</p>		
<p>9. Does ACSA employ an external project evaluator before making an investment decision?</p>		
<p>10. What can you recommend as best appraisal techniques and determinants of commercial infrastructural investment decision?</p>		
<p>MCOM DEVELOPMENT FINANCE</p> <p>To find out more about our world-class academic programmes, executive education short courses and customised programme offerings, contact: 0860 UCT GSB (828 472) INTL +27 (0) 21 406 1111 info@gsb.uct.ac.za or visit us online at www.gsb.uct.ac.za; www.gsb.uct.ac.za/mcom</p> 		
<p>Confidential</p>		

APPENDIX 4: Editorial Certificate

07 May 2024

INVESTIGATING THE PRUDENTIAL DETERMINANTS OF
INFRASTRUCTURAL INVESTMENT APPRAISAL TECHNIQUES IN
AIRPORTS COMPANY SOUTH AFRICA

Author

Phindulo Ndadza