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# National Development Banks' Investments in Climate Resilient Infrastructure: Challenges and Prospects.

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by

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## Declaration

I, **Vivian Ramathuba**., hereby declare that the work on which this thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university. I authorise the University to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever.

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**Abstract**

This thesis explores the challenges faced by National Development Banks (NDBs) in facilitating investments toward low-carbon and climate-resilient sustainable infrastructure in South Africa. It emphasises their critical role in addressing substantial financing gaps essential for meeting the Nationally Determined Contributions (NDC) commitments under the Paris Agreement. As global priorities increasingly shift toward Sustainable Development Goals (SDGs), NDBs are undergoing significant transformation, transitioning from their traditional roles as financiers to becoming proactive mobilisers of investment. This pivotal shift is examined in this study within the broader context of a renewed interest in these banks, recognising them as essential policy tools for spearheading rapid and sustainable development initiatives.

Through qualitative interviews with 12 experts in climate finance and related fields, the study illustrates how NDBs utilise financial instruments such as concessional loans, blended finance, and long-term financing to mitigate perceived high risks and attract private capital, particularly in sectors prone to high risks like water management and climate-resilient transport. Additionally, NDBs can be mandated by the government to channel substantial international funds into national sustainable infrastructure projects effectively. This mission oriented approach underscores the unique position of NDBs as critical intermediaries and implementers in the national climate strategy. Despite their potential to bridge vast funding gaps and align their focus with the Paris Agreement, NDBs encounter significant challenges, including policy inadequacies, coordination difficulties, financial constraints, and external economic pressures. This study proposes innovative strategies for NDBs, such as expanding blended finance models, implementing risk mitigation mechanisms, and enhancing institutional capacities to support mobilising funding for sustainable and low-carbon infrastructure. The findings highlight NDBs' ability to adapt to market conditions and regulatory environments, highlighting their pivotal role in transforming South Africa's infrastructure financing landscape to achieve its NDC objectives.

Furthermore, this research underscores the importance of strategic policy alignment and innovative financing approaches, including using guarantees and partnerships with international climate funds to enhance project bankability and enable significant private sector participation. Ultimately, this study demonstrates that NDBs are crucial in driving the investment towards a climate-resilient infrastructure in South Africa.

# Abbreviations

ADB: Asian Development Bank

AfDB: African Development Bank

AFD: Agence Française de Développement

AIIB: Asian Infrastructure Investment Bank

CA: Climate Agreement

CAT: Climate Action Tracker

CDM: Clean Development Mechanism

CGD: Centre for Global Development

CIF: Climate Investment Funds

CONSENT: Consent

COP: Conference of the Parties

CPI: Climate Policy Initiative

°C: Degrees Celsius

DC: Developing Countries

DEA: Department of Environmental Affairs

DEFIC: Development Finance Centre

DBSA: Development Bank of Southern Africa

EBRD: European Bank for Reconstruction and Development

EIB: European Investment Bank

EUR: Euro

FORM: Form

GCA: Global Center on Adaptation

GCF: Green Climate Fund

GDP: Gross Domestic Product

GEGI: Global Economic Governance Initiative

GEF: Global Environment Facility

GHG: Greenhouse Gas

G20: Group of Twenty

GSB: Graduate School of Business

IBRD: International Bank for Reconstruction and Development

IDA: International Development Association

IDB: Inter-American Development Bank

IDC: Industrial Development Corporation

IDFC: International Development Finance Club

IDRC: International Development Research Centre

IEA: International Energy Agency

IFC: International Finance Corporation

IMF: International Monetary Fund

IsDB: Islamic Development Bank

II: Infrastructure Investment

IIPSA: Infrastructure Investment Programme for South Africa

IPAP: Industrial Policy Action Plan

IPCC: Intergovernmental Panel on Climate Change

IPP: Independent Power Producer

IPR: Interview Protocol Refinement

IRP: Integrated Resource Plan

LDC: Least Developed Countries

MA: Master of Arts

MDB: Multilateral Development Bank

MIGA: Multilateral Investment Guarantee Agency

MS: Microsoft

NAP: National Adaptation Plan

NCI: New Climate Institute

NDB: National Development Bank

NDC: Nationally Determined Contributions

NDP: National Development Plan

NGO: Non-Governmental Organization

ODI: Overseas Development Institute

ODA: Official Development Assistance

OECD: Organisation for Economic Co-operation and Development

PIC: Public Investment Corporation

PPDF: Project Preparation and Development Facility

PPP: Public-Private Partnership

RE: Renewable Energy

REIPPP: Renewable Energy Independent Power Producer Programme

REIPPPP: Renewable Energy Independent Power Producer Procurement Programme

SADC: Southern African Development Community

SAGE: SAGE Publications

SANBI: South African National Biodiversity Institute

SDG: Sustainable Development Goals

SA: South Africa

SURVEY: Survey

UCT: University of Cape Town

UK: United Kingdom

UN: United Nations

UNCTAD: United Nations Conference on Trade and Development

UNDESA: United Nations Department of Economic and Social Affairs

UNCDF: United Nations Capital Development Fund

UNDP: United Nations Development Programme

UNEP: United Nations Environment Programme

UNFCCC: United Nations Framework Convention on Climate Change

URL: Uniform Resource Locator

USD: United States Dollar

US: United States

WEF: World Economic Forum

WG: Working Group

# Chapter 1
# Introduction

## 1.1 Background of the study

Significant progress has been made in awareness around the world, to transition toward low-carbon emissions. Countries, including South Africa (SA), are signatories to the Paris Agreement (United Nations, 2015), an international treaty adopted in December 2015. The Agreement addresses the reduction of greenhouse gas (GHG) emissions and financing projects to minimise the emissions contributing to global warming. As outlined, the Paris Agreement's primary goal is to "ensure that the temperature increase remains below 2 degrees Celsius (°C)" throughout this century. According to Priede, Gancon et al. (2018), the Agreement mandates that all countries that are signatories commit to the objectives by submitting their Nationally Determined Contributions (NDCs) and regularly reporting on emissions and implementation efforts.

Mobilising investments toward low-carbon sustainable infrastructure is crucial in addressing GHG. Rogelj et al. (2018), in a report by the Intergovernmental Panel on Climate Change (IPCC), concluded that between $1.6 to $3.8 trillion investment in clean energy is required to reach the target of a 1.5-degree Celsius threshold globally. Thus, a substantial rise in investments is necessary to achieve these targets.

The Paris Agreement's objectives include constantly making finance flow towards the climate-resilient infrastructure. This leads to the critical role financial institutions can play in scaling up finance towards sustainable infrastructure and achieving net-zero carbon emissions targets. Countries, including South Africa, have pledged to direct financial resources in a way that promotes low-carbon emissions (United Nations, 2015). Global, private sector initiatives have been introduced to encourage uniform disclosures of climate risk to investors. The Paris Agreement holds special importance for Development Finance Institutions (DFIs), which are ideally placed to showcase the potential benefits and returns of investments in sustainable development while mitigating their risks.

Before the Paris Agreement (2015), financial institutions, particularly Multilateral Development Banks (MDBs), had already been supporting climate-related projects, but commitments were scattered and lacked a unified global goal. According to (Nascimento, 2024), the turning point came in 2015 at COP21 when the Paris Agreement was signed and

adopted. Financial institutions started committing funds toward climate change, with a commitment of $100 billion, aligning with the Paris Agreement objectives by 2020. The objective was to implement innovative strategies for mobilising finance and assisting countries in meeting the targets outlined in their NDCs.

In 2015, MDBs and the International Monetary Fund (IMF) issued a report on scaling up funding from billions to trillions to finance the SDGs within each respective institutional mandate. The statement demonstrates the vision of their commitment to increasing support and making an impact globally. According to Llanes-Regueiro *et al*., (2017), the estimated investment in new infrastructure or upgrading the existing infrastructure is required to achieve the climate targets, and climate change targets will necessitate a shift in resource flow from billions to trillions of dollars. Such a paradigm shift requires a comprehensive financing framework capable of effectively directing resources and investments.

In the 8$^{th}$ edition of the Joint Report on MDB Climate Finance (2019), the MDBs announced the results of total climate adaptation and mitigation finance. Based on CGD (2007), once the funding needed to achieve climate change was better understood, the focus shifted to exploring the feasibility and methods for meeting these expectations. The overarching goal for addressing climate change is that most of the funding needed to meet the NDC targets must come from domestic resource mobilisation.

The initial commitment announced in 2015 of $100 billion towards climate finance by MDBs was achieved by 2019, as reported by the African Development Bank (AfDB). However, this finance only reached a few developing countries, including South Africa. MDBs are tasked with assisting member countries in meeting NDC targets. During the 26th COP, held in November 2021, the International Development Financial Club (IDFC), primarily composed of National Development Banks (NDBs) worldwide, announced that their members had emerged as the most significant global climate finance providers. They reported delivering US$ 1 trillion in green finance between 2015 and 2020, surpassing the target set at the UN Climate Action Summit in September 2019. Additionally, IDFC members declared their commitment to potentially mobilising up to US$ 1.3 trillion by 2025, with a significant focus on increasing funding for adaptation and biodiversity initiatives.

To meet the NDC targets, countries must phase out carbon-intensive energy systems and transition to low-carbon systems. Achieving this necessitates transformative shifts across key

economic sectors, including urban development, energy, agriculture, land use, water management, and industry. A key challenge lies in determining how to finance NDCs and whether sufficient investment can be mobilised to meet the targets. An OECD, 2021 report highlighted that achieving the necessary funding for transitioning global economies toward low-carbon, climate-resilient pathways will be unattainable without private sector investment (OECD, 2021).

The G20 Report (2019) highlights the pivotal role of MDBs and other DFIs in supporting policy and institutional strengthening, improving project quality, mitigating risks, and mobilising private finance by reducing capital costs. Similarly, an OECD report underscores the importance of MDBs in derisking projects during challenging early stages of development. Once the sustainable infrastructure project has been derisked, private investors are drawn in due to the stable long-term returns, offering significant potential to mobilise large-scale financing. According to Ziervogel *et al*., (2014), South Africa ranks among the world's most carbon-intensive economies due to its energy sources coming from coal. Reducing this requires substantial investments in sustainable infrastructure, with critical contributions from the private sector. The Climate Action Tracker (CAT) reports that in 2015, South Africa's energy sector was responsible for 79.5% of total GHG, as coal is the primary energy source. South Africa has introduced clean energy through policies such as the Renewable Energy Independent Power Producers Programme (REIPPP) to address these emissions, designed to expand energy production from clean technologies. Furthermore, in February 2019, according to the CAT, South Africa implemented a carbon tax to target emissions from fossil fuels. The 2019 OECD Report on Climate Futures emphasises the crucial role of investment in infrastructure in influencing development trajectories while fostering economic growth, enhancing productivity, and improving well-being. NDBs are well-positioned to close the funding gap for sustainable infrastructure in developing countries. As publicly funded institutions, NDBs are critical in mobilising climate finance. In their article, Pesme and Gutiérre (2021) highlight that state-owned banks entrusted with a governmental mandate to achieve specific development goals are increasingly recognised as valuable instruments for rapid counter-cyclical lending and financing SDGs. Pesme and Gutiérre (2021) further noted that to achieve the NDC's targets, NDBs must change their traditional role as "financers" to becoming "mobilisers" of investment. Additionally, they must secure greater recognition within the global climate and development finance framework.

Diana Smallridge *et al*. (2013) highlighted the urgent need to mobilise international capital significantly to fund mitigation infrastructure projects, highlighting the role of international funding in accelerating this transition. However, several barriers hinder private sector engagement in climate mitigation efforts. NDBs are well-placed to tackle these challenges. Quist (2021) underscores the essential roles of NDBs in *The Future of NDBs*, highlighting some of their functions in mitigating the cyclical fluctuations of private financing, investing in early stages, supporting infrastructure development, and promoting environmental sustainability. In contribution to this debate, this study explores the challenges faced by NDBs in facilitating investment toward sustainable infrastructure in South Africa. This study focuses on two NDBs- the Development Bank of Southern Africa (DBSA) and the Industrial Development Corporation of South Africa (IDC)- both of which have a mandate of developing infrastructure within South Africa. The study explores how NDB's roles can be altered to increase mobilisation towards sustainable infrastructure.

## 1.2 Problem Statement

The problems which the study seeks to address are summarised as follows:

### 1.2.1 The Current Case

According to Figueres *et al*., (2017), an estimated US$ 1 trillion annually must be mobilised to close the emission gap and avoid delays in achieving GHG emissions targets. Additionally, significant funds for climate change are required to support emerging markets in adapting (WEF, 2014). The Global Report (2011) emphasises that NDBs can act on behalf of the government to advance climate transformation if supported by clear government mandates and sufficient capitalisation. By utilising public funds, NDBs can significantly enhance the mobilisation of private financial resources. According to the 2018 Global Finance Update, funding is important to implementing the Paris Agreement. Giulia Lotti and Andrea Presbitero (2019) estimates that reaching climate goals by 2030 will necessitate an additional US$2.6 trillion in investment for emerging markets. Closing this financing gap represents a substantial share of GDP for emerging markets, emphasising the urgent strategy of mobilising private sector investment to address the gap. In response, the World Bank (2019) reports that MDBs have emphasised their dedication to encouraging increased investment from the private sector. However, scepticism remains regarding their capacity to leverage private participation effectively.

A UN Study (2014) also highlights that DFIs are key to bridging the gap to meet global targets. Innovative solutions for development financing, such as blended finance, guarantees, Public Private Partnership (PPP), and funding in local currency markets, enable greater private sector participation and foster development.

Bhattacharya *et al.,* (2019) highlight the immense potential to tap into institutional investors. However, scaling up private sector involvement requires enhanced mechanisms to mitigate risks during the initial phases of infrastructure investments and effectively attract long-term financing. Leveraging private sector capital through blended finance structures mitigates risks for private sector participation. MDBs are well-positioned to provide blended finance, reinforcing their critical role in mobilising private sector investments.

### 1.2.2 Climate Change: A Defining Challenge

The Mopan Report (2021) on coordinating the multilateral response to climate change highlighted that global temperatures are rising significantly above 2°C compared to preindustrial levels. This growing challenge presents serious social and economic threats, particularly to developing, low-income, and lower-middle-income countries, potentially undoing recent human and economic development strides. Fossil fuels remain the primary source of GHG emissions, and progress has been slow to phase out using such sources. However, in recent months, several significant nations have pledged more ambitious climate targets, including commitments to achieve carbon neutrality by 2050, signalling a shifting political landscape in the lead-up to COP 26. As at the time of this study, the latest assessment of IPCC (2023) confirms unequivocal global warming, attributing the primary cause to human activities, particularly since the mid-20th century. The escalation in global average temperatures in the post-industrial era correlates significantly with heightened GHG emissions from fossil fuel consumption.

NDBs have a vital role in catalysing the shift to net-zero emissions in infrastructure, given their critical role in providing finance, guarantees, technical assistance, and other support for infrastructure projects. MDBs are particularly well-suited to coordinate efforts among diverse stakeholders, as highlighted by the G20 (2018). Similarly, NDBs have the capacity, technical expertise, and international credibility to drive investment towards sustainable infrastructure.

### 1.2.3 The South African Case – Green Finance Gap

South Africa's annual cost of adapting to climate change is projected to exceed $30 billion between 2021 and 2030. Furthermore, the total cost of mitigation measures from 2020 to 2050 is estimated at over $1,350 billion, averaging approximately $44 billion annually (DEA, 2015; DEA, 2019b). The nation's energy sector predominantly depends on fossil fuels, with coal power plants contributing approximately 70% of total energy generation (IEA, 2021). The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) facilitated private sector investment in renewable energy projects to meet climate goals. The government facilitated this investment by creating an enabling environment through guarantees, revising energy policies, and implementing the Integrated Resource Plan 2030, which includes clean energy technologies.

UNEP (2013) emphasised the critical need to invest in decarbonising South Africa's energy sector as a central strategy for achieving the Paris Agreement targets and green growth objectives. To this end, the country has implemented various policies to channel financial resources into the clean energy sector. Empirical research, such as that conducted by Rodríguez, Haščič, *et al.*, (2014), demonstrates that government interventions through public policies and funding are essential for attracting private investment in renewable energy, thereby supporting green growth initiatives. Similarly, McNicoll *et al*., (2017) analysed South Africa's renewable energy programs, estimating the impact of public finance in mobilising private investment for climate action.

## 1.3 Limitation of Previous Research Studies.

The NDC Partnership in 2019 reviewed the role of NDBs in implementing the NDCs, and an emerging gap from the NDC Partnership study highlights the need to investigate further the extent of NDB in mobilizing private sector funding toward climate change. This study responds to this gap, focusing on South Africa and reviewing the DBSA and IDC initiatives. The NDC Partnership study recommended that further studies be conducted specifically for each country, considering their specific macroeconomics. With South Africa experiencing macroeconomic challenges such as low growth, high unemployment, high inequality rates, and energy shortages, the current recommendations must be tailor-made for South Africa.

A report by the OECD (2016) analysed strategies for increasing private sector participation in sustainable infrastructure, highlighting the need for dedicated climate funds institutions or the enhancement of existing NDBs, depending on the implementation scale. However, the OECD report focused on countries with dedicated green banks and excluded South Africa. Similarly, Ephraim Chinyamunzo (2019) examined the connection between policy and green finance within the renewable energy sector but did not investigate the effectiveness of NDBs in this context.

To address these financing gaps, NDBs can leverage their capital and government-backed status to draw in private financing and reduce risks for private lenders. While regional and international development finance institutions widely implement such strategies, they are less frequently employed by NDBs. Future research could benefit from analysing the practices of regional NDBs, focusing on strategies that foster co-financing partnerships with private lenders. This approach could enhance economic resource efficiency and address critical credit shortages.

The Mopan Report (2021) emphasises that achieving NDCs requires a significant increase in private capital investments in climate change initiatives. The above-mentioned problem suggests further research exploring the role of NDBs in mobilising investment to address the much-needed investment for sustainable infrastructure. This will assist policy practitioners in designing and effectively defining the role of NDBs to improve and address challenges. This research explores challenges experienced by NDBs in facilitating investments in sustainable infrastructure in South Africa. This is novel is an absence of literature that assesses the challenges experienced in facilitating sustainable investments and progress made by NDBs according to the literature reviewed.

## 1.4 Purpose and Significance of the Research

This research explores the challenges experienced by NDBs in mobilising funding for sustainable infrastructure projects in South Africa. The findings aim to provide insights for the decision makers on the extent of NDBs' contributions toward meeting these commitments. Additionally, the study will identify the challenges and constraints faced by NDBs in funding climate projects and assess their level of engagement in financing NDC-related initiatives. It will also examine potential solutions and address challenges in bridging the funding gap.

## 1.5 Research Questions and Objectives

The research questions addressed in this study are:

1. What role can the NDB play in mobilising funding for climate change-aligned sustainable infrastructure to address the funding gap for South Africa to meet its NDC commitments?
2. What challenges do NDBs encounter in facilitating investment in climate change-sustainable infrastructure projects in South Africa to address the funding gap?

### 1.5.1 Research Objectives

1. To understand the role and funding strategies employed by South African NDBs in mobilising funding for climate change sustainable infrastructure projects.
2. To explore challenges faced by NDBs in South Africa when facilitating investments in low-carbon sustainable infrastructure, particularly in addressing the existing funding gap

## 1.6 Research Assumptions

The researcher acknowledges that existing quantitative databases lack the comprehensive information needed to thoroughly examine the role of NDBs in mobilizing investments for low-carbon, climate-resilient, and sustainable infrastructure in South Africa, including all relevant instruments.

The Annual Financial Statements and Sustainability report, published annually by the NDBs, reports climate change investments; however, the information needs to be consistently reported over the period.

The data will be supplemented with the REIPPP Office report on the investments toward funding the programs over the period. The detailed literature review will further lead the researcher in conducting a case study analysis of the DBSA and the IDC to formulate the data. It is further assumed that the comparison with other best-case studies will be conducted.

## 1.7 Organisation of Dissertation

This research is structured into five chapters, followed by a reference section and concludes with appendices. An overview of the five chapters is provided below.

**Chapter 1: Introduction and Background**,

This chapter offers a brief overview of the research background and context. It identifies the central problem and underscores the importance of the study. It also outlines the research questions, objectives, and scope and notes limitations.

**Chapter 2**: **Literature Review**

This chapter provides a review of the literature on sustainable infrastructure and NDBs

**Chapter 3: Research Methodology**

This chapter presents the research methodology, encompassing data collection methods, sampling strategies, data analysis techniques, and the measures adopted to ensure data validity and reliability.

**Chapter 4: Discussion of findings**

This chapter outlines the research findings from the interviews and analyses the results.

**Chapter 5: Conclusion and Recommendations**

This chapter summarises recommendations and suggests directions for future research that can be explored further.

# Chapter 2

# Literature Review

## 2.1 Introduction

This chapter synthesizes the available literature on sustainable infrastructure and the role of NDBs in mobilizing finance for projects in South Africa. It outlines key concepts relevant to the study and examines NDBs' challenges in funding sustainable infrastructure. Additionally, it explores experiences from other countries and discusses existing theories related to NDBs' involvement in climate finance.

The chapter explores theoretical perspectives on sustainable infrastructure and the role of NDBs, followed by a review of empirical findings that align with the focus of this research and consolidate key insights.

## 2.2 Definition of concepts

### 2.2.1 Sustainable Infrastructure

According to Amar Bhattacharya *et al*., (2021), the investment needed in low-carbon sustainable infrastructure is essential for accelerating the transition from carbon-intensive systems. This transition necessitates transformative changes across critical economic sectors such as transport, energy and water resources. The 2018 UN report, *Financing Climate Futures*, highlights that achieving a major transition requires developing countries to implement strategies backed by sustainable infrastructure project pipelines. This transformation involves strengthening "hard" infrastructure, such as physical systems, and "soft" infrastructure, including governance frameworks, financial systems, and institutions. This dual focus is critical to achieving sustainable and climate-resilient development.

### 2.2.2 Climate Finance

Climate finance refers to "the funding of investments that yield environmental benefits in the framework of sustainable environmental development" (UNEP, 2017). In their 2020 report, Murphy and Parry (2020) analysed how MDBs are intensifying their financing efforts for climate adaptation by prioritising and directing funds toward initiatives endorsed by national governments. These approaches involve mobilising resources and directly funding projects to tackle climate adaptation challenges.

### 2.2.3 National Development Banks

NDBs are partially state-owned banks, with at least 30% government ownership, providing long-term funding or encouraging investments to achieve socio-economic development objectives within a particular region, country, or sector (UNDESA, 2005; World Bank, 2012). Musacchio and Lazzarini (2017) emphasised the developmental role of NDBs in developing countries through investment in infrastructure projects, encouraging investments, and mobilising capital support from global communities. The OECD (2018) highlights NDBs' pivotal role in infrastructure financing, emphasising their potential to increase funding to climate-resilient projects by increasing capitalisation to enable more significant climate financing, including concessional and non-concessional funding. Griffith-Jones and Ocampo (2008) emphasise another crucial function of NDB's capacity to offer counter-cyclical funding during financial crises. For example, during the 2008-2009 financial crisis, MDBs substantially boosted their lending commitments and disbursements to emerging economies, offering a critical counter-cyclical response that helped maintain investment levels (Griffith-Jones & Gottschalk, 2012). NDBs facilitate the mobilisation of private institutional capital by enhancing risk-adjusted returns for sustainable infrastructure through risk mitigation mechanisms. Financial intermediaries aggregate funds from donor governments and investors to strengthen commercial infrastructure investments (Humphrey, 2020). By integrating climate considerations into their activities, NDBs can influence other financial institutions to follow similar practices.

Miyamoto and Chiofalo (2016) estimated that in developing countries, MDBs and donors contribute approximately 7% of infrastructure funding, while governments and the private sector provide the remaining funds. NDBs in emerging economies are uniquely positioned to scale up financing for sustainable infrastructure due to their local market knowledge and strong public-private partnerships. However, the ability of NDBs to scale climate action and mobilise commercial investors varies by country and regional context (Ang, Röttgers & Burli, 2017). Development banks must adopt a more catalytic role, encouraging countries to exceed NDC ambitions and avoid emissions intensive development pathways. Achieving this will require rethinking the roles of governments and banks in enabling environments, policy alignment, and strategic leveraging of public resources to mobilise private investments. The importance of leveraging commercial investment to address infrastructure gaps is echoed in the G20 Hamburg

Principles, which outline a stepwise approach for MDBs to crowd in private finance. This involves enhancing the investment climate and prioritising commercial financing where appropriate (G20 IFA WG, 2017). As such, NDBs are increasingly recognised as key players in addressing the infrastructure challenges of developing countries, aligning their strategies with global climate and development goals, and mobilising the resources necessary to bridge investment gaps.

## 2.3 Overview of National Development Banks in South Africa

NDBs are classified as State-Owned Companies under the Public Finance Management Act (No. 1 of 1999). Mopeli (2018) points out that South Africa, functioning as a developmental state, manages several DFIs that assist different economic sectors, such as manufacturing, agriculture, housing, infrastructure development, small and medium enterprises (SMMEs), and energy.

The topic under research sets out to explore the challenges faced by NDBs in mobilising funding for a low-carbon and climate-resilient sustainable infrastructure in South Africa. The study examines the two largest NDBs in South Africa, the IDC and DBSA, with significant assets and mandated by the government to finance sustainable infrastructure. These institutions serve as key drivers of economic development, and the South African government regards these development banks as vital policy instruments for advancing infrastructure development. Their lending practices are influenced by their funding mechanisms.

This research study seeks to fill a gap by assessing South African NDBs' role in mobilising finance for low-carbon infrastructure to ensure the current challenges can be addressed to meet their mandates. These are NDBs that provide development financing for sustainable infrastructure.

**Table 1: NDBs in South Africa**

| Bank | Year Established | Mandate | Assets | Equity |
|---|---|---|---|---|
| Industrial Development Corporation (IDC) | 1940 | General | 9,869.390 | 6,397.022 |
| Development Bank of Southern Africa (DBSA) | 1983 | General | 6,201.611 | 2,385.846 |
| Land Bank (Landbank) | 1912 | Agriculture | 3,440.114 | 462.188 |
| National Housing Finance Corporation (NHFC) | 1996 | Housing | 240.534 | 217.25 |
| Ithala Development Finance Corporation (Ithala) | 1959 | MSMEs | 194.476 | 17.203 |
| Small Enterprise Finance Agency (SEFA) | 2012 | MSMEs | 150 | 100 |
| Independent Development Trust (IDT) | (1990). | Housing | 130 | 8 |

Note: All figures in USD millions
Source: Estimates from Agence Française de Développement (AFD) Data

### 2.3.1 Development Bank of Southern Africa (DBSA)

The DBSA, established in 1983 under the Development Bank of Southern Africa Act No. 13 of 1997, focuses on advancing infrastructure development, social progress, and regional integration. Recognised as a key tool by the South African government, it addresses infrastructure gaps in underserved domestic and regional markets (DBSA, 2018).

#### i. Funding Model

According to DBSA (2018) and Qobo and Motsamai (2014), the DBSA raises capital through borrowings in capital markets, utilising bilateral loans and bonds. Gerard and Ganesh (2017) highlight that NDBs raise funds by issuing debt in domestic and international markets, with the government retaining oversight and control. Accessing international borrowings allows DFIs to mobilise substantially larger capital than relying solely on government funding, subsidies, or local capital markets.

#### ii. Sectoral Focus and Strategy

The DBSA's core mission is to assist the South African government in addressing infrastructure gaps, financing projects, and coordinating infrastructure development to support sustainable growth. To achieve this, the DBSA collaborates with municipalities to implement infrastructure initiatives in key sectors such as education, healthcare, housing, roads, water, and sanitation.

The bank targets economic and social infrastructure, with economic initiatives to reduce backlogs, boost capacity, and promote development in underserved strategic sectors such as transportation, telecommunications, electricity, and subways. DBSA also invests in social infrastructure.

To facilitate these efforts, the DBSA offers services such as market research, project planning, financing, and implementation support (DBSA, 2018). Additionally, the bank plays a regional role within Sub-Sahara Africa, funding infrastructure projects to promote regional integration and development.

### iii. Role of DBSA in funding sustainable infrastructure

- Since 2010, the DBSA has been instrumental in implementing the REIPPPP, as highlighted by the IPP Office in 2018. This program addresses South Africa's electricity supply challenges by sourcing energy from private sector producers, focusing strongly on renewable energy alongside fossil fuels. Acting as a catalyst, the DBSA collaborated with the government to develop the program. Additionally, the DBSA manages funds dedicated to promoting sustainable investments (DBSA, 2018), as detailed in its Global Report 2021 and official website.
- **Green Fund**: The DBSA manages the initial USD 1.2 million target funding green projects, including developing green cities and promoting low-carbon economies.
- **DBSA Project Preparation Fund**: The DBSA is focused on funding project preparation studies for infrastructure projects
- **Infrastructure Investment Programme for South Africa (IIPSA)**: The DBSA manages a 100 million Euro project preparation fund supporting infrastructure projects in South Africa. International institutions contributing to the funds include the European Union, AFD, Kreditanstalt für Wiederaufbau (KfW), and the European Investment Bank (EIB).
- **Regional Project Preparation and Development Facility (PPDF)**: The DBSA manages a co-funding platform for technical assistance to prepare infrastructure projects by the European Union and KfW
- **Climate Finance Facility**: Developed with co-financing with GCF to facilitate local currency financing in South Africa's renewable energy sector, the DBSA is responsible for managing this fund.

- **Accreditation by GEF and GCF**: The DBSA is accredited by the Global Environment Facility (GEF) and Green Climate Fund (GCF) and leverages bilateral donor finance from institutions such as KfW grant support from the German and French governments.
- The DBSA has leveraged multilateral and bilateral funding to align its operations with government climate change goals, utilising concessional loans, grants, and service fees. Through initiatives like the REIPPPP, the bank has developed a portfolio of green projects and financial instruments supporting energy transition.

#### iv. Challenges and Recommendations:

The Global Report (2021) notes that while the DBSA has effectively supported renewable energy and attracted international climate finance, its offerings are limited. It focuses on renewable energy generation and green product manufacturing but lacks instruments for energy and resource efficiency in existing processes. Additionally, the DBSA relies on donor and government funds for concessional financing rather than its own resources. Allocating DBSA reserves for concessional financing could expand its product range and strengthen its role in advancing green investments and energy transitions.

### 2.3.2 Industrial Development Corporation (IDC)

The IDC was established in 1940 under the Industrial Development Act No. 22 of 1940. As stated on its official website, the IDC is a state-owned company that aligns its priorities and mandates with government policies. Its primary mandate is to promote industrialisation that drives sustainable economic growth, creates jobs, and empowers South Africans economically while ensuring steady growth across Africa. The IDC also emphasises investments in sustainable infrastructure to protect the environment and support long-term viability. The IDC is also responsible for driving industrialisation within South Africa and across Sub-Saharan Africa. While maintaining its focus on industrial development, the IDC places greater emphasis on empowering historically disadvantaged individuals, particularly by promoting the economic inclusion of black entrepreneurs and supporting their integration into the mainstream economy.

#### i. Funding Model

The IDC operates as a self-sustaining organisation, raising funds through domestic and international capital markets rather than relying on government allocations. As a taxable corporate entity, it secures funding from dividends, the sale of mature investments, and market

borrowings, with profits from its investment activities being a key source of operational sustainability.

To ensure its financial viability, the IDC provides development loans and capital to new ventures, targeting high returns on these investments. It also offers equity financing, becoming an equity partner in business ventures when appropriate. The decision to provide loans or equity financing considers financial risks and other relevant factors (IDC, 2017; Qobo, 2015).

### ii. Strategic Objectives

The IDC supports industrial development in South Africa and throughout Africa by offering financial and non-financial assistance to new, existing, and emerging businesses. It invests development capital in new ventures, focusing on long-term financial sustainability. The IDC's financing decisions are guided by various financial and economic factors, including the project's bankability, sustainability, viability, and overall developmental impact (IDC, 2017).

### iii. Role of IDC in funding sustainable infrastructure

NDBs play a crucial role in supporting and executing government strategies. They contribute through direct lending and by serving as catalysts to mobilise private banks. For instance, the IDC significantly contributed to REIPPP through participation in project development. The IDC took on early-stage project development risks alongside private sponsors, provided direct equity, and offered mezzanine funding to support communities and historically disadvantaged groups. These efforts aimed to mitigate risk on projects to allow private sector participation in the REIPPP. As Ndikumana, Naidoo, and Perez (2021) observed, renewable energy is anticipated to constitute a growing proportion of NDB loan portfolios, reinforcing their contribution to advancing sustainable development goals.

**Table 2: Brief Overview of the institutions**

| | DBSA | IDC |
|---|---|---|
| Year established | 1983 | 1940 |
| Mandate | Narrow | Broad |
| Ownership | 100% state-owned | 100% state-owned |
| Agriculture | | X |
| Infrastructure | X | X |
| Industrial | | X |
| Mining | | X |
| SME | | X |
| Regulatory setting | DBSA Act | IDC Act |
| Financing Model | Direct | Direct |
| Funding Sources | Capital Markets | Capital Markets and Return on equity investments |
| Independent Board of Directors | Yes | Yes |

*Source: Author's compilation from DBSA and IDC official reports, financial statements, and legal documents*

The IDC focuses on sectors like agriculture, mining, and industry, while the DBSA is dedicated to infrastructure development. These institutions operate under different regulatory frameworks: the DBSA is overseen by the Minister of Finance, whereas the IDC reports to the Department of Trade, Industry and Competition. Both institutions engage in direct lending to support sustainable infrastructure initiatives.

Their funding strategies also differ. The DBSA finances its activities by borrowing from capital markets, while the IDC relies on returns from its equity investments. Except for during the global financial crisis, when the DBSA received Treasury funds to fulfil a counter-cyclical role, neither institution has regularly received capitalisation from the South African government.

## 2.4 Theoretical Framework

This study draws on a range of development finance theories to understand and analyse the role of NDBs in mobilising funding for climate change aligned infrastructure in South Africa. These theoretical perspectives help to ground the study in both academic and policy discourse, enabling a clearer interpretation of findings and guiding the evaluation of NDB strategies.

### 2.4.1 Market Failure Theory

Market failure theory posits that private capital markets often underinvest in projects with long-term, uncertain returns such as sustainable infrastructure due to information asymmetries, high

risk, and externalities (Carvalho et al., 2019). In response, NDBs emerge as instruments to correct these failures by providing patient, long-term finance where private investors are reluctant to participate.

*Relevance to this study:* This theory provides a rationale for the role of NDBs in South Africa in addressing financing gaps in climate-related sectors, where high upfront costs and regulatory uncertainty constrain private investment.

### 2.4.2 Developmental State Theory

Developmental state theory underlies the importance of a strong, interventionist state that strategically directs capital to priority sectors for long-term growth and structural transformation (Carvalho et al., 2019; Mazzucato, 2013). Within this framework, NDBs function as key policy tools that align finance with national development and climate objectives.

*Relevance to this study:* It offers a lens to assess whether and how South African NDBs align their financing activities with broader development strategies such as the Just Energy Transition and the NDCs.

### 2.4.3 Directed Credit and Financial Repression Theories

Directed credit theory argues for the deliberate channelling of credit to underfunded yet socially beneficial sectors, typically facilitated through policy banks (Griffith-Jones & Ocampo, 2018). While often critiqued, financial repression theory historically explains how states used regulated financial systems and public banks to support industrial policy and public investment.

*Relevance to this study:* These theories contextualise the mandate of South African NDBs to provide below-market or concessional finance to crowd in private capital into unbankable or nascent green infrastructure markets.

### 2.4.4 Blended Finance and Risk-Sharing Frameworks

Recent development finance literature emphasises blended finance as a critical approach to de-risk private investment by using concessional capital and guarantees to mobilise private sector

participation (Studart & Gallagher, 2016). NDBs are uniquely positioned to operationalise such frameworks.

*Relevance to this study:* These theories support the analysis of how NDBs leverage public funds to catalyse large-scale climate investment through partnerships, co-financing structures, and credit enhancement tools.

## 2.5 Conceptual Framework: NDBs role in facilitating climate change

Mazzucato and Penna (2015) highlight that development finance roles can be facilitated in four key ways: "(a) a countercyclical role, (b) a capital development role, (c) support for new ventures, and (d) a challenge led or mission oriented role". The study extends beyond the traditional market-failure framework, which addresses deficiencies in public sector activity. Mazzucato and Penna (2015) assert that this framework is too restrictive, overlooking the broader roles public financial institutions have assumed, particularly in addressing the growing short-term focus and speculative tendencies of private finance.

### 2.5.1 Countercyclical Role

During economic recessions, these investments are encouraged to offset the private sector's reduced economic activity. Mazzucato and Penna (2015) concluded that the countercyclical role of NDBs addresses a specific type of coordination failure, where private agents act pro-cyclically, exacerbating economic downturns instead of recognising that increased lending could aid in economic recovery (Levy-Yeyati, Micco, and Panizza, 2004). In essence, the public promotion of countercyclical credit is often necessary to address such coordination failures. This countercyclical role serves as the foundation for all other functions of development banks, paving the way for capital development and broader economic growth.

### 2.5.2 Developmental Role

Mazzucato and Penna (2015) highlight that NDBs focus on financing long-term projects, promoting industrialisation, and supporting economic growth, particularly during expansions, by enabling strategic investments. Beyond addressing market gaps, NDBs contribute social capital, foster public-private partnerships, drive innovation, and build societal capabilities. Their developmental role aligns with supporting new ventures and challenge driven investments, relying on shared visions to achieve broader societal goals. While market failure

theory accounts for some of their activities, NDBs extend beyond providing financial capital to fill market gaps. They actively contribute social capital to enhance societal capabilities, coordinate efforts, build public-private partnerships, foster synergies, and drive innovation. This role aligns with their support for new ventures and challenge-led investments, which rely on social capital and shared visions to achieve broader societal objectives.

### 2.5.3 New Venture Support Role

These investments are directed towards high-risk areas such as research and development, start-ups, and prolonged innovation processes- areas that typically experience hesitance from private capital due to the associated risks. In industrialised economies, such efforts address the "funding gap" Small and Medium Enterprises (SMEs) frequently encounter when seeking internal or external funding for innovative endeavours. Given that innovation inherently involves substantial risk and requires both financial capital and long-term dedication (O'Sullivan, 2004; Mazzucato, 2013b), DFIs have increasingly committed to providing ongoing venture capital to high-tech startups, demonstrating the crucial relationship between financial capital and investment (Mazzucato & Penna, 2015).

### 2.5.4 Challenge led role

Mazzucato (2015) describes the mission led role as driven by ambitious public policy missions to address societal challenges and transform specific sectors or the broader economy. Investments target complex issues like climate change and aging populations, with DFIs worldwide focusing on green transitions and promoting sustainable investments. Climate change, as a negative externality from carbon-intensive activities, is tackled through mission oriented investments by NDBs, fostering innovation and technologies to address such challenges.

This role also addresses market failures caused by information gaps, such as private actors unaware of energy efficiency savings. Beyond correcting market inefficiencies, SIBs actively shape and create new technologies, industries, and markets to address critical societal needs.
The challenge led role involves developing a shared vision that aligns the efforts of public and private actors, steering them toward solutions that transcend existing paradigms. By complementing their developmental role, SIBs enhance social capital while fostering long term societal transformation through coordinated, mission driven actions

**Table 3: Analytical Framework: Characteristics of the different roles that NDB can play**

| New Approach | Counter-Cyclical Role / Direct Financier | Development Role | New Venture Support Role | Challenge led Role Mission Oriented |
|---|---|---|---|---|
| Climate Finance | Coordination Failures | Negative externalities Providing Long-term capital | Information asymmetries | Define the Policy Framework Negative Externalities |
| Limitation | Underinvestment and risk aversion, but underutilisation of financial | Knowledge Capital development and social capabilities | Speed up technology innovation Lack R &D and new technologies | Making things happen |
| Beyond | Smooth the business cycle | Funding Development Technical Assistance Communities and marginalised group participation | Project preparation Innovation and Technology | Tackling societal challenges, establishing visions through missions, and driving market creation and transformation. |
| Type of Capital | Financial Capital | Social Capital | Venture Capital | Visionary Capital |

*Source: Mazzucato and Penna 2015*

Research into how NDBs meet their mission driven or challenge oriented mandates is expanding, spurred by the demand for investments that support innovative, inclusive, and sustainable growth while addressing societal issues. Using their deep-rooted expertise, NDBs are well placed to enact policies for critical concerns like climate change. They participate in countercyclical, developmental, venture capitalist, and challenge driven activities, which empower them to remedy market failures and actively establish and shape markets, a vital component of innovation. Additionally, NDBs are recognised as the principal providers of public finance for climate change initiatives. Three key attributes enable NDBs to execute their roles effectively. Their state owned structure facilitates access to capital markets and signals financial credibility, attracting other investors. Additionally, their deep connections to local markets and understanding of regional contexts often surpass those of foreign investors. Lastly, their extensive expertise and experience in renewable energy projects position them as "technical banks," enabling them to address information asymmetry and guide the private sector on renewable energy investment opportunities.

Recent studies outline key measures for NDBs to support the transition to a low-carbon economy, including robust governance, clear mandates, adequate capitalisation, access to

capital markets, international partnerships, and enhanced risk management capacities (Smallridge *et al.,* 2019; Netto et al., 2021 Braga, 2022; Songwe, Stern and Bhattacharya, 2022). NDBs excel when financing credit-constrained firms, serving as direct financiers focusing on strategic goals. By mitigating risks and providing technical expertise, NDBs draw in private finance and pinpoint viable projects, fostering stakeholder trust.

Additionally, NDBs serve as mechanisms for channelling international financial resources into developing countries, leveraging their local market presence to align funding with national objectives. As policy coordinators, they relay market feedback to policymakers, helping to refine renewable energy policies. By addressing gaps that policies alone cannot resolve and offering comprehensive financial packages, NDBs can drive progress in facilitating investment in sustainable infrastructure energy.

## 2.6 Financing Products offered by NDBs

The OECD (2015) states that the primary goal of climate finance within the UNFCCC framework is to secure funding for mitigation and adaptation efforts. Table 4, derived from OECD (2014), illustrates the financial instruments and solutions for facilitating an increase in project finance. As markets develop and mature, de-risking strategies like insurance, credit enhancements, and guarantees become crucial for attracting private sector investments. According to the OECD (2015), public sector de-risking measures have a relatively low implementation threshold since they require minimal initial capital, making it easier to gain government approval for their adoption. However, transparency regarding the extent to which such measures leverage private sector finance globally is limited. At the project level, data is accessible for evaluating leverage, although different definitions and methodologies are employed (Caruso & Ellis, 2013).

In well-established markets, conventional financial instruments like debt and equity are required to attract substantial private-sector investment. However, precisely measuring the private capital mobilised and linking it to specific contributors' remains a complex challenge (Caruso & Ellis, 2013).

**Table 4: OECD Framework: Financial Instruments for Climate Mitigation and Adaptation Projects**

| Type | Other | Debt | Equity |
|---|---|---|---|
| **Financial Instruments** | Grant for projects/program **-Derisking interventions** | Loans (Concessional) Public funding is directly allocated to instruments like guarantees and insurance. | Stock and equity provision |
| **Mitigation or Adaption** | Both | **Both** | Mainly mitigation |
| **Focus of Project Types** | Projects with low revenue and cash flow | Not specified | High risk-return profile for mitigation projects |
| **Local financial market maturity** | Early Market phase | Not specified | Established market phase |
| **The development level of countries** | With limited institutional capacities or resources | Not specified | With greater institutional capacities and resources |
| **Technological maturity** | Early-stage development | **Not specified** | Mature proven |
| **Considerations** | - Enhances readiness to unlock investment<br>- Can covertly reduce upfront risks<br>- Hard to leverage private sector involvement<br>- Limited public resources constrain climate finance provision | | - High risk with challenging to track |

*Source: OECD, 2024*

In summary

- Grants: are often used for early-stage projects or in countries with limited institutional capacity to ensure market readiness.
- Debt Instruments (Loans, Guarantees): focus on reducing financial risks, such as political or market risks, to attract private co-investment.
- Equity Instruments: target larger, mature projects with proven technologies and a focus on mitigation efforts. These carry higher risks but promise higher returns.

Various financial products can support climate projects, with a mix of concessional loans combined with de-risking strategies, proving effective in mobilising private finance, as demonstrated in multiple case studies (Buchner *et al*., 2012). Governments play a crucial role in de-risking mechanisms, such as offering guarantees and enhancing bond credit ratings. Effective climate action requires collaboration with local and international financing sources, considering the substantial investments needed to meet climate objectives and the Sustainable Development Agenda. Strategic decisions about which financial institutions are most appropriate for deploying capital are crucial.

## 2.7 Empirical Literature

This section explores the contribution of NDBs to advancing sustainable infrastructure development, outlining different roles. Ndikumana *et al*., (2021) explore the African NDB landscape using data from multiple countries, including South Africa, to demonstrate how NDBs complement commercial banks in financing the real sector. The study reveals that while NDBs lend less overall than commercial banks, they prioritise medium- and long-term financing, consistent with their mandates, leading to higher non-performing loan ratios. The research highlights the potential for improving medium- and long-term credit availability in African economies by enhancing NDBs' lending capacities and granting them increased operational independence. Smallridge *et al*., (2013) explored NDB's role in facilitating private-sector involvement in Latin America. The research identified key obstacles to private sector involvement in low-carbon initiatives and underscored how NDBs can overcome these barriers through customised financial and non-financial tools. Enhancing NDBs' technical expertise and aligning their operations with clear mandates under national climate strategies were crucial for

improving their capacity to mobilise private and international climate finance, thereby addressing the investment shortfall in mitigation projects.

In South Africa, Nandipa (2020) investigated the expansion of targeted development investments by public sector investment corporations such as the IDC, DBSA, and PIC. The research underscored their significant contributions to industrialisation and infrastructure development and their impact on job creation, thus supporting the government in achieving the NDP and SDGs. The study also highlighted the PPP structures to be used by the public sector, engaging private investors to meet economic and social needs. It encourages corporate and institutional investors to augment their development financing, which boosts return and aligns with socially responsible investment practices, thereby promoting growth in historically disadvantaged communities.

Zhang's (2022) study examines how NDBs contribute to scaling up finance for clean energy by analysing their role in one developed country and two developing countries. The research suggests that, beyond providing financing, NDBs can improve climate policy effectiveness by coordinating efforts through three key mechanisms: a) Leveraging market expertise and feedback to refine renewable energy policies; b) Addressing gaps or barriers in existing policies; and c) Offering unified financial services to align with national priorities. NDBs benefit from state ownership, local market knowledge, and specialised expertise.

Studart and Gallagher (2016) underscore the crucial role NDBs play in financing infrastructure investments. They note that NDBs are uniquely positioned to lower project costs and risks, mobilise global and local financial resources, and provide governance and leadership for infrastructure development. When functioning effectively, NDBs can build confidence, mitigate risks, introduce tailored financial instruments, and attract diverse funding sources throughout a project’s lifecycle. Bhattacharya *et al*., (2016) add that NDBs can serve as neutral facilitators, fostering collaboration among governments, private investors, and civil society, while establishing scalable and replicable project models. However, challenges remain, particularly about the size of NDBs, which often limits their capacity to meet investment needs.

This constraint goes beyond balance sheets, affecting their ability to engage in essential tasks such as project identification and design. McNicoll et al. (2017) discovered that between 2010 and 2015, domestic public entities in South Africa were instrumental in attracting private finance for climate action, mainly through targeted financial policies. The government finance

also supported upstream intermediaries, such as funds and credit lines, alongside capacity-building efforts backed by international partners. The research emphasised the need for better quantification of these impacts and called for enhanced data collection on private investments linked to public financial support.

Similarly, Krruse *et al*., (2020) explored the responsiveness of global capital markets to the low-carbon agenda. Their findings revealed that investors increasingly favor companies developing and implementing low-carbon technologies. Given the significant emission reductions required to keep global warming below 2°C, their findings underscore the pressing need to align financial markets with global climate action objectives.

Xu, Marodon, and others (2021) provide a comprehensive comparative analysis of development banks, highlighting variations in mandates, governance, and financing structures. Their work underscores that while most NDBs share a public policy mandate, their effectiveness in mobilising climate finance depends heavily on institutional capacity, policy alignment, and financial instruments used. These insights are particularly useful in benchmarking South Africa's NDBs; DBSA and IDC against international peers, thereby identifying areas of structural or strategic improvement.

## 2.8 Conclusion

This chapter highlighted the role of NDBs and their need to be redefined from the traditional development and social objectives to one that is challenge led or mission oriented if they must play a meaningful role in mobilising funding and supporting sustainable infrastructure development in South Africa. NDB resources cannot meet the financial gap; hence, there is a need to crowd in private funding or fill in the gap to meet the country's NDCs. NDBs need to provide a conducive funding environment for the private sector through participation and policy formulation to reduce the information asymmetry with the private sector, providing funding products that act as credit enhancements. A key strategy includes NDBs, with a defined role mandated by the government to bridge the gap with all stakeholders. This ensures that local dynamics are incorporated when the government formulates policies for scaling up sustainable infrastructure development.

The literature indicates that the traditional focus on development and social objectives alone is insufficient to effectively attract and integrate private sector financing in South Africa to

advance sustainable infrastructure, achieve NDC targets, and meet the 2030 SDG goals. The framework outlined in this chapter emphasises the intricate nature of understanding the NDB's role in facilitating investment in sustainable infrastructure, the stakeholders involved, and how the NDB’s functions can be organised to support sustainable infrastructure development effectively. The literature review presented varying viewpoints on the role of NDBs and recommended redefining their functions to enhance their capacity to facilitate investment in sustainable infrastructure.

# Chapter 3
# Research Methodology

## 3.1 Introduction

This chapter outlines the research design, emphasising the qualitative approach and analytical frameworks used. It discusses the research approach, design, and evaluation of reliability, validity, and data collection challenges. A summary recaps the key points.

## 3.2 Research Approach

The three primary research methodologies are quantitative, qualitative, and mixed methods (Creswell & Plano Clark, 2018). This study adopts a qualitative approach influenced by the research questions, data available to analyse, and the context. As this study is exploratory and the availability of published or accessible data is limited, an extensive quantitative analysis is not feasible.

Further, current investments in sustainable infrastructure in South Africa are still limited to mitigation projects, mainly energy generation projects. NDBs still heavily report on the outcomes of their developmental mandates, such as jobs, women, and marginalised group participants. A quantitative approach is not ideal at this stage due to the limited data available for quantification. Consequently, the researcher chose a qualitative approach, drawing on insights from industry experts to understand the NDB's role.

## 3.3 Research Design

### 3.3.1 Sampling Strategy

This study employs purposive sampling, a technique in which participants are selected based on their expertise in the topic (Palinkas et al., 2015). This method ensures that individuals with direct experience and knowledge of sustainable infrastructure projects and climate finance are included. Given the study's focus, purposive sampling is well suited as it facilitated the collection of in depth and specialised insights into the challenges and opportunities NDBs encounter in financing sustainable infrastructure.

The study's target participants included key stakeholders from two NDBs, IDC and DBSA, representatives from private commercial banks, government entities, climate experts,

environmental organisations, and project developers. These participants were specifically chosen due to their strategic roles in climate finance and direct engagement with funding sustainable infrastructure projects in South Africa.

This study set the sample size using the data saturation principle, continuing data collection until no further themes or insights emerged (Guest et al., 2020). According to Guest *et al*. (2012), 6 to 12 interviews with knowledgeable participants typically suffices to gather in depth insights, with saturation often achieved after 12 interviews. This study interviewed twelve senior managers from the selected institutions, ensuring a comprehensive and balanced understanding of the topics explored.

The purposive sampling approach allowed for a selection of participants experienced in the field. (Suri, 2011). The participants were selected from the financing landscape in South Africa. The method captured in depth insights critical for understanding the complexities of financing sustainable infrastructure, particularly from the perspective of key actors involved in climate finance. Purposive sampling was selected because the research aims to gather specialised insights and experiences from individuals who deeply understand the financing challenges faced by NDBs. This method enabled a focus on experts capable of offering valuable insights into the role of these institutions in advancing sustainable infrastructure projects that align with South Africa's NDCs. As Mason (2002) notes, the emphasis in qualitative research should be on collecting sufficient and relevant information to reach data saturation rather than the number of respondents.

**Table 5: Breakdown of the interview stakeholders**

| | **Stakeholder** | **Number of Participants** |
|---|---|---|
| 1 | National Development Banks | 3 |
| 2 | Multilateral Development Banks | 1 |
| 3 | Commercial Bank | 1 |
| 4 | Blended Finance Fund | 1 |
| 5 | Venture Capitalist | 1 |
| 6 | Professor | 1 |
| 7 | Energy Specialist | 2 |
| 8 | Project Developers | 1 |
| 9 | Department of Environmental Fisheries & Municipalities | 1 |
| | Total | 12 |

*Source: Author's compilation*

### 3.4 Data collection

The semi structured interview approach allowed the researcher to begin with broad questions and follow up with more specific themes based on emerging patterns (Morse, 1994). This method encouraged diverse perspectives and facilitated a deeper exploration of the topic (Banister *et al*., 1994). A combination of semi structured and expert interviews were utilised to gather comprehensive insights from various stakeholders (Guest, MacQueen and Namey, 2012).

Interviews were conducted via Ms Teams, an online platform based on the scheduled time. A set of questions was designed to investigate NDBs' challenges in financing sustainable infrastructure projects. These questions are outlined in Annexure II of the interview schedule.

Key informants, including officials from NDBs, government representatives, climate finance experts, and project developers, were selected to provide varied perspectives (Patton, 2015). Expert interviews were also conducted to gather specialised insights on sustainable development, infrastructure investment, and policy implementation (Bogdan & Biklen, 2019).

The interviews aimed to uncover the factors impeding NDBs from fulfilling their potential, exploring their contributions to economic growth, their alignment with policy frameworks, and potential solutions to current challenges. Semi-structured interviews enabled the opportunity to clarify and further explore responses when needed (Leedy & Ormrod, 2013).

Castillo-Montoya (2016) presents the Interview Protocol Refinement (IPR) framework, designed to structure qualitative research interviews and ensure comprehensive coverage of all research questions. A matrix was created, mapping interview questions to research questions, ensuring alignment with the study’s objectives. This tabular layout offered a clear overview, simplified the review process, and ensured that every interview question was directly linked to specific research objectives while evenly distributing the research questions. Details of the tabular method used in the IPR framework can be found in Appendix 3.

Before data collection began, ethical approval was obtained from the Research and Ethics Committee of the Graduate School of Business, University of Cape Town, on October 17, 2024. This approval facilitated the identification of suitable interview respondents capable of addressing the research questions and providing insights into the infrastructure financing landscape. Participants gave their consent by completing the approved interview consent form

or verbally agreeing to be recorded during the interview on MS Teams. The recording was transcribed and included in tabular format. These measures ensured the confidentiality and security of their responses. The interview process spanned a little over a month, from November 11, 2024, to December 17, 2024, and all participants were anonymised.

Interviews were conducted within 45 to 60 minutes, using consistent questions to ensure objectivity. At least 30 minutes was dedicated to each interview to collect adequate information for meaningful findings and well founded research recommendations. The main challenge encountered in the interview process was the unavailability of some respondents at previously agreed times, which necessitated the researcher to postpone and, at times, reschedule, leading to clashes in schedules, which consequently ended up prolonging the interview process. To mitigate the challenges, the researcher accommodated changes in the slated interview periods and changed participants' interview timing based on availability.

### 3.5 Data Analysis

The data collected from interviews was examined using the thematic analysis technique outlined by Nowell et al. (2017). This approach is highly effective in recognising and analysing recurring patterns and themes associated with the challenges encountered by NDBs in financing sustainable infrastructure projects. Each interview was transcribed verbatim, and the data underwent a detailed review. The analysis process was conducted in multiple stages to thoroughly understand the themes and insights. First**, data reduction** was applied to manage the substantial amount of information collected. This step involved organising the data into manageable segments, focusing on themes relevant to the research objectives (Guest, MacQueen and Namey, 2012). By adopting content analysis, themes emerging from the interviews were categorised based on participants' perspectives, and the researcher highlighted key challenges in funding sustainable infrastructure.

The thematic analysis proceeded with data captured on an Excel spreadsheet. Excel was utilised to ensure efficiency and accuracy in identifying patterns by leveraging its built-in features, such as conditional formatting, filtering, and sorting. These tools allowed for cross-referencing and triangulating data from different respondents, enhancing the reliability of the findings (Miles, Huberman and Saldaña, 2014). A summary was generated, and themes related to the challenges and opportunities in sustainable infrastructure financing were compared across interview responses. Excel's charting and visualisation tools displayed the findings, providing a clear

overview of the outcome. Direct participant quotes were recorded in corresponding cells to highlight key points, preserving the authenticity of the insights.

Finally, **conclusions were drawn** based on the recurrent themes, addressing the research questions and objectives. Key factors limiting the effectiveness of NDBs were identified, along with practical recommendations to enhance their role in sustainable infrastructure development. The findings were meticulously validated against the original data to accurately reflect the participants' perspectives. This thematic analysis approach allowed for understanding the qualitative data, ensuring that implicit and explicit ideas were captured and explored to the broader challenges NDBs face in supporting sustainable development (Guest, MacQueen and Namey, 2014).

### 3.6 Ethical Considerations

i. **Informed Consent:** Before conducting the interviews, a detailed overview, purpose, methodology, and participants' roles in the research were shared. Informed consent of participants was secured to guarantee their full awareness of their rights in writing and their involvement in the study (Bryman, 2016).
ii. **Confidentiality:** To protect participants' privacy, all data was treated with strict confidentiality. Personal identifiers were anonymised, and the data was securely stored and accessible only to authorised researchers. These measures were implemented to maintain research integrity and protect the confidentiality of participants' information (Denzin & Lincoln, 2018).
v. **Respect for Participants:** Ethical principles were upheld in all interactions, ensuring that participants' privacy was protected and treated with respect and sensitivity (Tracy, 2020)

### 3.7 Research Reliability and Validity

Ensuring reliability and validity in this study was crucial for establishing the credibility and dependability of the findings

#### 3.7.1 Reliability:

Standardised procedures were followed throughout data collection and analysis. A set of predetermined open-ended questions was used during the interviews. This method ensured

consistency in covering key topics across interviews while providing flexibility to explore further issues highlighted by the participants. The use of a **thematic analysis** approach, supported by Microsoft Excel, also contributed to the reliability by ensuring consistent coding and categorisation of data (Strauss & Corbin, 1998).

To enhance reliability, all interviews were recorded with participants' consent and transcribed using AI on MS Teams, ensuring data accuracy and consistency. Additionally, using standardised questions across interviews minimised bias and facilitated comparative analysis, ensuring that findings were derived from a uniform data collection process.

### 3.7.2 Validity

Several strategies, including Triangulation of data from different stakeholder groups - NDB officials, government representatives, climate finance experts, and project developers - were used to cross-check and validate the perspectives gathered. This helped enhance the study's validity by ensuring that multiple viewpoints were considered, strengthening the credibility of the results (Miles, Huberman and Saldaña 2014).

Additionally, the interview process followed the principle of data saturation, continuing until no new themes or insights emerged, ensuring a thorough collection of perspectives. The application of thematic analysis emphasised identifying themes and enhanced validity by systematically aligning the findings with the research questions and objectives. (Naeem et al., 2023). The detailed ethical considerations, such as **informed consent** and **confidentiality**, also supported validity by promoting open and honest responses from participants, knowing that their identities and information would remain protected. This encouraged participants to share candid insights, thus enhancing the richness and authenticity of the data.

Overall, the structured yet flexible interview process, combined with rigorous data analysis techniques, ensured that this research's findings were reliable and valid.

## 3.8 Limitations

The study was limited to the South African context, reflecting the distinctive dynamics of its NDBs. Consequently, the insights derived may not fully apply to other countries or regions where differing economic, political, and institutional environments could lead to varied outcomes. (Marshall and Rossman, 2015).

Despite careful design and the use of purposive sampling to ensure diverse and informed perspectives, the findings may still be influenced by the participants' subjective experiences and viewpoints. Although efforts were made to address bias, the research was limited by the information participants were willing or able to share (Creswell & Creswell, 2017).

The availability of some key respondents was a challenge. In some cases, participants could only commit to interviews for a shorter period than initially agreed upon, which limited the depth of the information gathered. This time constraint may have restricted opportunities for further probing into complex issues, potentially affecting the richness of the data.

Some participants provided answers at a more generic level rather than discussing the operational challenges in detail. This may have influenced the depth of insights gained in certain areas of the study.

## 3.9 Chapter Conclusion

This chapter outlined the research framework, justifying the approach, design, sample size, and data collection methods for research.

# Chapter 4
# Discussion of Results

## 4.1 Introduction

This Chapter analyses insights obtained through semi-structured interviews with sector experts from NDBs, commercial banks, climate finance professionals, and policymakers. These interviews aimed to collect qualitative data on the pivotal roles NDBs play in bridging the funding gap and the challenges they encounter in catalysing investments to support climate change initiatives in South Africa.

The interview questions were aligned with the research objectives and mapped out systematically in a refined interview protocol framework. This framework ensured clarity, relevance, and consistency, enabling the extraction of meaningful insights. The findings were further enriched by thematic analysis, contextualised with academic literature and international best practices, and supported by direct quotes to enhance authenticity and depth.

The study explored two core research questions:

1. **Role of NDBs:** What role can NDBs play in mobilising funding for sustainable infrastructure related to climate change, thereby addressing the funding gap for South Africa to meet its NDCs?
2. **Challenges:** What challenges do NDBs face in facilitating funding of sustainable infrastructure projects?

This chapter organises the findings thematically based on key themes identified from the interviews. These themes include the lack of funding for mitigation infrastructure projects, de-risking investment initiatives, strategic approaches of NDBs, challenges and risks NDBs encounter, and the future prospects of NDBs in SA. Each theme is substantiated with insights from interviewees and further contextualised through relevant academic and practical references.

This chapter critically examines expert perspectives to identify actionable strategies and highlight critical areas for improvement that could significantly enhance the effectiveness of NDBs in leading and mobilising funding for climate-resilient and low-carbon sustainable

infrastructure. The insights presented here lay the groundwork for the policy recommendations and strategic priorities discussed in subsequent chapters.

## 4.2 Description of Participants

12 out of the expected 15 participants were interviewed online on the MS Team Platform across experts in Climate Finance from NDBs, MDB, Energy Specialists, Project Developers, the Department of Environmental, Blended Finance and Venture Capitalists in South Africa. This approach enabled the researcher to collect diverse and balanced feedback, helping to identify common themes that reinforced the insights provided by various interview participants. The participant's average years of experience in infrastructure finance was above 15 years. Table 4.1 below summarises the interview participants' key characteristics.

**Table 6: Profile of Participants**

| | Position | Gender | No Years | Organisation | Sector | Role | Date of interview | Duration of interviews |
|---|---|---|---|---|---|---|---|---|
| 1. | Managing Director | Female | 20 | Energy Consulting Company | Energy | Finance & Technical | 14.11.2024 | 50 minutes |
| 2. | Energy Specialist | Female | 16 | NDB | Energy | Technical | 15.11.2024 | 40 minutes |
| 3. | Infrastructure Finance | Female | 16 | Commercial Bank | Infrastructure | Finance | 5.12.2024 | 31 minutes |
| 4 | Programme Manager | Male | 21 | Government Agency Infrastructure | Infrastructure | Finance & Coordination | 10.12.2024 | 52 minutes |
| 5. | Principal | Female | 16 | MDB | Infrastructure | Finance | 11.12.2024 | 38 minutes |
| 6. | Head Infrastructure Fund | Female | 15 | Blended Finance Fund | Infrastructure Blended Finance | Blended Finance | 12.12.2024 | 30 minutes |
| 7. | Head Infrastructure | Female | 15 | NDB | Infrastructure | Finance | 13.12.2024 | 45 minutes |
| 8. | Chief Executive Officer | Female | 7 | Venture Capital | Green Transport Infrastructure | Electric Vehicles | 13.12.2024 | 30 minutes |
| 9. | Professor | Female | 20+ | Academic | Infrastructure / Climate / Energy | Finance | 16.12.2024 | 50 minutes |
| 10. | Senior Investment Manager | Female | 14 | NDB | Climate Fund | Finance | 18.12.2024 | 47 minutes |
| 11. | Head of Energy | Female | 20+ | Metro /Municipality | Energy | Energy Security | 19.12.2024 | 30 minutes |
| 12. | Chief Financial Officer | Female | 7 | Private Equity Fund | Energy | Finance | 20.12.2024 | 30 minutes |

*Source: Author's compilation*

## 4.3 Thematic Findings

### 4.3.1 The Role NDBs

From the study, it emerged that NDBs are pivotal in addressing South Africa's sustainable development challenges, especially in securing additional financial resources for climate-resilient infrastructure through various initiatives, including mobilising and using blended finance instruments. The thematic analysis of the interview responses identified five roles played by NDBs in financing sustainable infrastructure, namely: **addressing funding gaps, de-risking investments, mobilising resources, fostering innovation, and ensuring policy alignment**. These roles position NDBs as indispensable in bridging financial gaps and mobilising funding for sustainable infrastructure. Participants emphasised the need for NDBs to adopt innovative and adaptive strategies to meet evolving demands effectively. The following sub-sections provide a detailed exploration of the themes:

#### a) Addressing Funding Gaps

NDBs are critical in directing resources to underfunded sectors such as climate adaptation and sustainable infrastructure. These sectors, often neglected by private investors, include water management, transport, and disaster resilience infrastructure. While progress has been made in funding mitigation projects, there is a gap in funding adaptation projects. Interviewee 1 remarked: *"REIPPPP has attracted investment; adaptation projects lack funding and clear revenue streams."* Interviewee 11 noted: *"Climate adaptation remains poorly funded, with over-reliance on private finance for mitigation*."

The participants also identified the following strategies for addressing the funding gaps.

*i.* **Providing Concessional Loans and Blended Finance:** By combining grant funding with concessional and market-rate loans, NDBs reduce the financial burden of large-scale infrastructure projects. Interviewee 12 indicated that *"NDBs play a pivotal role during the high-risk early stages of development projects. Their ability to take on risk through concessional loans ensures that projects are financially viable, enabling commercial banks and private equity to step in later."* Interviewee 10 explained that *"DBSA mobilise (s) concessional funds from climate finance funds the GCF and GEF. Often structured as*

*subordinated loans or with longer tenures, these funds help de-risk projects and attract private sector investment in green initiatives."*

Interviewee 4 also indicated that *"Funds such as the GCF and partnerships with international donors enable the DBSA to leverage concessional financing for large-scale projects. This blended finance model attracts additional private sector investment, ensuring scalability and financial viability of renewable energy and climate resilience projects." "DBSA's strategic decision to host green funds has positioned it to attract concessional funding from international agencies. By aligning these funds with South Africa's NDC goals, the bank facilitates investments in climate-resilient infrastructure that might otherwise be underfunded,"* noted interviewee 11

In addition, interviewee 5 noted that *"NDBs primary role lies in de-risking projects by providing concessional funding and working with governments to ensure proper policies and project structuring. This enables private sector co-financers to join, ensuring greater mobilisation of resources."* Interviewee 2 further indicated that *"NDBs provide concessional loans while de-risking projects, ensuring private sector confidence. They initiated programs like the REIPPP, providing technical and project assistance alongside funding."*

*ii.* **Offering Long-Term Financing:** NDBs provide extended payback periods for projects with low initial returns, such as resilience-focused and renewable energy initiatives. Interviewee 4 noted that *"NDBs, such as the DBSA, focus on providing long-term financing structures that align with the extended payback periods of infrastructure projects. This is critical for renewable energy and resilience-focused initiatives, which may have long-term benefits."* In the same vein, Interviewee 7 indicated that "*The DBSA's ESG framework emphasises the importance of financing projects with extended lifecycles, such as climate-resilient infrastructure and renewable energy systems. This approach ensures that investments are aligned with long-term national and global sustainability goals."* Interviewee 8 also indicated *that "To support the adoption of green technologies, NDBs must prioritise long-term financing to accommodate the high upfront costs and delayed returns of infrastructure like EV charging stations and renewable energy grids. Without these extended timelines, such projects are unlikely to attract private sector interest."* Interviewee 11 noted that *"DBSA's funding structures are designed to support projects with*

*long-term funding such as municipal renewable energy systems. This long-term approach is essential for achieving climate resilience and ensuring sustained community benefits."*

Participants noted that current NDB investments in climate adaptation remain limited, underscoring the need for increased focus and resources. By targeting these underserved sectors, NDBs address immediate funding needs and create an enabling environment for further participation by private investments. *"NDBs are crucial for bridging the financing void in sectors like water and disaster resilience, where private investment is almost non-existent,"* observed Interviewee 9.

### 4.3.2 De-Risking Investments

NDBs reduce the risks linked to high risk, long term projects to enable private sector participation. Most interviewees indicated that policy reforms ensure NDBs retain their developmental focus rather than adopting conservative practices typical of commercial banks. *"Without reforms, NDBs risk losing their developmental focus,"* remarked Interviewee 10.

The interview with the participants identified the following de-disking mechanisms:

i. **Offering Guarantees and Insurance:** These tools mitigate risk for investors in volatile or emerging sectors, such as renewable energy.
ii. **Structuring Blended Finance:** By combining public funds with private investment, NDBs reduce private players' exposure and encourage collaboration.
iii. **Providing Concessional Financing:** Early-stage funding helps unlock additional capital and enables long-term developmental benefits.

*"Offering guarantees and concessional financing creates a pathway for private sector participation in high-risk projects,"* emphasised Interviewee 11. Although initiatives like the REIPPP have made strides, the financing gap remains vast. One participant noted, *"Both IDC and DBSA have played a vital role in de-risking early projects by providing early-stage capital and partnering with government to establish enabling policies."* However, access to consistent funding remains limited, particularly for early-stage projects.

NDBs also promote innovation by funding adaptation projects and alternative technologies, such as hydrogen energy systems and electric vehicles, aligning investments with sustainability goals.

### 4.3.3 Resource Mobilisation and Partnership Facilitation

NDBs can act as intermediaries, mobilising resources for infrastructure projects from domestic and international funders. Their capability to access and leverage funds from significant international sources like the GCF is transformative. "*The ability of NDBs to leverage funds from multilateral sources like the GCF is a game-changer for large-scale climate infrastructure,"* noted Interviewee 6.

The key roles of NDBs in resource mobilisation and partnerships include:

i. **Facilitating Public-Private Partnerships (PPPs):** NDBs structure PPPs, especially for high cost projects that may otherwise be unviable and invite the commercial bank's participation. Interviewee 1 noted "the *historical involvement of NDBs in developing markets, particularly in renewable energy projects."* Interviewee 1 further noted that *"NDBs, like DBSA, were critical in designing procurement processes and securing funding, highlighting their role in creating environments conducive to PPPs and attracting private investment."* This sentiment was corroborated by Interviewee 3 noting, *"The reason why renewable energy would have made this progress is because of the public-private partnership. We are seeing where banks are participating. The government is not trying to build by itself; we have yet to see some form of PPP in water projects. "*

   Interviewee 9 discussed the role of NDBs in developing new markets and addressing market failures, which aligns with their role in structuring PPPs to enhance infrastructure financing. This includes their involvement in early project stages and securing funding, which is crucial for high-cost projects. Interviewee 7 noted how NDBs could play a more significant role, mentioning that *"DBSA has started initiatives to support better generation in municipal infrastructure, which indicates involvement in structuring investments and possibly facilitating PPPs."* "*Leverage global funds like GCF while streamlining PPP frameworks to attract more private investments*," noted Interviewee 4. Corroborating this, Interviewee 8 encouraged "*Focus on public-private partnerships, ensuring streamlined processes and transparent frameworks to attract private capital*." The participants indicated that the NDB's contributions to policy framework development, project preparation, and equity stakes have been critical to the program's success. By assuming first-loss positions and collaborating with private investors to co-finance projects, NDBs have enhanced the attractiveness and feasibility of renewable energy investments. The

REIPPPP has emerged as a model for PPP and structured government commitment to driving sustainable investments. Interviewees 1, 3, and 10 described REIPPP as *"a blueprint for what can be achieved with structured public-private partnerships and clear government commitment."*

ii. **Targeting Underserved Sectors:** To ensure long term sustainability, focus areas include water management, flood defences, and climate resilient transportation systems. NDBs can drive systemic change in South Africa's financing landscape by implementing risk-reduction strategies and prioritising projects in underserved sectors. Interviewee 6, in discussions, noted "*how development banks must focus on integrating climate finance into projects from the start, which includes enhancing the infrastructure for climate resilience. This aligns with targeting sectors like water management and transportation, which require integrated strategies to cope with climate impacts."* Interviewee 2, in addition, explained that *"NDBs like DBSA provide technical and project assistance to municipalities for sustainability planning. This involves strategies around climate-resilient infrastructure, which could include water and transportation systems." "NDBs must adopt strategic risk-reduction approaches to enhance project viability and attract private investment,"* noted Interviewee 1.

iii. **Collaborative on New Ventures:** Examples include joint ventures for hydrogen energy projects and regional initiatives for cross border infrastructure development. Interviewee 7 discussed DBSA's role in specific energy and transportation initiatives, including their involvement in the municipal just energy transition program and other sectoral plans that align with national climate goals. Interviewee 7 further noted that, *"DBSA has specifically been tasked with the municipal stream for the just energy transition and intends to see how we decarbonise the municipal energy chain…. This reflects DBSA's involvement in collaborative, sector-wide initiatives often requiring cross-sector and cross-border coordination.*"

Similarly, Interviewee 9 referred to collaborative efforts in hydrogen energy development, where the interviewee noted, *"IDC is leading, has been tossed, and is leading the hydrogen value chain for the country. DBSA has contributed equally to the first hydrogen fund capitalised by IDC and DBSA, the Danish Government, and I believe the Norwegian Government..."* This exemplifies joint ventures and international collaboration in developing new energy solutions like hydrogen projects.

iv. **Collaboration is critical with both International, Local, and NGO Partners:** Participants indicated that collaboration with stakeholders is important for the success of NDBs in mobilising investments and driving sustainable infrastructure projects. Engaging with international institutions, local stakeholders, and NGOs allows for leveraging diverse expertise, funding, and community based insights, all of which enhance project outcomes and align efforts with national and global climate goals.

- **International Collaborations:** Collaboration with international institutions brings significant advantages in terms of technical expertise, access to concessional funding, and risk mitigation. As noted by Interviewee 5, *"Partnerships with global entities are critical for de-risking projects and boosting private-sector involvement."*

- **Local and NGO Partnerships:** NGOs are key to fostering community engagement and inclusivity throughout the project. Interviewee 8 noted that, *"NGOs act as bridges between communities and project developers, addressing the community needs and ensuring that local voices are incorporated into project planning and execution."* Interviewee 1 highlighted the significance of *"early-stage funding and equity-driven approaches," particularly in projects like rural electrification, support for smallholder farmers, and municipal water resilience programs.*

v. **Public-Private Partnerships (PPPs) and Adaptation:**

- **Scaling Investments:** NDBs scale up infrastructure investments and bridge funding gaps by collaborating with private sectors. *"Streamlined partnerships with DFIs are key to unlocking concessional funding," suggested Interviewee 4.*
- **Adapting Global Models:** Successful global financing models, such as Southeast Asia's blended finance initiatives and Europe's green bonds, must be adapted to local contexts to enhance their applicability and effectiveness. In this regard, Interviewee 4 noted that *"We need to learn from global success stories like the EU's green bond programs and adapt these strategies to align with South Africa's unique regulatory and economic landscape. For instance, blending international concessional loans with local private sector investment could address the financing gaps for climate-resilient infrastructure."* Interviewee 7 explained that, "*The DBSA has already begun integrating global best practices by partnering with European DFIs to introduce ESG-aligned frameworks. While global, these frameworks have been tailored to address South Africa's environment, which*

*is characterised by socio-economic factors."* Interviewee 8 indicated that, "*Global models like Southeast Asia's blended finance initiatives demonstrate how public-private partnerships can mobilise investment. However, in South Africa, we must ensure these models consider local challenges such as high unemployment and lack of infrastructure readiness, which require tailored solutions."*

## 4.4 Policy Alignment

### 4.4.1 Policy Alignment in Mission Oriented Function

NDBs can bridge the gap between policy formulation and implementation by ensuring that proposed initiatives align with national priorities and NDCs while making projects financially viable. In South Africa, NDBs can be instrumental in deploying the $8.5 billion committed by foreign entities for a Just Energy Transition, acting as key agents in implementing government strategies. This fund is aimed at supporting South Africa's shift from coal-dependent energy sources to more sustainable alternatives, consistent with South Africa's NDCs and the Paris Agreement.

Interviewee 9 noted that, *"Yes, it is a significant challenge for us because, as a nation, we are not effectively mainstreaming our strategies. This issue particularly concerns how we utilise NDBs, which are predominantly government-owned. We should be leveraging these institutions more effectively. For instance, considering the $8 billion pledged at the COP conference, we have not been engaging our development agencies to capitalise on these funds efficiently."* Interviewee 4 also indicated, "*Currently, the responsibility of the USD 8,5 billion towards just transition might reside with the National Treasury. However, the National Treasury is not ideally equipped to structure these projects or ensure a proper investment plan to unlock the necessary funding. This planning is crucial to enable implementation across various sectors. Therefore, if NDBs like DBSA and IDC could be tasked by the government to facilitate and mediate among partners, this could become a critical initiative and role that these banks could play and unlock the investment."*

### 4.4.2 Key Functions of NDBs in Policy Alignment

i. **Ensuring Policy Coherence:** NDBs align infrastructure and climate projects with national priorities, facilitating streamlined approvals and ensuring compliance with global climate commitments. This function is essential for the timely and effective

utilisation of the committed funds towards impactful projects. Interviewee 1 detailed how NDBs, specifically the DBSA, were critical in assisting the government with the procurement process for renewable energy projects, highlighting that *"The DBSA was critical in the formation of the REIPPP in the sense that they helped the government with the procurement of the design and then they also helped the government with the actual going out to the market and doing the actual procurement."* This highlights the role of NDBs in aligning projects with national policies and enabling efficient approval processes.

ii. **Advocating for Policy Reforms:** NDBs promote financial instruments like green bonds and tax incentives to enhance the attractiveness of sustainable financing. *"NDBs help align financial flows with our national climate goals through policy advocacy,"* noted Interviewee 7, underscoring the role of NDBs in resource mobilisation. *"NDBs enable private participation while ensuring policy alignment,"* emphasised Interviewee 5. This comment reflects the dual role of NDBs in facilitating investment and adhering to climate policies.

### 4.4.3 Mission Oriented Implementation by NDBs

At the 2021 Glasgow Climate Summit (COP26), a coalition comprising the United States of America, the European Union, the United Kingdom, Germany, and France committed $8.5 billion towards South Africa's just energy transition from coal to low-carbon energy. This funding is expected to support renewable energy expansion (solar, wind, and green hydrogen), grid modernisation and infrastructure improvements, energy transition programs to protect jobs in coal-dependent regions, and climate resilience projects to mitigate environmental and social risks. However, a major challenge has been effectively channelling and deploying these funds to ensure they achieve their intended impact.

NDBs are geared toward mission oriented tasks and can accelerate investments in sustainable infrastructure, acting on behalf of the government to ensure that international funds like the $8.5 billion are effectively channelled into South Africa’s energy transition. *"The involvement of NDBs in managing and deploying these funds underscores their capacity to act as critical intermediaries for government-led climate initiatives,"* remarked Interviewee 9.

Through their strategic operations, NDBs align investment mechanisms with policy frameworks and drive the practical application of substantial international funds, maximising their impact on South Africa's sustainable development and energy transition goals. This mission oriented approach highlights the unique position of NDBs as facilitators and implementers in the national climate strategy.

### 4.5 Innovation and Early-Stage Investments

NDBs champion innovation by investing in cutting edge technologies and early stage solutions to climate challenges. These initiatives can accelerate the shift toward a low carbon economy. *"Supporting early stage technologies like hydrogen energy systems and carbon capture is not just essential but transformative for our future,"* stated Interviewee 3.

#### 4.5.1 Key Strategies

*i.* **Funding Early-Stage Technologies:** This includes investments in carbon capture, advanced energy storage, and hydrogen energy. Interviewee 4 suggested that, *"The DBSA has begun exploring investments in early-stage technologies like hydrogen and advanced energy storage systems. Partnering with global donors and private sector investors allows us to support high-risk, high-reward innovations that align with our sustainability goals."* Interviewee 7 further explained that, "*The hydrogen economy is a critical focus area, with the IDC and DBSA collaborating to establish a hydrogen fund supported by international partners like Denmark and Norway. Early investments in this space are crucial for positioning South Africa at the forefront of clean energy innovation."* In addition, Interviewee 11 noted that, "*Early-stage investment in advanced technologies like carbon capture and green hydrogen production is vital. These investments help reduce carbon emissions and create opportunities for industrial diversification and global competitiveness."*

*ii.* **Promoting Venture Capital Models:** This entails supporting climate-tech startups to scale innovative solutions. Interviewee 4 indicated that *"South Africa's ecosystem for climate-tech startups can thrive if National Development Banks adopt venture capital models. Providing seed funding and early-stage equity investments will enable innovative solutions to reach commercial viability."* Interviewee 7, in

addition, noted that, "*The DBSA is uniquely positioned to play a venture capital-like role, offering support to startups that focus on green technologies. Early investments in such companies could unlock scalable renewable energy and climate resilience solutions."*

In addition, Interviewee 8 notes that, *"NDBs need to fund early-stage technologies, like carbon capture and hydrogen production. By taking on the risk associated with these innovations, they can catalyse private sector interest and secure South Africa's place in future energy markets."* Interviewee 11 indicated that *"Supporting early-stage companies through a venture capital approach ensures we nurture a pipeline of climate-tech innovations. These companies are the backbone of the green economy, and without proper funding mechanisms, their impact will remain limited."*

iii. **Launching Pilot Projects:** This entails testing and refining technologies before large-scale deployment. In this regard, Interviewee 2 noted that: *"Pilot projects provide an opportunity to test regulatory frameworks and technological compatibility in real-world scenarios. This step is critical for technologies like microgrids and distributed renewable energy systems before their broader rollout."* Interviewee 4 indicated that *"Launching pilot projects is crucial for refining technologies like green hydrogen production and microgrid systems. These pilots not only test feasibility but also provide valuable insights for scaling up and attracting commercial investment."* Interviewee 1 added that *"Government and DFIs need to prioritise pilot projects in areas like advanced energy storage and carbon capture. These pilots will not only validate the technology but also build local capacity and expertise, which are critical for scaling."*

### 4.6 Challenges Faced by NDBs in Funding for Sustainable Infrastructure

NDBs in South Africa face multiple challenges restricting their capacity to facilitate investment in sustainable infrastructure projects. The thematic analysis of the interviews identified the challenges, which included - **a lack of policies for adaptation projects, coordination issues, financial constraints, operational inefficiencies, low-risk appetites, and external political and economic instability**. The themes are discussed in the subsequent sections.

### 4.6.1 Lack of Policy for Adaptation Infrastructure Projects

Despite significant progress in renewable energy investments, adaptation projects remain critically underfunded. Essential sectors like water and transport infrastructure receive less attention than mitigation initiatives such as solar and wind energy. *"While solar and renewables receive substantial backing, vital adaptation projects such as water infrastructure are significantly underfunded,"* noted Interviewee 6.

Participants consistently emphasised that the absence of robust adaptation policies creates a fragmented and emerging funding landscape. Misaligned priorities among private sector actors, government agencies, and international partners exacerbate this issue. Interviewee 8 noted that *"The skewed focus on mitigation over adaptation creates a fragmented funding landscape"*. Similarly, Interviewee 4 urged, *"We need policies that treat adaptation as urgently as mitigation"*. This lack of policy coherence delays critical adaptation projects and undermines South Africa's broader climate resilience goals.

### 4.6.2 Lack of Coordination and Comprehensive Implementation

South Africa's climate infrastructure funding efforts suffer from inadequate coordination among key stakeholders. Challenges in collaboration between local governments, NDBs, and communities lead to delays in project implementation. *"Engagement with local governments and communities is often inadequate, delaying project implementation,"* remarked Interviewee 11. Participants highlighted the need for NDBs to play a leading role in driving strategic and coordinated efforts in funding adaptation projects. *"The scale and coordination needed for impactful adaptation climate projects are still lacking,"* noted Interviewee 9. Enhanced collaboration and streamlined implementation frameworks are critical for bridging the gaps in adaptation funding and project execution.

### 4.6.3 Financial Constraints

The participants noted financial constraints caused by limited capitalisation as a key challenge and insufficient capitalisation. Insufficient financial resources constrain their capacity to invest in large-scale infrastructure projects. *"Inadequate capitalisation of NDBs limits their ability to take on the high-risk projects private do not want to finance,"* explained Interviewee 1. Participants identified inconsistent government funding as a primary barrier to scaling transformative climate projects- *"Without consistent government funding, our capacity to*

*finance transformative projects is severely constrained,"* noted Interviewee 1. *"The IDC has not received government capitalisation in years, operating without a sufficient buffer to absorb risks,"* emphasised Interviewee 3. The lack of capitalisation prevents NDBs from leveraging opportunities in the green economy and addressing long-term sustainability goals. *"Insufficient capitalisation forces us to scale down ambitions, often prioritising short-term projects over more impactful long-term investments,"* observed Interviewee 11.

### 4.6.4 Operational Inefficiencies

Bureaucratic inefficiencies and rigid lending practices hinder the operational effectiveness of NDBs. Participants emphasised the need for greater adaptability in financing climate projects. *"We need to move beyond traditional financing models to meet the dynamic demands of climate projects,"* stated Interviewee 6. Participants suggested that NDBs adopt mission oriented approaches, prioritising projects aligned with South Africa's sustainability goals. *"NDBs must prioritise sectors critical to our national goals,"* remarked Interviewee 10. Addressing operational inefficiencies requires innovation in lending practices and a strategic focus on high-risk, high-impact projects.

### 4.6.5 Internal Inefficiencies and Long-Term Performance Measurement

A recurring issue was the shortage of technical expertise within NDBs, which limits their ability to assess risks and manage complex climate projects effectively. *"There is a critical shortage of technical expertise in managing climate projects, which undermines the NDB's ability to execute its mandate of developmental role,"* noted Interviewee 4. Additionally, the lack of long-term performance frameworks focused on sustainability outcomes hampers progress. Participants advocated for patient capital approaches and incentives to retain skilled professionals. *"Such frameworks ensure that we are investing not just for today but for the future of our country,"* stated Interviewee 7.

### 4.6.6 Low Risk Appetite and Policy Misalignment

Participants highlighted that NDBs often exhibit low-risk appetites, further compounded by misaligned policies that limit progress. *"Low-risk appetite and policy misalignment limit progress,"* emphasised Interview 10. Adopting metrics aligned with SDGs and policy outcomes, e.g., emissions reductions and social impact, could redefine the success of NDBs.

*"Prioritizing long-term rewards from environmental and social over immediate financial returns aligns with our national goals,"* remarked Interviewee11.

### 4.6.7 Political and Economic Instability

Political interference, frequent policy changes, and economic volatility deter long-term investments in sustainable infrastructure. *"Frequent policy changes erode(s) investor confidence and slow(s) project approvals,"* noted Interviewee 3. Currency fluctuations further increase financial risks and increase the cost of capital. *"The ongoing currency volatility makes long-term investments extremely challenging,"* noted Interviewee 6. Low sovereign credit ratings also escalate borrowing costs, further constraining the ability of NDBs to fund large-scale projects. *"Low sovereign ratings escalate the cost of capital and interest margins, increasing the risk of securing affordable funding",* explained Interviewee 2.

## 4.7 Discussion of findings

### 4.7.1 Role of Financing Sustainable Infrastructure

Research highlights that NDBs are uniquely positioned to fill financing gaps, particularly in emerging economies where private sector involvement in adaptation sectors like water management, disaster resilience, and climate-resilient transport is limited due to high perceived risks (Griffith-Jones & Ocampo, 2018). Concessional financing and blended finance are central to mobilising capital for high-impact projects (Bhattacharya *et al*., 2019). Though primarily focused on mitigation, REIPPPP demonstrates how structured public-private partnerships (PPPs) can fill funding gaps by combining public support and private capital. Instruments such as concessional loans, blended finance, and long-term financing are deployed to reduce financial burdens, especially for sectors with unclear revenue streams.

Studies (Smallridge *et al*., 2013) identify de-risking as a core function of NDBs, particularly in fostering private-sector investments in emerging markets. Instruments like guarantees and blended finance reduce perceived risks, making adaptation projects more attractive to private investors (Buchner *et al*., 2019). For example, DBSA and IDC have played essential roles in reducing early-stage risks for renewable energy initiatives, enabling private sector participation. The ability of NDBs to aggregate resources is widely recognised. Bhattacharya *et al*. (2016) emphasise that PPPs are crucial to mobilising large-scale financing for sustainable infrastructure.

NDBs act as intermediaries, mobilising international, national, and private resources. Their capacity to leverage funds from sources like the GCF and structure PPPs makes them integral to climate-resilient infrastructure financing. Policy alignment is central to NDB's effectiveness. Mazzucato (2013) highlights the role of NDBs in shaping financial landscapes and ensuring coherence between climate finance and government strategies. NDBs ensure that funding aligns with national priorities and global climate goals. Their advocacy for policy reforms, such as promoting green bonds and tax incentives, supports the integration of sustainability into national frameworks.

The research underscores the importance of NDBs in driving innovation. Mazzucato and Penna (2016) argue that NDBs create markets and foster technological advancements, particularly in sectors where private investment is scarce. NDBs support innovation through funding early-stage technologies and pilot projects. Initiatives like hydrogen energy systems and advanced energy storage are central to accelerating clean energy.

The findings confirm the critical roles NDBs play in financing sustainable infrastructure in South Africa. These roles address funding gaps, de-risk investments, mobilise resources, align policies, and foster innovation. They demonstrate the alignment of NDB activities with the analytical framework of adaptation roles and instruments.

By leveraging financial and non-financial tools, NDBs like DBSA and IDC act as catalysts for systemic change, enabling investment in a climate-resilient economy. Literature supports this perspective, highlighting NDBs as indispensable agents in shaping and financing the sustainable development landscape.

### 4.7.2 Challenges in Financing Sustainable Infrastructure

Despite their critical roles, NDBs face significant challenges that constrain their ability to finance sustainable infrastructure effectively. High-risk perceptions, particularly in emerging markets, pose a major barrier to private investment. As Rodrik (2005) points out, this necessitates the intervention of public institutions like NDBs, which act as first movers in addressing these risks. Similarly, Griffith-Jones *et al*., (2020) highlight the role of deploying concessional funding and derisking instruments to attract private capital into sustainable infrastructure projects.

Regulatory and institutional barriers further exacerbate these challenges. The OECD (2017) identifies the need for comprehensive regulatory and institutional reforms to transition the capability of NDBs. The World Bank (2021) echoes this sentiment, emphasising the importance of improved governance and streamlined policies in facilitating the flow of sustainable investments.

In addition to regulatory reforms, Bhattacharya *et al*., (2019) argue that NDBs must expand their use of blended finance and other innovative instruments to mitigate risks and enhance project bankability. Strategic partnerships with climate funds, such as the GFC, are vital for supplementing NDB resources and scaling their impact.

Policy alignment is another critical factor. According to the OECD (2017), integrating NDB strategies with national priorities and NDCs ensures that operations are streamlined and resources are allocated effectively. NDBs that achieve this alignment are more effective in securing funding and ensuring project success, emphasising the need for cohesive and integrated strategies to tackle sustainable infrastructure financing challenges.

# Chapter 5
# Conclusions and Recommendations

## 5.1 Introduction

This concluding chapter integrates the extensive findings of this research on the role of NDBs in financing climate infrastructure within South Africa. Drawing from a series of qualitative interviews with key stakeholders- including policymakers, financial experts, and representatives from NDBs- this research explored operational dynamics, strategic priorities, and the various challenges these institutions face. This chapter summarises these findings, provides theoretical and practical insights, discusses the recommendations and strategies, identifies study limitations, and suggests future research, all building upon the detailed analysis presented in Chapter 4.

## 5.2 Summary of Findings

The research found that NDBs can address the significant gaps in financing sustainable infrastructure in South Africa. Below are the key findings summarised:

1. **Critical Role of NDBs in Financing**: NDBs are pivotal in mobilising resources for high-risk sectors, which often see limited private sector involvement due to perceived risks. These banks utilise instruments like concessional loans, blended finance, and long-term financing to enhance project viability and attract private capital
2. **De-Risking and Mobilising Private Investment**: NDBs are critical in reducing investment risk's role in de-risking investments in emerging markets, enabling projects, and ensuring investment ventures are more attractive to private investors. They mitigate risks associated with high-risk sustainable infrastructure by offering guarantees and leveraging blended finance options. Their efforts in resource aggregation are essential for enabling large-scale financing
3. **Policy Alignment and Advocacy**: Effective policy alignment ensures that the operations of NDBs are streamlined with national priorities and global goals. This alignment is significant for leveraging funds from global sources and structuring effective public-private partnerships.

4. **Innovation and Market Creation**: NDBs foster innovation and technological advancement, particularly in areas with scarce private investment, by supporting early-stage technologies and pilot projects.
5. **Challenges Faced by NDBs**: Despite their crucial roles, NDBs encounter significant challenges that hamper their ability to finance sustainable infrastructure effectively. These include high-risk perceptions in emerging markets, which deter private investment, and regulatory and institutional barriers that impede operational efficiency. The necessity for comprehensive reforms and strategic partnerships to enhance governance, mitigate risks, and improve project bankability is evident.

This summary consolidates the understanding that NDBs are indispensable in shaping and financing sustainable development, highlighting their transformative impact and complex challenges. NDBs must continue evolving their strategies to align with changing environmental priorities and global financial landscapes.

## 5.3 Policy and Strategy Recommendations

To bridge the financing gap in sustainable infrastructure and meet South Africa's NDCs, NDBs must adopt innovative approaches that align with global best practices and the unique local challenges of the South African context. Below are actionable recommendations emphasising blended finance mechanisms and risk mitigation strategies. To further mobilise funding for sustainable infrastructure, this study proposes the following:

### 5.3.1 Expand Blended Finance Models

- **Public-Private Partnerships**: NDBs should leverage government funds to mitigate risk for private investors and increase sustainable infrastructure projects by structuring PPPs where both parties, public and private stakeholders, share risk and returns. **Concessional Finance**: Increase access to concessional loans and grants to lower funding costs, allowing more investment.
- **Green Bonds and Impact Investment**: Launch green bonds targeting institutional investors to mobilise large-scale funding for sustainable infrastructure.

### 5.3.2 Implement Risk Mitigation Mechanisms

- **Guarantee Schemes**: Introduce insurance instruments such as credit guarantees to mitigate and provide security for private investors in climate-focused projects.
- **Currency Hedging Tools:** Introduce mechanisms to mitigate currency risks for international investors, ensuring confidence in long-term infrastructure projects.
- **Insurance Solutions:** Partner with global insurers to offer products that cover risks associated with sustainability.

### 5.3.3 Strengthen Institutional Capacity

- **Technical Assistance for Project Development:** Provide support for feasibility studies, project preparation, and risk assessment to ensure bankable projects for climate-sustainable projects.
- **Capacity Building:** Enhance the skills of NDB staff in structuring innovative financing models, engaging stakeholders, and utilising blended finance instruments effectively.

### 5.3.4 Foster Collaboration and Knowledge Sharing

- **Regional and International Partnerships:** Collaborate with MDBs and other NDBs to access co-financing opportunities and share expertise in climate finance.
- **Stakeholder Engagement:** Build trust and align goals among government agencies, private investors, and civil society through transparent and inclusive decision-making processes.

### 5.3.5 Enhance Transparency and Accountability

- **Monitoring Frameworks**: Develop robust systems to track project impacts and ensure alignment with SDGs.
- **Public Reporting**: Regularly publish data on funded projects to build credibility and attract additional investment.

### 5.3.6 Government Role in Climate Finance

- **Policy Advocacy:** Collaborate with government agencies to design supportive regulatory frameworks that incentivise green investment or subsidies for energy efficiency initiatives.

- **Mandate Revision:** Redefine the mandates of NDBs to explicitly prioritise findings towards climate resilience and low-carbon sustainable infrastructure development, ensuring alignment with the Paris Agreement.

By embracing these strategies, South African NDBs can transition from traditional lenders to catalytic agents for sustainable infrastructure development, bridging the gap between policy and practice while aligning investments with global climate goals. These recommendations aim to mobilise significant private sector participation, leverage international support, and strengthen institutional capabilities, enabling NDBs to effectively meet the ambitious targets of South Africa's NDCs.

### 5.4 Limitations of the Study

The research offers important insights; however, it is necessary to recognise some limitations:

- **Qualitative Focus**: The reliance on qualitative methods, specifically interview-based data collection, limits the generalisation of findings across broader contexts. While the insights drawn from participants are rich in detail and context-specific, they reflect individual perspectives that may not comprehensively represent the entire population or all stakeholders involved in climate financing. Quantitative or mixed-method approaches could have provided additional breadth and statistical validation to support the identified themes.
- **Stakeholder Bias**: The findings are shaped by the perspectives and experiences of the participants. Despite applying rigorous thematic analysis to mitigate this, participants' viewpoints may reflect their biases, organisational agendas, or personal priorities. This potential bias could impact the results' objectivity and applicability to other stakeholders not included in the sample. Additionally, depending on self-reported data could lead to inaccuracies or selective reporting
- **Context-Specific Findings**: The study's findings are deeply rooted in South Africa's context, which offers important perspectives on the distinct challenges and opportunities for NDBs in the region. However, it might restrict or limit the transferability of conclusions to other geographic or institutional contexts. South Africa's regulatory frameworks, economic priorities, and infrastructure development goals significantly shape the applicability of the findings and may differ substantially from those in other countries or regions.

## 5.5 Areas for Future Research

Areas of future research could explore the roles of NDBs in greater depth and their impact on sustainable infrastructure development:

- **Quantitative Analysis**: Future studies could employ quantitative methods to measure NDB interventions in funding climate-resilient infrastructure. Metrics such as carbon emission reductions and climate adaptation infrastructure facilitated by NDB-supported projects would provide a more concrete evaluation of their effectiveness. Such analyses could also assess the cost-efficiency of different funding strategies and project outcomes.
- **Comparative Studies**: Conducting cross-regional or cross-country studies would allow researchers to identify best practices in NDBs. For example, examining successful NDB models in Southeast Asia or Europe could provide insights into how South Africa and other emerging markets could adapt and refine their strategies for greater effectiveness.
- **Blended Finance Mechanisms**: An investigation into various designs and implementations of blended finance models could reveal strategies for increasing private sector participation in large-scale, high-risk projects. Future research could focus on identifying the optimal mix of concessional loans, grants, and market-rate financing to balance risk and reward, ensuring both scalability and financial sustainability.
- **Policy Alignment**: Exploring the alignment between national climate action plans and international frameworks, such as the Paris Agreement, could provide insights into how NDBs can better position themselves to support transformative climate finance. This research could assess gaps and opportunities for harmonising policies to maximise the impact of NDB initiatives.

NDBs in South Africa hold transformative potential to bridge the sustainable infrastructure funding gap and advance climate resilience. By adopting a mission oriented approach, enhancing institutional capacity, and fostering collaboration, NDBs can support South Africa's efforts to achieve its NDCs. This study highlights actionable strategies and policy recommendations to empower NDBs as catalysts for systemic change. Unlocking their full potential will require sustained effort, innovative thinking, and collective action from all public and private stakeholders.

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# Annexure I


**Master of Commerce in Development Finance**

**INTERVIEW/SURVEY CONSENT FORM**

**Participant name:** **……**

I volunteer to participate in a research project conducted by **Vivian Ramathuba** as partial fulfilment of the requirements for the **MCom Development Degree** at the Graduate School of Business. I understand that the research is designed to gather information about ""National Development Banks' Investments in Climate Resilient Infrastructure: Challenges and Prospects"." and that I will be one of approximately **15** people being interviewed for this research.

Background and purpose of the research

The study will investigate various solutions and challenges in filling the funding gap. The main research questions addressed in this paper are:

- What role can the NDB play in mobilising funding for climate change sustainable infrastructure to address the funding gap for South Africa to meet the NDC commitments?
- What challenges do NDBs encounter in facilitating investment in climate change-sustainable infrastructure projects in South Africa to address the funding gap?

Ethics approval

The UCT GSB Research and Ethics Committee approved the ethical clearance for this study on 17 October 2024.

Participation and confidentiality

I understand that my participation in this research is voluntary, that I will not be compensated and that I may withdraw at any time. The interview will take approximately 45 - 60 minutes to complete and will be audio-recorded

I understand that I will not be identified by name in any reports using information obtained from this interview and that my confidentiality as a participant in this study will remain secure. Subsequent uses of records and data will be subject to standard data use policies that protect individuals and institutions' anonymity.

Should you have any questions or concerns, please contact me at rmtviv001@myuct.ac.za (+2784 494 8202) or my supervisor, Professor Alhassan, Abdul Latif latif.alhassan@uct.ac.za

Consent

I consent to participate in this interview, based on the terms outlined above and subject to the following additional condition of my own (if any).

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**Signed by interviewee** **Date**

…….. …….

**Signed by Student** **Date**

## Annexure II

# Questions

**Section 1: Demographic information**

1. Interview Date
2. Interview Start time:
3. Nature of business
4. Years of experience
5. Current role in business

**Section 2: Interview Questions**

**Introduction & Context**

- Can you describe the current landscape of funding for climate infrastructure in South Africa?
- What is your understanding of the NDB's role in financing sustainable projects?

**NDB's Role & Strategies**

- What key roles do you think the NDB should prioritise in mobilising investment? (e.g., developmental, countercyclical, mission oriented)?
- How can the NDB collaborate with partners to increase impact?
- What strategies have been successful in other similar projects or regions that NDBs can adopt to maximise its impact on sustainable infrastructure funding? e.g., non-profit-driven metrics such as policy outcomes and environmental impacts.

**Challenges & Risks**

- What are the main challenges NDBs encounter when financing climate infrastructure?
- How do political, economic, or risk-related factors affect NDBs' ability to attract investment?
- Are South African NDBs sufficiently capitalised to meet funding needs?

**Policy & Future Outlook**

- What policies or incentives can support NDBs in addressing the climate infrastructure funding gap?
- How do you envision the role of NDBs evolving in South Africa's sustainable development future

# Annexure 3

## Interview Protocol Refinement Framework

| | Background Question | Research Question 1 "What role can the NDB play in mobilising funding for climate change sustainable infrastructure to address the funding gap for South Africa to meet the NDC commitments? | Research Question 2 "What challenges do NDBs encounter in facilitating investment in climate change- sustainable infrastructure projects in South Africa to address the funding gap?" |
|---|---|---|---|
| **Interview Q1** | **X** | | |
| **Interview Q2** | **X** | | |
| **Interview Q3** | | **X** | |
| **Interview Q4** | | **X** | |
| **Interview Q5** | | **X** | |
| **Interview Q6** | | | **X** |
| **Interview Q7** | | | **X** |
| **Interview Q8** | | | **X** |
| **Interview Q9** | | | **X** |
| **Interview Q10** | | **X** | |