

An application of Theory of Change to EIA system evaluation

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PREFACE

And acknowledgements

"I don't like work, no man does, but I like what is in work, the chance to find yourself. Your own reality, for yourself, not for others, what no other man can ever know."

Joseph Conrad *Heart of Darkness*

My sincerest thanks to all those who made this possible. I am forever indebted and in no way can I repay the time, effort and patience you displayed in making this work a reality. Through this, I found myself.

ABSTRACT

Environmental Impact Assessment (EIA) is internationally one of the most widely adopted policy implementation instruments, introduced in more than 180 countries world-wide South Africa has a long and proud history of environmental assessment practice dating back to the 1970s. Therefore, periodical system evaluation is considered a key component of any well-functioning EIA system, with various system evaluations having been conducted internationally. EIA is sometimes seen as a barrier to development due to its requirements for rigorous participatory processes and scientific investigation which may often be viewed as time-consuming and expensive. There is also a general and ongoing concern about the efficiency, quality and effectiveness of the EIA system. To this end this research had as its aim the application of the Theory of Change method of evaluation to a specific EIA system, in this instance the South African system. The research identified, through the application of the Theory of Change method, seven key evaluation questions which would inform the system evaluation with the view to making recommendations. The key evaluation questions were answered through the evaluation of identified key performance indicators, resulting in recommendations being made for improvement of the South African EIA system.

Key word: EIA, Evaluation, Theory of Change, South Africa, system

ABBREVIATIONS AND ACRONYMS

BIA	Biodiversity Impact Assessment
CBA	Cost Benefit Analysis
DEA	Department of Environmental Affairs ¹
DEAT	Department of Environmental Affairs and Tourism ²
DPME	Department of Planning, Monitoring and Evaluation
DWAF	Department of Water Affairs and Forestry ³
DWS	Department of Water and Sanitation
EA	Environmental Assessment
EAPs	Environmental Assessment Practitioners
EAPASA	Environmental Assessment Practitioners Association of South Africa
ECA	Environment Conservation Act
ECO	Environmental Control Officer
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EIAMS	Environmental Impact Assessment Management System
EMF	Environmental Management Framework
EMI	Environmental Management Inspectorate
EMPr	Environmental Management Programme
EMS	Environmental Management System

¹ Now the Department of Environment, Forestry and Fisheries (DEFF)

² Now the Department of Environment, Forestry and Fisheries (DEFF)

³ Now the Department of Water and Sanitation (DWS)

ETD	Electronic Thesis and Dissertation Database
EXCO	Executive Committee
GDACE	Gauteng Department of Agriculture, Conservation and Environment ⁴
GDARD	Gauteng Department of Agriculture and Rural Development
GIS	Geographic Information System
IAIA	International Association for Impact Assessment
IAPA	Impact Assessment and Project Appraisal
IEM	Integrated Environmental Management
JEAPM	Journal for Environmental Assessment Policy and Management
KPA	Key Performance Area
KPI	Key Performance Indicator
M&E	Monitoring and Evaluation
MLRA	Marine Living Resources Act
MPRDA	Mineral and Petroleum Resources Development Act
NEMA	National Environmental Management Act
NEMAQA	National Environmental Management: Air Quality Act
NEMBA	National Environmental Management: Biodiversity Act
NEMWA	National Environmental Management: Waste Act
NEPA	National Environmental Policy Act
NEPF	National Evaluation Policy Framework
NRF	National Research Foundation

⁴ Now the Gauteng Department of Agriculture and Rural Development (GDARD)

NWA	National Water Act
NWU	North West University
PAJA	Promotion of Administrative Justice Act
PSC	Project Steering Committee
RoD	Record of Decision
SADC	Southern African Development Community
SAQA	South African Qualification Authority
SCA	Supreme Court of Appeals
SD	Sustainable Development
SEA	Strategic Environmental Assessment
S&EIR	Scoping and Environmental Impact Report
SIA	Social Impact Assessment
SOER	State of the Environment Report
ToC	Theory of Change
VIA	Visual Impact Assessment

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CHAPTER 1 INTRODUCTION

1.1 Introduction and background to EIA as a policy implementation instrument

Since its adoption in the 1970s, Environmental Impact Assessment (EIA) has been considered internationally to be one of the most widely adopted policy implementation instruments. It has, since its inception, been introduced in more than 180 countries world-wide (Morgan, 2012), and is recognised as an established tool to promote sustainable development (Loomis & Dziedzic, 2018). As a policy implementation instrument, it stands to reasons that questions are sure to be asked about the effectiveness of EIA. It is thus that periodical system evaluation is considered a key component of any well-functioning EIA system, with various system evaluations having been conducted internationally (Sadler, 1996; Arts, 1998; Thissen, 2000; Wood, 2003; Morrison-Saunders and Arts, 2004; Jones, *et al.*, 2005; Arts, *et al.*, 2012; Lyhne *et al.*, 2017; Loomis & Dziedzic 2018).

1.2 Problem statement and research aim

The effectiveness of EIA as a policy implementation tool to promote sustainable development is under increasing scrutiny (Morgan, 2012; Loomis & Dziedzic, 2018). Furthermore, EIA is sometimes perceived as a barrier to development due to its requirements for rigorous participatory processes and scientific investigation which may often be viewed and perceived as being time-consuming and expensive (Runhaar & Driessen, 2007; Runhaar, 2009; Runhaar *et al.*, 2010). There is also a general and ongoing concern about the efficiency, quality and effectiveness of EIA systems internationally. To this end, the analysis, evaluation and debate of the effectiveness of EIA is an important theme in EIA literature (Sadler, 1996; Lawrence, 1997; Cashmore, 2004; Elling, 2009; Morgan, 2012 & Rozema & Bond, 2015). Sadler has coined to date the most succinct summation of EIA effectiveness, asking simply whether EIA is working as intended and secondly, whether it is meeting the purposes for which it was designed (Sadler, 1996). Sadler's *International Study of the Effectiveness of Environmental Assessment* in 1996 distinguished three dimensions of effectiveness, namely:

Procedural effectiveness: Asking whether the impact assessment process conforms to established provisions and principles?

Substantive effectiveness: Asking whether the impact assessment process achieves the objectives se e.g supporting well informed decision making which result in environmental protection.

Transactive effectiveness: Asking whether the impact assessment process delivers these outcomes at the least cost in the minimum time possible. i.e is it effective and efficient.

These three effectiveness categories as established by Sadler remain the hallmark by which EIA effectiveness is conceptualised and understood (Loomis & Dziedzic, 2018). Despite this, subsequent researchers have, in an attempt to clarify what makes impact assessment work, distinguished other dimensions (Pope *et al.*, 2018). Most notably, Baker & McLelland (2003) built on Sadler's three dimensions of effectiveness by introducing a fourth dimension, normative efficacy.

Normative efficacy: Asking whether the impact assessment achieves its ideal purpose, which may include sustainable development, a fair democratic participatory process as well as other internationally recognised goals.

A vast body of literature exists on EIA evaluation, conceptualised around different concepts such as quality, efficiency, effectiveness and efficacy, follow-up, cost, etc. (Sadler, 1996; Cashmore *et al.*, 2004; Retief, 2010; Morgan, 2012; Bond *et al.*, 2018a; Loomis & Dziedzic, 2018). All these evaluation studies have merit, and contributed in their own way towards improving our understanding of different aspects of EIA. Loomis & Dziedzic (2018), in examining the current state of EIA effectiveness studies, considered and analysed existing effectiveness studies relating to each of the four dimensions as set out above. It was through the evaluation of studies that are of a multi-dimensional nature, that is to say, which systematically combine three or more of the above dimensions, so as to encourage holistic evaluations of EIA that the authors call for more multidimensional studies. This is a theme which is recurring in EIA literature (Theophilou *et al.*, 2010; Veronez & Montaña, 2015). The rationale behind such a call is that these studies offer more robust findings for addressing the challenges encountered along impact assessment processes as well as exploring systematic connections among the differing effectiveness dimensions.

In answering the call for more multi-dimensional evaluations of EIA effectiveness, this research proposes the application of programme theory thinking, and more specifically the Theory of Change (ToC) method to evaluation. Theory-based approaches to evaluation (such as ToC) have gained prominence in recent years, largely out of an increased sensitivity to complexity and the recognition that such approaches can deal with the specific complexities associated with the evaluation of policies and programmes, as well as the implementation of such policies and programmes (Mason & Barnes, 2007; Rogers, 2008; Brouselle & Champagne, 2011; McConnell, 2019).

1.3 Research aim and objectives

The application of the theory based approach, specifically ToC, may serve to offer a more multi-dimensional evaluation of, for example, a particular EIA system in so far as it relates to the four dimensions of effectiveness.

The research aim may thus be framed as being:

“To apply the Theory of Change (ToC) method of evaluation, to a selected EIA system, with a view to making recommendations for improvement”

In order to achieve the research aim, three key research objectives have been identified and formulated as contained in Table 1-1 below. This study engages with a clearly formulated set of explicit and researchable objectives which guide the study. These objectives guide the selection of the research approach and methods used as well as the process of data capturing and analysis (Rule & John, 2011; Miles *et al.*, 2014; Gray, 2014).

Table 1-1: Research objectives

Research Objectives	
1.	To apply the Theory of Change (ToC) evaluation method to a selected EIA system
2.	To develop performance evaluation criteria within the ToC approach against which the system may be evaluated
3.	To evaluate the system against the criteria

The link between the research objectives, methods used and the study chapter layout are dealt with in Section 1.5 of this thesis.

1.4 Research approach

With regard to the research aim and research objective, it is understandable that the research employs an approach and methodology that deals with evaluation. A review of the literature dealing with research approaches (See Rule & John, 2011; Yin, 2014) leads one to believe that evaluation research is a suitable approach, as evaluation research is considered to be the process whereby it is determined whether a phenomenon, such as a social intervention (in the form of a policy, plan or programme), has been effective and produced the desired results. Furthermore, numerous examples exist where an evaluation approach has been applied to the evaluation of the effectiveness of policy instruments specifically. (Deming, 1983; Arthur & Cox, 2014).

1.4.1 Defining “evaluation”

A simple definition of **evaluation** is “*the process of deterring the merit, worth, value or effectiveness of something*” (Rossi *et al.*, 2004). It must however be remembered that evaluation in itself is not by all accounts a research method. It should rather be viewed as a research approach in which multiple research methods such as interviewing or the analysis of documentation could be applied (Rossi *et al.*, 2004; Babbie, 2011). Evaluation research has been used in the past to inform policy making (Brewer, 1983) and according to researchers should produce objective evidence that may be used to facilitate and inform more intelligent decision making (Edwards *et al.*, 1983).

1.4.2 Evaluation research

Within the social sciences, so-called ‘**evaluation research**’ has a specific purpose, but should not be considered as being a separate or new research strategy because it could include flexible or fixed strategies as well as qualitative or quantitative data. Its purpose is simply defined as “... *to assess the effect or effectiveness of something*” (Robson, 2002:202). Three features of evaluation research have particular relevance to evaluation design. The first is that evaluators typically require a combination of methods, as well as rigorous and systematic data collection techniques to deal with the potential complexity of evaluation research (Oakley, 2000; Yin, 2003). Secondly, that evaluation research should not only focus on the evaluation of outcomes, but also include the evaluation of inputs such as process, as Robson (2002) puts it:

“The traditional view of evaluation restricted the questions asked to those concerning outcome. This approach, while still considered a central feature by many, is now more commonly seen as only covering a part of what is needed. Process evaluation is concerned with answering a ‘how?’ or ‘what is going on?’ question. It concerns the systematic observation and study of what actually occurs in the programme, intervention, or whatever is being evaluated. This may well be a crucial part of an evaluation as, without it, the nature of what is being evaluated may be obscure or misunderstood.”

Thirdly, experience in evaluation research also acknowledges the fact that case study approaches are particularly appropriate and useful and that a detailed investigation of ‘cases’ rather than ‘sample’ is preferred. Moreover, the more robust evaluation studies seem to have used comparisons between cases:

Internationally there is a wealth of literature on evaluation research methodologies for EIA system evaluations. (for example Wood, 2003; Dalal-Clayton & Sadler, 2005; Retief, 2007d; Kidd & Retief 2009; Retief 2010; Retief, 2013). The evaluation approach which underpinned this study is known as *Theory of Change* (**Research Objective 1**), and is widely accepted

and used as an evaluation methodology for policies, plans and programmes internationally (see Weiss, 1995; Allen *et al.*, 2017).

1.4.3 Introducing the Theory of Change concept

The ToC approach to evaluation illustrates the causal links and sequences of events needed for an activity or intervention to lead to a desired outcome or impact whilst articulating the assumptions underlying each step in the chain (Biggs *et al.*, 2017). The ToC approach or method maps the missing middle between what an activity or intervention does, what impact it has, and how this leads to the achievement of desired outcomes and impacts (Biggs *et al.*, 2017).

The concept of ToC was originally introduced in the field of evaluation in the 1990s. Recent years have seen an increase in the use of ToC in the field of monitoring and evaluation of public policies and programmes (Weiss, 1995; Vogel, 2012; Valters, 2015; Biggs *et al.*, 2017). Its adoption and use by the Department of Planning, Monitoring and Evaluation (DPME) in South Africa, to evaluate the effectiveness of policy intervention, guided the researcher in choosing it as a methodology around which to frame the study. (The rationale for choosing the South African system is set out below). Especially development programmes have latched on to ToC, with many international agencies seeing ToC as an emerging best practice (USAID, 2015b).

Ultimately, the ToC method produces a conceptual framework and a related causal narrative to guide evaluation. The causal narrative is explained and structured around a sequence of different so-called evaluation components namely: inputs, activities, outputs, outcomes and impacts (Weiss, 1995; Connel & Kubisch, 1998, Thornton *et al.*, 2017). In some instances, a design component is also included which deals with the contextual design of the policy or programme (DPME, 2011). These components are typically illustrated and explained in the form of a pyramid, namely the 'results-based pyramid' shown in **Figure 1-1**. Applying the ToC method to EIA system evaluation would require adapting and contextualising the following generic questions, namely: what we use to do the work (inputs)? What we do (activities)? What we produce or deliver (output)? What we wish to achieve (outcome)? What we aim to change (impact)? A more detailed discussion on the research design and methodology is provided in Chapter 3.



Figure 1-1: Results-based pyramid (DPME, 2011)

1.4.4 Application to the South African EIA system

This research has identified the South African EIA system as an appropriate case study. South Africa is considered an ideal country to test the application of ToC for two main reasons. Firstly, the country has a well-established EIA system with more than two decades of mandatory EIA practice. The EIA system is also well researched with a meaningful body of evaluation literature (see for example Retief, 2010; Sandham *et al.* 2007; 2008a; 2008b; 2010; 2013a; 2013b; Hallat *et al.* 2015; Kidd *et al.*, 2018; Swanepoel *et al.*, 2017). Secondly, ToC is the method formally prescribed by the South African government for policy evaluation and monitoring (DPME, 2011).

1.4.5 The EIA evaluation framework

In light of the above, the analytical framework for the study is primarily adapted from the environmental assessment quality and effectiveness review protocol originally designed and

successfully applied to South Africa (see for example Wood, 2003; Retief 2007a, 2007b, 2007c, 2007d). The proposed analytical framework incorporates ToC and logical framework approaches, and thereby combines the proven evaluation framework of Retief (2007d) with the chosen approach and methods of this study as set out above (figure 1-1) and below (figure 1-2).

To this end, the proposed evaluation framework illustrated in **Figure 1-2**– starts with the basic question “what do we expect to achieve?” – followed by “what are we doing?” – and ultimately “what are we achieving?”. These three basic questions relate directly to the results-based pyramid components of design, inputs, activities, outputs, outcomes and impacts (as set out in **Figure 1-1**) and which form the core of the ToC approach.

Firstly, the evaluation needs to deal with gaining a clear understanding of design and outputs through understanding the South African EIA System and what it is expected to achieve (i.e ‘design evaluation’). This understanding should be informed by an extensive literature review (**Chapter 3**), as well as a logical framework analysis and ToC development (**Chapter 2**). The second component of the evaluation is to engage with specific key performance areas (KPAs) and key performance indicators (KPIs) related to activities and outputs, in particular cost, efficiency and quality (i.e implementation and economic evaluation). The outcome of the design evaluation and the understanding of design and inputs will inform the eventual design of the KPIs. This is followed by an evaluation of the outcomes and impacts, in particular in relation to KPAs and KPIs around influencing decision making and contributing to sustainability (i.e impact evaluation) (**Chapter 4**). The evaluation of activities, outputs, outcomes and impacts will rely mainly on multiple case study analysis (**Chapter 4**). Finally, the outcome of the evaluation needs to be fed back in the form of recommendations to improve the system design (**Chapter 5**). The latter is also part of the logical framework approach and ToC testing – which aims to reverse-engineer our outcome and impact results back to our design, inputs, activities and output results.

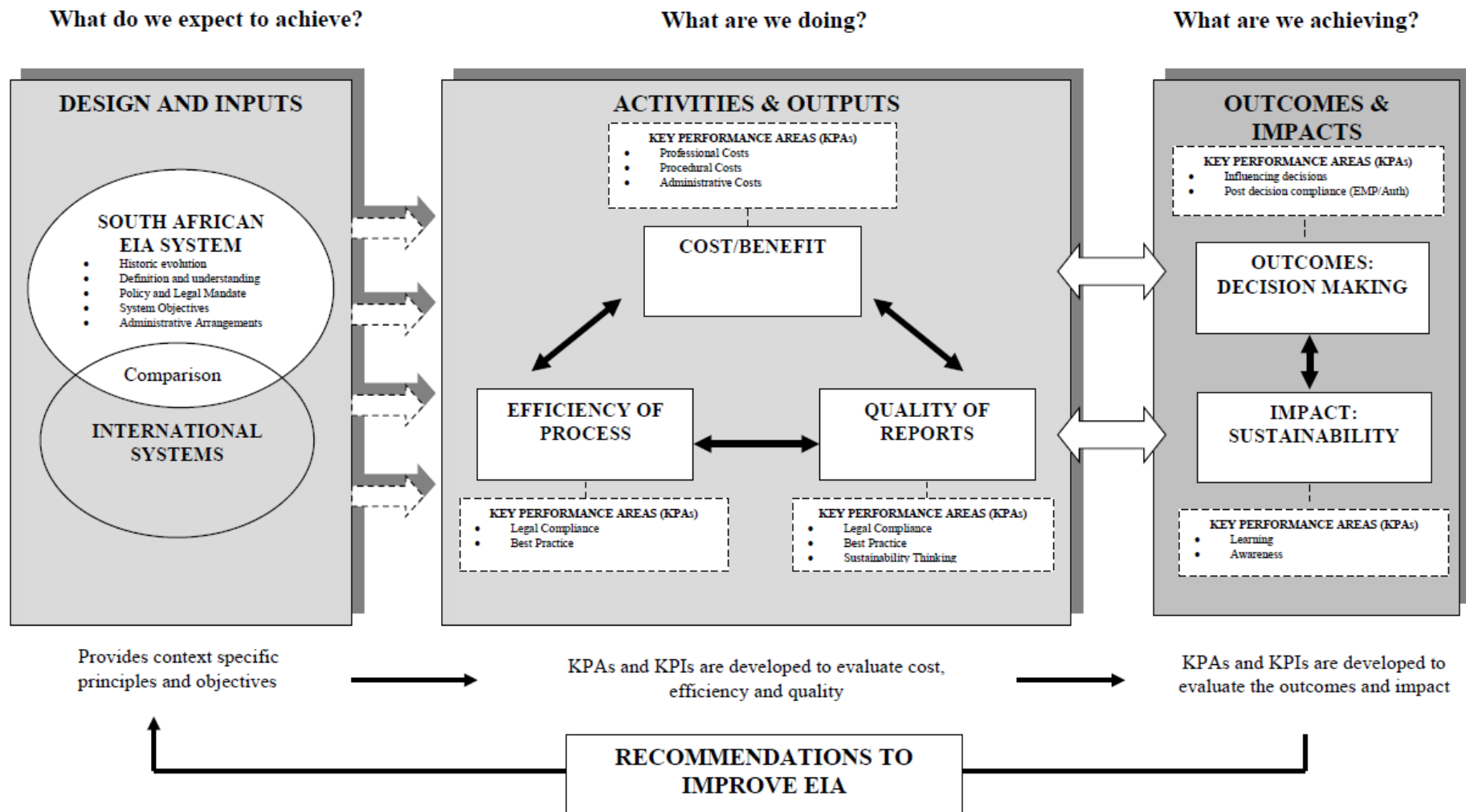


Figure 1-2: EIA evaluation framework (adapted from Retief, 2007d, & DPME, 2011)

1.5 Structure of this thesis and chapter layout

The study is comprised of five phases which are documented in 5 chapters as illustrated in **Figure 1-3** and which are detailed below.

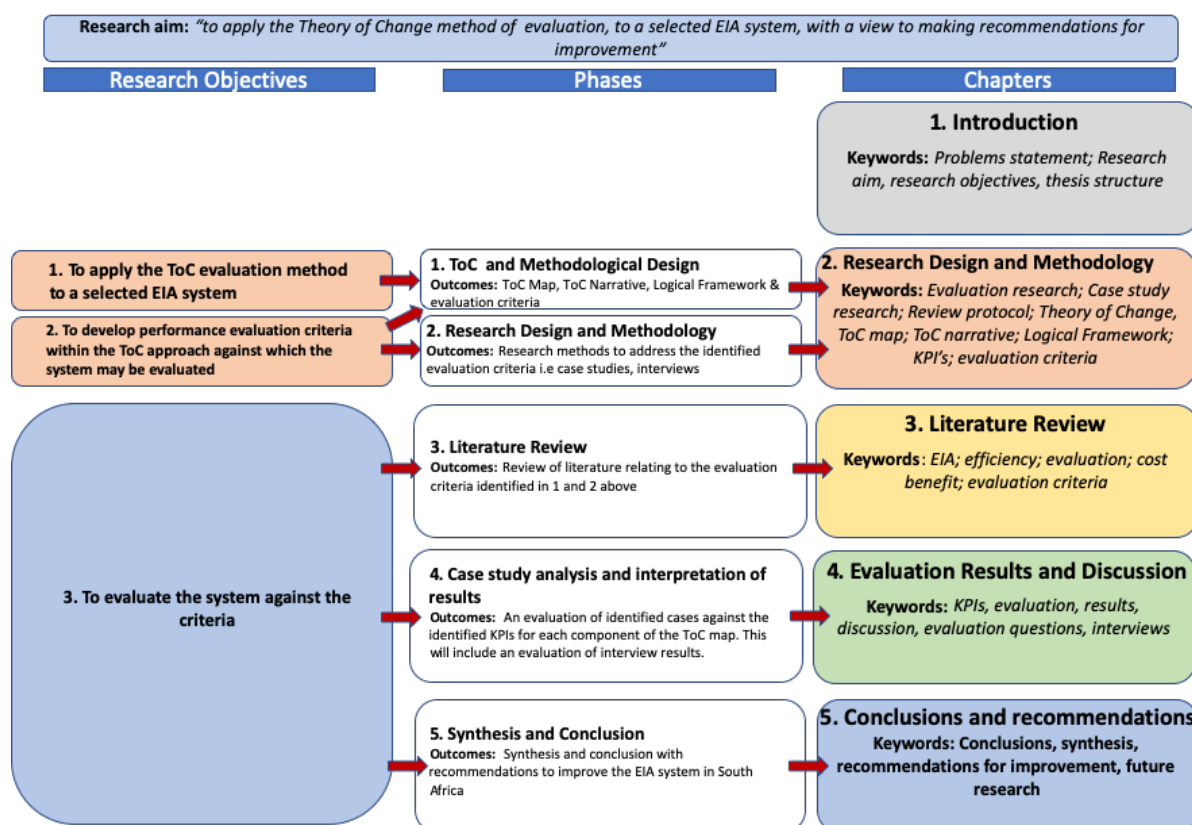


Figure 1-3: Overall research structure and layout

1.5.1 Phase 1: Theory of Change and Methodological Design

This phase outlines the development of the logical framework and ToC, as basis for the evaluation. The research approach and evaluation framework (as outlined in Section 1.4 of this chapter) is expanded on in Chapter 2. Key outcomes in this phase include a ToC map with a ToC narrative. Evaluation questions and KPIs are identified in the documented logical framework, against which the system evaluation is conducted. During this phase a workshop was held with internationally recognised researchers in order to supplement the researchers own ToC design. The outcome of this phase are contained within **Chapter 2** of the thesis titled “*Research design and methodology*”. The system which was chosen for the application of the ToC approach to evaluation was the South African EIA system. South Africa is considered an ideal country to test the application of ToC for two main reasons. Firstly, the country has a well-established EIA system with more than two decades of mandatory EIA practice. The EIA

system is also well researched with a meaningful body of evaluation literature (see for example Retief, 2010; Hallat *et al.*, 2015; Sandham *et al.* 2007; 2008a; 2008b; 2010; 2013a; 2013b; Kidd *et al.* 2018; Swanepoel *et al.*, 2019). Secondly, ToC is the method formally prescribed by the South African government for policy evaluation and monitoring (DPME, 2011).

1.5.2 Phase 2: Research design and methodology

The quality and the logic of the methods used throughout a study are integral to the success of any research. It is thus imperative that careful planning and design is undertaken to ensure successful capturing of data, as well as analysis and interpretation. Phase one of the study entailed the researching and reflecting on different research approaches, theoretical frameworks and methodological approaches. **Chapter 2**, titled “*Research design and methodology*” captures the design of the research process and sets out the different methodologies employed to answer the research objectives.

1.5.3 Phase 3: Literature Review

The analysis of existing knowledge pertaining to EIA legal frameworks, EIA policy frameworks and current EIA research forms the theoretical foundation on which phase 4 of the study has built. In phase three, an analysis of published research reports, legislation and policy documents was undertaken to establish the baseline of knowledge EIA in South Africa as it relates to the evaluation questions and the outcomes of the ToC. In so doing the researcher attempted to distil possible gaps in information. The aim of the literature review was to gain a better understanding of EIA, and more specifically the relevant research relating to EIA efficiently and effectiveness in both the South African and international context. The literature review is contained in **Chapter 3** titled “*Literature Review.*”

1.5.4 Phase 4: Case study analysis and interpretation of results

During this phase, selected cases were evaluated against the evaluation questions and KPIs which emanated from the ToC approach and logical framework. Interviews were also held during this phase with identified interviewees. The purpose of the case study evaluation and interviews was to evaluate the selected EIA system against the developed criteria. Section 2.3.2 deals with the case study selection and evaluation. The outcome of this phase is presented in **Chapter 4** titled “*Evaluation results and discussion.*”

1.5.5 Phase 5: Synthesis and conclusion

Phase 5 provides a synthesis of the research aim and objectives, whilst providing the final recommendations emanating from phases 2 to 4. The final synthesis, conclusion and ultimate recommendations made are contained within **Chapter 5** of this study.

1.6 Concluding remarks

The above has introduced the problem statement, research aim, research questions, research approach and the structure of the thesis. The following chapter (**Chapter 2**) describes the research methodology. The importance of the next chapter is the outline of the research design which assists the reader to navigate the thesis by clearly linking the research aim and questions with the research methods and processes.

CHAPTER 2 RESEARCH DESIGN AND METHODOLOGY

2.1 Introduction

Chapter 2 describes and justifies the methodological design for the study and builds on the discussion in Section 1.4 of this thesis, which sets out the research approach. **Chapter 2** introduces the Theory of Change (ToC) approach. The ToC approach is then applied to the selected EIA system, namely the South African system, resulting in a ToC map and ToC narrative (**Research objective 1**). This is followed by the logical framework and evaluation criteria in the form of key evaluation questions and corresponding indicators that were used in the evaluation (**Research objective 3**) as well as a description of the case study review protocol (**Research objective 2**).

Chapter 2 deals with **phases 1 and 2** of the study and addresses **research objectives 1 and 2** as set out in **Figure 2-1**.

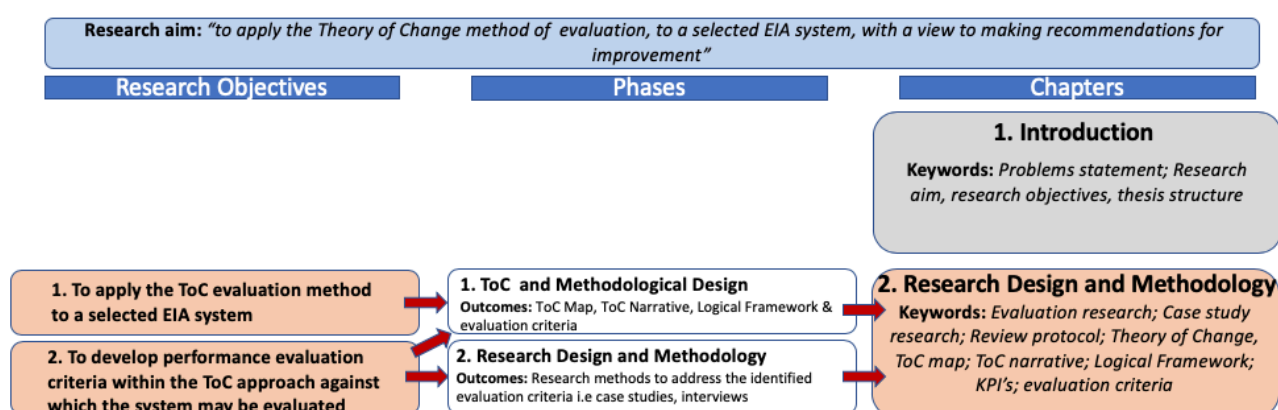


Figure 2-1: Overall research structure and layout (Research objective 1 and 2)

2.2 Theory of Change (ToC) and methodological design

Research objective 1 is the application of the ToC approach to a selected EIA system. This section provides a discussion on the rationale for the selection of ToC as an approach to evaluation, as well as a justification for the EIA system selected, namely the South African system. The outcome of the application of the TOC approach is a ToC map, ToC narrative, logical framework and evaluation criteria against which the system may be evaluated as illustrated in **Figure 2-2**.

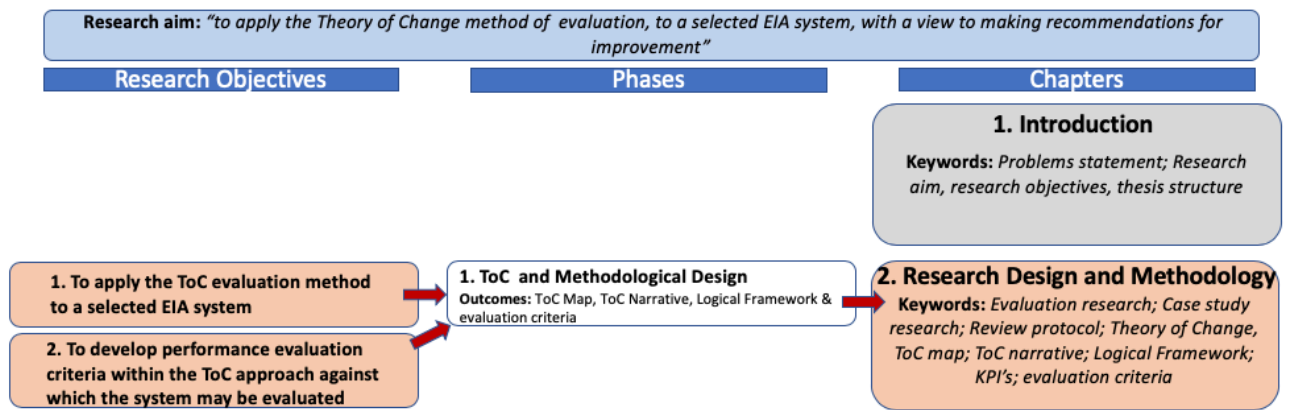


Figure 2-2: Research layout Chapter 2.2

Internationally, numerous EIA system review studies have been conducted over the years, especially within the European Union context (see for example Glasson, 1999; Arts *et al.*, 2012; Runhaar & Fischer, 2012; Jha-Thakur & Fischer, 2016; Jones & Fischer, 2016; Loomis & Diedzic, 2018, Aung *et al.*, 2020). These studies mainly focussed on outcomes and used different conceptual dimensions of the concept of effectiveness (such as procedural, transactive, substantive, normative, etc.). The most common methods used include documentation analysis, surveys and interviews.

To date, only one study has attempted to evaluate the EIA system in South Africa (DEA, 2008). Following on from the 2008 evaluation study (DEA, 2008) a process was launched to formulate a new strategy for Integrated Environmental Management (IEM) which came to be known as the Environmental Impact Assessment and Management Strategy (EIAMS) (DEA, 2014). In view of the fact that the last system review was around a decade ago, and in support of the publication of the EIAMS in 2014, the study identified this as a particularly opportune time to evaluate the performance of EIA in South Africa.

South Africa is considered an ideal country to test the application of ToC for various reasons. Firstly, the country has a well-established EIA system with more than two decades of mandatory EIA practice. The EIA system is also well researched with a meaningful body of evaluation literature (see for example Retief, 2010; Hallat *et al.*, 2015; Sandham *et al.* 2007; 2008a; 2008b; 2010; 2013a; 2013b; Kidd *et al.* 2018; Swanepoel *et al.*, 2019). South Africa as a country also faces numerous environmental challenges in the form of mounting developmental pressures to counter a stagnant economy, whilst also trying to cater for the developmental needs of an expanding population. Importantly, ToC is the method formally prescribed by the South African government for policy evaluation and monitoring (DPME, 2011). The researcher could find no literature where ToC has been applied explicitly to EIA

evaluation. However, Allen *et al* (2017) applied ToC to online decision support systems within the New Zealand agricultural and environmental management context. The aim was to evaluate the effectiveness of these decision support systems, which suggest some relevance to EIA as being a decision support instrument. The ToC approach within the South African context, and for purposes of this research, is guided by the definition of 'evaluation' contained in the 2011 National Evaluation Policy Framework (NEPF), namely:

"The systematic collection and objective analysis of evidence on public policies, programmes, projects, functions and organizations to assess issues such as relevance, performance (effectiveness and efficiency), value for money, impact and sustainability, and recommend ways forward." (DPME, 2011: iii)

Essentially, phase 1 of the research entailed an application of the ToC approach to evaluation (**research objective 1**). This resulted in an evaluation of EIA as a 'policy implementation instrument' (**research objective 3**), which could be considered synonymous with the evaluation of a policy intervention against evaluation criteria stemming from **research objective 2**. The approach followed for this evaluation (**research objective 1**) was based on the results-based management pyramid recommended by the National Treasury and DPME (2011) as a preferred approach to policy and programme evaluation within the South African context.

There is a traceable logic to the design of EIA as a policy implementation instrument which can be explained through logic models and/or ToC thinking in relation to the results-based management pyramid. In other words, explained through the causal logic chain between the design, activities, outputs, outcomes and impacts – as shown in **Figure 1-1** and **Figure 2-3**. It supports the hypothesis that if we implement certain interventions and achieve certain outputs we can expect certain outcomes and impacts (subject to certain clearly articulated assumptions). Causality is at the core of the scientific method, but is difficult to assess when dealing with complex systems or interventions (Romero *et al.*, 2018). Using the ToC approach and its focus on causal inference, may serve to reveal the underlying relationships within the selected EIA system and in so doing it may help to disentangle the likely mechanisms that underpin the causal relationships. Perdicoúlis and Glasson (2006) have explored causal networks in EIA, stating that for disciplines dedicated to the study of effects, such as EIA, causal networks seem like a useful instrument to easily relate and transparently demonstrate cause and effect. Their research (Perdicoúlis and Glasson, 2006) however looked at causal networks within the discipline of EIA at a project level, and did not elevate these causal networks to EIA systems as is the case with this research through the ToC approach.

In relation to the results-based pyramid, the NEPF (2011) introduces certain types of evaluation, focussing on specific areas in the causal logic chain, as also illustrated in **Figure 2-3**. The different types of evaluation in relation to this study are addressed in the sub-sections of Section 2.2.

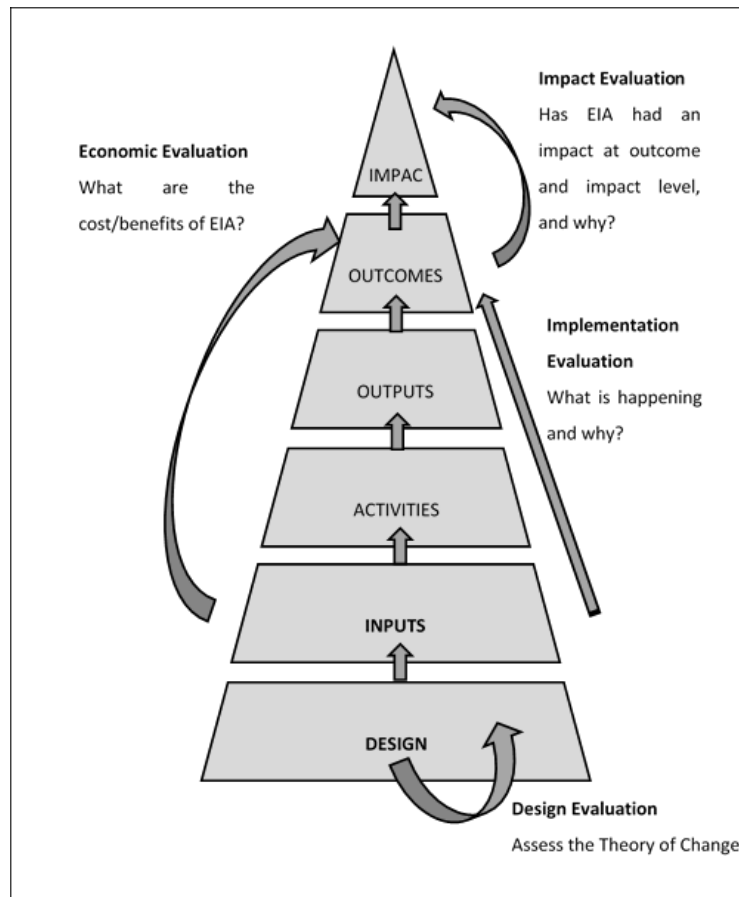


Figure 2-3: Results-based pyramid - relation of different types of evaluation as applied to EIA (DMPE, 2011)

2.2.1 Theory of Change (ToC) map

This section explains the ToC map that was developed and used for this research (**Figure 2-4**). The content of the map was designed based on an understanding of the EIA system in South Africa as informed by a series of workshops as detailed below. It was furthermore informed and refined by the literature review (see Chapter 3). In essence, the ToC framework is an exploded view of the understanding of how the EIA system in South Africa works. It addresses the causal logic between the design, inputs, activities, output, outcome and impact evaluation components from the 'results based pyramid' (**Figure 1-1** and **Figure 2-3**).

Essentially, the ToC map communicates the following:

- The causal logic between the different evaluation components from design of the EIA system to the eventual impact it aims to achieve.
- The various key assumptions that underpin the causal logic. These assumptions (there are nineteen assumptions across the different system evaluation components – see Box 2-1) are described in the ToC narrative and captured in the logical framework, to guide the development of evaluation criteria. The numbers indicated in brackets (..) after each assumption described in the ToC narrative (Box 2-1), relate to the numbered key assumptions on the ToC map (**Figure 2-4**).
- The key indicators against which the implementation of the EIA system will be evaluated for purposes of this study.

In applying the ToC method to the South African EIA system, the following five steps were followed:

- **Step 1 - South African Specialist Workshop:** The initial version of the ToC conceptual framework and narrative was developed based on the outcome of a specialist workshop with five specifically identified specialist on EIA in South Africa. Between them the specialists were all professional EIA practitioners with more than 100 years' collective experience in EIA practice. They were tasked to apply the results based pyramid structure to the South African EIA system based purely on their professional opinion and experience.
- **Step 2 - Regulator workshop:** The conceptual framework and narrative developed by the specialists were next presented to a regulator workshop for refinement and to obtain a regulator perspective. Invited to the regulator workshop were representatives from the eleven environmental competent authorities (nine provinces as well as the national Department of Environmental Affairs and the National Department of Mineral Resources) as well as the DPME.
- **Step 3 - Stakeholder Workshops:** The version developed by the specialists and agreed on by the regulators was next presented at a broader one-day stakeholder workshop. The stakeholder group included government officials, NGOs and environmental practitioners. The aim of the workshop was to provide an opportunity for different stakeholders outside of government to also provide inputs. Ultimately two such workshops were held at different locations to ensure maximum opportunity to participate. The workshops were well attended with more than fifty representatives from diverse civil society organisations.
- **Step 4 - International Specialist Inputs:** To ensure broader validity and to gauge international generalisability, workshops were held with international EIA specialists from four different countries in Central and Eastern Europe, namely Estonia, Sweden, United Kingdom and the Netherlands. The ToC conceptual framework and narrative were also presented at the IAIA international conference in 2018 and at a research working group in Australia in 2019. The latter included representatives from Australia, Canada and Brazil. All comments were captured and the conceptual framework and narrative refined. The outcome is, therefore, believed to be generalizable and has meaningful relevance beyond the South African context.

- **Step 5 - Refinement and finalization:** A final ToC specialist workshop was held to reflect on all comments received from the specialist workshop, regulator workshop, stakeholder workshop as well as the international engagement. The ToC conceptual framework and narrative presented here was then refined and finalised based on the above inputs.

Ultimately, the map provides a visual illustration of the causal logic between the different EIA system components being evaluated (i.e. design, inputs, activities, outputs, outcomes and impacts) and underpins the ToC narrative and logical framework to be discussed in Sections 2.2.2. and 2.2.3). The use of workshops and stakeholder input in developing the ToC map is central to the ToC method, as proponents of ToC highlight the importance of stakeholder processes in generating a participatory ToC (Briggs *et al*, 2017). This enables a better understanding of the context and the underlying assumptions that ToC as a process orientated method brings to the fore (Valters, 2015). The 19 assumptions which underly the South African EIA system as identified in the workshops discussed above, are listed in Box 2-1.

Box 2-1: Summary of key assumptions underpinning the inner logic of the South African EIA system

- A 'command and control based approach' geared towards regulating future activities is an effective way to give effect to the environmental right of all South Africans. (1)
- Sufficient skills and competencies exist to implement the EIA system. (2)
- The benefits of doing EIA outweigh the costs. (3)
- Nondiscretionary List based screening effectively triggers the need for EIA. (4)
- It is possible to identify key issues during scoping. (5)
- It is possible to determine significance during assessment and evaluation. (6)
- EIA is a scientific exercise. (7)
- Assume accuracy of prediction. (8)
- The public is willing and sufficiently capacitated to participate. (9)
- Reviewers read reports. (10)
- Reviewers understand the content of reports. (11)
- Reviewers are rational, impartial and objective. (12)
- Reviewers share the same value system. (13)

- Appeal Authorities are objective and impartial. (14)
- An efficient process, as defined by the set timeframes, will produce good quality reports. (15)
- Good quality reports will lead to informed decisions. (16)
- Decisions are underpinned by the NEMA Section 2 principles. (17)
- Decisions are lawful, reasonable and procedurally fair. (18)
- Informed decisions regulating future activities, that are lawful, reasonable and procedurally fair as well as underpinned by NEMA Section 2 principles, will lead to progressive realization of the Section 24 environmental right. (19)

The above assumptions are placed within the ToC map (**figure 2-4**) within each of the differing system components and are indicated by the corresponding number assigned in box 2-1.

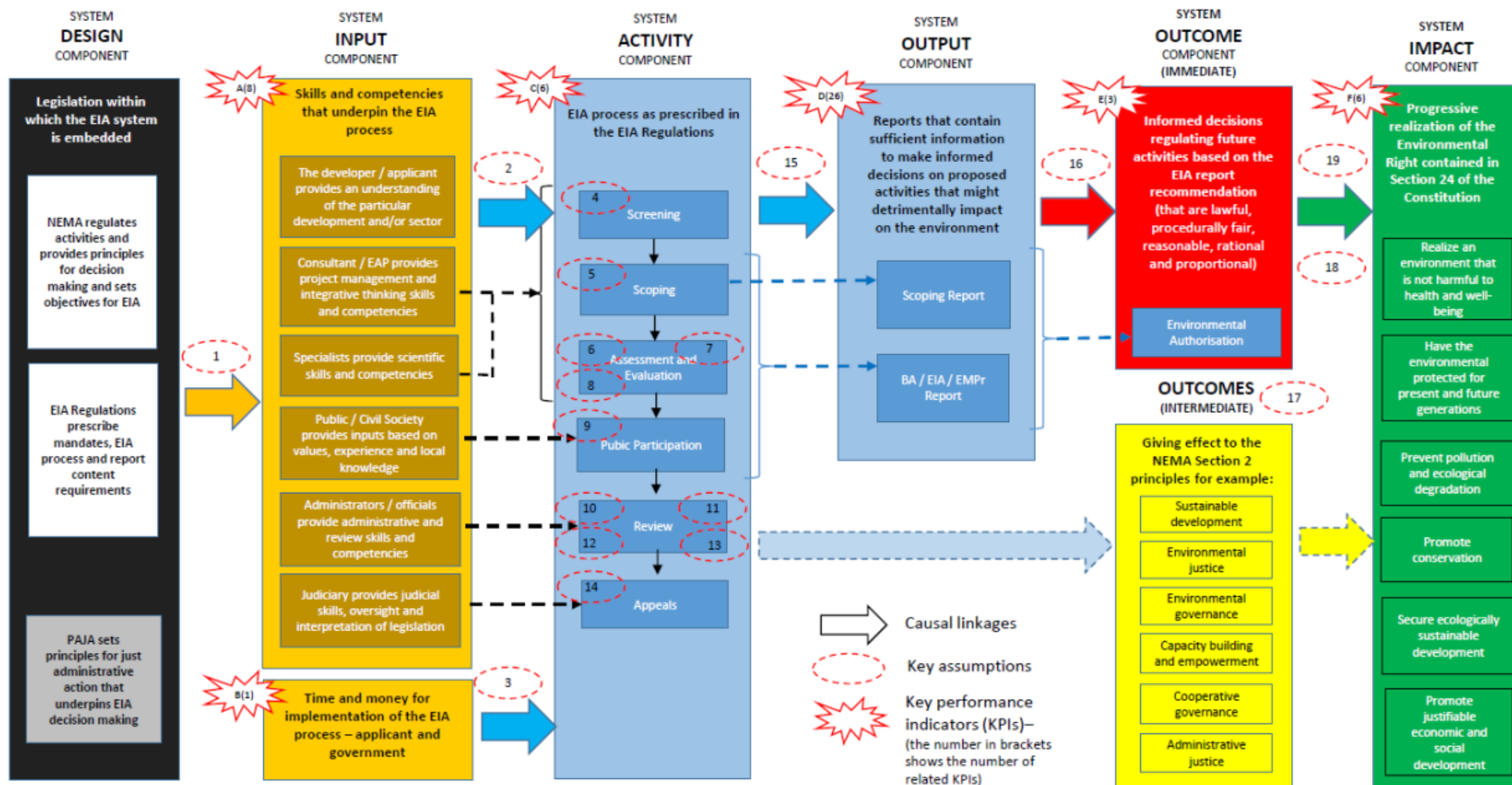


Figure 2-4: ToC map for implementation evaluation of the South African EIA System

2.2.2 Theory of Change Narrative

The ToC narrative is based on the ToC approach and talks directly to the ToC map (**Figure 2-4**) introduced in the previous section. The narrative is framed against the different system evaluation components i.e. design and inputs; activities and outputs as well as outcomes and impacts. It needs to be highlighted that the inner logic that underpins EIA systems is prescribed, well understood and established internationally, and that the South African system is fundamentally similar to the international understanding of how EIA systems function (IAIA 1998; Wood 1999; 2003; Morgan 2012; Kidd *et al.*, 2018).

Therefore, the ToC narrative presented here should be generally clear and understood by regulators, academics and professional working in the EIA field. The result being that the inner logic of how an EIA system works is prescribed and known, and cannot for example be changed / 'designed' / 'agreed upon' – it is what it is (Alberts *et al.*, 2019). This inner logic is based on almost half a century of international EIA practice, and more than two decades of South African EIA practice, and is relatively simple as summarised in the statement in Box 2-2. The fact that the inner logic of EIA is prescribed and agreed makes the whole design of ToC easy in that the research is merely describing how EIA works within the South African context. The description is either right or wrong (or possibly incomplete) – but cannot be changed as it is imbedded in law. This differs to a ToC application in evaluations of interventions where the inner logic still needs to be developed and/or designed. Accordingly, the ToC described in this section is not controversial or contentious and was not 'designed' – but describes the agreed inner logic of how the EIA system works, as well as the assumptions that underpins the logic. The implementation of the design is however often open to interpretation by the regulator or the courts, however such interpretation will often result in changes to inputs or activities, and not necessarily the design of the system per se as it is contained within legislation. Box 2-2 contains the ToC narrative resulting from the application of the ToC approach to the South African EIA system. Essentially the ToC narrative suggests that:

Box 2-2: The Theory of Change narrative

"The EIA system is embedded in legislation (design component), relies on a certain level of skill and competence (input component) to administer and implement a process (activity component), that produces sufficient information captured in an EIA report (output component), to inform decision making (outcome component), on the authorisation or refusal of future activities that might have a detrimental effect on the environment, towards progressively giving effect to the environmental right contained in Section 24 of the Constitution (impact component)."

The following sections will expand further on the above inner logic statement. The narrative of the inner logic should be read from left to right on the ToC map (**Figure 2-4**) and starts with a discussion of the design and input components in the next section. For each of the components, key evaluation questions are identified. It is these evaluation questions which were used to frame the evaluation of the EIA system (**research objective 2**).

2.2.2.1 Design and input components

<u>Summary definition:</u> Design and input components deal with the resources that contribute to the delivery of the activities and output component (Weiss, 1995; Connel and Kubisch, 1998; DMPE, 2011; Thornton <i>et al.</i>, 2017). In this case the design and input components relate to the design of and inputs to the South African EIA system as reflected and prescribed in EIA legislation as well as skill and competency requirements. Ultimately the system is embedded in legislation and implemented through certain skills and competencies. Understanding of the design and input components is used as the basis against which to analyse the ToC, inner logic and consistency of the intervention (DMPE, 2011).
Evaluation questions related to the design and input components are: • <i>Evaluation Question 1:</i> What are the objectives of EIA in South Arica? • <i>Evaluation Question 2:</i> How is EIA expected to achieve its objectives? • <i>Evaluation Question 3:</i> What has been the economic impact of the EIA process on differing sectors?

The EIA system design happened over the course of two decades. Before 1997, EIA in South Africa was conducted on a voluntary basis, mainly in line with international understandings adopted from the United States. During this pre-legislation period no formal EIA system existed, because there was no administration or regulatory requirements in place. The period between 1997 and 2006 could be seen as a transitional period for the EIA system when the mandate for EIA was changed from the old dispensation legislation (i.e. Environment Conservation Act, 1989) (RSA, 1989) to be aligned with the National Environmental Management Act of 1998 (NEMA) (RSA, 1998b). Chapter 3 of this thesis provides a more detailed discussion on the historic evolution of the EIA system in South Africa.

The preamble to NEMA shows that the NEMA EIA system was explicitly designed to give effect to the environmental right contained in Section 24 of the Constitution (RSA, 1996) – as

will also be highlighted in relation to the system impact component. EIA as a policy implementation instrument is seen as a 'reasonable measure' to give effect to the environmental right. As a framework Act, NEMA mainly provides for:

- Setting of principles for decision making (Section 2 and 24);
- Promulgation of Regulations for command and control instruments to regulate future 'activities' (Section 24, Chapter 5), and
- Setting of objectives for IEM, which includes EIA (Section 23, Chapter 5).

For implementation, NEMA relies on policy implementation instruments and the promulgation of regulations. The first NEMA EIA Regulations were promulgated in 2006 and have since been revised four times, in 2010, 2014 and 2017 (DEA, 2014 a-d). The EIA Regulations mainly prescribe:

- Mandates / responsibilities for different role players;
- The EIA procedures to be followed;
- Report content requirements;
- Defines specific activities to be regulated, and
- Issuing of conditional environmental authorizations (i.e. command and control approach).

However, because EIA is also essentially an administrative action, it is also strongly governed through administrative justice and more specifically Section 33 of the Constitution (RSA, 1996) and the Promotion of Administrative Justice Act (PAJA) (RSA, 2000). In order to promote environmental justice PAJA provides for principles for just administrative action and decision making

In view of the above, the EIA system design in South Africa is therefore established, prescribed and embedded in legislation. Chapter 3 (Literature Review) of this thesis provides a more detailed discussion on the legal mandate for EIA. Without the legal basis there is no EIA system. Therefore, the EIA system is designed and prescribed around legislation that explicitly governs decision making related to our environmental right (NEMA and EIA Regulations) and implicitly to just administrative action (PAJA).

The main inputs to the EIA system are specific skills and competencies. The logic that underpins this is that in order to make informed decisions, information is required which is derived from different role players with different skills and competencies, such as:

- Consultants/Environmental Assessment Practitioners (EAPs) provide project management and integrative thinking skills and competencies as defined in NEMA and the South African Qualification Authority's qualification standard for Environmental Assessment Practice (SAQA ID 61831).
- Specialists provide scientific skills and competencies. These inputs are typically considered as the scientific basis for decision making.
- Public/Civil society provides inputs based on values, experience and local knowledge. These inputs are typically considered as evidence for decision making.
- Administrators/officials provide administrative and review skills and competencies. This typically requires integrated thinking and understanding of issues.
- Judiciary provides judicial skills, oversight and interpretation of legislation.
- The developer / applicant provides an understanding of the particular development and/or sector.

The EIA system also relies on inputs related to time and money. In this regard the main direct financial burden lies with the applicant who pays for the appointment of the EAP and conducting of the EIA. The cost input in terms of EIA administration and review is borne by government.

The key assumptions that underpin the design and input components of the EIA system includes:

- Assumption 1: A command and control based approach geared towards regulating future activities is an effective way to give effect to the environmental right of all South Africans.
- Assumption 2: Sufficient skills and competencies exist to implement the EIA system.
- Assumption 3: The benefits of doing EIA outweigh the costs.

2.2.2.2 Activity and Output components

Summary definition:

The activity component deals with the process or actions that use the inputs to produce the outputs (Weiss, 1995; Connel & Kubisch, 1998; DMPE, 2011; Thornton *et al.*, 2017). In this case the activity component is related to activities comprising the EIA process. The output component represents the final goods or services which the intervention delivers (DMPE, 2011). In this case the output component relates to the EIA reports (i.e. Scoping, Basic Assessment, EIA, EMP_r) used to inform authorisation decision making by the regulator. The causal narrative argues a causal link between the activities related to the EIA process and the eventual quality of the EIA report.

Evaluation questions related to design and input components are:

- *Evaluation Question 4:* To what extent has the EIA process been efficiently implemented?
- *Evaluation Question 5:* What is the quality of EIA reports and processes?

It has long since been argued internationally that environmental assessment is more about process than about product (Glasson *et al.*, 2001; Owens *et al.*, 2004). In other words, there is an agreed causal link between the activities related to the EIA process and the eventual quality of the EIA report (Bond *et al.*, 2018a). The international so-called best practice operational principles (IAIA, 1998) sets out the different EIA activities, which are understood to underpin good quality reports. The activities within the South African EIA system reflect the international best practice operational principles and are prescribed as procedural phases in the EIA Regulations (as amended in 2017). These phases are linked to prescribed regulated timeframes. Broadly speaking they include:

- *Screening:* The aim of screening is to determine if an EIA is required, and if yes, which authorization process to follow, Basic Assessment or Scoping and EIA. The Regulations prescribe that screening be done by the independent EAP appointed by the applicant. It involves the screening of the proposed development against published lists of activities published in the EIA Regulations (RSA, 2014a).
- *Scoping:* There are seven scoping objectives described in Appendix 2 of the South African EIA Regulations. It mainly requires the EAP to identify key issues to be addressed in the assessment phase. Public participation is an important action during scoping.
- *Assessment and evaluation:* NEMA (RSA, 1998) defines the actions of assessment and evaluation slightly differently, with assessment being more objective and science based while evaluation recognises the subjective and value driven nature of assessment. The EIA Regulations define eight objectives for the environmental assessment process. Ultimately the assessment and evaluation activity needs to identify significant impacts and communicate the finding in an EIA report to inform decision making. Typically, the assessment includes activities such as site visits and consideration of specialist inputs.
- *Public participation:* This activity is mandated through specific sections in NEMA as well as the EIA Regulations. The comments received during the public participation process must be recorded and responded to by the EAP and reflected in the final EIA reports.
- *Review:* This activity is done by the EIA administrators/officials against prescribed decision making criteria contained in NEMA and PAJA. There are primarily four documents (outputs) that get reviewed depending on the process triggered during screening namely, Scoping Report, Basic Assessment Report, EIA Report and the EMPr. The outcome of the review should be reflected in the eventual decision/authorisation.

- *Appeal*: This activity is triggered post decision making and is regulated by Appeal Regulations (RSA, 2014e). It requires a reconsideration of the decision by the appeal authority and may result in a revised decision.

The outputs of the EIA process are good quality reports that contain sufficient information to make informed decisions on proposed activities that might detrimentally impact on the environment. Therefore, the inner logic suggests that the EIA system primarily produces good quality reports as the main output or 'product'. The type of report is dependent of the process triggered during screening. In South Africa, the quality of EIA reports is probably one of the most research aspects of EIA (see for example Hallatt *et al.* 2015; Sandham *et al.* 2007; 2008a; 2008b; 2010; 2013a; 2013b). For a detailed discussion on the status of report quality in the South African EIA system refer to Chapter 3 of this thesis. The reports are the result of the different activities prescribed in the EIA process.

The key assumptions that underpin the activity and output components of the EIA system include:

- Assumption 4: Non-discretionary List based screening effectively triggers the need for EIA.
- Assumption 5: It is possible to identify key issues during scoping.
- Assumption 6: It is possible to determine significance during assessment and evaluation.
- Assumption 7: EIA is a scientific exercise.
- Assumption 8: Assume accuracy of prediction.
- Assumption 9: The public is willing and sufficiently capacitated to participate.
- Assumption 10: Reviewers read reports.
- Assumption 11: Reviewers understand the content of reports.
- Assumption 12: Reviewers are rational, impartial and objective.
- Assumption 13: Reviewers share the same value system.
- Assumption 14: Appeal Authorities are objective and impartial.
- Assumption 15: An efficient process, as defined by the set timeframes, will produce good quality reports.
- Assumption 16: Good quality reports will lead to informed decisions.

2.2.2.3 Outcome and impact components

Summary definition:

The outcome component reflects the results of achieving certain outputs (Weiss, 1995; Connel & Kubisch, 1998; DMPE, 2011; Thornton *et al.*, 2017). In this case, the outcome component is represented by the extent to which EIA influences proposal design and decision making.

The impact component represents the results of achieving certain outcomes (DMPE, 2011). In this case the impact component relates to the extent to which EIA is giving effect to the progressive realisation of the environmental right contained in Section 24 of the Constitution (RSA, 1996).

Evaluation Questions related to the outcome and impact components are:

- *Evaluation Question 6:* To what extent has EIA influenced proposal design and decision making?
- *Evaluation Question 7:* To what extent has the EIA process been effective in achieving its objectives, towards sustainable development?

The main immediate outcome of EIA is a decision informed by the content of the EIA report. Although decision making happens incrementally throughout the EIA process, the final outcome is a single decision authorising future activities. It could therefore be argued that the immediate outcome of the EIA system is numerous authorisation or refusal decisions on listed activities related to individual projects. The decision is communicated through an environmental authorization that provides the rationale for the decision. The decision outcome is governed by set criteria against which the decision must be taken as stipulated in inter alia NEMA (for example section 2, Section 24, EIA Regulations, relevant Guidelines) as well as PAJA which determines that decisions must be lawful, procedurally fair, reasonable, rational and proportional (Kotze & Van der Walt, 2003).

The EIA literature and the five ToC workshops highlighted numerous intermediate outcomes such as changes in values, promotion of transparency in decision making, capacity building and empowerment, promotion of administrative justice, as well as knowledge generation and better understanding of impacts (Morgan, 2012; Pope *et al.*, 2013). Ultimately, it may be argued that these intermediate outcomes are accurately reflected in the foundational principles of NEMA. Therefore, giving effect to the NEAM Section 2 principles represents the intermediate outcomes of EIA. This makes sense since the NEMA principles must underpin EIA decision making toward progressive realisation of Section 24 of the Constitution. For a

detailed discussion of the legal mandate for EIA and the relation to NEMA refer to Chapter 3 of this thesis.

However, in terms of EIA system evaluation methodology these intermediate outcomes provide a number of difficulties. The most important of these is the difficulty in measuring and/or arguing causality. Therefore, although the research highlights and acknowledge these important intermediate outcomes, it also points out and recognise the methodological difficulties in evaluating against them. To this end the study did not attempt to evaluate the intermediate outcomes, focusing rather on the immediate outcomes and how this translates into the impact component.

The main impact of EIA is a progressive realization of the environmental right contained in Section 24 of the Constitution (Kidd, 2011; Kidd *et al.*, 2018), which states:

“Everyone has the right—

(a) to an environment that is not harmful to their health or well-being; and

(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that—

(i) prevent pollution and ecological degradation;

(ii) promote conservation; and

(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

Chapter 3 of this thesis provides a more detailed discussion on the environmental mandate for EIA and the interpretation of Section 24. Having a constitutional right as the ultimate impact of an intervention provides various methodological challenges, because measuring progressive realisation of any constitutional right is problematic. It is not an objective that is ever fully ‘achieved’. The difficulties in defining aspirational objectives (and ultimate impact) in clear quantitative terms, is one of the reasons why ToC approaches are not ideal for EIA system evaluation and is not commonly used internationally. It is unlike other interventions where the aim and objectives are clearly and quantitatively defined, which lends itself more towards ToC approaches. This is, however, a methodological challenge which will be dealt with as part of the methodological design.

The following assumptions underpin the inner logic of having EIA as a policy implementation instrument, especially assumption 19, which goes to the heart of what EIA is about. The key assumptions that underpin the outcome and impact components of the EIA system include:

- Assumption 17: Decisions are underpinned by the NEMA Section 2 principles.
- Assumption 18: Decisions are lawful, reasonable and procedurally fair.
- Assumption 19: Informed decisions regulating future activities, that are lawful, reasonable and procedurally fair as well as underpinned by NEMA Section 2 principles, will lead to progressive realization of the Section 24 environmental right.

2.2.2.4 Concluding remarks

The application of the ToC approach to evaluation to the South African EIA system results in key evaluation questions (as illustrated in Table 2-1). The system is broken down into the design, input, activity, output, outcome and impact components. Each of these components is underpinned by assumptions, with 19 assumptions being identified in total.

Each of the components results in key evaluation questions relating to that particular system component. These evaluation questions in relation to the different system components are set out in Table 2-1.

Table 2-1: Key evaluation questions developed for EIA System Evaluation

EIA system components	Key Evaluation Questions
Design and Input Components	Evaluation Question 1: What are the objectives of EIA in South Africa? Evaluation Question 2: How is EIA expected to achieve its objectives? Evaluation Question 3: What has been the economic impact of the EIA process on identified sectors?
Activity and Output components	Evaluation Question 4: To what extent has the EIA process been efficiently implemented? Evaluation Question 5: What is the quality of EIA reports and processes?
Outcome and impact components	Evaluation Question 6: To what extent has EIA influenced proposal design and decision making? Evaluation Question 7: To what extent has the EIA process been effective in achieving its objectives, towards sustainable development?

2.2.3 Logical framework for evaluation

The Logical Framework has been conceptualised and completed based on the ToC map and narrative (**refer to Table 2-2**). The input, activity, output, outcome and impact components have been described and key assumptions identified. Key evaluation questions have also been identified for each of the components. It is acknowledged that it is impractical to review every detail of every aspect of an EIA system, hence the need for representative key performance indicators (KPIs), as shown in Figure 2-4 and described in Table 2-2. This ensured the practical viability of pursuing a holistic review of the EIA system. For the purposes of this research, the term 'indicators' instead of 'criteria' was preferred, because indicators suggest that they are indicative, whereas criteria imply precision not always achievable due to the subjective nature of EIA system evaluations (Todd, 2001). The use of evaluation indicators has the added advantage that conformance to one purposefully designed indicator implies wider performance in other related aspects, which then need not be evaluated separately. The indicators can be traced back to the ToC map, ToC narrative and inner logic of the EIA system, which implies that the justification for the evaluation indicators relies on the validity of ToC. The following indicator design criteria were used to justify the design of key indicators:

- The linkage between the indicator and the relevant ToC inner logic and key assumptions must be clear. In many cases the indicators are explicitly linked to key assumptions.
- The indicator should be quantitatively and/or qualitatively measurable. The quantitative and qualitative nature of indicators might vary considerably so that subjectivity does become a particular feature of this EIA system evaluation. Ultimately a level of conformance need to be measured against the set indicators.
- Information and data to address the indicator should be readily available, within time and resources, through the application of scientifically justifiable methods (i.e. documentation evaluation and interviews).
- The indicator should be easy to understand and interpret. However, the nature of the evaluation does not allow for hard and fast unambiguous indicators. Context and case specific interpretation will always be important to their application.

Finally, in light of the distinctly qualitative and investigative nature of the evaluation, the evaluation scale was not fine grained, and relied on judgment by the evaluator about the conformance of the case to the particular indicator (framed as a question). The conformance score was based on multiple sources of data, which includes documentation and interviews. Only three scales were used, namely A- 'conformance', B- 'partial conformance' and C- 'non-conformance'. This broad scale allowed for flexibility in the application of the protocol while

retaining the logic provided by the ToC. Provision was also made to consider instances where the 'conformance status could not be established' or are 'not applicable'.

Table 2-2: Logical framework for implementation evaluation of the South African EIA System

Narrative summary and key evaluation questions	Key Performance Indicators (KPIs)	Means of verification	Assumptions
Impact (the results of achieving specific outcomes)			
Progressive realisation of the Environmental Right contained in Section 24 of the Constitution Evaluation Question 7: To what extent has the EIA process been effective in achieving its objectives, towards sustainable development?	The following indicators are indicative of the extent to which the Environmental Right contained in Section 24 of the Constitution is progressively being realised. (see Figure 2-4, KPI 'F(6)')	Interviews with key stakeholders	Informed decisions regulating future activities, that are lawful, reasonable and procedurally fair as well as underpinned by NEMA Section 2 principles, will lead to progressive realization of the Section 24 environmental right. (see Figure 2-4 Assumptions 1 and 19)
	To what extent does the EIA system realize an environment that is not harmful to health and well-being?	Interviews with key stakeholders	
	To what extent does the EIA system achieve protection of the environment over the immediate and long term?	Interviews with key stakeholders	
	To what extent does the EIA system succeed in preventing pollution and ecological degradation?	Interviews with key stakeholders	
	To what extent did the EIA promote conservation?	Interviews with key stakeholders	
	To what extent did the EIA secure ecologically sustainable development?	Interviews with key stakeholders	
	To what extent did the EIA promote justified economic and social development?	Interviews with key stakeholders	

Narrative summary and key evaluation questions	Key Performance Indicators (KPIs)	Means of verification	Assumptions
Outcomes - intermediate (the results / what we wish to achieve over time)			
Giving effect to the NEMA Section 2 Principles Evaluation Question 7: To what extent has the EIA process been effective in achieving its objectives, towards sustainable development?	The KPIs included under the impact component above are also indicative of the extent to which the intermediate outcomes are realised and therefore no separate indicators are developed. (see Figure 2-4, KPI 'F(6)')	Not applicable	Decisions are underpinned by the NEMA Section 2 principles. (see Figure 2-4, Figure 2-4: ToC map for implementation evaluation of the South African EIA System Assumption 17)
Outcomes - immediate (the results / what we wish to achieve immediately)			

Narrative summary and key evaluation questions	Key Performance Indicators (KPIs)	Means of verification	Assumptions
Informed Decisions regulating future activities based on the EIA report recommendations, that are lawful, procedurally fair and reasonable (i.e. rational and proportional) Evaluation Question 6: To what extent has EIA influenced proposal design and decision making?	The following indicators are indicative of the extent to which decisions were lawful, reasonable and procedurally fair. (see Figure 2-4, KPI 'E(3)')	Documentation evaluation	Decisions are lawful, reasonable and procedurally fair. (see Figure 2-4 Figure 2-4: ToC map for implementation evaluation of the South African EIA System, Assumption 18)
	To what extent did the application authorise the correct listed activities? (lawful)	Verify listed activities in the application with what is authorised	
	To what extent did the process comply with minimum legal procedural requirements? (procedurally fair)	Verifying procedural compliance based on documentation review	
	To what extent was the decision described in the environmental authorisation consistent with and based on the content of the EIA reports? (reasonable / rational / proportional)	Verifying consistency between EIA reports and decisions.	
Outputs (the main products towards achieving the outcome)			

Narrative summary and key evaluation questions	Key Performance Indicators (KPIs)	Means of verification	Assumptions
Good quality Reports containing sufficient information to inform proposal design and make informed decisions on proposed activities that may detrimentally impact on the environment. Evaluation Question 5: What is the quality of EIA reports and processes?	The following indicators are indicative of the <u>completeness</u> of the EIA report content (but does not talk to substantive quality). (see Figure 2-4: ToC map for implementation evaluation of the South African EIA System Figure 2-4, KPI 'D(26)')	Documentation evaluation	Good quality reports will lead to informed decisions. (see Figure 2-4, Assumption 16)
	Was a description of the proposed activity provided?	Documentation evaluation	
	Was need and desirability described?	Documentation evaluation	
	Were key issues identified?	Documentation evaluation	
	Have alternatives been considered?	Documentation evaluation	
	Was a plan of study included?	Documentation evaluation	
	Was significance determined?	Documentation evaluation	
	Was significance dealt with before and after mitigation?	Documentation evaluation	
	Was public participation conducted?	Documentation evaluation	

Narrative summary and key evaluation questions	Key Performance Indicators (KPIs)	Means of verification	Assumptions
	Was an EMPr submitted which describes mitigation measures?	Documentation evaluation	
	Was an impact summary statement provided?	Documentation evaluation	
	The following indicators are indicative of the <u>substance</u> quality of the EIA report content.	Documentation evaluation	
	Was the description of the activity provided sufficient to inform the identification of listed activities?	Documentation evaluation	
	Was the information provided sufficient to justify the identification of key issues (scoping)?	Documentation evaluation	
	Was the timing of the development justified in relation to need and desirability?	Documentation evaluation	
	Was the location of the development justified in relation to need and desirability?	Documentation evaluation	
	Did the plan of study incorporate the key issues as identified during scoping?	Documentation evaluation	
	Were reasonable alternatives presented and assessed?	Documentation evaluation	
	Was significance determined according to a justified methodology, which includes the method and its application?	Documentation evaluation	
	Was the determination of significance consistently applied across specialist disciplines?	Documentation evaluation	

Narrative summary and key evaluation questions	Key Performance Indicators (KPIs)	Means of verification	Assumptions
	Was justification provided for different proposed mitigation measures against the mitigation hierarchy?	Documentation evaluation	
	Has the significance rating after mitigation been justified?	Documentation evaluation	
	Were the proposed mitigation measures as described in the impact assessment incorporated into the EMPr?	Documentation evaluation	
	Were roles and responsibilities assigned meaningfully in relation to management actions in the EMPr?	Documentation evaluation	
	Was there any supplementary information submitted to the authorities that was not in the public domain?	Documentation evaluation	
	Were all comments from IAPs adequately responded to in the impact assessment process and reports (not relegated to comments and response reports)?	Documentation evaluation	
	Were all key IAPs consulted in the impact assessment process?	Documentation evaluation	
	Were the key recommendations from the impact assessment justified and clearly summarised in a non-technical fashion?	Documentation evaluation	
Activities (to achieve the outputs)			Assumptions for activities to lead to outputs
EIA process as prescribed in the EIA Regulations	The following indicators are indicative of the efficiency of the EIA process measures against the prescribed timeframes.	Documentation evaluation	An efficient process, as defined by the set

Narrative summary and key evaluation questions	Key Performance Indicators (KPIs)	Means of verification	Assumptions
Evaluation Question 4: To what extent has the EIA process been efficiently implemented?	(see Figure 2-4 , KPI 'C(6)')		timeframes, will produce good quality reports. (see Figure 2-4 Figure 2-4: ToC map for implementation evaluation of the South African EIA System Assumptions 4 to 15)
	Did the competent authority acknowledge and accept the application within the prescribed timeframe?	Documentation evaluation	
	Were the regulatory timeframes met for public participation?	Documentation evaluation	
	Did the consultants submit their reports within the prescribed timeframes (only 2014 Regulations applicable)?	Documentation evaluation	
	Did the competent authority acknowledge the final report submissions within the prescribed timeframe?	Documentation evaluation	
	Did the competent authority make and communicate their decision within the prescribed timeframe?	Documentation evaluation	
	Was the appeals process conducted according to the prescribed timeframes?	Documentation evaluation	
Inputs that contribute to the delivery of the activities and output component			Assumptions for inputs in order to support activities
Time and money for implementation of the EIA process provided by the applicant for conducting the EIA	The following indicator is indicative of the cost-benefit of the EIA. (see Figure 2-4 KPI 'B(1)')	Documentation review and personal communication	The benefits of doing EIA outweigh the costs.

Narrative summary and key evaluation questions	Key Performance Indicators (KPIs)	Means of verification	Assumptions
and government with administration Evaluation Question 3: What has been the economic impact of the EIA process on identified sectors?	Did the direct EIA costs fall below the international benchmark of 1% of total project cost?	Documentation review and personal communication	(See Figure 2-4, Assumption 3)
Skills and competencies that underpin the EIA process (A) Evaluation Question 2: How is EIA expected to achieve its objectives?	The following indicators are indicative of the skills and competencies that underpin the EIA. (see Figure 2-4, KPI 'A(8)')	Documentation review and personal communication	Sufficient skills and competencies exist to implement the EIA system. (see Figure 2-4, Assumption 2)
	To what extent do the skills and competencies of the consultants conform with NQF level 8?	Documentation review	
	To what extent do the skills and competencies of the consultants conform with relevant fields of study?	Documentation review	
	To what extent do the skills and competencies of the consultants reflect relevant experience?	Documentation review	
	To what extent do the skills and competencies of the specialists conform with relevant specialist registrations?	Documentation review	
	To what extent do the skills and competencies of the specialists conform with relevant fields of study?	Documentation review	
	To what extent do the skills and competencies of the officials conform with NQF level 8?	Communication with department	
	To what extent do the skills and competencies of the officials conform with relevant fields of study?	Communication with department	
	To what extent do the skills and competencies of the officials reflect relevant experience?	Communication with department	

Narrative summary and key evaluation questions	Key Performance Indicators (KPIs)	Means of verification	Assumptions
Design which sets out what the system aims to achieve?			
The way that the system is designed and legislated sets the overall objective of EIA. Evaluation Question 1: What are the objectives of EIA in South Arica?	No KPIs exist for this evaluation question	Literature review	

2.2.4 Determining the type of evaluation to be conducted

An interpretation of the research aim, objectives and key evaluation questions identified for this research shows that the evaluation related to 3 types of evaluation – as shown in Table 2-3 and defined as follows:

Implementation Evaluation: Aims to evaluate whether an intervention's operational mechanisms support achievement of the objectives or not and understand why. Looks at activities, outputs, and outcomes, use of resources and the causal links. It builds on existing monitoring systems, and is applied during programme operation to improve the efficiency and efficacy of operational processes (DMPE, 2011). It also assesses the quality of the indicators and assumptions. This can be rapid, primarily using secondary data, or in-depth with extensive field work. Implementation evaluation when applied to an EIA system may be used to provide an indication of procedural effectiveness as stated by Sadler (1996). This infers that the EIA system processes conforms to established provisions and principles.

Impact Evaluation: Seeks to measure changes in outcomes (and the well-being of the target population) that are attributable to a specific intervention. Its purpose is to inform high-level officials on the extent to which an intervention should be continued or not, and if there are any potential modifications needed. This kind of evaluation is implemented on a case-by-case basis (DMPE, 2011). Impact evaluation aligns with the concepts of substantive effectiveness and normative effectiveness (Sadler, 1996, Baker & McLleland, 2003), asking whether the EIA system and its processes achieve the objectives set for example supporting well informed decision making which results in environmental protection and whether the EIA system achieves its ideal purpose, which may include sustainable development, a fair democratic participatory process as well as other internationally recognised goals.

Economic Evaluation: Economic evaluation considers whether the costs of a policy or programme have been outweighed by the benefits. Types of economic evaluation include: *cost-effectiveness analysis*, which values the costs of implementing and delivering the policy, and relates this amount to the total quantity of outcome generated, to produce a "cost per unit of outcome" estimate (e.g. cost per additional individual placed in employment); and *cost-benefit analysis* (CBA), which goes further in placing a monetary value on the changes in outcomes as well (e.g. the value of placing an additional individual in employment) (DMPE, 2011). Economic evaluation of the EIA system will possibly provide an indication of what Saddler calls transactive effectiveness, that is to say that the impact assessment process delivers these outcomes at the least cost in the minimum time possible. i.e is it effective and efficient.

Table 2-3: Relation between research aim and evaluation questions, different evaluation types and effectiveness types

Purpose	Types of Evaluation	Relation to causal logic chain (see Figure 2-4)	Effectiveness type (Sadler, 1996; Baker & McLlelland, 2003)
Research aim			
The research aims to apply the ToC approach to evaluation to the South African EIA system, with a view to making recommendations for improvement	Impact Evaluation	Outcomes, Outputs and Impact	Substantive and Normative
Key evaluation questions			
Evaluation Question 1: What are the objectives of EIA in South Arica?	Implementation Evaluation	Design	Procedural
Evaluation Question 2: How is EIA expected to achieve its objectives?	Implementation Evaluation	Inputs	Procedural
Evaluation Question 3: What has been the economic impact of the EIA process on identified sectors?	Economic Evaluation	Outputs	Transactive
Evaluation Question 4: To what extent has the EIA process been efficiently implemented?	Implementation Evaluation	Activities	Procedural
Evaluation Question 5: What is the quality of EIA reports and processes?	Implementation Evaluation	Outputs	Procedural and Substantive
Evaluation Question 6: To what extent has EIA influenced proposal design and decision making?	Implementation Evaluation	Outcomes	Substantive
Evaluation Question 7: To what extent has the EIA process been effective in achieving its objectives, towards sustainable development?	Impact Evaluation	Impact	Normative

This study is mainly an ‘implementation evaluation’ as defined by the National Evaluation Policy Framework (NEPF) (DPME, 2011), although admittedly the research objectives and

evaluation questions do extend the scope of the evaluation to also include elements of 'impact evaluation' as well as 'economic evaluation'.

Therefore, in order to address the research objectives, the entire results based pyramid (**Figure 2-3**) needed to be covered in the design of the ToC narrative, from design through to impact. The challenge for this study was therefore to develop a logical framework and criteria specifically for EIA system evaluation by adapting the results-based management pyramid as a preferred approach. Indicators needed to be developed across the different review components, and then applied to multiple case studies. Ultimately the result of the evaluation had to be fed back in the form of recommendations to improve the system design (**Research objective 3**). The latter is also part of the logical framework approach and ToC testing – which aimed to reverse-engineer the evaluation results. It is argued that by addressing the entire results based pyramid, the research engaged with the four effectiveness classes as pioneered by Sadler (1996) as illustrated in Table 2-3.

As stated above, evaluation research is well established in the environmental assessment field and that frameworks for evaluation have also already been developed (example Wood, 2003; Dalal-Clayton & Sadler, 2005; Retief, 2007d; Kidd & Retief 2009; Retief 2010; Retief, 2013). Although it is noted that the ToC approach is a recognised evaluation method (DPME, 2011; Alberts, *et al.*, 2019) preferred in the South African context for DPME evaluations, some weaknesses exist when applying it to EIA system evaluation. These are outlined in Section 2.5, which provides the methodological limitations of the research. To address the limitations, an adaptation of the ToC approach was applied to this study, where these weaknesses are addressed in the ToC process and methodological design (as discussed in Section 2.3 *Research Design and Methodology*).

2.2.5 Conclusions on *Theory of Change methodological design*

Section 2.2 has dealt with **research objective 1**, namely the application of the Theory of Change approach to evaluation to a selected EIA system, as well as **research objective 2**, the development of criteria against which the system may be evaluated.

The application of the ToC approach has resulted in the ToC map (**Figure 2-4**), which described the different components of the South African EIA system, from *design*, *inputs*, *outputs*, *outcomes* and finally *impacts*. The ToC map furthermore identified 19 key assumptions (**Box 2-1**) on which the South African EIA system is predicated. This phase of the research then continued to draft the TOC narrative (**See Box 2-2**) which informed the logical framework for the south African EIA system, or in other words, the inner logic on which the EIA system is based (**Table 2-2**). The logical framework provided seven key evaluation questions, with forty-six (46) corresponding KPIs (**Refer to Table 2-1 and Table 2-4**). The evaluation questions and KPIs are also linked with the identified assumptions, the rationale being that in addressing the identified evaluation questions and KPIs, the research will test the validity of the nineteen identified assumptions.

Research regarding the ToC map and ToC narrative together with the logical framework, key evaluation questions and underlying assumptions has been peer reviewed and published by the researcher, namely Alberts *et al.* (2019). The next section (Section 2.2.5) describes the research design and methodology that were used in addressing **research objective 3**, which is the evaluation of the selected EIA system against the identified criteria.

2.3 Research Design and Methodology

This section (Section 2.3) outlines the research design that was developed to deal with the research objectives and resulting evaluation questions discussed in earlier. Section 2.3 presents the research design and describes the link between the research aim and **research objective 3** (Refer to Figure 2-5). The methodological approach and methods related to the case study evaluations are described in this section.

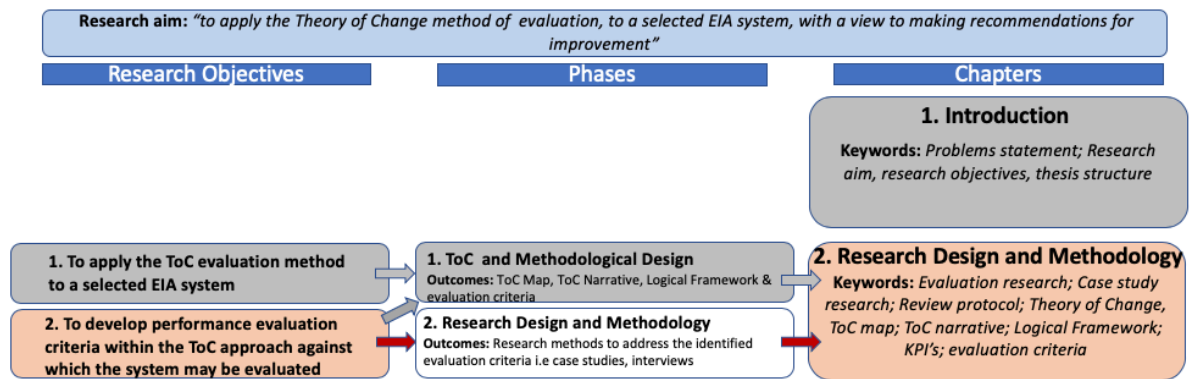


Figure 2-5: Research layout Chapter 2.3

This section and sub-sections (2.3.1, 2.3.2 and 2.3.3) set out the research methods identified to address the evaluation criteria in the form of KPIs resulting from the application of the ToC approach and as contained within the logical framework in above.

Phase 2 of the research involved designing a research methodology to address the identified evaluation questions and corresponding KPIs (Table 2-4).

Table 2-4: Evaluation questions and corresponding KPIs used for the evaluation as derived from the Logical Framework (also refer to Table 2-2)

EIA system component	Evaluation question	Key Performance Indicator
Design	Evaluation Question 1: What are the objectives of EIA in South Arica?	NA
Inputs	Evaluation Question 2: How is EIA expected to achieve its objectives?	To what extent do the skills and competencies of the consultants conform with NQF level 8? To what extent do the skills and competencies of the consultants conform with relevant fields of study? To what extent do the skills and competencies of the consultants reflect relevant experience? To what extent do the skills and competencies of the specialists conform with relevant specialist registrations? To what extent do the skills and competencies of the specialists conform with relevant fields of study? To what extent do the skills and competencies of the officials conform with NQF level 8? To what extent do the skills and competencies of the officials conform with relevant fields of study? To what extent do the skills and competencies of the officials reflect relevant experience?
Inputs	Evaluation Question 3: What has been the economic impact of the EIA process on identified sectors?	Did the direct EIA costs fall below the international benchmark of 1% of total project cost?
Activity	Evaluation Question 4: To what extent has the EIA process been efficiently implemented?	Did the competent authority acknowledge and accept the application within the prescribed timeframe?

EIA system component	Evaluation question	Key Performance Indicator
		Were the regulatory timeframes met for public participation? Did the consultants submit their reports within the prescribed timeframes (only 2014 Regulations applicable)? Did the competent authority acknowledge the final report submissions within the prescribed timeframe? Did the competent authority make and communicate their decision within the prescribed timeframe? Was the appeals process conducted according to the prescribed timeframes?
Output	Evaluation Question 5: What is the quality of EIA reports and processes?	Was a description of the proposed activity provided? Was need and desirability described? Were key issues identified? Have alternatives been considered? Was significance determined? Was significance dealt with before and after mitigation? Was public participation conducted? Was an EMP submitted which describes mitigation measures? Was an impact summary statement provided? Was the description of the activity provided sufficient to inform the identification of listed activities? Was the information provided sufficient to justify the identification of key issues (scoping)? Were reasonable alternatives presented and assessed? Was significance determined according to a justified methodology, which includes the method and its application

EIA system component	Evaluation question	Key Performance Indicator
		Was the determination of significance consistently applied across specialist disciplines? Was justification provided for different proposed mitigation measures against the mitigation hierarchy? Has the significance rating after mitigation been justified? Were the proposed mitigation measures as described in the impact assessment incorporated into the EMP? Were roles and responsibilities assigned meaningfully in relation to management actions in the EMP? Was there any supplementary information submitted to the authorities that was not in the public domain? Were all comments from IAPs adequately responded to in the impact assessment process and reports (not relegated to comments and response reports)? Were all key IAPs consulted in the impact assessment process? Were the key recommendations from the impact assessment justified and clearly summarised in a non-technical fashion?
Outcome	Evaluation Question 6: To what extent has EIA influenced proposal design and decision making?	To what extent did the application authorise the correct listed activities? (lawful) To what extent did the process comply with minimum legal procedural requirements? (procedurally fair) To what extent was the decision described in the environmental authorisation consistent with and based on the content of the EIA reports? (reasonable / rational / proportional)

EIA system component	Evaluation question	Key Performance Indicator
Impact	Evaluation Question 7: To what extent has the EIA process been effective in achieving its objectives, towards sustainable development?	To what extent does the EIA system realize an environment that is not harmful to health and well-being? To what extent does the EIA system achieve protection of the environment over the immediate and long term? To what extent does the EIA system succeed in preventing pollution and ecological degradation? To what extent did the EIA promote conservation? To what extent did the EIA secure ecologically sustainable development? To what extent did the EIA promote justified economic and social development?

Yin (2014) describes the research design as *'the logic linking the data to be collected to the research questions of the study, it is in other words the process the researcher will follow to successfully answer the research objectives'*. It is imperative that every research project or study must have a well-planned research design (Hesse-Biber & Leavy, 2006). The basic concepts of research and knowledge construction are discussed, before discussing the research design and methods adopted for this study.

Essentially *evaluation research*, which is the chosen approach for this study, may incorporate either *quantitative or qualitative* methods or it may employ a combination of both. Quantitative research is often touted as being a 'hard science' whilst qualitative research is considered being more of a 'soft science' (Gillham, 2000; Gherardi & Turner, 2002). This often creates the impression that quantitative research is possibly more legitimate or robust than qualitative research. Qualitative research, although not being as old as quantitative research (Rule & John, 2011), has in its own right proven itself to be a valuable approach to research in which both exploratory, as well as descriptive knowledge can be generated (Hesse-Biber & Leavy, 2006). It stands to reason ultimately, that qualitative and quantitative approaches are two different, yet equally legitimate approaches to asking questions and in so doing, generating knowledge (Smith & Heshusius, 1986; Hesse-Biber & Leavy, 2006). Arguably the most notable difference between the two approaches (quantitative and qualitative research) is that qualitative research is more inclined to focus on the evaluation of text and words, whilst quantitative research is expected to focus more on numbers (Flick, 2007). A longstanding debate within academia, has been the combination of these two approaches into mixed methods research, with strong arguments for as well as strong arguments against the concept (Smith & Heshusius, 1986; Howe, 1988; Sale *et al.*, 2002; Johnson & Onwuegbuzie, 2004). It is contended by Flick (2007) that the mixed-methods research approach attempts to end the historic debate (Johnson & Onwuegbuzie, 2004) between the two approaches through the establishment of pragmatic links between the two whilst simultaneously emphasizing and utilizing the specific strengths of each method. Plowright (2011) discourages the use of the terms quantitative and qualitative, contending rather that it should be avoided all altogether, and that a new approach embracing integrated methodologies should be adopted, namely the so-called 'third methodological movement' also referred to by Tashakkori & Teddlie (2003) and which according to Johnson *et al.* (2007:123) may be defined as:

"...the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration."

The use of mixed methods when following the evaluation research approach is supported by Babbie (2011). The nature of this research as set out in chapter 1, necessitates a mixed method design, which was accordingly applied to achieve research objective 2 (evaluation of the selected EIA system). That being said, the manner in which the integration between qualitative and quantitative methods transpires should be carefully considered and well planned (Morgan, 2012). It is argued by Flyvbjerg (2006) that research should be problem driven rather than methods driven. To this end, the most suitable method for answering each research question, or objectives should be selected (Gillham, 2005). This researcher agrees with the approaches of both Flyvbjerg (2006) and Gillham (2005) and therefore the research aim and objectives described in **Chapter 1**, together with the outcome of the ToC approach as applied to the South African EIA system (**Section 2.2**) guided the selection of research methods to ultimately achieve **research objective 2**.

The validity and reliability of the research results is determined by the suitability of the research method, or combination of research methods for addressing a specific research question. Determination of validity involves a constant questioning of whether the method being used is actually measuring that which it should. In other words how valid or credible is the data?

Reliability addresses the question as to whether a methodology would generate the same or similar results if the same phenomena was measured several times. It deals with the question of the dependability of the techniques being used (Babbie, 2011; Grosseohme, 2014). Validity and reliability are concepts which were considered throughout this research. This was done by attempting to ensure the reliability of the data capturing process, which is discussed further in the following sections related to each method. The different research methods that were applied to each research question are shown in **Table 2-1**. These methods are subsequently discussed (Sections 2.3.1 to 2.3.3) and explained in the light of the applicable evaluation questions.

2.3.1 Literature review

A literature review is the systematic process of reviewing and analysing an existing corpus of published knowledge on a particular topic (Fink, 2010). This process, which entails the critical evaluation of a selection of documents which contains information, ideas, data and evidence related to the particular topic being studied (Hart, 2009) ensures that the existing knowledge is properly understood and digested and ensures that the proposed research objectives are contextualised within the existing knowledge base (Booth *et al.*, 2012; Hart, 2009; Jesson *et al.* 2011). The literature review also serves as a methodology (Jesson *et al.* 2011) which is

aimed at answering some of the research questions being asked (Fink, 2010). It therefore not only justifies the credibility or desirability of a specific research question but it also answers some of them (Hart, 2009). To this end, the literature review can be regarded as an integral framework or backbone of any research study and is vital to its success.

The literature review, as set out in Chapter 3 (Section 3.4), of this thesis, was conducted based on the different EIA system components (design though to impact) and corresponding evaluation questions. The literature review informed the system evaluation (**Research Objective 3**), and provided the necessary context within which the evaluation results could be synthesised and recommendations for system improvement could be made.

The literature review process entailed the following three steps: It must be remembered that the literature review was framed around the key evaluation questions stemming from the application of the ToC approach to the South African EIA system.

Step 1: A literature search was conducted via the Scopus database of peer reviewed EIA literature. The literature review employed the Scopus database, which included, at the time of the literature review, in excess of 22,800 journals. This included all journals with a primary focus on impact assessment, together with 150,000 plus text books. The Scopus data base has been favourably compared by Web of Science in terms of volume of journals and articles covered. This suggests a possible bias leaning more towards natural sciences when compared relatively to the social sciences (Mongeon & Paul-Hus, 2016). As is expected with database searches, the database algorithm restricts the available results. These were limited to the English language as well as to academic sources. Search terms included combinations of “EIA”; “impact assessment”; “performance”; “quality”; “effectiveness”; “cost”; “efficiency”; “developing countries”; “South Africa”. The literature review was an iterative one; with additional search terms being required in order to more fully capture relevant literature as the search progressed.

Step 2: A literature search was conducted of the National Research Foundation (NRF) Nexus and National ETD Portal databases which includes all PhD and masters research conducted in South Africa. The researcher used the search terms “EIA”; “Environment” AND “Impact” AND “Assessment”; “South” AND “Africa” – and a combination thereof. As with the Scopus database the search was iterative until a saturation point was reached.

Step 3: A search was conducted of all policies, legislation and case law related to the South African EIA system. The search relied on environmental law journal searches (such as the South African Journal of Environmental Law and Policy, Potchefstroom Electronic Law

Journal) as well as the Lexis Nexis environmental law database. Moreover, the search also included national and provincial environmental department websites.

2.3.2 Case study evaluation protocol

Experience in evaluation research suggests that case study approaches are particularly appropriate and that detailed investigation of 'case' rather than 'sample' is preferred (Eisenhardt 2002; Yin, 2017). This is particularly true for the South African EIA system where thousands of EIAs are conducted annually, which makes a representative sampling approach unviable. The strongest evaluation studies also seem to have used comparisons between cases, as stated by Robson (2002: 205):

"The flexibility in design and execution of the case study, together with the fact that most evaluations are concerned with the effectiveness and appropriateness of an innovation or programme in a specific setting, make the case study strategy appropriate for many evaluations." (Robson, 2002: 205).

Yin (2017) distinguishes between four types of case study designs, namely 'single holistic', 'single embedded', 'multiple holistic' and 'multiple embedded'. Single case designs usually rely on cases considered very typical or very unique, while multiple cases aim to cover different examples within a particular context. The difference between holistic and embedded case study designs lies in the need for analysis of specific embedded components (multiple units of analysis) within the holistic context. Since the research aimed to investigate a number of different sectors within the South African context, a single case study design was ruled out. Furthermore, since the research aimed to investigate different system components such as inputs, activities, outputs and outcomes (i.e. specific embedded components), a 'multiple embedded' case study design was preferred.

The findings of multiple case study approaches are in many instances perceived as being more compelling and robust than those of single case study approaches (Herriott & Firestone, 1983; Yin, 2017). The greater certainty lies with the greater number of cases. However, it needs to be stressed that this research followed 'replication logic' and not 'sampling logic' (Cape *et al.*, 2018). The research did thus not make broad generalisations but rather context specific conclusions that could be expected to replicate under similar conditions, within different sectors, within the South African context.

The development of a case study review protocol is, according to Yin (2017), desirable under all circumstances, but essential for multiple case study approaches. The protocol contains the methods, as well as procedures and general rules, to be followed in data gathering and analysis and provides the foundation for the validity and reliability of eventual results. It

typically includes a conceptual framework (in this case the ToC), data collection procedures and questions for evaluation (Yin, 2017).

2.3.2.1 Case study selection

Agreement on which *sectors* and *number of cases* to be evaluated are key considerations in the overall evaluation design. This evaluation has covered the following sectors, due to their significance in terms of contribution to the national economy and the fact that they are clearly subjected to EIA authorisation:

- Mining (e.g. open cast, underground, minerals processing, small and large ranging from sand mining to fracking);
- Agriculture (e.g. feedlots, broilers, abattoirs, etc.);
- Energy (e.g. coal fired power stations such, transmission infrastructure, renewable energy projects, etc.);
- Tourism (e.g. access and accommodation infrastructure in national parks, etc.);
- Housing (e.g. high cost country, golf and lifestyle estates; low cost housing developments; mixed land use developments);
- Bulk Services Infrastructure and Transport (e.g. linear development such as rail and pipelines, etc.); and
- Waste Management (e.g. waste storage, waste processing activities, recycling, etc.).

The question of how many cases to select per sector is a difficult one. Literature on the matter recommends the use of more case studies to improve the robustness of results (Schofield, 2002; Yin, 2017). To this end there is the understanding that a so-called ‘saturation point’ can be reached where the addition of extra cases would not significantly add to the results and conclusions in any beneficial manner. It is however the availability of resources that plays an important part in determining how many cases would be viable and real saturation might only be reached over years of follow-up research. This evaluation aligns with the view of Eisenhardt (2002: 27) who comments that:

“Finally, while there is no ideal number of cases, a number between 4 and 10 cases usually works well. With fewer than 4 cases, it is often difficult to generate theory with much complexity, and its empirical grounding is likely to be unconvincing, ... With more than 10 cases, it quickly becomes difficult to cope with the complexity and volume of data.”

Therefore, the selection of six (6) EIA cases per sector was proposed. The information for these cases was obtained from the ten environmental authorities, which includes the nine provinces and national Department of Environmental Affairs (DEA). The sampling was purposive based on the following EIA case selection criteria:

- EIAs for which authorizations have already been issued;
- EIAs where the proposed developments have been implemented;
- EIAs where there is full access to the complete case files and documentation;
- EIAs where key stakeholders are accessible for purposes of interviews; and
- EIAs that together provide a range of scale and complexity (i.e. big and small projects, diverse projects within a particular sector).

Ultimately, the environmental authorities provided access to 105 EIA cases, of which only seventy-three (73) cases were complete (with complete case files and documentation). Incomplete files could not form part of the sample, as the entire suite of documents was required for the evaluation exercise. Therefore, if a file did for example not contain the application form, it could not have been included. From the seventy-three (73) cases, forty-two (42) cases were selected for review (**See Table 2-5 and Appendix E**). The study aimed as far as possible to select cases from across environmental authorities to get a well-represented national profile of cases. This second round of selection across authorities was to avoid perceptions of manipulation by the environmental authorities and to ensure that the final case selection is as objective as possible.

2.3.2.2 Case study evaluation methods

Evaluation research typically require a combination of methods, that rely on rigorous and systematic data collection to deal with the potential complexity presented by case study research (Oakley, 2000; Yin, 2017). Typical of qualitative research, the data for this EIA system evaluation consisted in their most basic form of 'words'. As Miles & Huberman (1994) point out, these 'words' are produced through interviews or contained in documentation. Walcott (1992) describes the data gathering methods plainly as 'asking' and 'examining'. However, the apparent simplicity of qualitative data masks a good deal of complexity because the data is 'soft' and allows for subjective interpretation. The next sections describe the two main data gathering methods for the case study evaluations, namely documentation evaluation and semi-structured interviews.

Table 2-5: Total number of cases per sector and competent authority

Environmental authorities	Number of cases per sector per competent authority and/or province							
	Agriculture	Energy	Tourism	Housing	Bulk services infrastructure	Waste management	Mining	Other
Northern Cape	1	9	0	1	2	1	1	0
Limpopo	1	1	1	0	1	0	6	1
Mpumalanga	3	0	1	2	1	0	6	0
Gauteng	2	1	1	3	1	0	0	1
North West	1	1	1	1	2	1	0	0
Kwa-Zulu Natal	0	0	0	1	0	0	0	1
Eastern Cape	1	1	0	1	3	0	0	1
DEA	0	2	6	1	2	13	1	0
Western Cape	0	1	1	1	5	2	0	0
Free State	1	0	0	1	2	1	0	1
Total no. of cases	10	16	11	12	19	18	14	5

2.3.2.2.1 Documentation evaluation

Documentation was a key source of data for this research. The documentation evaluation process refers to all documentation related to the EIA application for each EIA case study. The evaluation process engaged with documentation in the case file that goes beyond the EIA report. The evaluation of the documentation supported the analysis of inputs, activity, outputs and immediate outcome components. However, interpretation of documentation always requires the evaluator to tread lightly, acknowledging that it was written at a specific time, within a specific context, for a specific purpose, by a specific person(s) for a specific audience (Yin, 2017). The advantages of documentation as a source of data are its unobtrusive nature, as well as its permanent form allowing for re-analysis (Robson, 2002). Because of the importance of access to documentation, its availability was a particular criterion for case study selection.

The documentation contained in the case files were divided into five main categories, namely: (i) EIA reports; (ii) EIA specialist reports; (iii) EIA review/audit reports, (iv) environmental authorisation (EA) and a range of (v) formal correspondence. An evaluation sheet was designed for application to the documentation evaluation – **see Appendix A**. The result of the documentation evaluation was scored on the evaluation sheet against the forty-six (46) KPIs and also captured the justification for the conformance scores.

2.3.2.3 Case study data gathering process

The data collection process was conducted between March 2018 and July 2018. Data was gathered for the different cases in parallel, which allowed for the alignment of logistical aspects. In general, the data gathering process involved two phases (as outlined below). The researcher made use of six qualified and experienced case reviewers or evaluators, with a combined total of 100 years' experience in EIA practice. The use of several case reviewers, helped to address the issue of researcher bias and subjectivity and allowed for validation of the case study results. Reviewers were selected based on their knowledge and experience of the South African EIA system as well as their knowledge of EIA within the context of the specific sectors chosen for the evaluation.

Phase 1: Preparation for evaluation (March 2018 – April 2018):

- Case files from the different environmental authorities were sourced and made available to the researcher and reviewers. All documentation / project files were kept in one location.

- The case selection from the overall sample was done once all the project files were sourced.
- From the project files potential interviewees were identified and an interview schedule was drawn up.

Phase 2: Conducting the evaluation (April 2018 – June 2018):

- The evaluation of documentation formed the first step of the overall evaluation process.
- The evaluation team convened at a single location (North West university, Potchefstroom Campus) for a consolidated period of time to conduct the evaluations. This ensured a focussed approach and facilitate good communication and interaction within the evaluation team.
- Evaluation results were circulated and evaluated by the review team, and then finally consolidated and synthesised by the researcher.
- All documents were evaluated within a consolidated time span. This ensured a consistent approach to the evaluations
- Semi-structured interviews with purposefully selected key individuals were conducted according to the pre-arranged interview schedule.
- The investigative nature of the evaluation required, in some cases, follow-up telephonic interviews to clarify and elaborate on certain aspects and findings.

2.3.2.4 Interpretation and analysis of results

The research supported the view of Miles & Huberman (1994) who describe qualitative analysis as consisting of concurrent activities of data reduction, data display and conclusion drawing/verification. The next sections (Sections 2.3.2.4.1 to 2.3.2.4.5) describe these activities in more detail.

2.3.2.4.1 Data reduction

Data reduction, or ‘data condensation’ (Tesch, 1990) refers to the process of selecting, focusing, simplifying, abstracting and transforming data, in this case ‘words’ gathered through interviews and documentation evaluation. According to Miles & Huberman (1994: 173):

“Data reduction is not something separate from analysis. It is part of analysis. The researchers’ decisions – which data chunks to code and which to pull out, which patterns best summarize a number of chunks, which evolving story to tell – are all analytic choices. Data reduction is a form of analysis that sharpens, sorts, focuses, discards, and organizes data in such a way that final conclusions can be drawn.” (Miles and Huberman, 1994: 173)

The review protocol (**Appendix A**) was the main data reduction tool for the research. It provided different lines of enquiry, from the more detailed indicator level to a more conceptual

level. The research made use of a broad range of data to pursue the line of enquiry set out in the review protocol. To manage the potentially complex and multi-faceted array of data, and facilitate successful data analysis, the research followed a structured data management regime adapted from methods commonly used in environmental auditing, such as 'evaluation checklists' and 'finding sheets'. The checklists contained all the indicator questions and captured the final evaluation results. The justification for the results was noted on the finding sheets and linked back to the checklists via a referencing system. Typically, the finding sheets reflected a combination of types of data, which included documentation evaluation as well as interview results.

In this way, the performance value awarded for each indicator on the evaluation checklists was clearly justified against the triangulation of a range of data types. For the documentation and interview evaluation sheets see **Appendices A and B**.

2.3.2.4.2 Case study data display

The analysis of the qualitative data focused on patterns in results which assisted in later cross-case comparisons. Subsequently, the displays were aimed at providing a conceptual illustration without eroding the qualitative characteristics. Two types of display were considered, namely:

- **Matrix:** Data was captured initially on a matrix for each case, which showed the overall evaluation results of the different indicators. This was useful as a reference for the overall results.
- **Scatter plot:** To illustrate patterns, as well as correlation and possible causations, in overall results a circular scatter plot resembling two 'wagon wheels' were used. The conformance scores were plotted along the spikes of the 'wagon wheels', which show the relative position of the review results in terms the different evaluation components. Thus, basic patterns were distinguished based on the groupings within different conformance components. Moreover, the inputs, activity, output and outcome results were compared with the impact results to identify possible positive or negative correlations

In the end it was decided to only represent the data by way of a meta matrix, contained in **Appendix C**. Scores were colour coded, allowing the researcher to identify areas of good, average or weak performance across the selected cases.

2.3.2.4.3 Individual case analysis

The results of the individual case study evaluations provided both a holistic view of evaluation performance together with rich, detailed descriptions in relation to the specific indicators. The literature clearly warns against:

“... just adding up separate variables, as in a quantitative survey approach will destroy the local web of causality, and result only in a smoothed down set of generalizations that may not apply to any specific case in the set, let alone others” (Miles and Huberman, 1994: 172)

Thus, the analysis did not rely on a mere aggregation of the results with the expectation to conclude with an overall evaluation ‘score’. The underlying assumption was that conformance to more indicators implied better performance. This assumption however, remains qualitative and subjective in nature and was thus not considered absolute, especially since the relative weight of the different indicators had not yet been established (at that stage). The following broad performance measurement classification was used, ranked A, B and C. It did not set out specified thresholds or specific quantifiable parameters because ultimately the overall performance depended on an informed qualitative judgment:

- **C = Poor to Average:** Failure to conform, and/or partial conformance, to the majority of indicators. i.e non-conformance
- **B = Average:** Partial conformance to the majority of indicators, or an even spread in performance. i.e partial conformance
- **A = Average to good:** Partial, and/or conformance, to the majority of indicators. i.e conformance

Essentially the indicators and evaluation results were used to present a qualitative description and to tell a story against the ToC inner logic, not to provide a result based on a quantitative ‘calculation’.

2.3.2.4.4 Cross case analysis

Cross case analysis confronts the inherent tension that exists between the ‘particular’ and the ‘universal’. To deal with this tension two broad approaches to qualitative cross case analysis are proposed in the literature (Ragin, 1987; Abbot, 1992; Miles & Huberman, 1994). They are the so-called ‘case orientated’ and ‘variable orientated’ approaches. The case orientated approach initially considers the case as a whole entity, looking at configurations and patterns within each case before a comparative analysis of, usually, a small number of cases. This approach aligns well with Yin’s (1984; 2017) ‘replication logic’ strategy as already discussed. The variable orientated approach casts a wider net over a larger number of cases, with variables and their inter-correlations across cases as the building blocks of the analysis, rather than individual cases. Both approaches have their strengths and weaknesses. Case orientated analysis is good at finding specific, concrete, historically-grounded patterns common to small sets of cases, but its findings are often particularistic. The variable orientated approach is poor at handling real life complexities with findings often very general.

Miles & Huberman (1994) propose that it is usually desirable to utilize the best of both worlds by applying a 'mixed strategy' also referred to as the 'stacking of comparable cases'. This strategy resembles the 'multiple embedded' case study design chosen for the research. Ragin (1987) also supports this approach and points out that it is more effective to think of a synthesized approach which involves using several variables for each of several cases, and then identifying alternative patterns of explanation. As for single case analysis the literature warns that simple,

"... aggregating or averaging results across cases is bound to lead to misinterpretation and superficiality." (Miles & Huberman, 1994: 173)

The cross case analysis presents conclusions that do not erode the context specific basis of individual cases, and at the same time achieves explanations beyond the particular case without leaning towards superficiality. Miles & Huberman (1994) propose the following broad actions as the basis for a 'mixed strategy':

- Write up each of series of cases using a standard set of variables;
- Analyze each case in depth;
- Stack case-level displays into a meta-matrix; and
- Condense data to allow for systematic comparison.

The first two actions were dealt with as part of the individual case evaluations. Based on the 'mixed strategy' the following analysis process was followed. Firstly, a 'case analysis' to compare the correlation between overall evaluation results across cases (which reflects characteristics of the 'case orientated approach'). Secondly, a 'component analysis' was conducted of specific component performance variables (which reflects characteristics of the 'variable orientated approach'). Patterns amongst cases provided the building blocks to develop descriptive models for each component where applicable.

The case analysis compared the KPI results for different cases. It included the following steps:

- *Stack results into a meta-matrix:* This was achieved by capturing the KPI evaluation results for the components, and KPI for each case in a matrix format referred to as a 'meta matrix'. This data formed the basis for the case analysis, and for the following component analysis.
- *Compare overall evaluation results:* Comparison of the overall evaluation results obtained for each of the individual cases made it possible to compare performance. The performance evaluation was a judgment based on the extent of conformance to the indicators, with the understanding that conformance to a larger number of KPIs implies better performance. The measurement was expressed in a spectrum between 'good', 'average' or 'poor' and were illustrated on line graphs.

- *Identify correlation between different components:* This comparison showed variations in the correlation between component performance. The correlation was either positive or negative. Positive correlation included cases that achieved similar performance results. Negative correlation included cases where performances differed.

The next section describes the 'component analysis' (which applied to the cross case analysis) in more detail.

2.3.2.4.5 Sector and component analysis

The component analysis comprised of four steps and dealt with the five components outlined in the ToC map. The review protocol provided a framework in the form of the ToC map and narrative that included what was considered to be the most important components for evaluation. To provide a description of the performance of EIA system in relation to different sectors required detailed analysis of these components. The following steps were taken to systematically describe each component:

- *Extract component data from meta matrix:* The performance data for each component were extracted from the meta matrix described in the previous section. To allow for comparison, the data were presented in a matrix format.
- *Identify similarities in performance across cases:* By comparing the performance for each KPI it was possible to isolate similarities in performance as well as differences across cases. KPIs for which four or more of the six cases had similar performance results, were considered to be similar. The results were illustrated on bar graphs (Refer to Chapter 4 – Results and discussion).
- *Identify differences in performance across cases:* The remainder of the KPIs that showed differences in results between cases were refined further for patterns or similarities between two or more cases. To achieve this, the analysis compared performance of the different cases in relation to these indicators in a metamatrix (**Appendix D**).
- *Formulate graphs based on the evaluation results:* The graphs indicated performance against each of the identified KPIs for analysis and discussion (Refer to Chapter 4 – Results and discussion).

2.3.3 Interview processes

Interviews are particularly important when dealing with the evaluation of intermediate outcomes and impacts. This is because the intermediate outcomes and impacts are not always reflected in the documentation. For example, interviews with different role players is the only way to gauge the extent the EIAs gave effect to administrative justice (intermediate outcome) and/or contributed to ecologically sustainable development (impact).

Interviews are widely used in social research and vary between highly structured to flexible formats depending on the nature of the research (Robson, 2002). Rubin & Rubin (1995) suggest that interviews in case study research are likely to be more fluid than rigid, conversational rather than structured. Expanding on this view Yin (2017: 89-90) states that the case study interviewer has two responsibilities throughout the interview process, namely:

“ ... (a) to follow your own line of enquiry, as reflected by your case study protocol, and (b) to ask your actual (conversational) questions in an unbiased manner that also serves the needs of your line of inquiry.”

The main questions considered as part of the interview design were, ‘who to interview?’, ‘what types of interview would be most suitable?’ and ‘which questions to ask?’. As proposed by Yin (2017), the lines of enquiry for the interviews are based on the evaluation indicator questions. Thus, it was necessary to determine who would be able to deal with the particular line of enquiry, and what type of interview would be best suited for that individual, given the time available for the interview and the logistics involved. For the purpose of the case study evaluation the following four broad categories of potential interviewees were identified – for which a total of 20 interviewees were identified per category:

- Those responsible for *initiating* the EIA: This included for example consultants, representatives from funding agencies or government officials.
- Those responsible for *conducting* the EIA: In most cases external consultants conducted the EIAs. Even in cases where the EIAs are managed ‘in house’, specialist consultants are usually involved.
- Those responsible for *implementing* the EIA: The implementation of the EIA is the responsibility of project owners or developers, government agencies at national, provincial and local level.
- Other: The iterative nature of identifying interviewees resulted in various discussions with individuals indirectly involved with the EIAs, such as government officials, Interested and Affected Parties (IAPs) and specialist consultants. These discussions would not be considered formal interviews although they would serve to clarify and confirm certain aspects.

The evaluation had to ensure sufficient representation from each category to satisfy the particular line of enquiry. The interviews were conducted anonymously so as to promote participation of the interviewees and to illicit honest responses to the questions posed (Saunders *et al.*, 2015).

These stakeholders were refined and categorised under the following groups:

- Environmental Assessment Practitioners (EAPs);
- Competent Authorities as defined by the NEMA EIA Regulations (CAs);

- Applicants or Developers; and
- Non-governmental organizations working in the environmental sector.

Appendix B provides the interview design sheet with all the interview questions, also those related to the different impact KPIs. All interviews were transcribed and analysed, and were then translated back to the KPIs related to the impact of the EIA system. As with the documentation review, the interviews were used to verify and corroborate evidence from other sources with regards to testing conformance to indicators. Interviews were conducted over the phone (15 to 45 minutes), supplemented by written submissions (where this was possible). All interviews were semi-structured although the type of interview varied between open ended and more focused depending on the time available.

The interview questions were designed by the researcher, who also identified the interviewees as set out above. Interviewers were identified to conduct the interviews, after which an interviewer workshop was held by the researcher and the interviewers to triangulate and analyse interviewee responses. The multiple interviewers were used to address potential subjectivity and to strengthen the validity of results. The use of interviewers to conduct the interviews addressed any concerns around interviewer bias. The results of the interviews are discussed in **Chapter 4** of this thesis.

Yin (2017) points out a number of distinct features for the formulation and design of interview questions for case study research. Firstly, the questions are generally posed to the investigator rather than the interviewee. Thus the investigator's judgment and interpretation of data serves as the main basis for the evaluation of the case. Secondly, the verbal line of enquiry might be different to the mental line of enquiry due to the investigative nature of case study research. Therefore, the interview questions did not necessarily exactly reflect the questions for evaluation contained in the protocol.

2.4 Ethical considerations

According to the North-West University (NWU, 2018), ethical considerations should be acknowledged and taken into consideration during research. The nature of this research did not include any significant risks to animal or human participants. The research proposal for this study was reviewed by the Scientific Committee of the Environmental Management Research Group (EMRG) in the Unit for Environmental Sciences and Management and was exempted from full review by the Faculty of Natural and Agricultural Science's Research Ethics Committee (REC). The outcome of the ethics approval process indicated that the methodology proposed was considered to be a low ethical risk.

2.5 Limitations to the study

The following methodological limitations must be taken into consideration when reading this thesis:

- **Applying the ToC methodology:** Although it is noted that the ToC approach is a recognised evaluation method (DPME, 2011; Alberts, *et al.*, 2019) preferred in the South African context for DPME evaluations, some weaknesses exist when applying it to EIA system evaluation. The first is that the inner logic of EIA has already been developed, agreed upon and prescribed in South African legislation, so the ToC in this process reflects a description of what is, which does not lend itself well to a process where the ToC is expected to be 'designed' through a participation process for example.

Secondly, the aims of the EIA system are very difficult to measure and in most cases not quantifiable, different to other interventions which typically rely on well-defined and quantifiable outcomes and impacts. Moreover, the success of EIA in achieving its aims (or having an impact) can only be determined over years or even generations.

Thirdly, the ToC approach, in particular, requires substantial time to access and work with the wide range of stakeholders necessarily involved in the EIA system. The need for agreement on the ToC map, narrative, underlying assumptions and developed KPIs, requires an iterative and time-consuming process (Mackenzie and Blamey, 2005). The focus on highly complex, multi-site interventions consequently requires measurement at multiple levels (the individual, group, organization and government) making the processes fraught with practical and conceptual difficulty (Barnes *et al.*, 2003; Sullivan *et al.*, 2002). In addition the approach's commitment to improving programme or policy intervention delivery and integrating process and outcome requires the articulated ToC to be revisited over the course of the intervention.

Finally, the ToC approach is underpinned by the assumption that rational causal linkages exists across the different components, which is highly questionable and does not recognize the messy world of decision making, underpinned by irrationality, which makes claims of causality very difficult. In short, it implies an oversimplification of the world which is not always borne out by reality. It is mainly due to these weaknesses that ToC approaches are not generally used in EIA system evaluations internationally. Therefore, an adaptation of the ToC approach is applied to this study, where these three weaknesses are addressed in the ToC process and methodological design as discussed in **Sections 2.2 and 2.3** of this thesis.

- **Measuring the contribution of EIA to sustainability** is difficult to conceptualise and evaluate empirically as set out in the literature review (Chapter 3 of this thesis) (see for example: Retief, 2011; Retief 2013). The interview method, which mainly tested the perceptions of different stakeholders, was used to deal with this challenge, as it is common practice internationally (see for example Arts, *et al.*, 2012; Lyhne *et al.*, 2017; Loomis & Dziedzic, 2018).
- **Generalizing from case study research:** How to generalise from case study research has been a topic of debate amongst scholars for decades. To deal with this question the evaluation followed the so-called 'replication logic' and not 'sampling logic' approach (see Yin, 2017). Accordingly the research did not make broad generalisations but rather attempted to make context specific conclusions that could

be expected to be replicated under similar conditions or within similar contexts or sectors.

- ***Dealing with causality*** is a general challenge associated with case study and evaluation research. For example, there are many external influencing factors that affect the outcomes and the impacts of EIA. Therefore, it was important that the ToC and ToC logical framework were designed to allow for reasonable and rational explanations, with clearly defined assumptions.
- ***Weighting of indicators and limited baseline data on indicators could be a limitation:*** It is acknowledged that certain inputs and activity indicators are more significant in influencing outputs and outcomes than others. However, until a better understanding is gained of how the EIA system functions, it would not be desirable to prioritise or weigh the relevant importance of each indicator. Following the logic and assumptions contained in the ToC did, however, provide a rational basis for arguing the relative importance of different indicators.

Limited baseline data and/or targets for indicators is also a limitation. The indicators used in this research and system evaluation had to be designed from scratch and therefore no blueprint in terms of targets and indicators existed, compounded by the fact that there is limited existing baseline data.

CHAPTER 3 LITERATURE REVIEW

3.1 Introduction

Chapter 3 reviews the relevant literature related to the evaluation questions identified in Chapter 2. Firstly, a brief overview of the international EIA literature is provided, followed by an overview of the South African EIA literature. Thereafter the relevant literature relating to the seven developed evaluation questions as identified is reviewed. The literature review is undertaken in pursuit of **research objective 3**, namely the evaluation of the selected EIA system against the criteria developed as part of **research objective 2** and discussed in **chapter 2**.

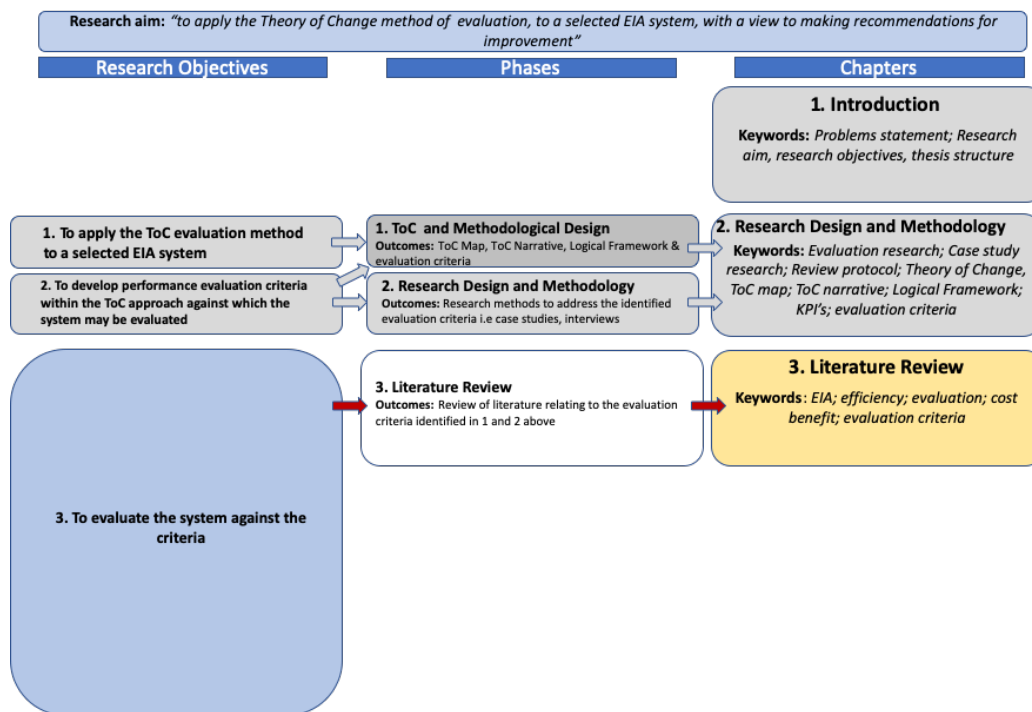


Figure 3-1: Research layout Chapter 3

3.2 Overview of international EIA literature

Internationally, the body of literature and knowledge dealing with environmental impact assessment (EIA) is vast. Since the conception of EIA in the late 1960s, it has been widely embraced and adopted, with over 200 countries worldwide having conducted some form of impact assessment (Lee & George, 2000; Wood, 2003; Dalal-Clayton & Sadler, 2005; Morgan, 2012; Loomis & Dziedzic, 201; Alberts *et al.*, 2019). Considering the nature of EIA literature highlights two particular features. The first being, that despite the wealth of literature which has developed over the past five decades, the content and related debates tend to be

practice orientated with a limited theoretical grounding (Bartlett & Kurian, 1999; Cashmore, 2004; Owens *et al.*, 2004, Loomis and Dziedzic, 2018). Resultantly, the thinking around EIA has evolved around practice rather than theory (Retief, 2010). Progress has been made in theory building in recent years, particularly between the fields of environmental assessment, planning, decision making and political sciences (Bartlett & Kurian, 1999; Kornov & Thissen, 2000; Nilsson & Dalkmann, 2001; Richardson, 2005; Wallington, *et al.* 2007, Bond *et al.* 2018a, 2018b) and the need to promote learning and retrospective analysis in EIA has become a strong focus (Jha-Thakur *et al.*, 2009; Morrison-Saunders & Retief, 2015a).

The second defining feature underpinning the EIA literature is that it tends to have a context and more specifically a country or case specific focus. This makes generalisation and knowledge transfer difficult (Retief, 2010). It is recognised that there is a significant difference to the depth and level of debates between different contexts. This reflects the history and maturity of for example a particular EIA system (Retief, 2010). Being mindful of the risk of oversimplifying the context, it may be contended that a broad overview of environmental assessment literature suggests that key international debates revolve around three main interrelated themes (Wood, 2003; Jay *et al.*, 2007; Retief, 2008; Retief, 2010; Morgan, 2012; Pope *et al.*, 2013), as illustrated in Figure 3-2. Although these themes relate to environmental assessment (EA) more broadly we could for purposes of this study apply them specifically to EIA.

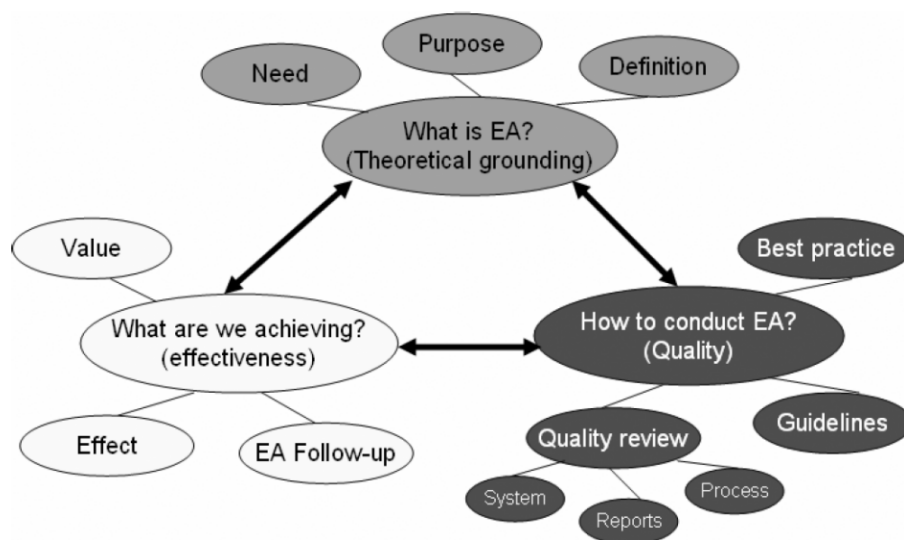


Figure 3-2: Main international themes for debate in environmental assessment (EA)
(Source: adapted from Retief, 2010; Morgan, 2012; Pope *et al.*, 2013)

The first theme deals with the identity and theoretical grounding of EIA, and asks the fundamental question “What is EIA?”. This relates to the underlying debates about the need for EIA, its purpose and, ultimately, its definition. It is acknowledged that the practice driven nature of EIA together with the fact that EIA is still a relatively new research field, explains the somewhat limited literature and research on theoretical grounding (Bond *et al.*, 2018). The early inception years of EIA have seen debates focussed mainly on questions framed around, “How can EIA be applied?” or “How can we do EIA?”. This constitutes the second main theme of debate within EIA literature. This debate addresses the macro level issues which included questions around best practice guidelines and system requirements. The micro level issues include issues concerning quality of processes, reports and methodologies. The sheer volume of literature dealing with this theme illustrates how it has dominated EIA debate (Wood, 2003; Dalal-Clayton & Sadler, 2005; Retief, 2010). The third theme within the EIA literature addresses concepts such as performance evaluation, which has gained prominence and attention over the past 15 years. It asks the questions, “How well is EIA being done — and — what is EIA achieving?” the understanding being that by answering the latter, then the first two themes could also be further refined and addressed. Questions dealing with EIA effectiveness, follow-up and value are all related to the third theme. In conclusion, it needs to be stressed that none of the three key themes can be considered in isolation as all three inform one another in an iterative manner. Although a broad overview of international literature supports the features and key themes described above, very limited empirical research has been conducted in order to analyse and trace debates. One such study is by Retief (2010), which is described in more detail in the next section.

An October 2017 search of Scopus (methodology explained later in this thesis) reveals that 3090 peer reviewed scientific publications have been published on EIA between 1980 and 2017. The majority of these publications are published in five main journals as shown in Figure 3-3. The trend in sheer volume of publications over time suggest that the number of publications increased dramatically since 2000 in the wake of two new journals being launched.

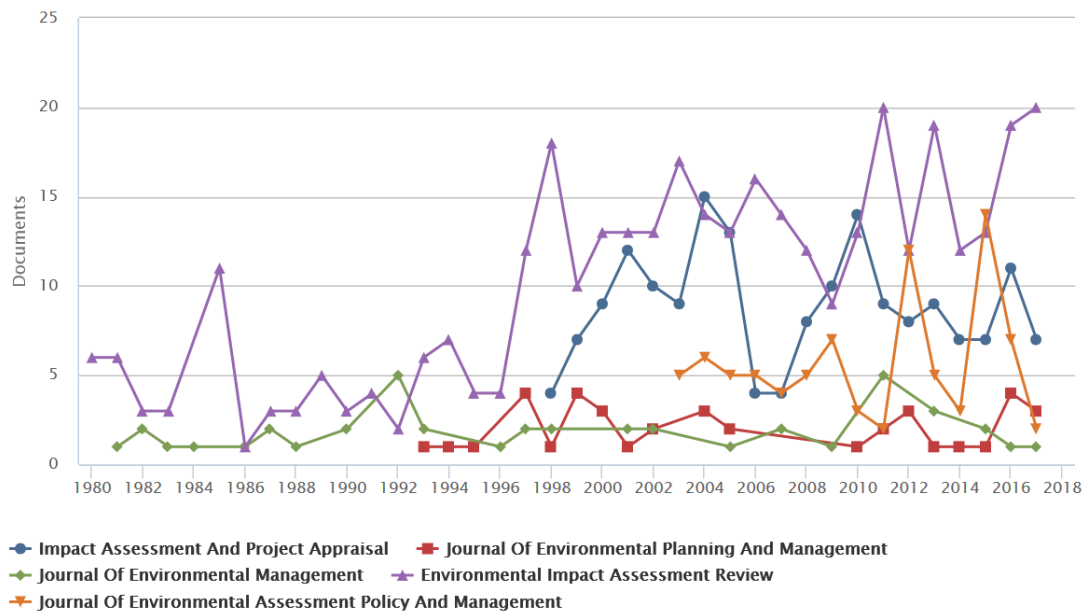


Figure 3-3: Main International Impact Assessment Journals (Source: Scopus search, 2017)

The editorial by Morrison-Saunders & Retief (2015b) shares the outcome of an evaluation of paper submissions to the journal Impact Assessment and Project Appraisal (IAPA) for the period 2009-2015. During this period, the IAPA journal received over 270 manuscript submissions, of which over 130 papers were subsequently accepted for publication. In round figures, there were more than 420 authors associated with the total manuscript submissions received, representing 60 countries. Figure 3-4 illustrates the relative number of authors per country and demonstrates that EIA is truly an international field of research. Overall some 370 reviewers from 32 countries were involved in the peer review of papers.

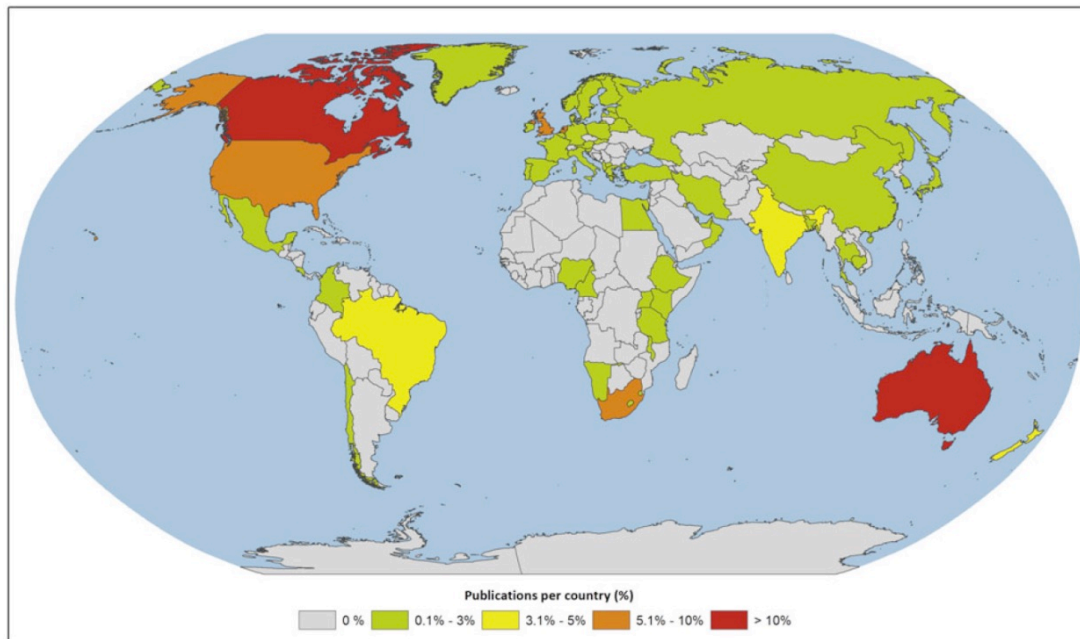


Figure 3-4: Frequency and distribution of authors for manuscripts submitted to IAPA Journal 2009–2014 (Source: Morrison-Saunders & Retief, 2015b)

The October 2017 Scopus search also reveals the main universities that contributed to the total number of impact assessment publications between 1980 and 2017 (Figure 3-5).

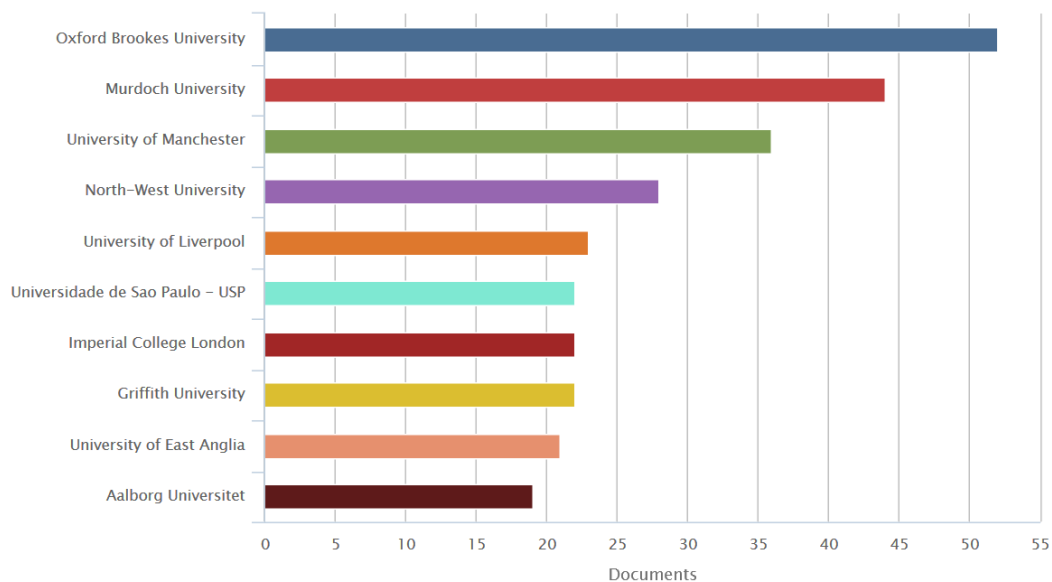


Figure 3-5: Main International Universities producing EIA research, 1980-2017 (Source: Scopus search 2017)

3.3 Overview of South African EIA literature

The October 2017 Scopus literature search revealed that South Africa ranks 9th in terms of overall peer reviewed EIA publications (Figure 3-6), the Netherlands and above Spain. This is a particularly good performance considering that other countries such as UK, US and the Netherlands have had at least a decade's head start in terms of the introduction of EIA policy and legislation. Of course, this does not mean that all the publications from South Africa relates to the South African EIA system. The data only reflects number of publications and not the particular focus of the research.

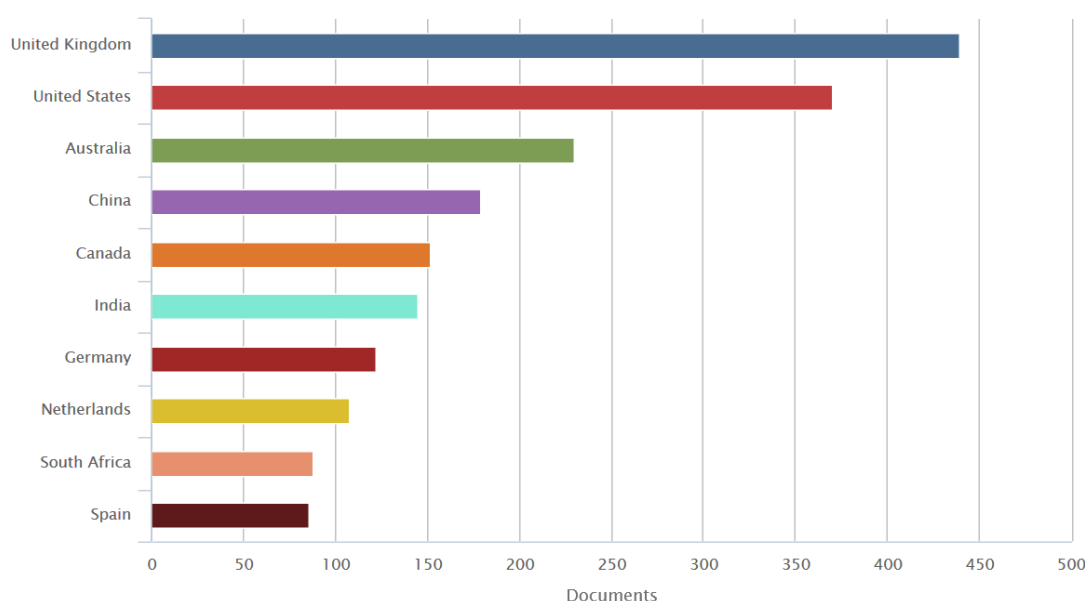


Figure 3-6: Main countries producing EIA research, 1980-2017 (Source: Scopus search 2017)

The only attempt at empirically tracing EIA debates within the South African context is by Retief (2010), which involved an analysis of the proceedings of the annual International Association for Impact Assessment, South African chapter (IAIAsa) conferences between 1997 and 2008 (the 2007 IAIA conference is not included in the analysis because it was an invited thematic conference). The analysis involved a review of 472 papers presented at these conferences. Figure 3-7 shows that the majority of papers (81%) dealt with issues around EIA practice and how to conduct EIA. Only 6% could be considered contributions to the theoretical grounding of EIA exploring questions related to the theoretical identity of EIA. The remaining 13% explored the effect EIA has had. However, when considering the data over time as illustrated in **Figure 3-7** it suggests that the third question dealing with the effect of EIA, became significantly more prominent, making up around half of the contributions in 2006 and

2008. Unfortunately, a more recent analysis has not been conducted but anecdotal evidence suggests that the debates around effectiveness have continued this trend beyond 2008.

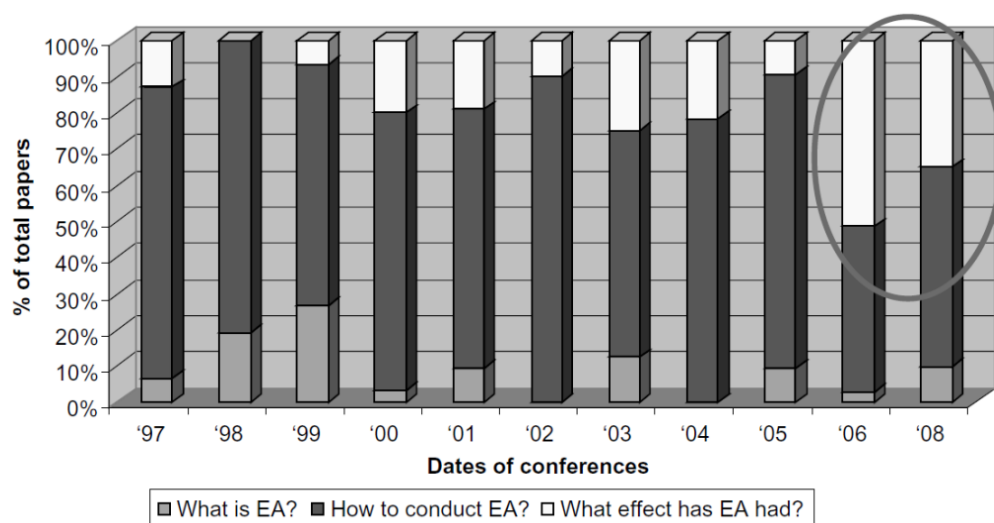


Figure 3-7: Trends in engagement with main international environmental assessment (EA) debates at IAIA conferences 1996 to 2008 (Source: Retief, 2010)

Therefore, the results suggest that since around 2006 debates have shifted away from concerns with quality and application of EIA towards more pertinent questions around effectiveness and the value that EIA is adding. It is evident that the EIA profession has seen a period of intense introspection over the past years, and in so doing, questioning the need for and contribution of EIA. The Retief (2010) analysis also shows that debates in EIA are wide ranging and complex, thus making it difficult to clearly trace learning or so-called “evolution”. Rather debates can at the very most be traced along certain topics or themes over time. More detailed analysis is possible within each theme. However, learning in EIA seems to occur incrementally and in a muddled fashion, not according to a neat linear and/or logical progression, which is probably not unique to EIA (Retief, 2010). There have been proven instances of attempting to redesign the wheel, but also instances of rapid progression in the complexity and range of debates. Therefore, any attempts to explore and to gain a better understanding of debates around EIA, will need to recognise this complexity and non-linear progression.

The key international themes of debate described in Section 3.2 provide a conceptual point of departure for the analysis of the South African EIA System. It is further recognised that there will always be a need and desire to reflect on best practice and to improve on guidelines, but maybe not to the extent required during the early years of EIA. The trend over the past

decade, which was to focus more on questions around effectiveness of EIA will continue in future, as will attempts to further strengthen the theoretical grounding of EIA.

3.4 Literature review structure

The literature review aimed to identify existing knowledge in relation to the different evaluation questions resulting from **research objective 2**. These questions were conceptualized as part of an evaluation framework which guides the overall methodology and analysis (**See section 1.4 & 2.2.3**). This section aims to introduce the methodology related specifically to the literature review phase of the evaluation.

The literature review as it relates to the identified evaluation questions is structured as outlined in Table 3-1.

Table 3-1: Structure of literature review chapter

Evaluation Questions	Related Evaluation Components (See framework – Figure 1-2)	Section
What are the objectives of EIA in South Arica?	Design	3.5.1, 3.5.2, 3.5.3
How is EIA expected to achieve its objectives?	Inputs	3.5.3, 3.5.4, 3.5.5
What has been the economic impact of the EIA process on identified sectors?	Outputs	3.6.1
To what extent has the EIA process been efficiently implemented?	Activities	3.6.2
What is the quality of EIA reports and processes?	Outputs	3.6.3
To what extent has EIA influenced decision making?	Outcomes	3.7.1
To what extent has the EIA process been effective in achieving its objectives, towards sustainable development?	Impact	3.7.2

3.5 Literature: Design and input components

This section relates to the following evaluation components and questions:

Design and input components deal with the resources that contribute to the delivery of the activities and output component. In this case the design and input components relate to the design of and inputs to the EIA system as reflected in EIA theory, EIA policy and legislation as well as administrative and skill requirements. Ultimately the system is designed around

legislation and implemented through certain administrative and skill requirements. Understanding of the design and input components is used as basis against which to analyse the ToC, inner logic and consistency of the intervention.

Evaluation questions related to the design and input components are:

- **Evaluation Question 1:** What are the objectives of EIA in South Africa?
- **Evaluation Question 2:** How is EIA expected to achieve its objectives?

The following sections engage with the evaluation questions above, against the existing literature. As basis for understanding the design of the EIA system literature on the theoretical grounding of EIA was included, followed by a summary of the evolution of the EIA system in South Africa. The policy and legislative basis of the EIA system is then described in some depth in order to distil what the objectives of EIA are and how, from a governance perspective, SA is expected to achieve them. Existing literature on the skills and administrative capacity underpinning the system is dealt with next. The section is concluded with the existing literature on comparative system evaluations.

3.5.1 Theoretical grounding of EIA

Internationally theoretical understandings and ontologies are rarely mentioned in the EIA literature explicitly, if at all (Bond *et al.*, 2018). Recent work by Bond *et al.* (2018b) suggests that it is evident that the roots of EIA are embedded in a positivist philosophy which it is argued “*still dominates institutionalized EIA in many countries*” (Morgan, 2012; Bond *et al.*, 2018b), whereby facts and value judgements are distinguished (and values dismissed). The authors argue that this reflects a naïve realism ontology, at least within the EIA process itself and before decision-makers become involved. It is however recognised that in recent times there has been a move towards what Owens *et al.* (2004) call post-positivist theories, acknowledging that values are important and not everything can be measured precisely and analysed statistically. The Post-positivist ontologies, or theoretical perspectives, argued to have relevance for EIA include *inter alia*, critical realism (as espoused by Haigh *et al.*, 2012), and constructivism (proposed by Sheate, 2012 & Jalava *et al.*, 2013) to reflect the realities of decision makers constructing their own realities based on their perceptions. Bond *et al.* (2018b) maintain that these post-positivist ontologies call for “*more transparent, deliberative, and inclusive processes for informing policy and decisions*” (Owens *et al.*, 2004). It is understood by the authors that post-positivist ontologies demand increased emphasis on procedural fairness, justice and transparency as the basis for understanding EIA legitimacy; recognising values are important and encourages public participation as a means of obtaining

the different values. This ontological shift that exists in the academic literature therefore underpins the current understanding of organisational legitimacy in which the emphasis is very much on the way the EIA is conducted and the range of evidence considered (Bond *et al.*, 2018).

Haigh *et al.* (2012) are singled out in EIA literature for adopting a particular theoretical position; which argues that 'critical realism' is an appropriate ontology. Critical realism accepts the validity of science and social science (and therefore both positivism and constructivism) in explaining observations of the world (Bond *et al.*, 2018b). The design of the South African EIA system seems to align best with the views of Haigh *et al.* (2012) that critical realism is an appropriate ontological position for EIA as it recognises the validity of quantitative and qualitative data, thereby accommodating more subjective elements of impact predictions, values and views as well as objective evidence. The latter theoretical perspective is in line with how EIA is understood from a policy and legislative perspective in South Africa, as will become clear in the following section.

Therefore, from a theoretical grounding perspective, and in attempting to simplify the theoretical understanding, EIA is generally considered as both an 'art' and a 'science', that is to say, a matter of having to deal with 'soft' and value driven issues (related to for example, public participation and decision making) as well as 'hard' science (which might be reflected in specialist studies on biodiversity, water quality, social impacts, etc.). The following definitions of 'assessment' (more science) and 'evaluation' (more art) in Section 1 of NEMA clearly supports this dichotomy:

"...‘Assessment’ means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to decision-making.

‘Evaluation’ means the process of ascertaining the relative importance or significance of information, in the light of people's values, preferences and judgements, in order to make a decision...."

This understanding of EIA as both an art and a science can be accommodated within the ontology of 'critical realism'. A dichotomy is therefore present (Kennedy, 1988; Wood, 2003) in understanding EIA as both an 'art' and a 'science'. This is similar to the theoretical grounding of many other disciplines and professions such as architecture, town planning, decision making sciences, etc. (Cilliers & Retief, 2013), and should provide a sound theoretical basis to develop a ToC narrative for EIA.

3.5.2 Historic Evolution of the EIA system in South Africa

South Africa has a proud and relatively long history of EIA dating back to the early 1970s (Boden, 1980; Sowman *et al.*, 1995; Mafune *et al.*, 1997). Since its early years, EIA has evolved from its humble and simple beginnings as an *ad hoc*, voluntary instrument, to the formalised and highly regulated EIA system we have at present. This section of the literature review focuses on the historical evolution of EIA in South Africa in order to place the current definition and understanding and eventually ToC narrative within a historic context. As a point of departure it is useful to highlight the main shifts in the understanding of EIA since its inception as described by Kidd *et al.* (2018), namely:

- First, there was an early move in the development of EIA in South Africa away from a focus on the biophysical environment or conservation to debates focussing more on the integration of sustainability within decision-making. The result being an introduction of a broad understanding of the term ‘environment’.
- Secondly, the requirement to legislate EIA has led to the concept becoming increasingly prescriptive and rigid in relation to the defined legal mandate this constitutes a move away from the need for flexibility and issues-driven approaches seen during the early years of EA application.
- The lack of a clear distinction between Integrated Environmental Management (IEM) and EIA been the cause of much confusion. It has been argued that the concept of IEM is too narrow to deal with the full extent of environmental management and too wide to be considered only as EIA. Subsequently environmental management and EIA has drifted away from the IEM concept towards new understandings of environmental management and assessment. The 2014 National Environmental Impact Assessment and Management (EIAMS) Strategy reflects the most recent thinking around the interface between EIA and environmental management in South Africa (DEA, 2014).
- The limitations of project-level EIA has led to the realisation that EIA requires a wider remit to also include strategic level assessment. During the early years of IEM this was referred to as the assessment of policies and programmes, followed by the introduction of strategic environmental assessment (SEA) during the mid-1990s. A number of more strategic environmental management instruments has been developed and legislated in the last decade to support project level EIA decision making such as SEA, Environmental Management Frameworks (EMFs), State of the Environment Reports (SOER), etc. (see for example Retief *et al.*, 2008; Retief *et al.*, 2011a; Marais *et al.*, 2015; Cilliers & Retief, 2017).

Table 3-2 provides a summary of EIA benchmark events, which suggest that four stages can be distinguished in the evolution of the South African EIA system, namely inception, formation, formalisation and refinement. Each stage represents a change in understanding and approach to EIA, which in turn was affected by a combination of international thinking and local experience and requirements

Table 3-2: Historic EIA benchmark events in South Africa (Source: Kidd *et al.*, 2018)

UP TO EARLY 1990s — INCEPTION	
1976	South African Council for the Environment Report: The report proposed methods and procedures for environmental evaluation in South Africa.
1979	Symposium 'Shaping our environment': Emphasised the value of EIA as an aid to the management of environmental change to incorporating principles of EIA into guidelines for use by professional planners.
1980	White Paper on a National Policy Regarding Environmental Conservation: Aimed to formulate a national policy on environmental conservation and proposed that the environment (both natural and manmade) should become a normal consideration in the planning and development cycle of projects.
	Environmental Planning Professions Inter-disciplinary Committee: Proposed guidelines to assist planning professionals in taking environmental aspects into account.
1982	Environment Conservation Act 100 of 1982: Provided for the establishment of a statutory Council for the Environment, which played a significant role in the development of EIA thinking.
	The President's Council: (an advisory council to the President) requested to advise on the principles according to which priorities between development and conservation can be stated.
1983	Council for the Environment and a subcommittee for EIA: The EIA Committee initiated research, workshops and consultation on EIA to develop a mechanism that would suit the South African context.
1984	President's Council: Published two reports that requested compulsory introduction of EIA for development projects outside Guide Plan areas.
1985	National Workshop on the significance and necessity of EIA: Government officials, professionals and academics indicated unanimous support for the introduction of EIA as part of a 'comprehensive holistic planning procedure'.
1987	Working Group (consisting of the EIA Committee and members of the Council for the Environment): Was appointed to develop the philosophy on environmental assessment for South Africa.
1989	Environment Conservation Act 73 of 1989: Made provision for an environmental policy (Section 2) and EIA (Sections 22, 23 and 26).
	Integrated Environmental Management (IEM) report: Set out the principles and a procedure for the evaluation of policy, programmes and projects.
EARLY TO MIDDLE 1990s — FORMATION	
1992	IEM Guideline Series reports: Served as guidance on the implementation of IEM.
	EIA for the Eastern Shores of Lake St Lucia: Presented the largest and most expensive assessment at the time conducted according to IEM philosophy and included both strategic and project level issues.
MIDDLE 1990S TO MIDDLE 2000s — FORMALISATION	
1996	SEA — a Primer Report: Aimed to initiate debate in order to develop an agreed convention or protocol on SEA in South Africa.
1997	EIA Regulations: Promulgated in terms of ss 21, 22 and 26 of the Environment Conservation Act 73 of 1989 for listed project level actions only.
1998	White Paper on an Environmental Management Policy for South Africa: Laid the foundation for SEA to be included into future legislation.
	IEM Discussion Document: Aimed to clarify IEM for environmental authorities and the private sector before it became legislated.
	National Environmental Management Act 108 of 1998 (NEMA): Included enabling legislation for EIA under Chapter 5.
2000	SEA Guidelines for South Africa: Set out a definition, approach, principles and process elements for SEA.
2004	NEMA Amendment Act 8 of 2004: Included specific enabling provisions for SEA.
	IEM information series 10: Provides an introductory information source on SEA.

	FROM 2006 ONWARDS — REFINEMENT AND SECTORAL EXPANSION
2006	2006 EIA regulations: Provides the first EIA Regulation in terms of section 24 of NEMA
	2006 Guideline Series on EIA: The guideline series aims to provide a user-friendly interpretation of the EIA Regulations
	Amendments to 2006 EIA Regulations: The amendments aim to refine definitions and listed activities
2007	Updated SEA Guidance: The updated SEA guidance provides a description of practice and the different interpretations of SEA in South Africa
2009	Regulations for listed activities - Waste Management: This Act provides specific EIA requirements for waste management related activities
2010	2010 EIA Regulations: Revision and refinement of the 2006 EIA Regulations in terms of section 24 of NEMA
	2010 Guideline Series on EIA: The guideline series aims to provide a user-friendly interpretation of the EIA Regulations
	Regulations for listed activities - Air Quality: This Act provides specific EIA requirements for air quality related activities
2014	Introduction of EMF Regulations: Introduction of EMF Regulations as a decision support tool for EIA and strategic planning
	2014 EIA Regulations: Refinement and replacement of the 2010 EIA Regulations in terms of section 24 of NEMA
	2014 Listing Notices: Refinement and replacement of the 2010 EIA Listing Notices with a view to strengthen the screening mechanism for EIA.
	Establishing of the “One Environmental System”

3.5.2.1 Up to the early 1990s: Inception

This early era of EIA saw the inception of the concept of EIA in South Africa, initiated and spurred on by the United States National Environmental Policy Act (NEPA), 1969. At this time the concept of 'sustainability' had not yet gained prominence. The term 'environment' was used to refer largely to the 'biophysical or natural environment' with some reference in the 1980 White Paper on a National Policy Regarding Environmental Conservation to the 'man-made environment' (Sowman *et al.*, 1995). The issue at the time was how to address and deal with the apparent conflict between decisions concerning development and conservation. It was argued at an early stage, that due to the unique socio-political and economic situation in South Africa, the concept of EA could not merely be imported from developed country contexts and that a more home-grown and nuanced approach was required (CE, 1976; Fuggle, 1989; Fuggle & Rabie, 1999).

The understanding and views of EIA during this period are reflected in reports (CE 1976; PC 1984), workshop proceedings (CE, 1986), policy documents, legislation and articles published in various journals (Rabie 1976; Blight 1980; Rabie 1986; CE 1989) at the time. Upon consideration, it is apparent that the initial understanding of environmental assessment related primarily to project level EIA. By the late 1980s however, it was realised that EIA on its own might be too limited in scope, reactive, anti-development and separate from the planning process (Hamann *et al.*, 2000). Extensive consultation and deliberation confirmed that this

view was common amongst government officials, environmental professionals and academics at the time. A broader philosophy was required for the South African context. This philosophy had to be flexible, generally applicable, widely accepted and practical to implement. It was envisaged that more detailed procedures and guidelines would be developed for specific types of projects, policies and plans once the generic procedure and principles were in place. This initiated and ushered in the next evolutionary phase, where the concept of Integrated Environmental Management (IEM) was developed to serve as an overarching and holistic environmental management philosophy.

3.5.2.2 Early to middle 1990s: Formation

This stage is founded on two landmark events, namely, the promulgation of the Environment Conservation Act 73 of 1989 (ECA) together with the release of the Council for the Environment report on IEM (CE, 1989). Section 2 of the Act provided for the promulgation of an environmental policy whilst sections 21, 22 and 26 allowed for the implementation of EIA. During the same period, the IEM report provided a description of the environmental evaluation philosophy for South Africa, which included the first proposed procedure for assessment of policies and programmes, along with definitions. It is apparent that no distinction between principles and procedures for strategic and project level assessment were made (similar to the United States and the Netherlands). However, the IEM procedures made it clear that it was not concerned just with assessment, but also with implementation and monitoring, that is to say the full planning cycle. Subsequent to a review of the 1989 IEM proposals, IEM Guidelines in the form of six guideline documents were published which contained minor amendments to the 1989 proposals and also more detailed practical guidance (DEA, 1992a). The Guidelines Series was well received and accepted and became the basis for voluntary application of EIA at the time.

During the formative years of EIA, its application was largely concerned with project level assessment, although isolated cases were found where SEA principles were included (Hansen *et al.*, 1997; Mafune *et al.*, 1997). However, one specific application of IEM warrants special mention as a benchmark case study in view of its high profile and overall status, namely the EIA for Eastern Shores of Lake St Lucia. It was hailed at the time as arguably the largest and most expensive EIA undertaken in South Africa (Weaver *et al.*, 1996). It provided an example of the application of IEM to different levels of decision-making. Both strategic (concerning the appropriate land use for a sensitive geographic area) and project level issues related to the implementation of the project (mining heavy minerals from coastal dunes) were included in the assessment. At that time the evolution of EIA was closely linked to the IEM philosophy, which provided for the following:

- A procedure for assessing policies and programmes similar to that for projects (CE, 1998; DEA, 1992b). This procedure was designed around the basic phases of the planning process, from proposal generation to implementation.
- A list of policy and planning proposals that should be considered for assessment (DEA, 1992b). These included mostly town planning related applications such as township establishment, structure plans, town planning schemes, declaration of limited development areas, etc. It also proposed that any other policy on the use of natural resources be considered.
- Special mention was made of the importance of considering cumulative effects at the strategic level. In order to achieve this, it was proposed that IEM be integrated with the broader planning context (DEA, 1992c).
- A broad understanding of the term 'environment' was introduced, defined as 'encompassing biophysical and socio-economic components' (DEA, 1992b).

It is evident that by the mid-1990s environmental assessment in South Africa combined principles and procedures for both project and strategic level assessment (very similar to the way it was being implemented in the United States and the Netherlands). Although sustainability was mentioned, no formal definition was provided nor was it punted as being the ultimate aim of IEM. Accordingly, the aim of IEM was to ensure that 'the environmental consequences of development proposals are understood and adequately considered in the planning process' (DEA, 1992b). The Rio Earth Summit in 1992, however, introduced the concept of sustainable development and from the mid-1990s this concept would also be injected into the EIA debate in South Africa, thereby initiating the next stage in its evolution.

3.5.2.3 Middle 1990s to middle 2000: Formalization

The aforementioned phases could be perceived or seen as the conception of EIA, while this stage represents its actual birth. Formal EIA legislation emerged in terms of the 1997 EIA Regulations and related EIA Guidelines (DEA, 1998a). However, this period also proved particularly important for the adoption and development of strategic level assessment or SEA. Whereas in the past, reference was made to the 'assessment of policies and programmes', the term SEA was now introduced. Early discussion documents on SEA (CSIR, 1996a; CSIR, 1996b & CSIR, 1997), SEA guidance (DEA, 2000) and enabling legislation emerged. The CSIR, supported by the then DEAT (now DEFF), as well as the national Department of Water Affairs and Forestry (DWAF), played the initial leading roles in the development of SEA.

During this period, the first new formal discussion document on IEM since the 1992 Guideline Series was published by DEAT in 1998 (DEA, 1998b). Its importance was highlighted in the White Paper on an Environmental Management Policy for South Africa specifically which stated that IEM will not only perform a central role in EIA, but also in development planning,

economic policy formulation and spatial development plans (RSA, 1998). The purpose of this IEM discussion document was to clarify the interpretation of IEM for both the environmental authorities and the private sector before any envisaged new legislation be introduced. It is unsurprising that the vague and broad understanding of IEM did not allow for it to be legislated in any kind of detail during this period. Ultimately Chapter 5 of the NEMA, which deals explicitly with IEM, would serve as and create the framework legislation that provided enabling provisions for the formalisation and legislation of EIA under the new Act, which led to the next phase of the evolution of the EIA system.

3.5.2.4 From 2006 onwards: Refinement (and sectoral expansion)

This phase saw attempts at refining both EIA in the form of various new versions of EIA Regulations in 2006, 2010, 2014 and 2017. To this end, three specific themes guided changes to the different versions of the EIA Regulations, namely refinement of screening criteria (i.e Listing Notices), refinement of the EIA process (i.e timeframes) as well as the refinement of public participation and consultation requirements. Moreover, there was a drive to see specific sectoral Regulations in terms of EIA requirements for waste management and air quality management being published in 2009 and 2010 in the wake of the National Environmental Management Waste Act (NEMWA) (RSA, 2008b) and National Environmental Management Air Quality Act (NEMAQA) (RSA, 2004b). This resulted in two new lists of activities specifically related to waste and air quality being added to the existing lists in terms of the NEMA EIA Regulations. To assist with the interpretation of the NEMA EIA Regulations the then DEAT published a number of guideline documents (van Schalkwyk, 2006), the first were for the 2006 and later for the 2010 EIA Regulations. To date no new national guidelines have been published on the 2014 NEMA EIA Regulations, except for the guideline dealing with ‘need and desirability’.

Another important occurrence during this period was the development of so-called Environmental Management Frameworks (EMFs). Although not an assessment tool, EMF does make important linkages with EIA, especially in terms of screening and providing strategic context for decision making. The first discussions about EMF were in the late 1990s as part of an IEM discussion document (DEA, 1998b) with formal legislation only being brought to pass in 2006 as part of the EIA Regulations and later in 2010 in terms of separate dedicated EMF Regulations. The slow adoption of SEA during this period could be ascribed to the apparent confusion on the difference between EMF and SEA and the rapid expansion of EMF practice. For a more detailed discussion on the state and extent of EMF practice see Marais *et al.* (2015) and Cilliers & Retief (2017). In recent times the DEA have explored the application of SEA more broadly, for example in relation to renewable energy planning.

Research by Cape *et al.* (2018) explored the expectations of role players involved in the renewable energy SEAs and found that government, industry, and the local community had very different expectations of what SEA should deliver.

3.5.3 Legal Mandate for EIA

A clear understanding of the EIA legal mandate is required in order to deal with the evaluation question around the objectives of EIA and how these objectives are to be achieved. The following sections deal with the core legislation underpinning EIA, important sectoral legislation as well as EIA case law.

3.5.3.1 Core legislation providing EIA mandate

There are three core acts that underpin the EIA legislative mandate, which are: The Constitution of the Republic of South Africa, 1996 (Constitution), Promotion of Administrative Justice Act (PAJA) (RSA, 2000) and the NEMA. The EIA Regulation are also covered in this section.

3.5.3.1.1 Constitution of the Republic of South Africa

The Constitution introduced an entirely new approach to environmental law, governing and management by providing for a right to an environment that is not harmful to health or well-being.

Section 24 states that:

Everyone has the right—

- (a) to an environment that is not harmful to their health or well-being; and*
- (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that—*
 - (i) prevent pollution and ecological degradation;*
 - (ii) promote conservation; and*
 - (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*

The introduction of this environmental right heralded an important break from the ECA and its policies in that the environment and ultimately the protection thereof has now been entrenched as a fundamental human right. Central to this right is the notion of sustainable development. The concept of sustainable development within the South African legal context is firmly entrenched by virtue of section 24 of the constitution, more specifically section 24(b)(iii), which dictates that ‘everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that

secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.

Consideration of para (b) of the environmental clause reveals a socio-economic character whilst imposing a constitutional imperative on the state to secure the rights of individuals through reasonable legislative and other measures. Scrutiny of the wording of section 24 reveals the potential conflict that may be created between environmental conservation and sustainable development if the intent of this clause is not realised in a given situation

In considering the wording of section 24(b), the argument may be postulated that although credence is given to the three traditional pillars or elements of sustainability, namely economic, social and environment, the use of the word 'ecologically' qualifies the interpretation that the South African constitution seeks to place environmental considerations centre stage, thus favouring the environmentally centred variant of sustainable development within the context of section 24 (Ferris, 2010). This argued ecocentric notion of sustainable development does not, however, reveal itself in the definition of sustainable development as provided in the NEMA section 1.

Sustainable development is defined by the NEMA as meaning 'the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.' The NEMA continues to state in section 2(4)(a) that sustainable development requires the consideration of all relevant factors, including the following:

- (i) *That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
- (ii) *that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
- (iii) *that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;*
- (iv) *that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;*
- (v) *that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;*
- (vi) *that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;*
- (vii) *that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and*

(viii) *that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.*

The environmental clause in section 24 of the Constitution, and thus the state's commitment to sustainable development, has been concretised in NEMA, more specifically section 2, which sets out a number of environmental management principles which apply to the actions of all organs of state that may significantly affect the environment. These principles form the basis of all environmental governing efforts and are underpinned by the goal and notion of sustainable development (Kidd, 2011; Glazewski, 2013). The notion of sustainable development is also alluded to in several instances within legislation. These include inter alia the Marine Living Resources Act (MLRA), the National Water Act (RSA, 1998), the Mineral and Petroleum Resources Development Act (RSA, 2002), the National Environmental Management: Biodiversity Act (RSA, 2004), and the National Environmental Management: Waste Act (RSA, 2008b).

The concept of sustainable development has in the preceding years come under judicial consideration in several cases. These include *inter alia BP Southern Africa (Pty) Ltd v MEC for Agriculture, Conservation, Environment and Land Affairs* (2004). In this case it was contended that 'sustainable development constitutes an integral part of modern international law and will balance the competing demands of development and environmental protection.

More recently, the case of *MEC: Department of Agriculture, Conservation and Environment v HTF Developers (Pty) Ltd and Another*. (2008) centred around the clearing of virgin ground without the required environmental authorisations in terms of the Environment Conservation Act, the court held that 'the National Environmental Management Act envisages the concept of sustainable development which requires that a risk averse and cautious approach is applied, whereby negative impacts on the environment and on people's environmental rights be anticipated and prevented and where they cannot be altogether prevented, are minimised and remedied.' (See para 24 at 328 B–C.)

Arguably, the most prominent and leading case dealing with sustainable development within the South African context is the case of *Fuel Retailers Association of Southern Africa v Director-General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province and Others* 2007 In this particular case, the constitutional court was tasked to consider the nature of sustainable development in greater detail. The ruling saw a discussion of sustainable development within the context of the Constitution, whereby it was stated that:

“The Constitution recognises the interrelationship between the environment and development; indeed, it recognises the need for the protection of the environment while at the same time it recognises the need for social and economic development. It contemplates the integration of environmental protection and socio-economic development. It envisages that environmental considerations will be balanced with socio-economic considerations through the ideal of sustainable development. This is apparent from section 24(b)(iii). Sustainable development and sustainable use and exploitation of natural resources are at the core of the protection of the environment.”

The court continued to state that the ‘NEMA, which was enacted to give effect to section 24 of the Constitution, embraces the concept of sustainable development’. The court in making the ruling continued to dissect the definition of sustainable development as found within NEMA before concluding that ‘[t]his broad definition of sustainable development incorporates two of the internationally recognised elements of the concept of sustainable development, namely the principle of integration of environmental protection and socio-economic development, and the principle of inter-generational and intra-generational equity.’ The court concluded its ruling by highlighting that the principle which enables the environmental authorities to balance developmental needs and environmental concerns is the principle of sustainable development. The latter interpretation provides a broad ranging decision making mandate for policy implementation instruments such as EIA, which is daunting in terms of the very difficult trade-offs this implies, but also exciting in that it provides the opportunity to take a holistic and long terms view when making decisions (Retief & Kotze, 2008).

3.5.3.1.2 Promotion of Administrative Justice Act

A decision authorising (or not) an activity is an administrative decision and, accordingly, has to comply with the requirements of administrative law. A vast body of literature, that spans more than a 100 years, exists on administrative law and justice (Retief *et al.*, 2019). One of the early papers by Pound (1924) entitled ‘The growth of administrative justice’ refers to this so-called ‘mass phenomena’ of legal development in the English speaking world, around the growth and progress of administrative justice. The importance of administrative justice is also well recognised in young democracies, like South Africa, where specific provisions on administrative justice are included within national constitutions (GTZ, 2002; Kidd, 2018). Typically, administrative justice falls within the body of law known as administrative law, which governs the administrative actions of agencies of government. A governments administrative actions may include rule making, adjudication, or the enforcement of a specific regulatory agenda. The aim of administrative law and in particular administrative justice is the regulation of administrative actions and thereby the behaviour of the state towards its citizens.

Essentially it protects the citizenry against excesses of government power – i.e. protecting the weak (citizens) against the strong (government).

Central to the consideration of administrative justice is government decision making and Adler (2010) goes as far as to define administrative justice in these terms as, “ ... *the justice inherent in decision making*”. Mashaw (1983) emphasises that government needs to be able to explain, “ ... *those qualities of the decision making process that provide arguments for the acceptability of its decisions*”, and thereby identify so-called ‘legitimizing principles’ for administrative decision making. Within the South African context, administrative justice is guaranteed by section 33 of the South African Constitution, which reads:

- (1) *Everyone has the right to administrative action that is lawful, reasonable and procedurally fair.*
- (2) *Everyone whose rights have been adversely affected by administrative action has the right to be given written reasons.*
- (3) *National legislation must be enacted to give effect to these rights, and must –*
 - (a) *provide for the review of administrative action by a court or, where appropriate, an independent and impartial tribunal;*
 - (b) *impose a duty on the state to give effect to the rights in subsections (1) and (2); and*
 - (c) *promote an efficient administration.*

The promotion of Administrative Justice (PAJA) (RSA, 2000) was promulgated to give effect to the constitutional provision above. The act deals with what is considered to be administrative action, and sets out the grounds for review relating to administrative action which is unlawful, unreasonable or not procedurally fair.

EIA decisions, perhaps more frequently than should, have been held to be invalid because of failure to comply with the requirements of administrative justice, that is to say the principles of lawfulness, reasonableness and procedural fairness. The courts have in several cases considered the application of administrative justice within the context of EIA in South Africa. Noteworthy cases as discussed by Kidd *et al.* (2018) include the following.

In the case of *Earthlife Africa (Cape Town) v Director-General: Department of Environmental Affairs and Tourism and Another* (2005) interested parties had been given an opportunity to comment on a draft of the EIA report, but not the final report, which was held to be procedurally unfair. Another example, which was ultimately not the subject of litigation, was the approval of a proposal to develop a tolled national road through the Wild Coast in southern KwaZulu-Natal and the Eastern Cape, a richly biodiverse area. When brought on appeal, the Minister set aside the decision because a member of the consultancy, the managing director of the

EIA consultancy (supposed to be independent according to the regulations), was on the board of one of the engineering construction companies that would be carrying out the project.

In *Clairison's CC v MEC for Local Government, Environmental Affairs and Development Planning* (2010) the activity for which authorisation was required was a retirement village, to be established on a property currently zoned for agricultural use. The relevant regional structure plan was amended to allow for 'township development'. Four years after the application had been lodged, a decision was made refusing the environmental authorisation on the following grounds, namely: fynbos vegetation on the site required conservation; part of the property comprised a critical biodiversity area; and there were concerns about urban sprawl, and provision of water and sewage. Furthermore, there was opposition to the development's taking place outside the 'urban edge' and the 'no go' alternative would enable the area to retain a rural setting. An appeal against the decision was unsuccessful, the appeal decision essentially reiterating the points outlined above. The applicant argued in reviewing the decision under the Promotion of Administrative Justice Act that the relevant considerations which the Minister failed to take into account were the surrounding land usages and recent structure plan amendments; the Municipality's determination of the urban edge; and the impact of the proposed development on the natural environment. To this end, the court took into account a number of surrounding developments and structure plan amendments as well as the apparent fact that the MEC regarded previous land use decisions that had been taken in the area as having been wrongfully decided. In the end, the court decided that the MEC erred in not taking into account the factual aspect of the existing surrounding developments (in the sense that the existence of development in the area ought to have been taken into account in favour of further development). Regarding the biodiversity concerns, the court noted that it had not been adequately considered – the MEC, in effect, ought to have called upon expert specialist consideration of this aspect and had failed to do so. On the evidence available, it appeared that the biodiversity element was not critical. Taken together, these factors indicated that the MEC had not taken into account relevant considerations. The court set aside the MEC's decision. In the appeal case *MEC for Environmental Affairs and Development Planning v Clairison's CC* (2013) the court observed in respect of the 'relevant considerations' argument that -

"if there is one thing that is clear from the evidence it is that the MEC pertinently took account of each of the factors – indeed, the application was refused precisely because he took them into account. The true complaint of Clairisons – endorsed by the court below – is instead that he attached no weight to one of the factors, and in the other cases he weighed them against granting the application, whereas Clairisons contends that they ought to have weighed in favour of granting it, which is something different."

The supreme court of appeal reasoned that the court of first instance had blurred the distinction between appeal and review and, instead of finding whether the functionary had taken the factors into account, had decided that the MEC had attributed an inappropriate weight to the factors, which was not an appropriate function of the judiciary. Consequently, the SCA decided that the MEC had not failed to take into account relevant considerations, so there was no basis (on that score) to set his decision aside. It is, however, not correct that a court may not consider the weight of the factors (considerations) that are taken into account in the decision-making process. Another ground of review for administrative decisions is reasonableness, and it can compellingly be argued that a decision-maker who does not attribute an appropriate weight to the considerations under his or her scrutiny will have acted unreasonably. It will be inappropriate for a court to interfere in an administrative decision in cases where there might superficial disagreement as to the relative weight given to factors, but it would be possible in cases where, in the words of the court in *Bangtoo Bros v National Transport Commission*, '[t]ake a case, for example, where a factor which is obviously of paramount importance is relegated to one of insignificance, and another factor, though relevant, is given weight far in excess of its true value. Accepting that the tribunal is the sole judge of the facts, can it be said that it has in the circumstances postulated properly applied its mind to the matter in the sense required by law? After much anxious consideration I have come to the conclusion that the answer must be in the negative'.

In *Magaliesberg Protection Association v MEC: Department of Agriculture, Conservation, Environment and Rural Development, North West* (2010) a development was approved despite being in conflict with the environmental management framework (EMF) for the area, which indicated that the area in question was one in which no physical development ought to take place. The court a quo decided that the EMF was not applicable, because it had not been published in the *Gazette* at the time the decision was made. It failed to recognise that the EMF had been published, however, when the decision was confirmed on appeal by the MEC. Sensibly, the Supreme Court of Appeal (*Magaliesberg Protection Association v MEC, Department of Agriculture, Conservation, Environment and Rural Development, North West Provincial Government* (2013)) did not approach the matter on the retrospectivity or otherwise of the EMF, holding that it was a 'policy'. Seemingly accepting that the EMF was applicable, the court nevertheless decided that, even if it was, the decision to allow the development ought to stand as, in the circumstances, the damage to the environment was not too serious. The court held that, had the decision been not to approve the development, this would have amounted to rigid adherence to policy, which is a ground of review of administrative decisions.

3.5.3.1.3 National Environmental Management Act

The main legislative instrument giving effect to the section 24 constitutional right is the NEMA (RSA, 1998b). The NEMA is premised on a set of environmental principles, derived from international law, which bind all organs of state. These sustainability principles should underly all government actions and decisions in so far as they relate to the environment. In giving effect to the concept of sustainable development and the implementation of the NEMA principles, Ngcobo J stated the following in his dissenting judgement in the *HTF Developers* case: 'At the heart of the NEMA principles, is the concept of sustainable development which requires organs of state to evaluate the social, economic and environmental impacts of their activities.' Against the backdrop of sustainable development, the basis of the NEMA is formed by the set of environmental management principles as found in section 2 of the Act. These principles apply throughout the Republic of South Africa to the actions of all organs of state that may significantly affect the environment. The principles apply alongside other relevant considerations including the state's responsibility to respect, protect, promote and fulfil the socio-economic rights as contained within chapter 2 of the Constitution. Glazewski (2013) contends that this makes it clear that in applying the principles, decision makers are not only to consider ecological factors but social considerations, such as housing, food, water, social security, well-being and even dignity, all of which are referred to in the Bill of Rights (Glazewski, 2013). This gives effect to the notion of sustainable development by integrating social, economic and environmental considerations. Rossouw & Wiseman (2004) provides a useful interpretation and thematic summary of the principles as reflected in Table 3-3.

Table 3-3: Thematic summary of environmental management principles (Source: Rossouw & Wiseman, 2004)

Themes	National environmental management principles
Sustainable development	- Development must be socially, environmentally and economically sustainable - There must be responsible use and exploitation of non-renewable natural resources
Decision-making and co-operative government	- Decisions must take into account the interests, needs and values of all interested and affected parties - There must be intergovernmental co-ordination and harmonisation of policies relating to the environment - A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge - Recognises all forms of knowledge, including traditional knowledge - Decisions must be taken in an open and transparent manner
Environmental assessment and management	- Environmental management must place people and their needs at the forefront of its concern - The social, economic and environmental impacts (disadvantages and benefits) of activities must be assessed, prevented or minimised and remedied - Environmental management must be integrated, acknowledging that all elements of the environment are linked - Disturbance of ecosystems and loss of biological diversity are avoided or minimised and remedied - Pollution and degradation are avoided or minimised and remedied - Sensitive ecosystems require specific attention in management and planning procedures - Waste is avoided, or minimised and re-used or recycled or otherwise disposed of in a responsible manner - The cost of pollution must be paid by those responsible for harming the environment
Environmental justice	- Environmental justice must be pursued so that no persons are unfairly discriminated against - There must be equitable access to environmental resources to meet basic human needs - Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle - Workers have a right to refuse work that is harmful to human health or the environment
Stakeholder engagement	- Participation must be allowed of all interested and affected parties in environmental governance - All people must have the opportunity to develop the understanding and capacity necessary to achieve effective participation - Participation by vulnerable and disadvantaged persons must be ensured

In addition, the principles are to serve as a general framework within which environmental management and implementation plans must be formulated by organs of state as identified and mandated by chapter 3 of NEMA. The principles serve as guidelines to which organs of state must refer when taking decisions or performing actions where the protection of the environment is concerned. The principles are further to serve as a reference point upon which conciliators appointed under the NEMA make their recommendations. Finally, and as Glazewski (2013) contends, most importantly, the principles serve to guide the interpretation, administration and implementation of the NEMA and any other law concerned with the protection or management of the environment.

The above principles apply unequivocally to the state's organs; their application to private legal persons and the private sector in general, however, is not that clear (Glazewski, 2013). Glazewski (2013) argues that their application to the private sector cannot be founded by considering the wording of section 2(1)(a)–(e) above, which refers either specifically to organs of state, or to duties that can only be carried out by organs of state. Despite this Glazewski (2013) does support the argument that these principles are applicable not only to organs of state, but also to private juristic persons in the same way that the environmental right contained in section 24 of the Constitution has horizontal application. A further point to note

is the lack of criminal sanction attached to the violation of the section 2 principles, thus raising the question as to enforceability of these principles within the South African context.

The NEMA, through section 23, sets out the general objectives of chapter 5 which is entitled 'Integrated Environmental Management' (IEM). The original section 23 lists the general objectives of chapter 5 as being 'to ensure the integrated environmental management of activities.' This original definition was later expanded by way of amendment to read 'the purpose of this Chapter is to promote the application of appropriate environmental management tools in order to ensure the integrated environmental management of activities.' EIA would be one such tool and to date by far the most widely applied.

Glazewski (2013) notes that the use of the term 'activities' in chapter 5 is widely defined to mean 'policies, programmes, processes, plans and projects.' This would imply that a broader set of environmental instruments could be applicable (such as SEA and EMF), making it clear that not only are project level activities included in the ambit of the legislation, but also planning or policy development activities which may precede the actual physical commencement of any project-level activity (Glazewski, 2013) The NEMA then, through section 23, continues to elaborate on the general objectives of IEM, stating them to be:

- “(a) promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment;*
- (b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;*
- (c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;*
- (d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;*
- (e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment; and*
- (f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.”*

The environmental management principles in section 2 of the NEMA should play a crucial role in giving effect to the ideals of IEM, with sustainable development (SD) thus being the end

goal. Section 23 furthermore dictates that the Director-General co-ordinates the activities of organs of state, and that they be assisted by inter alia providing training, publishing guidelines and co-ordinating procedures.

Section 24 of the NEMA spells out the legal mandate for EIA in South Africa, through several sections and amended sections as discussed by Kidd et al (2018). A summary discussion of these sections is provided below.

The founding statement made in s 24(1) of the Act reads as follows:

In order to give effect to the general objectives of integrated environmental management laid down in this Chapter, the potential consequences for or impacts on the environment of listed activities or specified activities must be considered, investigated, assessed and reported on to the competent authority or the Minister responsible for mineral resources, as the case may be, except in respect of those activities that may commence without having to obtain an environmental authorisation in terms of this Act.

In order to identify those activities, which require authorisation, s24(2) confers the following powers:

The Minister, and every MEC with the concurrence of the Minister, may identify —

- (a) activities which may not commence without environmental authorisation from the competent authority;*
- (b) geographical areas based on environmental attributes in which specified activities may not commence without environmental authorisation from the competent authority;*
- (c) geographical areas based on environmental attributes in which specified activities may be excluded from authorisation by the competent authority;*
- (d) individual or generic existing activities which may have a detrimental effect on the environment and in respect of which an application for an environmental authorisation must be made to the competent authority.*

Section 24 also provides for the minimum requirements for procedures for the investigation, assessment and communication of the potential impact of activities with respect to every application for an environmental authorisation —

- (a) investigation of the environment likely to be significantly affected by the proposed activity and alternatives thereto;*
- (b) investigation of the potential impact of the activity and its alternatives on the environment and assessment of the significance of that potential impact;*
- (c) investigation of mitigation measures to keep adverse impacts to a minimum, as well as the option of not implementing the activity;*

- (d) *public information and participation which provide all interested and affected parties, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in such information and participation procedures;*
- (e) *reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information;*
- (f) *investigation and formulation of arrangements for the monitoring and management of impacts, and the assessment of the effectiveness of such arrangements after their implementation;*
- (g) *coordination and cooperation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state;*
- (h) *that the findings and recommendations flowing from such investigation, the general objectives of integrated environmental management laid down in this Act and the principles of environmental management ... are taken into account in any decision made by an organ of state in relation to the proposed policy, programme, plan or project; and*
- (i) *that environmental attributes identified in the compilation of information and maps as contemplated in s 24(3) are considered.*

Importantly, s 24 also provides that compliance with the procedure laid down by the Minister or an MEC in terms of s 24(4) does not remove the need to obtain an authorisation, other than an environmental authorisation, for that activity from any organ of state charged by law with authorising, permitting or otherwise allowing the implementation of the activity; and authorisations or permits obtained under any other law for an activity listed or specified in terms of NEMA does not absolve the applicant from obtaining authorisation under NEMA and any such other authorisations or permits may only be considered by the competent authority if they are in compliance with s 24(4)(d). This envisages that a certain activity might require authorisation under both NEMA and other legislation, and requires that both authorisation processes must be followed. This is highlight the need to good communication and cooperative governance arrangements. For example, certain activities which qualify as a 'water use' in terms of the National Water Act, which require a licence in terms of s 22 of that Act, may also require environmental authorisation in terms of NEMA.

Whereas the original NEMA contained only two sections (23 & 24) in Chapter 5, the Amendment Act has inserted several new sections into Chapter 5 to flesh out the authorisation process, although there is still a need for regulations to, first, identify the listed activities and, second, to provide for the authorisation procedures. Sections 24A and 24B deal with the procedure for listing and delisting activities and areas respectively. Section 24C sets out the procedure for identifying the competent authority, which must be done at the same time as the listing of activities. There are certain activities (eg an activity that has implications for the

national environmental policy or international commitments or relations) for which only the Minister may be the competent authority. Listed activities and designated competent authorities must be published in the *Gazette*.

It may be argued that the legislature, in recognising that enforcement of conditions imposed on current authorisations is problematic, thus requires through s 24E that every environmental authorisation must as a minimum ensure that adequate provision is made for the ongoing management and monitoring of the impacts of the activity on the environment throughout the life cycle of the activity; the property, site or area is specified; and provision is made for the transfer of rights and obligations when there is a change of ownership in the property.

Another challenge for the authorisation system under the Environment Conservation Act (ECA) was that persons who commenced identified activities without the necessary authorisation presented problems to the authorities in dealing with the unauthorised development. Although commencing unauthorised activities was a criminal offence in terms of the ECA, there were no other remedies directly applicable to this situation and authorities have to make use of methods such as s 28 of NEMA, which are not ideally suited to the problem. Unauthorised commencement is now addressed by sections 24F and 24G, which allows for a process of corrective action which might entail prosecution or an administrative fine, or both. Regulations have also been published in 2017 to detail the Section 24G process and calculation of administrative fines.

The EIA profession have for some time been grappling with how to accredit Environmental Assessment Practitioners or EAPs. Section 24H goes some way towards addressing this challenge in that it provides for an association proposing to register its members as EAPs to apply to the Minister to be appointed as a registration authority, and sets out information which must appear in the application. It is significant that the Act does not provide for criteria for registration of individual EAPs but rather for a kind of self-regulation model whereby certain bodies will be able to accredit their own members. The appointment as a registration authority may be terminated with good cause.

Section 24I provides for the appointment of external specialist reviewers where the competent authority does not have the requisite technical authority and/or where high levels of objectivity are required. The powers of the Minister or MEC to publish implementation guidelines are set out in section 24J. Often, applicants not only have to make application for environmental authorisations under section 24 of NEMA, but also applications for authorisations under other applicable legislation at the same time (for example, planning laws or the National Water Act). Challenges arising from this are sought to be addressed in section 24K (Consultation between

competent authorities and consideration of legislative compliance requirements of other organs of state having jurisdiction) and section 24L (alignment of environmental authorisations).

Section 24M provides for exemptions from specified provisions and section 24Q with monitoring and performance assessment. Two critical provisions are sections 24N and 24O. Section 24N provides for the submission of environmental management programmes where necessary. The competent authority *may* require the submission of an environmental management programme before considering an application for an environmental authorisation, but where environmental impact assessment (as opposed to basic assessment) has been identified as the environmental instrument to be utilised in informing an application for environmental authorisation, or where the application relates to prospecting, mining, exploration, production and related activities on a prospecting, mining, exploration or production area, the competent authority *must* require the submission of an environmental management programme before considering an application for an environmental authorisation. The contents of the environmental management programme are prescribed under section 24N in the Act.

The duties of the holder and any person issued with an environmental authorisation are set out in section 24N(7); he or she –

- (a) must at all times give effect to the general objectives of integrated environmental management laid down in section 23;*
- (b) must consider, investigate, assess and communicate the impact of his or her prospecting or mining on the environment;*
- (c) must manage all environmental impacts i) in accordance with his or her approved environmental management programme, where appropriate; and ii) as an integral part of the prospecting or mining, exploration or production operation, unless the Minister responsible for mineral resources directs otherwise;*
- (d) must monitor and audit compliance with the requirements of the environmental management programme;*
- (e) must, as far as is reasonably practicable, rehabilitate the environment affected by the prospecting or mining operations to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and*
- (f) is responsible for any environmental damage, pollution, pumping and treatment of polluted or extraneous water or ecological degradation as a result of his or her operations to which such right, permit or environmental authorisation relates.*

Section 24O(1) sets out criteria to be taken into account by competent authorities when considering applications. If the competent authority considers an application for an environmental authorisation, he or she must-

(a) comply with the Act;

(b) take into account all relevant factors, which may include-

(i) any pollution, environmental impacts or environmental degradation likely to be caused if the application is approved or refused;

(ii) measures that may be taken-

(aa) to protect the environment from harm as a result of the activity which is the subject of the application; and

(bb) to prevent, control, abate or mitigate any pollution, substantially detrimental environmental impacts or environmental degradation;

(iii) the ability of the applicant to implement mitigation measures and to comply with any conditions subject to which the application may be granted;

(iiiA) the ability of the applicant to comply with the prescribed financial provision;

(iv) where appropriate, any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment;

(v) any information and maps compiled in terms of section 24 (3), including any prescribed environmental management frameworks, to the extent that such information, maps and frameworks are relevant to the application;

(vi) information contained in the application form, reports, comments, representations and other documents submitted in terms of this Act to the Minister, Minister responsible for mineral resources, MEC or competent authority in connection with the application;

(vii) any comments received from organs of state that have jurisdiction over any aspect of the activity which is the subject of the application; and

(viii) any guidelines, departmental policies, and environmental management instruments that have been adopted in the prescribed manner by the Minister or MEC, with the concurrence of the Minister, and any other information in the possession of the competent authority that are relevant to the application;

(c) take into account the comments of any organ of state charged with the administration of any law which relates to the activity in question.

The NEMA creates the legislative framework within which EIA is applied in South Africa, and provides the together with the Constitution of the republic, the objectives of EIA. That is to say, ultimately achieving the right as contained in section 24. NEMA also provides for how EIA is to achieve this objective, by furthermore providing for the publication of substantive regulations set out the procedures to be followed when conducting EIAs. These regulations are addressed below.

3.5.3.1.4 EIA Regulations

South Africa has a list based screening mechanism, which means that the obligation to conduct an EIA and the level of assessment required are triggered by so-called listed activities. There are three listing notices. Listing Notice 1 contains those activities for which the basic assessment procedure is required. Listing Notice 2 lists the activities for which the scoping and environmental impact report procedure is required. In short, the activities in listing notice 2 are regarded as those likely to have a more serious potential impact on the environment and consequently require a more comprehensive assessment prior to commencement. Listing Notice 3 applies where environmental authorisation, following basic assessment, is required prior to commencement of that activity in specific identified geographical areas only. For example, the development of masts or towers for telecommunications outside urban areas in specified types of protected areas in Free State, Limpopo, Mpumalanga and Northern Cape is a listed activity on Notice 3.

The EIA regulations also provide detail of the application and decision-making process. Under the Environment Conservation Act, there were no timeframes prescribed for different steps in the process, with the result that applications often took an inordinate time to conclude. Timelines were introduced in the NEMA regulations and have been tweaked in various versions, the most recent being the 2014 Regulations, in general and in relation to specific steps in the process.

Chapter 3 of the regulations deals with the general requirements for applications, including where the application must be submitted; the duties of competent authorities, including consultation with other organs of state administering laws relating to matters affecting the environment; duties of the proponents and applicants; and matters pertaining to environmental assessment practitioners and specialists. A pivotal decision to be made is what process to follow for the activity in question, and regulation 15 provides that the environmental assessment practitioner must identify whether basic assessment or scoping and environmental impact report (S&EIR) must be applied to the application, taking into account any notices published in terms of section 24D of the Act; any guidelines applicable to the application process or activity which is the subject of the application; and any advice given by the competent authority. An application must be managed in accordance with regulations 19 and 20 if basic assessment must be applied to the application; or regulations 21 to 24 if S&EIR must be applied to the application, which must be applied to an application if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any one of the activities.

The formal requirements for the application are set out in regulation 16, and compliance with these requirements must be checked by the competent authority in terms of regulation 17. Regulation 18 specifies the very important criteria to be taken into account by competent authorities when considering applications: when considering an application, the competent authority must have regard to section 24O and 24(4) of the Act, the need for and desirability of the undertaking of the proposed activity, any guideline published in terms of section 24J of the Act and any minimum information requirements for the application. The explicit statement of these considerations is important in relation to possible review applications of environmental authorisations where persons unhappy with the decisions feel that not all of the relevant factors have been taken into account.

Regulations 19 and 20 deal with the basic assessment process, which applies to those activities listed in Listing Notices 1 and 3. The applicant must, within 90 days of receipt of the application by the competent authority, submit to the competent authority a basic assessment report, inclusive of specialist reports, an environmental management programme, and where applicable a closure plan, which have been subjected to a public participation process of at least 30 days (included within that 90 day period) and which reflects the incorporation of comments received, including any comments of the competent authority. The 'default' period of 90 days may be extended to 140 days if significant changes have been made or significant new information has been added to the basic assessment report or environmental management programme or closure plan, which changes or information was not contained in the reports or plans consulted on during the initial public participation process, and the revised document(s) must be subjected to another 30-day public participation process (part of the extra 50 day period).

The scoping and environmental impact report process (S&EIR) is set out in regulations 21 to 24. If the S&EIR process must be applied to an application, the applicant must, within 44 days of receipt of the application by the competent authority, submit to the competent authority a scoping report which has been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received, including any comments of the competent authority. A scoping report must contain all information set out in Appendix 2 to these Regulations.

An EMPr must contain all information set out in Appendix 4 to the Regulations and, where the application is for an environmental authorisation is for prospecting, exploration, extraction and primary processing of a mineral or petroleum resource or activities directly related thereto, the EMPr must address the requirements as determined in the regulations. It must furthermore set out the relevant requirements pertaining to the financial provision for the rehabilitation,

closure and post closure of prospecting, mining or production operations, made in terms of the Act, and a specialist report must contain all information set out in Appendix 6 to the Regulations.

The competent authority must within 107 days of receipt of the environmental impact report and EMPr, in writing, either grant environmental authorisation in respect of all or part of the activity applied for; or refuse environmental authorisation. If the competent authority decides to grant authorisation, he or she must issue an environmental authorisation or environmental authorisations complying with regulation 26 to, and in the name of, the applicant or applicants. This can be a composite or individual authorisations, or an integrated one in terms of section 24L of the Act.

Chapter 5 of the regulations deal with amendment, suspension, withdrawal and auditing of compliance with environmental authorisations and environmental management programmes. Regulation 34 provides that the holder of an environmental authorisation must, for the period during which the environmental authorisation and EMPr, and where applicable the closure plan, remain valid ensure that the compliance with the conditions of the environmental authorisation and the EMPr, and where applicable the closure plan, is audited; and submit an environmental audit report to the relevant competent authority. The requirements of the audit process and report are also set out in this regulation, although it appears to be silent on the frequency of such exercises.

Public participation is covered by Chapter 6. Essentially, the public participation process must give all potential or registered interested and affected parties (i.e those whose details are formally recorded in a register), including the competent authority, a period of at least 30 days to submit comments on each of the relevant reports or documents, whilst providing access to all information that reasonably has or may have the potential to influence any decision with regard to an application. Access need not be granted to that information if it is protected by law. It must include consultation with the competent authority; and every State department that administers a law relating to a matter affecting the environment relevant to an application for an environmental authorisation. The formal requirements of public participation are set out in regulation 41. Regulation 42 prescribes the register of interested and affected parties and regulations 43 and 44 cover the comments of registered interested and affected parties and how such comments are to be included in the reports and plans submitted.

3.5.3.2 Sectoral EIA legislation

There is provision for environmental assessment in legislation other than NEMA. It should be borne in mind, however, that where environmental assessment is provided for in other legislation, the activity in question might require environmental assessment under NEMA as well.

3.5.3.2.1 National Environmental Management: Waste Act

The National Environmental Management Waste Act (RSA, 2008b) requires through the working of sections 19 and 20, an EIA for certain listed waste management activities. These activities are listed by way of regulation and are traditionally separated by the requirement for either a basic assessment or full EIA. The list of activities requires that person who wishes to commence, undertake or conduct a waste management activity listed under this category, namely category A, must conduct a basic assessment process set out in the Environmental Impact Assessment Regulations (RSA, 2014a) made under section 24(5) of the NEMA as part of a waste management licence application contemplated in section 45 read with section 20(b) of the waste act. Furthermore, regulation 4 requires that a person who wishes to commence, undertake or conduct a waste management activity listed under category B, must conduct a scoping and environmental impact reporting process set out in the Environmental Impact Assessment Regulations made under section 24(5) of the NEMA as part of a waste management licence application contemplated in section 45 read with section 20(b) of this Act.

3.5.3.2.2 National Environmental Management: Air Quality Act

The National Environmental Management: Air Quality Act (RSA, 2004b) contains no direct reference to environmental assessment but does provide for risk assessments which fit the definition of environmental assessments. The Act provides for the Minister to declare any appliance or activity, or any appliance or activity falling within a specified category, as a controlled emitter if such appliance or activity, or appliances or activities falling within such category, result in atmospheric emissions which through ambient concentrations, bioaccumulation, deposition or in any other way, present a threat to health or the environment or which the Minister or MEC reasonably believes presents such a threat. This may be done only after application of the precautionary principle contained in section 2(4)(a)(vii) of NEMA and consideration of any risk assessments. A similar precautionary principle and risk assessment requirement applies in respect of the declaration of controlled fuels: a substance or mixture of substances which, when used as a fuel in a combustion process, result in

atmospheric emissions which through ambient concentrations, bioaccumulation, deposition or in any other way, present a threat to health or the environment or which the Minister or MEC reasonably believes present such a threat.

Although NEMAQA lists processes which require an atmospheric emissions license, the issuance of the license in terms of NEMAQA is not subject to an EIA per se. NEMA, through regulation 984 activity 6 however requires an EIA for the development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, before listing certain exclusions. Expansions of such facilities are also covered by regulation 983 activity 34.

3.5.3.2.3 National Environmental Management: Biodiversity Act

The National Environmental Management: Biodiversity Act (RSA, 2004) contains a Chapter dealing with 'Species and organisms posing potential threats to biodiversity', which include alien species, invasive species and genetically modified organisms. The Act sets out certain restricted activities that cannot be carried out in respect of alien species without a permit. Such permit may be issued only after a prescribed assessment of risks and potential impacts on biodiversity has been carried out. No such prescription has yet been made (this prescription would presumably be done by means of regulation). There is an identical provision in respect of listed invasive species. The Minister also has the power to make regulations relating to the assessment of risks and potential impacts on biodiversity of restricted activities involving specimens of alien species or of listed invasive species.

In the section dealing with genetically modified organisms, the Act provides that if the Minister has reason to believe that the release of a genetically modified organism into the environment under a permit applied for in terms of the Genetically Modified Organisms Act may pose a threat to any indigenous species or the environment, no permit for such release may be issued in terms of that Act unless an environmental assessment has been conducted in accordance with chapter 5 of NEMA as if such release were a listed activity contemplated in that Chapter. The Minister must convey his or her belief referred to above to the authority issuing permits in terms of the Genetically Modified Organisms Act before the application for the relevant permit is decided.

The Biodiversity Act also contains a general provision relating to environmental assessment in the Chapter dealing with the permitting process. In relation to permitting generally, section 89 provides that the issuing authority, before issuing a permit, may in writing require the

applicant to furnish it, at the applicant's expense, with such independent risk assessment or expert evidence as the issuing authority may determine.

3.5.3.2.4 National Environmental Management: Coastal Management Act

The National Environmental Management: Integrated Coastal Management Act (RSA, 2008) envisages environmental impact assessment processes in relation to various aspects governed by the Act. First, before designating land as coastal access land (coastal access land is land designated in order to allow for public access to the coastal public property) or withdrawing any such designation, a municipality, the MEC or Minister, as the case may be, must, inter alia, assess the potential environmental impacts of doing so. The second reference to assessment of environmental impact is in section 59, which provides that, if the Minister or MEC has reason to believe that a person has, either prior to or after the commencement of this Act, carried out, is carrying out, or intends to carry out, an activity that has, is having, or is likely to have, an adverse effect on the coastal environment then, he or she may issue a written coastal protection notice to the person responsible for that activity requiring that person to take various steps, including to investigate and evaluate the impact of an activity on an aspect of the coastal environment in accordance with Chapter 5 of the National Environmental Management Act.

3.5.3.2.5 National Water Act

The National Water Act (RSA, 1998) requires that a water use must be licensed, save in respect of certain exceptions. The Act provides, in respect of applications for such licences, that the responsible authority may, to the extent that it is reasonable to do so, require the applicant, at the applicant's expense, to obtain and provide it by a given date with, inter alia, an assessment by a competent person of the likely effect of the proposed licence on the resource quality; and an independent review of such assessment by a person acceptable to the responsible authority. In addition, the responsible authority may direct that any such assessment must comply with the requirements contained in regulations made under section 26 of the Environment Conservation Act.

In the chapter in the National Water Act dealing with government waterworks, the Act provides that the Minister must, before constructing a waterworks (which includes any borehole, structure, earthwork or equipment installed or used for or in connection with water use), prepare an environmental impact assessment relating to the proposed waterworks which must, where the Minister considers it appropriate, comply with the requirements contained in regulations made under section 26 of the Environment Conservation Act. In

addition, the Minister must publish a notice in the *Gazette* which, inter alia, contains a summary of the environmental impact assessment; and inviting written comments to be submitted. The Minister is also required to consider the environmental impact assessment before construction of the waterworks.

Finally, the Act deals with information systems, one of the objectives of which is to provide information to water management institutions, water users and the public for planning and environment impact assessments.

3.5.3.2.6 National Heritage Resources Act

An interesting variation on the theme is presented by the National Heritage Resources Act (RSA, 1999), which, as the name suggests, is concerned with the management (and protection) of the country's heritage resources. Section 38 of the Act provides for an impact assessment procedure in respect of possible impact on heritage resources, rather than the environment as a whole. This section provides that any person who intends to undertake a development categorised as described and listed must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. The authority must, within 14 days of receipt of such notification, if there is reason to believe that heritage resources will be affected by such development, notify the person who intends to undertake the development to submit an impact assessment report. Such report must be compiled at the cost of the person proposing the development, by a person or persons approved by the responsible heritage resources authority with relevant qualifications and experience and professional standing in heritage resources management. Once the report has been considered by the responsible authority, the latter must decide, after consultation with the person proposing the development, whether or not the development may proceed; any limitations or conditions to be applied to the development; what general protections in terms of the Act apply, and what formal protections may be applied, to such heritage resources; whether compensatory action is required in respect of any heritage resources damaged or destroyed as a result of the development; and whether the appointment of specialists is required as a condition of approval of the proposal.

3.5.3.3 EIA Case Law

The following section will briefly discuss some prominent EIA cases as considered by Kidd *et al.*, (2018) in order to chart the progression of the EIA legislation in South Africa and how the

cases have aided the development of the legal regime in providing for the objective of EIA and how EIA is to achieve this objective.

Significant case law exists in relation to the 1997 ECA Regulations, which is unsurprising, given that all stakeholders had to come to grips with EIA as a policy implementation instrument, and in so doing differences of interpretation and implementation are to be expected. The case of *Silvermine Valley Coalition v Sybrand van der Spuy Boerderye and others* (2002) was significant for two particular reasons: firstly, it helped to illustrate the difficulties that may arise where the identification of listed activities in the legislation is not sufficiently clear enough in order to ascertain whether a particular activity is in fact one which requires environmental authorisation or not. The applicant in this particular case had been previously informed by the relevant competent authority that the activity, namely the establishment of a new vineyard on land (the status of which was not immediately apparent, but could be described as open ground) was not an identified activity. The result of this would have been that the activity could have been carried out without an EIA. The applicant group was unsatisfied with this state of affairs and sought Senior Counsel's opinion, the opinion suggesting that the activity was in fact an identified activity and subject to environmental authorisation. The competent authority, the Western Cape Department of Environmental and Cultural Affairs, also sought their own opinion from Senior Counsel. This opinion supported their original decision, which concluded that it was not an identified activity. When this was raised in Court, it was ruled, after much deliberation, that the activity was an identified activity subject to authorisation. The second important aspect of the case was the timing of the EIA. The applicants were seeking to conduct and submit the EIA after the activity had largely been carried out already (without authorisation, which the respondents were under the impression was unnecessary as set out above). The Court ruled that it was inappropriate for an EIA to be carried out after the event, the reason being that it was a device to be used in order to ascertain likely impacts before the activity commenced.

The case of *Eagles Landing Body Corporate v Molewa NO and others* (2003) was decided shortly afterwards and held somewhat differently. The Court decided that it was appropriate for an EIA to be requested after commencement of the activity but before construction had been completed. Both these cases are worthy of comment but this is relatively academic now, since NEMA addresses the issue of what remedies are available for an activity that commences without authorisation (See also Kidd, 2007) There were several decisions concerned with whether an activity qualified as an identified activity or not (other than the Silvermine case referred to above).

In *Sasol Oil (Pty) Ltd and another v Metcalfe NO* (2004), the applicants, who had unsuccessfully sought authorisation for the development of a filling station, challenged EIA guidelines developed and used by the Gauteng Department of Agriculture, Conservation, Environment and Land Affairs which informed the decision to refuse the application. The court ruled that the guidelines were valid, that being said however, that the Department did not have the power to authorise or reject an application for the development of a filling station, since the identified activities did not apply to filling stations per se, but only to 'facilities for the storage or handling of 'any substance which is dangerous or hazardous and is controlled by national legislation' (which would include petroleum). The ruling in this instance is important as it highlights the importance of guidelines, which although they are not law, may be used by the competent authorities to interpret and to guide implementation of EIA regulations.

In *BP Southern Africa (Pty) Ltd v MEC for Agriculture, Conservation, Environment and Land Affairs* (2004) a similar inquiry was put before the court. The case entailed a review of the provincial Department's decision to refuse an application to develop a filling station in terms of s 22 of the ECA. Central to the case was the question as to whether the Department was entitled to rely on a guideline that provided that filling stations would not generally be approved if these were situated within a three kilometre radius of an existing filling station. The issue that concerned the court was whether the development of a filling station fell within the list of identified activities, and the court decided that it did, contrary to the Sasol Oil ruling discussed above. It distinguished the Sasol case mentioned above, but also suggested that the 'narrow' decision in Sasol was incorrect. The court gave several reasons for this, but the pivotal reason serves to provide the crux of the matter: The court asked a rhetorical question — 'absent the storage and handling of petroleum products in a filling station, what then is left of the 'filling' station?' The court further ruled regarding the department's reliance on guideline documents that it is 'abundantly clear that the mandate of a government department carrying out environmental authorisation includes the consideration of socio-economic factors as an integral part of its environmental responsibility'. This conclusion was based on the consideration of the environmental right in section 24 of the Constitution, as well as several other statutory requirements, including section 24 of NEMA, but even without that section, there are several other provisions, such as the national environmental management principles in section 2 of NEMA, which amply support the court's conclusion. It was concluded that the use of guideline documents was beneficial in aiding the department to deliver on this mandate, and that the use of guideline documents was in fact warranted and a positive action on the department's behalf as it ensured consistency and certainty in decision making.

There are other decisions which support this approach. In *MEC for Agriculture, Conservation, Environment and Land Affairs v Sasol Oil (Pty) Ltd* (2006) the Supreme Court of Appeal expressly recognised that NEMA requires that the interpretation of any law concerned with the protection and management of *the environment must be guided* by the principles in s 2, which have as their heart the principle of sustainable development, which requires organs of state to evaluate the 'social, economic and environmental impacts of activities'. In *Capital Park Motors CC and Another v Shell South Africa Marketing (Pty) Ltd and Others* (unreported) the court held that the 'legislature [in both the ECA and NEMA] has used the widest possible terms when matters of this nature need to be considered', which would include socio-economic considerations. On this basis, the court held that an applicant did have locus standi to approach the court when its interest was of a commercial, rather than a strictly environmental, nature. The approach adopted in these cases was impliedly confirmed by the Supreme Court of Appeal in *Fuel Retailers Association of SA (Pty) Ltd v Director-General Environmental Management, Mpumalanga, and Others* (2007).

In *HTF Developers (Pty) Ltd v Minister of Environmental Affairs and Tourism and others*, 2006 (5) SA 512 (T) the applicant, after obtaining the relevant town-planning permission which allowed for the subdivision of a property for purposes of residential development, commenced operations to provide services to the proposed plots of land. After representations made by concerned persons were heard, the competent authority in the form of the Gauteng Department of Agriculture, Conservation and Environment issued a directive in terms of s 31A of the ECA stating that the activity was one which required environmental authorisation. The directive required the applicant to cease construction activities and to rehabilitate the land. The position and action of the department were based on its decision that the land in question qualified as 'virgin ground', in terms of the list of identified activities. The applicant after obeying the directive, applied to the Court for an order declaring that the land was not 'virgin ground' and, secondly, that the directive was unlawful, thus requesting it to be set aside. The Court, in a well-reasoned judgment, considered the relevant provisions in the light of s 24 of the Constitution together with the concept of sustainable development. The court held that a landowner 'may not use his or her land in a way which may prejudice the community in which he or she holds the land in trust for future generations'. As for the meaning of 'virgin ground', the Court found that virgin ground, defined as 'land which at no time during the preceding 10 years has been cultivated,' was not confined to agricultural land, because the verb 'cultivate' must be construed widely so as to include notions of improvement (which would accordingly include construction). The applicant further argued that land falling within a proclaimed township could by that very fact not fall within the definition of virgin ground as the proclamation of that land as residential inevitably entailed an environmental assessment to

be conducted at some earlier stage. The Court rejected this argument due to the fact that the constitutional right and new environmental legislation being far more recent than the relevant provincial ordinance.

An emerging theme within the international and national discussions around EIA, is how effective consideration must be given to climate change aspects within EIA. This point is well illustrated in the court judgment in the matter of *Earthlife Africa, Johannesburg v The Minister of Environmental Affairs and others* (2005) case as discussed below. The ruling is considered to be South Africa's first climate change court case, and serves to highlight the significance, place and principled approach to climate change impact assessment in the country's established and constitutionally-based system of environmental law. The case centred on the granting of an environmental authorisation for the construction of an independently run power plant in the northern part of South Africa without an independently researched climate impact report. The decision to grant the authorisation was appealed by Earth Life Africa. The minister, on considering the appeal decided that the authorisation should not be withdrawn, but that a climate change impact report must be compiled prior to commencement of the construction of the power plant. The ministers' decision on the appeal, along with the Chief Directors decision to grant the authorisation were then taken on judicial review. The applicants achieved victory on almost all the substantive legal points canvassed in the judgment and the court directed the Minister to reconsider the appeal. The judgement is considered to be a victory for the assessment climate change impacts and is expected to pave the way for increased regulation of climate change within the South African context

3.5.4 Skills and administrative capacity requirements

There is scant reflection in the peer reviewed literature on skills and capacity requirements of the EIA system in South Africa. For example, the literature searches on Scopus and the NRF database revealed only three peer reviewed papers (Sowman *et al.* 1995; Duthie, 2001; Sandham & Retief, 2016), one conference paper (Van der Heyden *et al.*, 1998) and a single master's dissertation (Abdulla, 2002). This is unfortunate because the lack of skills and capacity is commonly raised as an underlying reason for inefficiency and lack of quality in EIA (see for example Abdulla, 2002; Kotze & Van der Walt; 2003; Nel, 2005; Sampson, 2007; Kidd & Retief, 2009; Machaka *et al.*, 2013), yet there seems to be limited peer reviewed research to draw on to substantiate such claims.

Research by Sandham and Retief (2016) found that in South Africa, EIA is widely taught at South African universities and has developed a robust body of research. The evolution of EIA in South Africa towards becoming a fully-fledged profession has also led to attempts at standardizing work, formalizing training and the establishment of a registration authority, namely the Environmental Assessment Practitioners Association of South Africa (EAPASA). The multidisciplinary nature of EIA makes it a contested field, and various disciplines have attempted to lay claim to this area of expertise, most notably the biological/ecological community, especially during the early years of EIA. However, the growing realization of the importance of the human dimension of EIA has supported the growing contribution of a body of EAPs from non-ecological backgrounds, and the ongoing demand for postgraduate education in EA for students from a wide range of disciplinary backgrounds. In order to formalise the registration process of EAPs with EAPASA so-called unit standards had to be developed and a qualification registered with the South African Qualification Authority (SAQA) outlining core competencies for EIA training. The following six core competencies have been developed for EAPs at a SAQA Level 8, which mean they function at a post graduate honours level:

1. Demonstrate a conceptual understanding of the environment, sustainable development, environmental assessment, and integrated environmental management.
2. Demonstrate the ability to think holistically, systemically, systematically, spatially and in an integrative manner and to discern what is relevant to decision-making.
3. Identify and apply environmental assessment procedures and methods.
4. Review and monitor environmental assessment procedures and methods.
5. Conduct applied research in a specific context.
6. Meet specific communication requirements at all levels through environmental reporting processes and stakeholder engagement.

Notwithstanding the development of formal qualifications and unit standards important basic questions around skills and capacity remain unanswered, such as the number of EAPs working in the private and public sectors as well as the level of skills / qualifications they have. Although data for the public sector might be currently available from state departments, especially DEA, private sector information will probably only become available once EAPASA have gone through the process of registering practicing EAPs. This process has been

extended to 2022, and until such time it will be difficult to gain exact data on the number of EIA professionals in both the private the public sector.

Work done by the North West Universities Centre for Environmental Management between 2016 and 2018, saw an extensive training programme spanning 3 years and 9 interventions whereby 561 were trained. (Roos *et al.*, 2020). Data from these training events where used by Roos *et al.* (2020) in publishing research on government perceptions on the benefits for EIA. To this end, the published work provides and insight into the approximate number of EIA officials in South Africa. The EIA training was scheduled over a period of three years (2016–2018) for government officials responsible for EIA review and decision-making. During the three years, a total of 561 officials were trained. Attendance at a training event over the three-year period was compulsory, therefore, although the exact non-attendance figures were not known (e.g. people who were off work sick), it has been assumed that the total population of provincial and national government officials responsible for EIA review and decision-making in South Africa is not significantly higher than 561 (Roos *et al.*, 2020). Though providing an indication of government official numbers, the research did not provide an indication of government EIA officials qualifications.

3.5.5 International Systems Comparison

Generally, distinction is made between macro namely systems level, and micro or case level performance evaluations (Sadler, 1996; Thissen, 2000; Morrison-Saunders & Arts, 2004; Jones *et al.*, 2005 & Retief, 2011). Debates on the macro-level requirements to establish environmental assessment have been one of the earliest evolutionary themes in environmental assessment. In the literature there has been wide reflection on both enabling conditions as well as barriers to the implementation of EIA in terms of specific policy and legal contexts together with institutional arrangements (Buckley 2000; Stinchcombe & Gibson 2001; Roos *et al.*, 2020). Principles and criteria for the review of project-level EIA systems have been developed since the early 1990s (Wood 1995). The study conducted by Sadler (1996) can be regarded as one of the first comprehensive international comparative macro-level reviews. The review criteria developed by Wood (1995, 2003) for EIA systems evaluation is probably the most widely adopted set of EIA systems review criteria, applied for comparative review between EIA systems in developed (Jones *et al* 2005; Barker & Wood, 1999) and developing countries (Wood 1999; Andreou & Jones 2001; Ahmad & Wood 2002). There are also system reviews done for other forms of impact assessment such as SEA. For example, Von Seht (1999) expanded on five fundamental principles for SEA developed by Elling (1997) to propose 15 requirements for a comprehensive SEA system. The most extensive SEA

system review was conducted by Dalal-Clayton and Sadler (2005) and provides a summary of SEA systems internationally.

3.5.5.1 South African EIA System Evaluations

The first attempt to conduct a system evaluation was after a decade of mandatory EIA practice in 2008 (DEA, 2008). However, this evaluation and the resultant report entitled “*The effectiveness and efficiency of South Africa’s Environmental Impact Assessment Process*”, was according to the researchers’ knowledge never formally adopted by the department and has remained ‘draft’ ever since, therefore underscoring the importance of this research in an attempt to evaluate the current South African EIA system. Following on from the 2008 evaluation study (DEA, 2008) a process was launched to formulate a new strategy for Integrated Environmental Management (IEM) which came to be known as the Environmental Impact Assessment and Management Strategy (EIAMS) published in 2014 (DEA, 2014). The outcomes of the EIAMS strategy is meant to inform the future development of the South African EIA system.

3.5.5.2 Comparative EIA System Evaluations

Based on the 1997 ECA EIA Regulations, Wood (1999, 2003) conducted what, to date, has been the only macro-level comparative review of the South African EIA system. Wood compared the South African EIA system with six other developed countries namely, US, UK, Netherlands, Canada, Australia and New Zealand, and concluded that the South African EIA System met seven of the 14 evaluation criteria, partially met two and failed to meet five. As shown in **Table 3-4**, the main areas of weakness relate to report review, the centrality of the full range of impacts to decision-making, impact monitoring, public participation, EIA System monitoring and the SEA of programmes, plans and policies. When considering the 2006, 2010 and 2014 EIA regulations against these criteria, it seems that only two of these weaknesses have been addressed, namely the centrality of the report to decision-making and the requirements for monitoring of actions and impacts.

Table 3-4: Comparative Evaluation of EIA Systems (Source: Wood, 2003)

Evaluation criterion	Criterion met within jurisdiction						
	United States	UK	Netherlands	Canada	Australia	New Zealand	South Africa
1. Legal basis	●	●	●	●	●	●	●
2. Coverage	●	●	●	○	●	●	●
3. Alternatives	●	●	●	●	●	●	●
4. Screening	●	●	●	●	●	●	●
5. Scoping	●	●	●	●	●	●	●
6. EIA report preparation	●	●	●	●	●	○	●
7. EIA report review	●	●	●	●	●	●	○
8. Decision making	●	●	●	●	●	●	○
9. Impact monitoring	○	○	●	●	●	○	○
10. Mitigation	●	●	●	●	●	●	●
11. Consultation and participation	●	●	●	●	●	●	●
12. System monitoring	●	○	●	●	●	○	○
13. Benefits and costs	●	●	●	●	●	●	●
14. Strategic EA	●	●	●	●	●	●	○

● Yes ● Partially ○ No

The literature search of PhDs and masters research revealed that further meaningful work has been conducted in terms of regional comparison of EIA legislation. For example:

- **South Africa vs Namibia and Swaziland** (Roux, 2003): This research compared the EIA legislation of the three countries against Wood (1995; 2003) system evaluation criteria. It found that the three systems compared well with many of the shortcomings identified to be addressed in the different country's proposed legislative reform processes (in the case of South Africa the NEMA 2006 EIA Regulations). Moreover, the similarities of the different EIA legislative regimes make the alignment of EIAs for cross border developments easier.
- **South Africa vs Malawi** (Harrison, 2005): In this research EIA legislative frameworks for South Africa and Malawi was evaluated against the Wood (2003) system evaluation criteria. It found that the two systems performed very similarly against the set criteria, which suggest similar legislative arrangements.

Other more focussed comparative analyses have been done on specific aspects such as public participation. Decadt (2001) compared EIA public participation between South Africa, United Kingdom and United States (US). The comparative analytical framework in the research reveals significant variations between the three countries. Of the three countries the US have the most extensive public participation provisions, particularly as far as the level and degree of public participation and range of techniques are concerned.

3.5.6 Conclusions – Literature on design and input components

The sections above have provided a review of the literature in so far as it relates to the design and inputs components of the South African EIA system. The literature review addressed the two evaluation questions related to these components, the synthesis of which is provided below.

Synthesis of the literature relating to the design component of the South African EIA system and evaluation question 1 results in the following conclusions.

Design
Evaluation Question 1: What are the objectives of EIA in South Africa?
A review of the literature results in the following objectives for EIA in South Africa being identified. Firstly, EIA is a policy implementation instrument, which is used in pursuit of the realisation of the environmental right as contained within section 24 of the constitution. In pursuit of this right, which has at its core the promotion of sustainable development, EIA is expected to promote the section 2 environmental management principles contained within NEMA, in so far as they relate to decisions on regulated activities. Ultimately, the objective of EIA within the South Africa context is the promotion of and achievement of sustainable development as defined in NEMA and the relevant case law discussed above. EIA is also expected to deliver on administrative justice in so far as decisions are made. These decisions must be lawful, reasonable and procedurally fair.

Synthesis of the literature relating to the input component of the South African EIA system and evaluation question 2 results in the following conclusions.

Input Component
Evaluation Question 2: How is EIA expected to achieve its objectives?
In answering the question as to how EIA is expected to achieve its objectives, a review of the literature heralds the following. It is accepted that critical realism' is an appropriate ontological position for EIA as it recognises the validity of quantitative and qualitative data, thereby accommodating more subjective elements of impact predictions, values and views as well as objective evidence. Accordingly, EIA is understood to be both an 'art' and a 'science.
The South African legal system mandates the state to authorise and regulate activities, after considering the potential consequences or impacts of these activities on the environment.

South African legislation through NEMA and its regulations provides clear procedural and content requirements as basis for decision making, which requires decisions to be procedurally fair, lawful and reasonable.

The decision making mandate is vested with provincial and national spheres of government where administrative capacity is provided. Skill requirements are prescribed for EAPs in legislation and qualification standards. In terms of skills training significant progress seem to have been made with personnel in most provinces having sound qualifications, although overall staff shortages and inexperience are highlighted as key challenges.

3.6 Literature: Activities and Output Components

This section relates to the following evaluation components and questions:

The activity component deals the process or actions that use the inputs to produce the outputs. **In this case the activity component related to the EIA process.** The output component represents the final goods or services which the intervention delivers. **In this case the output component relates to the EIA report used in authorisation decision making by the competent authority.** So the main activity and output components related to the EIA system is the EIA process and EIA report.

Evaluation questions related to design and input components are:

Evaluation Question 3: What has been the economic impact of the EIA process on identified sectors?

Evaluation Question 4: To what extent has the EIA process been efficiently implemented?

Evaluation Question 5: What is the quality of EIA reports and processes?

3.6.1 Cost/economic impact of EIA

The successful adoption of EIA can be traced to the implicit or explicit assumptions that the benefits of doing EIA outweigh the associated costs and resultant economic impacts (Retief & Chabalala, 2009). Although it has been stated internationally that the aim of any EIA system should be to maximise environmental benefits, to minimise environmental costs, and to minimise the costs to the proponent (i.e economic impact), it has been argued that it would be impossible to establish precisely either the benefit or the cost of EIA (Wood, 2003). The reason being that comparing the benefits and costs of EIA is ultimately a matter of judgment,

dependent on how the factors are weighted, which was and still remains extraordinarily difficult to measure and largely unquantifiable (Arrow *et al.*, 1996; Sadler, 1996). Debates centred around EIA cost invariably raise basic fundamental and often contentious questions around the need for EIA, whether it has or adds value, and if EIA is ultimately worthwhile pursuing.

Recent years have seen increasing and renewed pressure building around EIA systems internationally to become more efficient and to demonstrate its added value (Retief *et al* 2007a; Bond *et al* 2014, Morrison-Saunders *et al* 2015c, Loomis & Dziedzic, 2018, Alberts *et al.*, 2019). That being said, research dealing with the fundamental issues related to cost has been limited, both internationally and especially within the South African context (Retief & Chabalala, 2009). This may probably be ascribed to the substantial conceptual and methodological challenges presented by such research, which includes the difficulties associated with trying to clarify terminology and disentangling what is actually meant by the 'cost' of EIA. The next sections provide an overview of how 'cost' have been conceptualised in relation to EIA as well as the empirical data that exist for the South African context.

3.6.1.1 Conceptualising the 'cost' of EIA

A main reason for the surprisingly limited international empirical research on the 'cost' of EIA, is arguably the substantial methodological challenges which such research presents. To this end three main difficulties may be highlighted. Firstly, it is understood that dealing with terminology and disentangling what is meant by the term 'cost' presents a challenge to consistency in analysis and subsequent internal and external validity of results. Secondly, no databases exist from which sound and verifiable empirical quantitative data on the costs of EIA can be readily or easily extracted. To ensure accurate data, research has to rely on direct access to project files. Finally, data on the cost of EIA is not always readily available with role players being reluctant to disclose cost related information. This is especially applicable to the South African context where private sector consultants are those mainly responsible for conducting EIAs within a highly cost competitive market.

The international literature clearly highlights the difficulties in defining what is meant by 'EIA cost' (Glasson, *et al* 2001; Wood 2003). Notwithstanding these difficulties, some progress has been made to conceptualise and distinguish different 'EIA cost' classifications – see Figure 3-8. For example, Gilpin (1996) distinguishes between 'direct costs' which refers to fees developers and regulators incur to comply with relevant EIA legislation and 'indirect costs' which arise from delays associated with a lack of coordination and conflicting demands. Similarly, Hart (1984), identify and distinguishes between four principal cost elements,

namely, costs of document preparation, review circulation, and administration of the law; costs of delay; costs of uncertainty and costs of mitigation. Consideration of the different cost components, highlights the fact that most research has focussed on exploring 'direct EIA cost' as well as the effect of time delays on total project cost. The European Commission (EC 1996; 1997, 2003) also contends that an inevitable need exists to obtain more reliable cost estimates of the likely range of both financial and time costs and benefits associated with the implementation of EIA regulations.

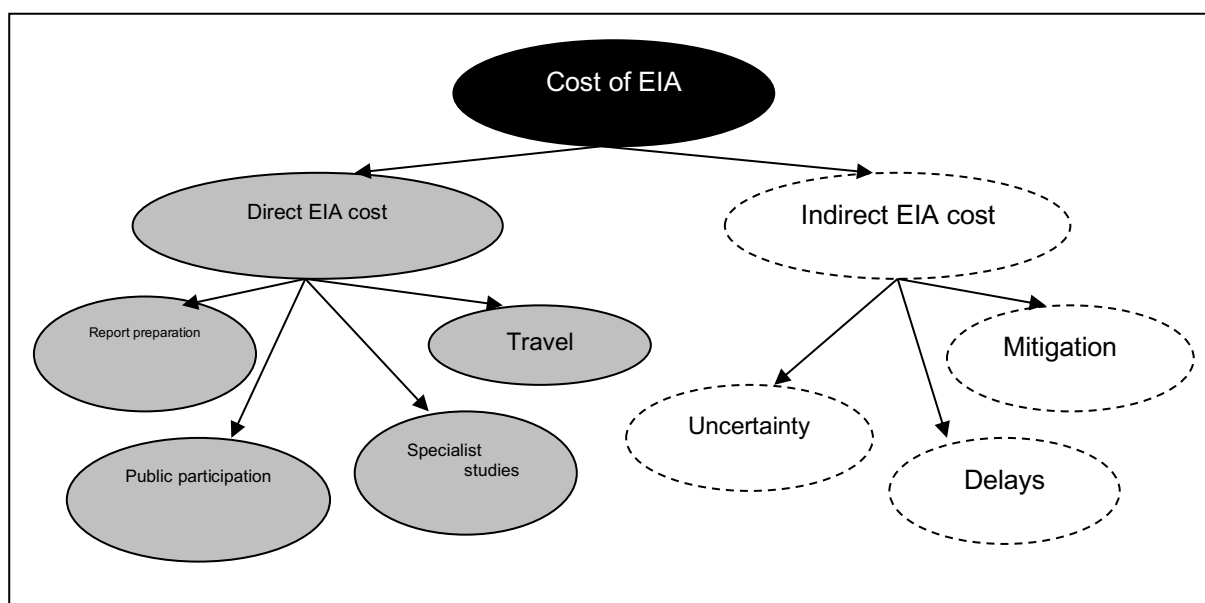


Figure 3-8: EIA cost elements (Sources: Hart, 1984; Gilpin, 1996; Retief and Chabalala, 2009)

The conceptualization presented in Figure 3-8 has been further refined by Retief et al (2007a) by considering direct and indirect cost (y-axis) of EIA in a matrix format over time (x-axis) – see Figure 3-9. Therefore, it suggests that when thinking about cost one needs to consider not only the direct and indirect nature thereof but also the time element, since many of the effects of EIA only occurs long after the EIA has been completed. The conceptualisation also suggest that direct costs are mostly borne by the developer/proponents and the indirect costs by communities and/or society in general. Moreover, the conceptualisation also shows that arguing causality between EIA and cost elements becomes more difficult when moving from direct to indirect costs (y-axis) as well as over time, moving from the conceptualization, design, construction, operational to decommissioning phases (x-axis).

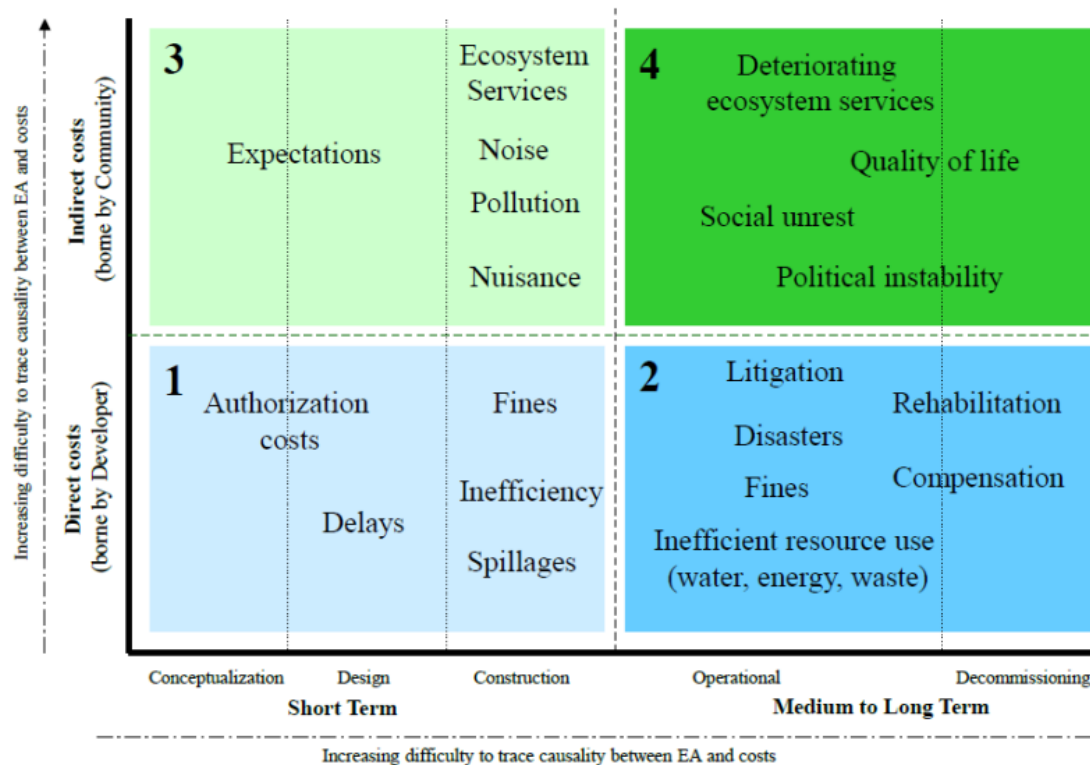


Figure 3-9: Conceptualising the business case for EIA (Source: Retief et al 2007a)

Based on the conceptualisation in Figure 3-9, Retief et al (2007a) suggest the following four categories of EIA costs. It is evident empirical research on the cost of EIA is more viable for Category 1 because proving causality for categories 2, 3 and 4 becomes exceedingly difficult:

- **Category 1:** Short term direct costs borne by the developer in relation to aspects such as Authorisation costs during the design phase as well as potential delays, fines, inefficiencies, spillages, etc. during the construction phase.
- **Category 2:** Medium to long terms direct costs borne by the developer related to possible litigation, disasters, fines, inefficient use of resources (i.e water and energy), etc. during operations, as well as direct rehabilitation and compensation costs during decommissioning.
- **Category 3:** Short term indirect costs borne by the community such as unrealised expectations, loss of ecosystem services, nuisance, pollution, etc. during design and construction phases.
- **Category 4:** Medium to long term indirect costs during operational and decommissioning phases borne by the community such as deterioration ecosystem services, quality of life, political instability and social unrest.

When considering the objectives of EIA in South Africa as determined by the policy and legal context it becomes evident that categories 3 and 4 have particular relevance. This relevance could be explored in more detail as part of the ToC narrative.

3.6.1.2 Empirical data on the cost of EIA in South Africa

Broad estimations have been developed in relation to direct EIA costs for the European Union (EU) as well as for selected developed countries. These mostly express EIA cost in relation to overall project cost or they provide a range estimate of what EIA studies typically cost in local currency. **Table 3-5** provides a comparative summary of international EIA costs for selected countries. A comparison of the direct EIA cost reveals notable differences with Canada being the most expensive, followed by the Netherlands. When EIA cost is considered as a percentage of total project cost, most countries fall within the 0.01 and 0.5% range, with cases of more than 1.0% being less common. The finding of the European Commission (1996, 2003), as indicated in Table 3-5, with regard to the costs of EIA in relation to total capital vs project cost, is that EIA costs range between 0.01% and 2.56% of the total project costs with an average EIA cost of less than 0.5%. The report states that for 60% of the projects reviewed, EIA costs amounted to less than 0.5% of the overall capital cost of the project. EIA costs exceeding 1% were exceptional. 40% of these instances occurred in relation to particularly controversial projects taking place in sensitive environments, or instances where good EIA practice had not been observed. The larger cost portion in EIA is directed to the processes of conducting environmental studies or investigations and report writing. This amounts to between 60% and 95% of the total EIA cost. It was however found that the actual cost tends to rise in direct relation to the capital cost of the project, whereas the relative EIA cost decreases progressively with the rising project costs.

Table 3-5: Comparative international cost estimates for EIA (Sources: EC 1996; 1997; 2003; Norwegian Ministry of Environment 2003; Wood, 2003; Tyldesley 2005; Retief & Chabalala, 2009)

Country / Region	Description	Dates	Direct EIA cost (converted to Rand/July 2006)	Direct EIA cost as % of total project cost
European Union	Average for the region	1996	Not available	0,01 to 2,56 (60% below 0,5)
<i>United Kingdom</i>	National range estimate	1999	120 000 – 1.2 million (£10 000 – 100 000)	0,1 to 1,0
	Department of Transport estimate	1997	420 000 (£35 000)	Not available
	Range cost of review consultants	1999	12 000 – 240 000 (£1 000 – 20 000)	Not available
<i>Scotland</i>	National range estimate	2005	Not available	Less than 1,0
<i>Norway</i>	National range estimate	2005	Not available	0,1 – 0,5
<i>Netherlands</i>	National range estimate	1993	450 000 – 2.25 million (€50 000 – 250 000)	0,01 to 0,5 (large proj.) 0,1 to 3,0 (small proj.)
<i>Finland</i>	National range estimate	2005	72 000 – 450 000 (€8 000 - 50 000)	Not available
Canada	National average for screening costs	1999	1.2 million (C\$200 000)	average 1,1
	National average for comprehensive studies	1999	51 million (C\$8,5 million)	average 3,9
United States	National average for project specific EIS	1994-1998	10.5 million (\$1,5 million)	average 0,2
Australia	Often exceeds	1999	5 million (Aus\$ 1 million)	Not available

The only empirical research on the 'direct EIA cost' in relation to 'overall project cost' in South Africa was conducted by Retief & Chabalala (2009). The data was obtained from a detailed analysis of 148 EIAs conducted across three provinces of South Africa. The research suggested that the average direct cost of EIA within South Africa is particularly low compared to international EIA systems. The direct EIA cost as a percentage of total project cost could

be verified for 96 of the 148 EIAs reviewed. Figure 3-10 indicates that the direct EIA costs as a percentage of total project cost ranged between 0,01% and 8,0%. The majority of the EIAs ranked between 0,04% and 3%, with a significant number of cases exceeding the 1% benchmark.

This suggests that although overall direct EIA costs in South Africa are low, when compared internationally, as a percentage of total project costs, EIA in South Africa compares with the higher spectrum of international cost norms. This suggest that a large number of EIAs are being conducted for relatively small scale projects, which places a noteworthy cost burden on small and medium economic enterprise. Retief & Chabalala (2009) suggested that the screening mechanism for EIA in South Africa should channel EIA away from small to medium size projects and focus more time and resources on bigger scale projects, which are also likely to have more significant environmental impacts.

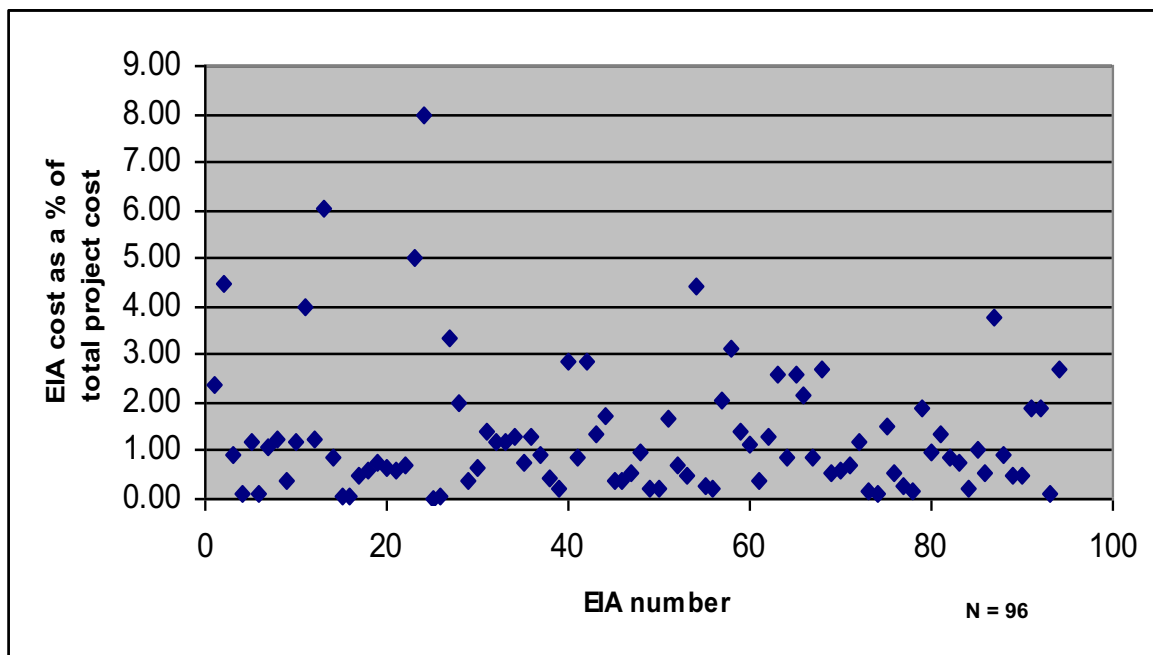


Figure 3-10: Direct cost of EIA as % of total project cost (Source: Retief & Chabalala, 2009)

The research by Retief & Chabalala (2009) also presents a breakdown of direct EIA costs. As reflected in Figure 3-11 six broad components were distinguished from the research data. Of these components the most expensive was the site investigation or site visit at 39%. A large cost component of 28% was undefined and was merely linked to invoice descriptions such as submission of reports, pre-application consultation with environmental authority, issuing of record of decision, etc. Public participation costs averaged approximately 13% of direct EIA

costs. In view of the fact that these costs excluded the compulsory advertisement requirements it suggests that in many instances public participation went further than the minimum legal requirements, including possibly public meetings and engagements with surrounding land owners. Cost for onsite as well as press advertisements made up 4% of total project costs. The results indicate that travel is a particularly expensive cost component of EIA. It contributed 14% to the total cost. Interviews with the environmental consultants highlighted that actual travel costs were in fact much higher and in some cases it was stated that the extensive travel requirements severely affected profit margins on certain projects. Preparations of reports made up 2% of total costs and mainly included printing costs. EIA application fees did not exist at the time of the research, so this cost item could not be reflected as is the present case.

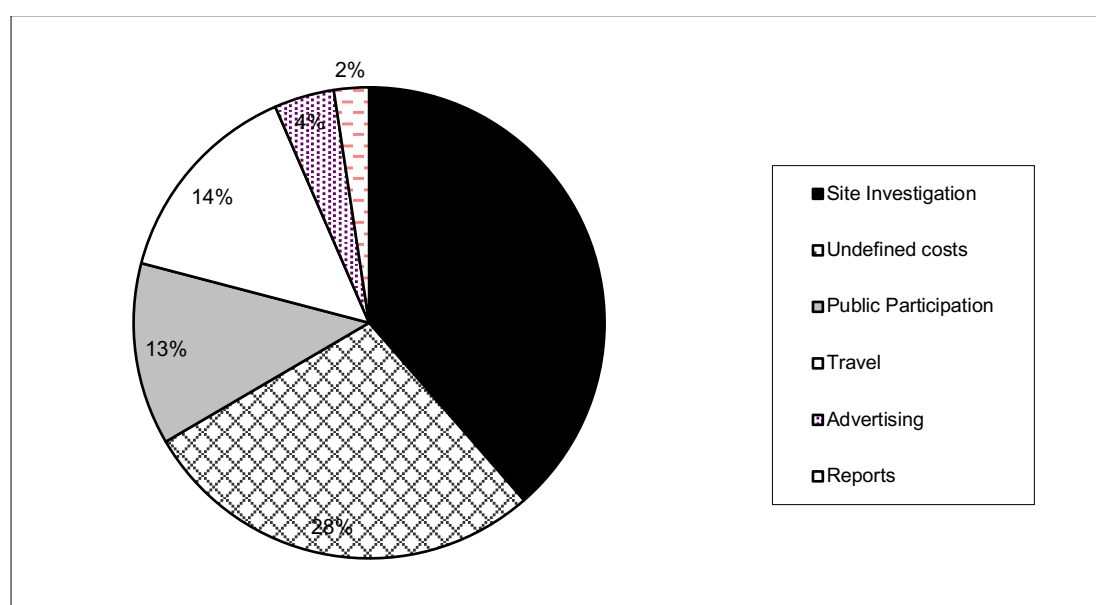


Figure 3-11: Breakdown of EIA costs components (Source: Retief & Chabalala, 2009)

The research by Reteif & Chabalala (2009) also delved into the rationale behind the cost estimates through semi-structured interviews with the environmental consultants. Interestingly, no evidence was found showing that total project cost was a significant consideration in the calculation and preparation of EIA cost estimates or quotations by consultants. It was even expressly stated by some interviewees that total project cost should not serve as a parameter for costing EIA because less expensive projects with high potential environmental impact could and should be more expensive than bigger, more expensive projects with less of a potential impact. Furthermore, very few EIA quotations included an indication of the hourly rate for environmental consultants. This was because EIA consultants were of the opinion that professional hourly rates are a poor and in most cases a meaningless

parameter for costing or quoting on EIAs. The results highlighted the following main considerations raised by consultants when calculating EIA cost (Retief & Chabalala, 2009):

- **EIA process:** It is obvious that the level of EIA (scoping or full EIA) was a main cost consideration and EIA quotes included almost without exception a provision that stated, *“a new quote would be presented should a ‘full EIA’ be required”*. However, it was ironic that consultants considered exemption applications as potentially more expensive and time consuming than scoping.
- **Travel:** The location of the consultancy relative to the project could, for less expensive EIAs, be a key determinant of competitive pricing. In this regard local consultancies had a distinct advantage.
- **Risk of application not succeeding:** Consultants were reluctant to even quote for EIAs, which presented a limited chance of success. The main reason for this was the need to avoid the potential quagmire created by public participation and ultimately appeal processes.
- **Anticipated public response and public participation requirements:** Linked to the previous point the potential participation requirement was a key consideration. In many instances EIA quotes highlighted the fact that the reflected cost only includes the basic legislative requirements to advertise on site and in the press and excludes any further participation related costs.
- **Sensitivity of the environment:** It was expressed that the sensitivity of the environment was a consideration, mainly because it affects the complexity of the EIA and the cost of potential specialist inputs.
- **Size of the consultancy:** Some consultants were of the opinion that the size of the consultancy plays a role and that smaller consultancies could generally charge less because of lower overheads.

A review of the literature suggests that the evaluation of cost or economic impact as part of a EIA system evaluation should focus on what is termed direct costs elements of EIA as well as total EIA costs compared to total project cost. Focussing on the latter would ensure international comparison with other EIA systems. In terms of indirect cost elements, the most viable cost element would be the effect of delays caused by EIA on total project cost. Of course proving causality between project delays and the EIA process could prove exceedingly difficult. This brings us to the next section dealing with the literature review on the efficiency of the EIA process.

3.6.2 Efficiency of EIA in South Africa

The issue of time delays related to EIA has been emphasised at the highest level, with previous President Thabo Mbeki referring to the backlog in applications as 'quite frightening' and in 2012 the Presidential Infrastructure Coordinating Commission of South Africa identified EIA and related delays as one of three key risk factors for bulk infrastructure development in

the country (Bond *et al* 2014). The efficiency of the EIA system in South Africa is typically considered as a function of the number of EIAs conducted in relation to available administrative capacity to evaluate and process these applications. Compared to international EIA practice, the number of EIAs conducted in South Africa since 1997 can be considered exceptionally high with an average of 3600 EIA per year under the NEMA regime down from more than 5000 under the ECA regime - see table 3-7 (Retief *et al.*, 2011b). When considering that countries with extensive resources and capacity such as the Netherlands (70 EIAs per year), United Kingdom (500 EIAs per year) and Germany (1 000 EIAs per year) conduct considerably less EIAs, (EC 2003) it is not surprising that EIA has been blamed for delays in project implementation and that serious allegations around inefficiency have been made.

The refinement and changes to EIA regulations in 2006, 2010, 2014 and 2017 specifically targeted redrafting and refining of the EIA screening criteria. The aim has been to address the relatively high number of EIAs through introducing more detailed listed activity descriptions and thresholds. At this point it needs to be stressed that there is no international benchmark for the ideal number of EIA applications, since different countries all conduct EIAs differently. The differences in conducting EIAs are rooted in a wealth of historical, legal and societal factors including various contextual variables, such as the status of the economy, sensitivity of the receiving environment, societal values, capacity of the public sector and civil society and the governance regime. The 2008 South African EIA system evaluation showed that on average EIA processes are seemed to be conducted in line with prescribed legal timeframes as well as international standards (DEA, 2008). However, more recent published empirical research on EIA process efficiency is lacking, which is unfortunate since competent authorities have in recent years developed detailed process monitoring systems, linked to overall departmental performance management (DEA, 2014).

Table 3-6: International comparison – number of EIA application per year (Source: Retief *et al.*, 2011b)

Countries	Average annual number of EIA applications	GDP per capita 2009–2010 (US \$)	Population (millions)
Developed countries			
Denmark	60	36,200	5.5
The Netherlands	70	39,000	16.7
The UK	500	35,400	61.1
Germany	1000	34,200	82.3
Australia	110	38,500	21.3
Developing and countries in transition			
Kazakhstan	3000	11,400	15.4
Russia	3000	15,200	140.0
Brazil (São Paulo State)	25 (in 2010)	24,400	33.1
South Africa			
ECA regime	> 5000	10,000	49.1
NEMA regime	3600		

Under the ECA regime, approximately 50% of applications were finalised within 6 months from the application date and an additional 33% within a year (DEA, 2006). The remainder was only finalised within a period of two years or more. In an effort to address this issue the 2006 EIA Regulations was the first to make provision for specified decision-making timeframes namely; 14 days for purely administrative actions, 45 days for review of minor reports and 60–105 days for review and decision-making on complex reports. These time frame have evolved further during 2010 and 2014 visions of the EIA Regulations. Although literature on the efficiency performance post 2006 are not generally available anecdotal evidence suggest that these changes have provided an effective framework for compliance and enforcement around procedural efficiency, by government.

The only empirical research on possible reasons for inefficiency in EIA processes has been by Steenkamp (2010) who conducted semi-structured interviews with EIA consultants and government officials. Five broad reasons for inefficiency were highlighted by the interviewees, namely:

- **Information gathering:** Environmental consultants claim that obtaining specialist studies and requests for additional information by the relevant authorities are some of the main reasons for inefficiency. To improve procedural efficiency around information gathering it was suggested that strategic tools such as EMF, SEA and conservation plans (C-Plans) be used to support and strengthen the scoping phase of the process. The recent introduction of the GIS based screening tool by DEA is also a step towards strengthening early decision making around information requirements.
- **Public participation and consultation:** The consultants indicated that they often struggle to obtain comments from government departments and that public comments and objections are often received outside the prescribed timeframe. The introduction

of set timeframes for public participation aims to address this challenge, while gaining comments from government departments has also been assigned as the mandate of the competent authority.

- **Lack of capacity:** This lack of capacity refers both to the insufficient number of staff as well as the inappropriate and low skill levels. The consultants identified the complexity of specialist studies as contributing to the problem, since these reports are often complex and beyond the technical competence of the relevant official that needs to interpret it. Government officials highlighted that high staff turnover is partly to blame. This results not only in the shortage of staff but also in a lack of institutional memory. Moreover, the lack of staff also inevitably increases the workload of officials and decreases their efficiency. The officials felt that incomplete and poor quality reports also increased their workload since it results in officials having to continuously request clarification or additional information in order to make an informed decision. There seems to be a lack of quality information going into the system combined with lack of capacity to deal with the information.
- **Lack of cooperative governance:** The failure of co-operative governance in South Africa is widely acknowledged and well documented (Kotze, 2003; Nel, 2005; Sampson, 2007; Van Wyk, 2007). The result has been the duplication and overlapping of governance efforts, wasting of resources and ultimately inefficiency (Jordi *et al.*, 1998; Mcdaid, 2000; Snyman, 2003; Kidd & Retief, 2009). These views are supported by the government officials who stated that there is inadequate consultation and communication between the different spheres of government (vertical communication); between government departments at the same sphere of government (horizontal communication) as well as within government departments. The recent initiatives towards a 'one environmental system' acknowledges and talks to these challenges.
- **Changes in scope of project:** Serious delays and back tracking occurs when the proponent changes the nature or scope of the project after the EIA process has been initiated, since such changes require amongst other the amendment of the public participation process and/or environmental reports. It was emphasised that the environmental application should influence the planning and design phases of projects so that risks may be identified early on in the project life cycle.

Finally, the drive for procedural efficiency and/or 'streamlining' has also been shown to erode many of the important benefits of EIA such as transparency, public participation and consultation (Bond *et al.*, 2014). Moreover, the quality of EIA could also suffer with less time for specialist studies to be conducted and less time for proper consideration of the outcomes of the assessment. Clearly a balance need to be struck between providing a reasonable time for the EIA and also avoid unnecessary delays for applicants (DEA, 2014).

3.6.3 Quality of EIA

Quality is much sought after in, and a basic foundation for, any well-functioning EIA system (DEA, 2014). However, the term is rarely defined, has an uncertain relationship with EIA effectiveness, and it means different things to different stakeholders. This researcher agrees with the recent conceptualisation by Bond *et al.* (2018a) who concluded that effective EIA

depends on good quality EIA and that, simply stated, good inputs lead to good outputs. The latter understanding also directly reflected in the evaluation framework. Research on the quality of EIA has certainly been the most prominent area of EIA research internationally and within the South African context. In terms of reviewing the quality of EIA Reports, various review packages and guidelines have been developed, some date back to the 1990s (Lee & Colley, 1992; EC, 1994; Glasson, 1996). The Lee-Colley package is probably the most well-known and widely applied in developed and developing countries (Lee & Colley, 1992; Ibrahim, 1992; Mwalyosi & Hughes, 1998). Extensive progress has been made to adapt international report review packages such as the Lee Colley review package to the South African context (Sandham & Pretorius, 2007). These packages have been used to review EIA quality over time (temporal), for different provinces as well as for different sectors and themes, as discussed in more detail in the following sections.

3.6.3.1 Temporal research on EIA quality

Experience in the UK and Europe, found that the overall quality of EIA systems and especially EIA report quality generally improves with time (Badr *et al.*, 2004; Barker & Wood, 1999; Canelas *et al.*, 2005; European Commission, 1996; Fuller, 1999; Glasson *et al.*, 1997; Morrison-Saunders *et al.*, 2001). However, although there is an assumption of improvement in system performance over time there has been little temporal research on EIA quality in South Africa, which means that there is little empirical understanding on trends in quality over time. Ideally the performance of EIA systems should be monitored, in particular tracing the influence of changes to legislation on performance. The two notable studies on EIA report quality over time in South Africa is by Makhaye (2003) and Sandham *et al.* (2013). Makhaye (2003) compared report quality before and after the first 1997 ECA EIA Regulations, while Sandham *et al.* (2013) aimed to evaluate to what extent the legislative changes between the 1997 ECA and 2006 NEMA EIA regimes have influenced system performance (in particular the quality of EIA reports). A sample of EIA reports from the two legislative regimes was reviewed using an adapted version of the Lee and Colley (1992) review package. Despite some improvements in certain aspects, it is slightly disturbing that according to Sandham *et al.* (2013) overall report quality decreased slightly from the ECA (pre 2006) to the NEMA regime (post 2006). However, the results from this evaluation for both the 1997 and the 2006 regimes are still similar to those from other South African studies on EIA quality (Sandham & Pretorius 2007; Sandham *et al.*, 2008a, 2008b, 2010) as well as internationally (Barker & Wood 1999; EC 1996; Lee, 2000; Pöhlönen *et al.*, 2010) with lower grades in the more analytical areas compared to the higher grades in the more descriptive and presentational areas of evaluation. It therefore appears that according to Sandham *et al.* (2013) the

modifications to the regulations, often heralded as the solution to improvements in performance have not resulted in improved quality of EIA reports.

3.6.3.2 Quality of EIA per province

To date EIA report quality review has been conducted for three provinces namely Limpopo, Free State and Gauteng Provinces. **Table 3-7** provides a summary of the quality performance results. These results do not reflect an evaluation of the performance of provincial departments in general (because the sample of cases reviewed does not allow for such generalisation) but merely a reflection on the quality of a sample of EIA reports within these provinces. For the Limpopo Province, Sandham *et al* (2005) reviewed a total of 95 project files from the competent authority. The data set was from a wide range of activity categories and from a wide range of geographic locations within the province. The investigation focused on various EIA aspects including baseline information, specialist studies, duration taken for projects to be authorised and the record of decision (ROD). It concludes that overall, EIA practice in the Limpopo Province conforms to the South African EIA regulations and guidelines fairly well. However, public participation, consideration of alternatives and consideration of socio-economic impacts was identified as particular weaknesses. Kruger and Chapman (2005) conducted a similar study for the Free State province, albeit based on a smaller sample of EIAs. The overall results suggest a particularly poor performance, especially in relation to dealing with baseline information, consideration of alternatives and overall communication of results. The North West Province has been well covered in terms of quality research and although the overall grades seem to be slightly higher than for the Limpopo and Free State provinces, similar weaknesses occur (Sandham *et al* 2002; Sandham & Pretorius 2007). Research for other provinces have focussed more on capacity as a particular determinant of quality (see for example Duggan, (2000) for Kwazulu Natal and Wybenga, (2000) for Gauteng).

Table 3-7: Summary of provincial EIA Report quality research results (Source: updated from Kidd and Retief 2009)

Summary of Performance Areas (adapted from Lee Colley, 1992)	Provincial context		
	Limpopo Province (Sandham <i>et al.</i> , 2005; Cshivhandekano, 2003)	North West Province (Sandham <i>et al.</i> , 2002; Sandham & Pretorius 2007)	Free State Province (Kruger & Chapman, 2005)
<i>Description of the project:</i>	○ Emphasis on biophysical	○ Well performed with 75% of	○ Inadequate baseline data on biophysical

Summary of Performance Areas (adapted from Lee Colley, 1992)	Provincial context		
	Limpopo Province (Sandham <i>et al.</i> , 2005; Cshivhandekano, 2003)	North West Province (Sandham <i>et al.</i> , 2002; Sandham & Pretorius 2007)	Free State Province (Kruger & Chapman, 2005)
• Description of development • Inclusion of site plan • Environmental description and baseline conditions	with limited consideration of social and economic aspects	cases considered satisfactory ○ Limited consideration of social and economic aspects	aspects with 55% of cases considered poor ○ Socio-economic aspects neglected
<i>Identification of key impacts:</i> • Definition of impacts • Scoping • Prediction of impact magnitude • Assessment of impact significance	<i>Not covered</i>	○ Impacts well defined ○ Poor prediction of magnitude ○ Struggle to deal with significance ○ 77% of cases use two or less prediction techniques	○ Only one prediction technique used in 49% of cases ○ 22% of cases utilized two techniques
<i>Alternatives and mitigation:</i> • Consideration of alternatives • Scope and effectiveness of mitigation measures	○ Only 45% of cases considered alternatives	○ Limited use of more than one alternative ○ Weak consideration of mitigation measures	○ Only 47% of cases considered alternatives
<i>Communication of results:</i> • Layout of statement • Presentation of results	<i>Not covered</i>	○ Well performed - 94% of cases considered satisfactory	○ Considered poor ○ Slight concern over biased language

3.6.3.3 Sectoral and theme based quality research

Moreover, report quality review criteria have also been developed to deal with amongst other the specific sectors to be investigated as part of this EIA system evaluation, namely mining (Sandham *et al.*, 2008b), agriculture (Sandham *et al.*, 2010), energy (Boshoff, 2014), housing (Mbhele, 2010), tourism (Retief *et al.*, 2018), bulk infrastructure (Sandham *et al.*, 2013b) and waste (Laven, 2017). **Table 3-8** provides a summary of the broad quality review results for

different sectors. All these studies were conducted against adapted versions of the Lee & Colley (1992) review package. The research results came to very similar conclusions regarding report quality. In general, the key weaknesses relate to the identification and analysis of potential impacts, the ranking in terms of significance and the identification of sound alternatives and mitigation measures to address impacts. Overall it was found that biophysical data tend to dominate EIA reports and that social and especially economic inputs were limited. Furthermore, it was found that although EIA reports conform to minimum legal requirements they fall short of best practice.

Quality has also been evaluated for specific themes in EIA such as public participation and social impact assessment (SIA) and biodiversity impact assessment (BIA). In terms of public participation research tends to focus on learning from specific high profile case studies such as the Gautrain (see Coetzee, 2003; Aregbeshola, 2009), developments along the Wild Coast (see Kubukeli, 2006), the installation of controversial gas pipelines (see Petrick, 2004), etc. The consensus from the research seems to be that the South African EIA system provides extensive opportunity for public participation, but that the implementation thereof does not always reflect best practice. Research on the quality of certain specialist studies such as SIA and BIA suggest major shortcomings. In the case of SIA serious questions are raised about the skills and capacity of specialists (Du Pisani & Sandham, 2006) while for BIA the concern lies more in the availability of time and resources for specialist to do their work (Rouwenhorst, 2003; Hallat *et al.*, 2015).

Table 3-8: Summary of sectoral EIA Report quality research (Source: updated from Kidd & Retief, 2009)

Summary of Performance Areas	Sectors						
	Mining (Sandham <i>et al.</i> , 2008)	Agriculture Biological pest control (Sandham <i>et al.</i> , 2010)	Energy Renewables (Boshoff, 2014)	Housing (Mbhele, 2010)	Tourism National Parks infrastructure (Retief <i>et al.</i> , 2018)	Bulk Services Manufacturing (Sandham <i>et al.</i> , 2013)	Waste (Laven, 2017)
Description of the project: - Description of development - Inclusion of site plan - Environmental description and baseline conditions	- Generally satisfactory with 85% satisfactory scores - Minor weakness regarding description of duration of project phases	- Description of control agent and target invasive species considered satisfactory - Description of receiving environment considered poor	- Generally satisfactory with 70% satisfactory scores - Description of development	- Well described in terms of spatial data and site plans - Baseline conditions well described	- Overemphasis on biophysical with limited socio-economic considerations - Development well described	- Baseline condition well described - Weak understanding of the proposed activity	- Generally satisfactory with 86% satisfactory scores - Some weakness in relation to waste description
Identification of key impacts: - Definition of impacts - Scoping - Prediction of impact magnitude - Assessment of impact significance	- Generally acceptable with 70% satisfactory results - Particularly strong in scoping and significance - Weak in dealing with magnitude	- Key impacts not identified - No indirect or cumulative effects considered	- Satisfactory identification of key issues and impacts - Limited consideration of cumulative impacts	- Key issues well identified in relation to bulk services provision - Weak consideration of significance	- Key issues missed during scoping - Difficulties in dealing with significance	- Weak prediction of impacts - Weak consideration of significance	Poor identification of impacts with only 25% satisfactory results
Alternatives and mitigation: - Consideration of alternatives - Scope and effectiveness of mitigation measures	- Generally satisfactory with 65% satisfactory results - Some weaknesses in dealing with mitigation	- Consideration of alternatives satisfactory - Mitigation measures poorly considered	- Weak consideration of alternatives - Weak consideration of mitigation measures	- Limited alternatives considered in terms of services and location - Weak consideration of mitigation	- Alternatives well considered - Mitigation hierarchy well applied - Good EMPs	Limited consideration of technology alternatives	Generally satisfactory with no weaknesses

Summary of Performance Areas	Sectors						
	Mining (Sandham <i>et al.</i> , 2008)	Agriculture Biological pest control (Sandham <i>et al.</i> , 2010)	Energy Renewables (Boshoff, 2014)	Housing (Mbhele, 2010)	Tourism National Parks infrastructure (Retief <i>et al.</i> , 2018)	Bulk Services Manufacturing (Sandham <i>et al.</i> , 2013)	Waste (Laven, 2017)
<i>Communication of results:</i> - Layout of statement - Presentation of results	Very well performed with 95% satisfactory results	- Well performed - Slight concern over biased language	- Insufficient on-technical summary - Poor summary of main issues	Results well communicated	Well communicated	Weak executive summary	Well performed with some weaknesses relating to project layout description

3.6.4 Conclusions – Literature on activities and output components

The sections above have provided a review of the literature in so far as it relates to the activities and outputs and components of the South African EIA system. The literature review addressed the two evaluation questions related to these components, the synthesis of which is provided below. Synthesis of the literature relating to the activities component of the South African EIA system and evaluation question 3 results in the following conclusions

Activities
Evaluation Question 3: To what extent has the EIA process been efficiently implemented?
When compared to international EIA practice, the number of EIAs conducted in South Africa is exceptionally high when compared to other countries. Anecdotal evidence suggest that EIA processes are generally conducted within set legal timeframes and that effective frameworks for monitoring procedural efficiency exist in government. Questions are being asked as to what extent the drive for procedural efficiency is eroding the potential benefits of EIA in terms of improving decision making and providing for transparency and participation

Synthesis of the literature relating to the outputs component of the South African EIA system and evaluation questions 4 and 5 resulted in the following conclusions

Outputs
Evaluation Question 4: What is the quality of EIA reports and processes?
South African EIA report quality has been evaluated over time. This has been done for different provinces and sectors. Overall report quality decreased slightly from the ECA (pre 2006) to the NEMA regime (post 2006). The literature suggests that lower quality grades are achieved for dealing with impact identification, alternatives, mitigation and significance. The literature suggest that higher quality grades are achieved for dealing with more descriptive and presentational areas of evaluation.
Evaluation question 5: What has been the economic impact of the EIA process on identified sectors?

There is no existing literature on the full economic impact of EIA on specific sectors in South Africa.

Determining the economic impact of EIA is exceedingly difficult from a conceptual and methodological perspective.

Research suggests that the average direct cost of EIA in South Africa is particularly low compared to international EIA systems.

As a percentage of total project costs, EIA in South Africa compares with the higher spectrum of international practice. This suggests that a large number of EIAs are being conducted for relatively small scale projects, which might be placing a notable cost burden on small and medium enterprises

3.7 Literature: Outcome and Impact Components

This section relates to the following evaluation components and questions:

The outcome component reflects the results of achieving certain outputs. **In this case the outcome component is represented by the extent to which EIA influences decision making.** The impact component represents the results of achieving certain outcomes. **In this case the impact component relates to the extent to which EIA is achieving its objectives towards delivering more sustainable outcomes.** So the main outcome and impact components related to the EIA system is the extent to which EIA influences decisions which then delivers more sustainable outcomes.

Evaluation questions related to the outcome and impact components are:

Evaluation Question 6: To what extent has EIA influenced decision making?

Evaluation Question 7: To what extent has the EIA process been effective in achieving its objectives, towards sustainable development?

3.7.1 Influence of EIA on decision-making

The increasing emphasis placed on compliance monitoring through initiatives such as the establishment of the Environmental Management Inspectorate (EMIs) or Green Scorpions have improved the effectiveness of EIA implementation albeit that prosecution and conviction rates remain low (Patterson & Kotze 2009). Moreover, the emergence of environmental control officers (ECOs) has also significantly contributed to post decision follow-up and implementation of independent verification. Research by Wessels *et al.* (2015) indicates that independent verifiers added most value to major construction projects when they were

involved with screening of the EIA requirements for new projects, allocation of financial and human resources, checking and monitoring legal compliance, influencing implementation, reporting conformance results, community and stakeholder engagement, integration with self-responsibility programs such as environmental management systems (EMS), and controlling records. It was apparent that ECOs as verifiers could be more creatively utilised in preconstruction preparation, providing feedback of knowledge into assessment of new projects, giving input to the planning and design phase of projects, and performance evaluation. The research confirms the benefits of proponent and regulator follow-up, specifically in having independent verifiers that disclose information, facilitate discussion among stakeholders, are adaptable and proactive, aid in the integration of EIA with other programs, and instil trust in EIA enforcement by conformance evaluation.

The literature review did highlight specific areas of research related to the extent to which EIA influences decisions, such as:

- ***The influence of specialist studies on decision making in EIA:*** These include social impact assessment (SIA) (Du Pisani & Sandham, 2006) biodiversity impact assessments (BIAs) (Hallat *et al.*, 2015, Swanepoel, 2017), geotechnical and geohydrological studies (Venter, 2015), etc.
- ***Follow-up and post decision compliance:*** Geeringh (1998) conducted an evaluation of EMP implementation for linear developments, in particular Eskom transmission lines. Research on status and barriers to follow-up have also been conducted for the Kwazulu-Natal Province by Cubitt (2001), through interviews with relevant provincial officials, while the paper by Hullet & Diab (2002) provides a good overview of the general status of EIA follow-up in South Africa.
- ***Accuracy of prediction:*** The research by Jordaan (2011) calculated the accuracy of prediction for a specific high profile EIA case study and found accuracy of prediction to be around 66%. This means that 34% of impacts identified during construction and operation were not predicted by the initial EIA. Therefore, even if the EIA was fully implemented, 36% of impacts would not have been identified. This raises the importance of post decision monitoring and adaptive management arrangements that can react to unforeseen impacts.
- ***Rejections:*** A common criticism of EIA systems internationally is that projects are rarely rejected and that rejections are usually based on procedural non-compliance. As a result, the EIA process is perceived as a rubber stamping exercise placating the environmental lobby while allowing development to continue. Davidson (2012) conducted research on the extent to which EIAs are rejected in South Africa and what the grounds for these rejections were. Seventeen EIA rejections were obtained and analysed. The research found that a number of substantive reasons were provided for the rejection of EIAs, while only one EIA was rejected purely on procedural grounds. The two most prominent reasons why EIAs are rejected relate to the undesirable location of the proposed development and the potential negative socio-economic impacts.

In conclusion, due to the fact that in South Africa very little EIA follow-up research on enforcement and compliance monitoring happens, little empirical data on the effectiveness of EIA in general, and its influence on decision making in particular, exists. However, in South Africa it is considered a key factor influencing the quality and effectiveness of the EIA system (DEA, 2014).

3.7.2 Contribution to sustainability

Contending and grappling with sustainability has been implicit in and intertwined into the evolution of EIA practice in South Africa since its voluntary inception in the 1970s. It did however become more explicitly defined in the legal mandate during the 1990s (Sowman *et al.*, 1995; Kidd & Retief, 2009; Kidd *et al.*, 2018, Alberts *et al.*, 2019). The first main shift or trend in the evolution of the EIA system during the late 1970s and early 1980s, was a progression away from the biophysical environment or conservation focus, towards debates dealing with trade-offs between development and environment whilst also seeing the integration of the concept of sustainability within decision making (Kidd & Retief, 2009; Kidd *et al.*, 2018). Internationally, as well as in the South Africa context, there is not much research available on the extent to which EIA has delivered on sustainability or more sustainable outcomes. Work by Morrison-Saunders and Retief (2012) is one such exception. The research tested the South African EIA mandate (as defined in legislation) against international best practice sustainability principles which were developed by leading sustainability assessment scholars such as Gibson (2006). The. Research also explored the effectiveness of the EIA system in delivering its sustainability mandate. The research demonstrated that in the South African context, EIA already has a very strong and explicit sustainability mandate, as already explained in section 3.5 above, which means that the challenge for EIA does not lie with the mandate or the promulgation or passing of appropriate enabling legislation, but rather with implementation and giving effect to this mandate in EIA practice. The authors (Morrison-Saunders & Retief, 2012) therefore argued that there is no apparent need for legislative reform in South African EIA policy or law. The authors promote a shift away from what they considered to be an over emphasis on legal reform towards a more pragmatic approach, in so doing they suggest that practitioners themselves have a key role to play in driving the sustainability agenda. Similar sentiments have been expressed by Weaver *et al.* (2008) for both South African and international EIA practitioners alike in which case they advocated individuals' "*pushing the sustainability vectors on every EIA an individual practitioner works on*" and by Gibson (2006) who concluded their book with the statement: "*It is about making the world better, one undertaking at a time*".

Arising from a questionnaire survey of South African EIA practitioners, DEA (2008) reported that “*Very few participants in the questionnaire indicated that the purpose of EIA is to ensure or promote sustainable development*” and suggested that this was “*indicative of the general ignorance amongst both officials and practitioners in respect to the sustainable development purpose of EIA*”. Similarly, DEA (2011, 2014) reported on a misalignment with the objective of promoting ecologically sustainable development in the South African EIA system whereby practice is seen to be attempting to reduce the harm caused by specific projects rather than promoting the overall objective of attaining sustainable development. More specifically DEA (2011: 5) stated that: “*This means that in making decisions in relation to a specific project there is often insufficient attention given to the context in which the decision is being made and to whether or not the implementation of the project would have a positive impact on the attainment of ecologically sustainable development and can be considered to be ‘justifiable’ socio-economic development.*”

The literature review could find only a single empirical research study that attempted to apply international best practice sustainability assessment practice to the South African context. This was Robbertze (2016) who evaluated a single case study against the Gibson (2006) sustainability principles. The results showed that due to the broad definition of the environment within the South African context, EIA within this context is similar to what is internationally understood as sustainability assessment. Moreover, it was found that there is a particular focus on social aspects in impact assessment and that the ‘brown agenda’ is well represented in decision making. Particular challenges in applying sustainability thinking was however related to incorporating longer term thinking and dealing with uncertainty.

3.7.3 Conclusions – Literature on outcome and impact components

The sections above have provided a review of the literature in so far as it relates to the outcome and impact components of the South African EIA system. The literature review addressed the two evaluation questions related to these components, the synthesis of which is provided below. Synthesis of the literature relating to the activities component of the South African EIA system and evaluation question 6 results in the following conclusions

Outcome
Evaluation Question 6: To what extent has EIA influenced decision making?
EIA has significant mandate to positively influence decision making towards sustainable development.

There is limited empirical research on the extent to which EIA influences decision making with most research focussing on post-decision follow-up. South Africa has made significant strides in law and administrative arrangements to deal with compliance monitoring and follow-up.

The research emphasise the importance of post decision monitoring and adaptive management to deal with unforeseen impacts

Synthesis of the literature relating to the outputs component of the South African EIA system and evaluation questions 4 and 5 resulted in the following conclusions

Impact
Evaluation Question 7: To what extent has the EIA process been effective in achieving its objectives, towards sustainable development?
There is limited research available on the extent to which EIA has delivered sustainability and/or more sustainable outcomes. There seems to be ignorance or misalignment amongst both officials and practitioners in respect of the sustainable development mandate and purpose of EIA. The research demonstrated that in the South African context EIA already has a very strong and explicit sustainability mandate which means that the challenge for EIA does not lie with the mandate (or the establishment of appropriate enabling legislation) but rather with giving effect to this mandate in practice. Particular challenges in applying sustainability thinking in EIA is related to incorporating longer term thinking and dealing with uncertainty.

3.8 Overall synthesis and final remarks to Chapter 3

Chapter 3 provided a review of the relevant international and South African literature as it relates to the different South African EIA system components and the seven identified evaluation questions. The outcome of the literature review is summarised against the different evaluation components and questions in Appendix C.

CHAPTER 4 EIA SYSTEM EVALUATION RESULTS AND DISCUSSION

4.1 Introduction

Chapter 4 provides an overview of the results obtained during the study. The data analysis was done according to the methodology described in Chapter 2 of this thesis and is structured around the different evaluation components of the logical framework and ToC evaluation framework described in **Chapters 2 and 3**.

Chapter 4 addresses **research objective 3**, which was the evaluation of the selected EIA system against the developed performance evaluation criteria resulting from **research objective 2** as set out in **chapter 2** above. The evaluation criteria developed, entailed **7 evaluation questions**, with corresponding KPIs for each. The system evaluation results are discussed below.

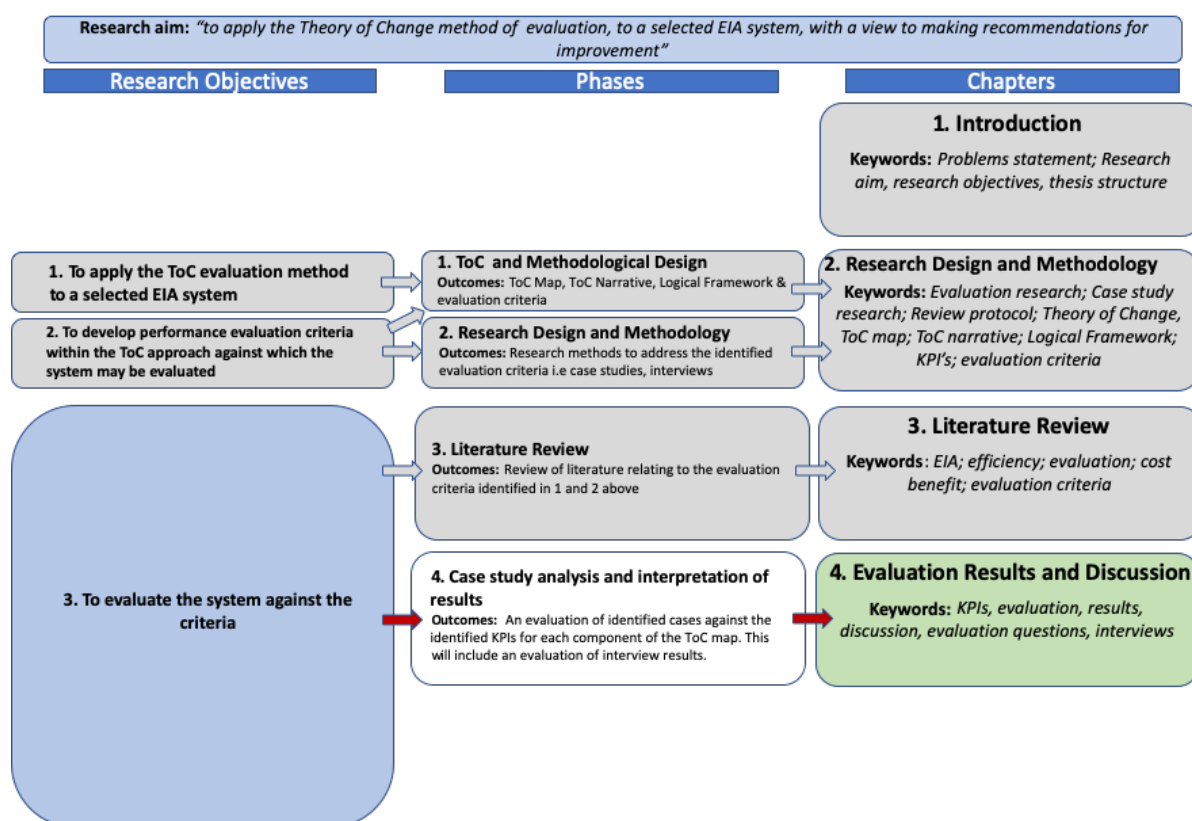


Figure 4-1: Research layout Chapter 4

As explained in **Chapter 2**, the evaluation was done against purposefully designed KPIs for each of the seven evaluation questions and scored in terms of conformance (A), partial conformance (B) and non-conformance (C).

4.2 Input Component: Skills and Cost

The input component deals with the resources that contribute to the delivery of the activities and output components (DMPE, 2011), in this case inputs around skills and competencies together with time and money. The inner logic of the EIA system as reflected in the ToC map suggest two key assumptions related to the input components namely: that sufficient skills and competencies exist to implement the EIA system and that the benefits of doing EIA outweigh the costs. Based on the outcome of the literature review and the outcome of the case study analysis against nine purposefully designed KPIs, these assumptions can now be tested.

4.2.1 EIA Cost

The literature review showed that the only empirical research on the 'direct EIA cost' in relation to 'overall project cost' in South Africa was conducted by Retief and Chabalala (2009). The data was obtained from a detailed analysis of 148 EIAs conducted across three provinces of South Africa under the ECA regime (pre-2006). The research suggests that the average direct cost of EIA in South Africa is particularly low compared to international EIA systems. However, the direct EIA costs as a percentage of total project cost ranged between 0,01% and 8,0%, with the majority of the EIAs grouped between 0,04% and 3%. This confirmed that a meaningful number of cases exceeded the 1% benchmark. However, the 1% benchmark should always be considered in context because there is no obvious direct correlation between overall project cost and the overall significance of potential environmental impacts. For example, you could reasonably foresee instances where very large infrastructure build projects such as sewerage works might have an obviously minimal negative and significantly positive environmental impact while a smaller capital project such as a battery waste storage facility might have significant potential environmental impacts. The outcome of the case study analysis for this research should be considered against this contextual understanding.

As highlighted in the literature review, one of the main reasons for the surprisingly limited empirical research on the 'cost' of EIA, is the substantial methodological challenges presented by such research. The literature review identified the three main difficulties that can be distinguished. Firstly, dealing with terminology and disentangling what is meant by the term 'cost' poses a challenge to consistency in analysis and subsequent internal and external

validity of results (as discussed in the literature review in **Chapter 3** above). Secondly, there are no databases from which sound and verifiable empirical quantitative data on the costs of EIA can be readily extracted. Finally, data on the cost of EIA is not always readily available and role players are reluctant to disclose information. Recognizing these challenges this evaluation relied on the international benchmark for direct EIA costs set as 1% (Retief and Chabalala, 2009) of total project cost which was included as KPI 1.1. Industry knowledge and accepted norms were used to determine the percentage of EIA cost by the case reviewers in relation to project cost. The reviewers, aggregated EIA costs estimates vs project cost estimates to determine whether the 1% threshold was exceeded or not based on their collective experiences. This was only done where cost information was unavailable.

4.2.1.1 Data analysis – ‘cost’ of EIA:

This system evaluation (**research objective 3**) provides an ideal opportunity to build on the research by Retief & Chabalala (2009) as discussed in the literature review and section 4.1.2 above. The analysis of the 42 cases against KPI1.1, namely:

KPI 1.1 – *Did the direct EIA cost fall below the international benchmark of 1% of total project cost?*

An analysis of the data suggests that the case evaluations produced four possible cost trends across sectors as reflected in **Figure 4-2** namely:

- Sectors under 1% threshold includes energy and mining. This is not surprising since the total project cost for these projects varied between billions and hundreds of millions of Rands. For example, the establishment of a new mine within the Mpumalanga province was budgeted at R1.5bn, giving an estimated EIA cost of R15 million should the 1% threshold be applied. All the cases reviewed dealt with the establishment of mining infrastructure, therefore, the direct EIA cost is bound to be insignificant compared to the overall project cost. Similarly, the energy cases which were reviewed all dealt with new build renewable energy projects, with Case 3 claiming a total project cost of R4bn. Although the exact EIA costs could not be determined it is highly unlikely that it would exceed R40 million rand and the 1% threshold. For these types of projects EIA does not present a particular cost burden.
- Sectors with majority projects falling under the 1% threshold include bulk services and housing. Although for the majority of cases within these sectors the EIA cost was way below the 1% benchmark, exceptions were found. These included two housing projects which dealt with staff accommodation and a small 1.6ha residential

development as well as an access road to a low water bridge which had a total project cost of R7.6m and a rural housing hub which had a total project costs of R5.5. These are however considered exceptions and it is reasonable to conclude that EIA cost is not considered meaningful in relation to housing and bulk services infrastructure projects.

- Sectors where majority of cases exceed the 1% threshold are tourism and waste management. For these sectors EIA cost is becoming meaningful direct cost item. Particularly in relation to waste management projects related to small, micro and medium enterprises (SMMEs), as also borne out by the work of Retief & Chabalala (2009). However, since waste management in general (and even small scale waste management facilities) should be considered potentially high impact activities, a case could be made that higher EIA costs relative to total project cost is justified. The tourism sector is however slightly different in that the high cost of the EIAs could be well justified against the sensitive locations of these developments, typically in nature reserves and national parks. These locations do have reasonable cost implications related to specialist studies, public participation, traveling, etc. Examples of such projects which were reviewed included the construction of a luxury lodge in the Kgaladgadi National Park as well as a new visitor gate and access road in the Kruger National Park.
- Sectors which exceeded 1% threshold: Agriculture was the one sector where for all the cases direct EIA cost exceeded the 1% threshold. Considering that agricultural developments takes place in sensitive environments (similar to tourism), resulting in high specialist inputs/cost this result is maybe not surprising. Moreover, agricultural developments, generally, do not have the infrastructural cost components that many other sectors have which lowers the total project cost. These two factors partly explain why agricultural developments are more likely to exceed the 1% threshold. Finally, the agricultural sector is especially prone to phased developments which drives up the relative cost of EIA. For example, EIA applications are typically submitted for the next feasible area to be cultivated rather than simultaneously applying for all the future areas to be one day cultivated.

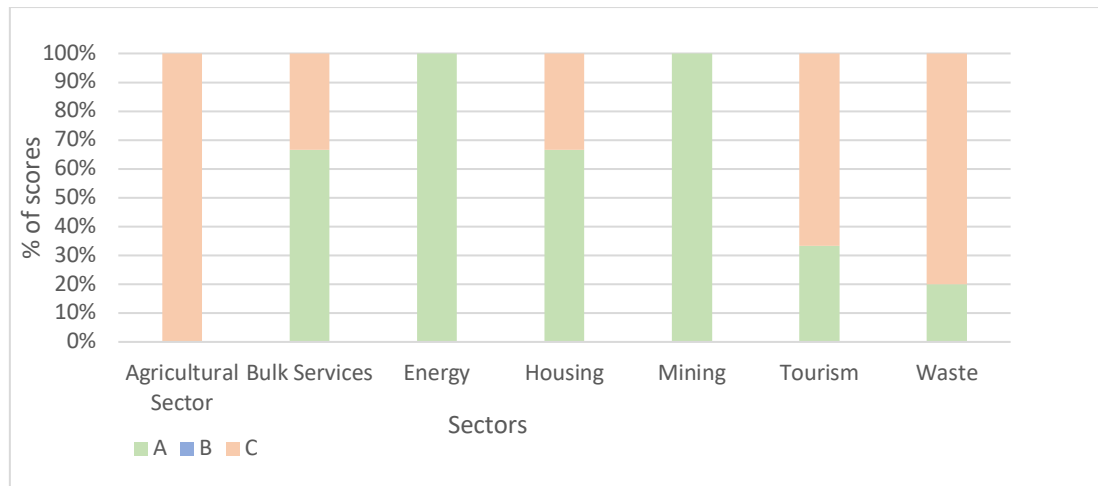


Figure 4-2: Performance of the cost input component per sector against the 1% benchmark

4.2.2 Skills and competencies

The literature review showed that there is scant reflection in the peer reviewed literature on skills and competency within the South African EIA system. For example, the literature search on Scopus and the NRF database revealed only three peer reviewed papers (Sowman *et al.* 1995; Duthie, 2001; Sandham & Retief, 2016), one conference paper (Van der Heyden *et al.*, 1998) and a single masters dissertation (Abdulla, 2002) that deals with this topic. This is unfortunate because the lack of skills and competency is commonly raised as an underlying reason for inefficiency and lack of quality in EIA (see for example Abdulla, 2002; Kotze & Van der Walt; 2003; Nel, 2005; Sampson, 2007; Kidd & Retief, 2009; DEA, 2014), yet we seem to have limited peer reviewed research to draw on to substantiate such claims.

The literature shows that in 1995 fewer than 200 persons had higher degrees related to environmental assessment expertise, and fewer than 500 persons had been exposed to short intensive training programmes to equip them to undertake environmental assessments (Sowman *et al.*, 1995). The paper by Duthie (2001) entitled “A review of provincial environmental impact assessment administrative capacity in South Africa” concluded that in terms of training significant progress had been made by 2000, with personnel in most provinces having sound qualifications, although overall staff shortages and inexperience were highlighted as key weaknesses. More recently, Sandham & Retief (2016) found that in South Africa, EIA is widely taught at South African universities and has developed a robust body of research. The evolution of EIA in South Africa towards becoming a fully-fledged profession has also led to attempts at standardizing work, formalizing training and the establishment of a registration authority, namely the Environmental Assessment Practitioners Association of

South Africa (EAPASA). The multidisciplinary nature of EIA makes it a contested field, and various disciplines have attempted to lay claim to this area of expertise, most notably the biological/ecological community, especially during the early years of EIA. However, the growing realization of the importance of the human dimension of EIA has supported the growing contribution of a body of EAPs from non-ecological backgrounds, and the ongoing demand for postgraduate education in EA for students from a wide range of disciplinary backgrounds. In order to formalise the registration process of EAPs with EAPASA so-called unit standards had to be developed and a qualification registered with the South African Qualification Authority (SAQA) outlining core competencies for EIA training at a SAQA Level 8.

For the purpose of this evaluation three groups of role players (consultants, specialists and officials) were evaluated against eight KPIs (1.2 to 1.9) for all 42 cases.

KPI 1.2 – To What extent do the skills and competencies of the consultants conform with NQF level 8?

KPI 1.3 – To what extent do the skills and competencies of the consultants conform with the relevant fields of study?

KPI 1.4 – To what extent do the skills and competencies of the consultants reflect relevant experience?

KPI 1.5 – To what extent do the skills and competencies of the specialists conform with relevant specialist registrations?

KPI 1.6 - To what extent do the skills and competencies of the specialists conform with relevant fields of study?

KPI 1.7 - To what extent do the skills and competencies of the officials conform with NQF level 8?

KPI 1.8 - -To what extent do the skills and competencies of the officials conform with relevant fields of study?

KPI 1.9 - -To what extent do the skills and competencies of the official reflect relevant experience?

The KPIs aimed to evaluate level of education, professional registrations and experience. These KPIs talk to the basic assumptions that the relevant skills and competencies do exist in the South African EIA system. **Figure 4-3** presents the outcome of the evaluation.

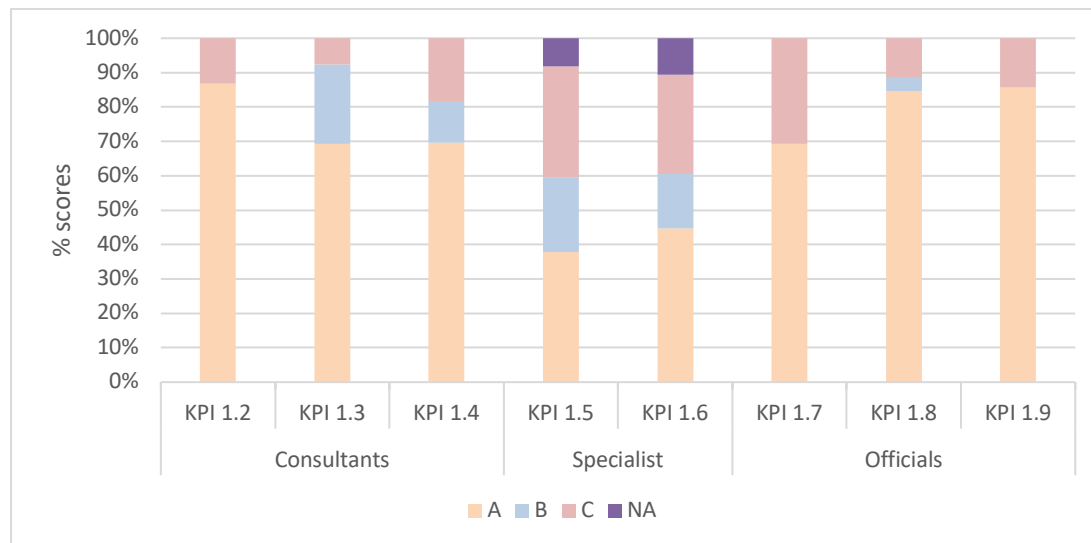


Figure 4-3: Performance of skills and competencies per KPI / relevant role player

The following conclusions are evident from **Figure 4-3** in terms of consultants (EAP) skills and competencies (related to KPIs 1.2, 1.3 and 1.4):

- In relation to KPI 1.2 the majority of cases scored an 'A' grade (33 from 38 with four that could not be determined) which confirms that the consultant was qualified at NQF level 8. The exceptions typically were four-year Landscape Architecture degrees and BSc undergraduate degrees. However, a particular challenge that emerged when evaluating the consultant skill and competencies is that it was not always clear who the assigned EAP was? The individual who signed the application form was not always the same individual who drafted the report. In some instances, much was made of the general competencies of the consultancy with less emphasis on the competence of the actual individual EAP. Ideally the EIA system should ensure that the identity of the EAP responsible for the EIA is clear and consistent throughout the process i.e the person who signed the application form. We suspect some abuse might occur where more senior consultants are put forward as the EAP but that the actual work is done by more junior staff who might not yet qualify in terms of minimum skills and competencies. This is difficult to regulate, although the liability should be clearly assigned to a particular individual. This particular concern may be addressed in future when a project must be signed off by a registered EAP (i.e. the EAP must be the primary reviewer or compiler of an EIA)

- In terms of field of study, the evaluation produced a mixed bag. A total of 27 cases scored an 'A' which suggest qualification that include specific environmental management/assessment training. Nine cases scored a 'B' which suggest related but not specifically environmental management/assessment training such as environmental engineering and landscape architecture. In three cases the consultant scored a 'C' with qualification that had no relevance such as education and business management.
- In terms of experience the cases scored well with 23 'A's (more than five years), four 'B's and six 'C's. For nine cases the years' experience could not be determined from the case files. This is somewhat concerning since the years' experience should ideally be communicated in the EIA reports. The high number of EAPs with more than five years' experience is welcoming, with some having more than 20 years' experience. This experience data might suggest some level of success in retaining professional within the EIA field.

In terms of specialist skills and competencies the following conclusions are made (related to KPIs 1.5 and 1.6):

- A total of 14 cases scored an 'A' where all specialists could demonstrate relevant registrations. In eight cases the majority of specialists demonstrated relevant registrations scoring a 'B'. In 12 cases 'C's were scored where the majority could not demonstrate relevant registrations. Five cases could not be determined and three cases in the agricultural sector did not require specialist studies. Agriculture was the worst performer with 3 Cs and 3 NAs. Energy had 1C and 3Bs and mining 4C and 1B, waste 3Cs and 1B seems to also perform poorly. When interpreting the latter results it should be acknowledged that many specialist fields don't have formal registration bodies, especially in relation to the social sciences i.e Social Impact Assessment and Visual Impact Assessment. It is reasonable to conclude that where registration bodies did exist, the relevant specialist were registered.
- The evaluation results for relevant fields of study (KPI 1.6) correlates well with the outcome in terms of relevant registrations (KPI 1.5). It is concluded that specialist studies related to ecological/biodiversity assessment (fauna, flora, aquatic, etc.), heritage impact assessment, archaeological assessment and technical engineering studies (i.e bulk services, traffic, noise, etc.), relevant training and registration requirements were met. However, the competence of specialist conducting studies

such as social impact assessment and visual impact assessment is more difficult to gauge due to lack of formal training and registration options in these specialist fields.

The evaluation concluded as follows regarding the skills and competencies of officials (related to KPIs 1.7, 1.8 and 1.9):

- In terms of KPI 1.7 18 A's and 8 C's were recorded. For a large percentage of the officials, the relevant information could not be sourced for this evaluation which warrants specific mention and which raises concerns as almost a third of the recorded data shows non-compliance with the minimum requirements. This is particularly relevant to the mining and housing sectors which scored 50% non-compliance each.
- For KPI 1.8 22A's, 3 C's and a B were recorded. From the data it seems that although the officials were qualified in the relevant fields of study, the level of qualification falls below NQF level 8 as discussed above. This means that opportunities for further study could address this short coming.
- KPI 1.9 saw 24 A's and 4 C's being recorded. This shows that more than 50 % of officials have more than 2 years' experience. The experience however ranges from 2 to 20 plus years.

The registration authority, once in place will not distinguish between the registration of those doing the EIAs and those reviewing and administering EIAs. In this regard competent authorities need to ensure an administrative system, which ensures that registered EAP takes responsibility for, and signs off on the final review, especially in cases where a case file has been awarded to a candidate and/or EAP in training. Moreover, the requirement for registration will also (over time) require of EAPs to adhere to a code of conduct and to participate in Continuous Professional Development activities to maintain their EAP registration.

4.3 Activity Component: Efficiency

The activity component deals with the process or actions that use the inputs to produce the outputs (DMPE, 2011). In this case the activity component is related to activities comprising the EIA process and mainly relate to questions around procedural efficiency. The ToC inner logic identified 11 assumptions that underpin the different stages of the EIA process. Based on the outcome of the literature review and the case study analysis against six purposefully designed KPIs, these assumptions can now be tested. These KPIs are 2.1 to 2.6.

KPI 2.1 – Did the competent authority acknowledge and accept the application within the prescribed time?

KPI 2.2 – Were the regulatory timeframes met for public participation?

KPI 2.3 – Did the consultants submit their reports within the prescribed timeframes (only cases after 2014 regulations were published)

KPI 2.4 – Did the competent authority acknowledge the final report submissions within the prescribed timeframe?

KPI 2.5 – Did the competent authority make and communicate their decisions within the prescribed time frame?

KPI 2.6 – Was the appeals process conducted according to the prescribed time frames?

The literature review showed that under the ECA regime approximately 50% of applications were finalised within 6 months from the application date and an additional 33% within a year (DEA, 2006). The remainder was only finalised within a period of two years or more. In an effort to address this issue the 2006 EIA Regulations was the first to make provision for specified decision-making timeframes namely; 14 days for purely administrative actions, 45 days for review of minor reports and 60–105 days for review and decision-making on complex reports. These timeframes have evolved further during 2010 and 2014 versions of the EIA Regulations. Although literature on the efficiency performance post 2006 are not generally available anecdotal evidence suggest that these changes have provided an effective framework for compliance and enforcement around procedural efficiency, by government.

Figure 4-4 provides an overall summary of the activity component performance per sector, which suggest a particularly good performance across all KPIs. Out of 210 possible scores related to procedural efficiency the results show 149As, 2 Bs, 12Cs and 17NA (for KPI 2.3 not relevant to cases prior to the 2014 EIA Regulations) and 30 scores could not be determined. The generally good performance suggests no patterns across sectors. The EIA systems seems generally efficient in meeting the legal timeframes for the cases evaluated.

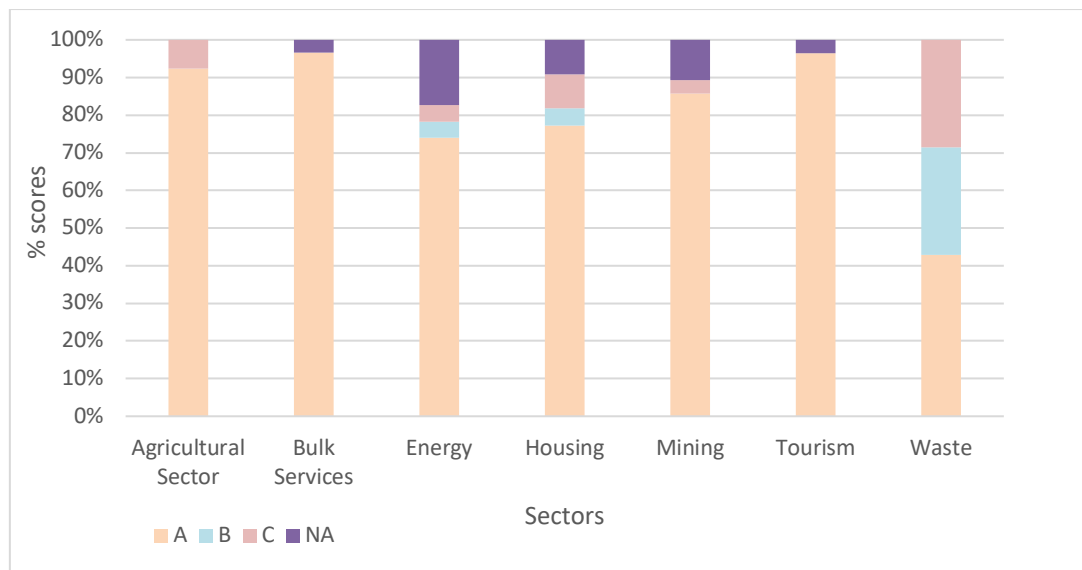


Figure 4-4: Performance results for activity component per sector (meeting timeframes)

Figure 4-5 provides an overview of the total EIA timeframe measured from registration of the EIA to the issuing of the environmental authorisation for the 42 cases evaluated. It shows that the longest time was 2603 days and the shortest 115 days, with the average timeframe 568 days. The extreme cases could be considered exceptional instances with for example appeal processes and the resuscitation of a lapsing application. It is however evident that a number of cases performed well below the set legal timeframe which suggest that in some cases the process timeframe performs even better than what is legally required. The data shows that in most of the sectors and cases reviewed, the total time frames were shorter after the implementation of the 2014 regulations. It is surmised that this is due to the implementation of stricter time frames on consultants for drafting and submission of reports. In a majority of cases reviewed, legal time frames were complied with by the department.

In conclusion it needs to be stressed that the drive for procedural efficiency and/or 'streamlining' has also been shown to erode many of the important potential benefits of EIA such as transparency, public participation and consultation (Bond *et al* 2014). Moreover, the quality of EIA could also suffer with less time for specialist studies to be conducted and less time for proper consideration of the outcomes of the assessment. Clearly a balance needs to be struck between providing a reasonable time for the EIA as well as to avoid unnecessary delays for applicants (DEA, 2014).

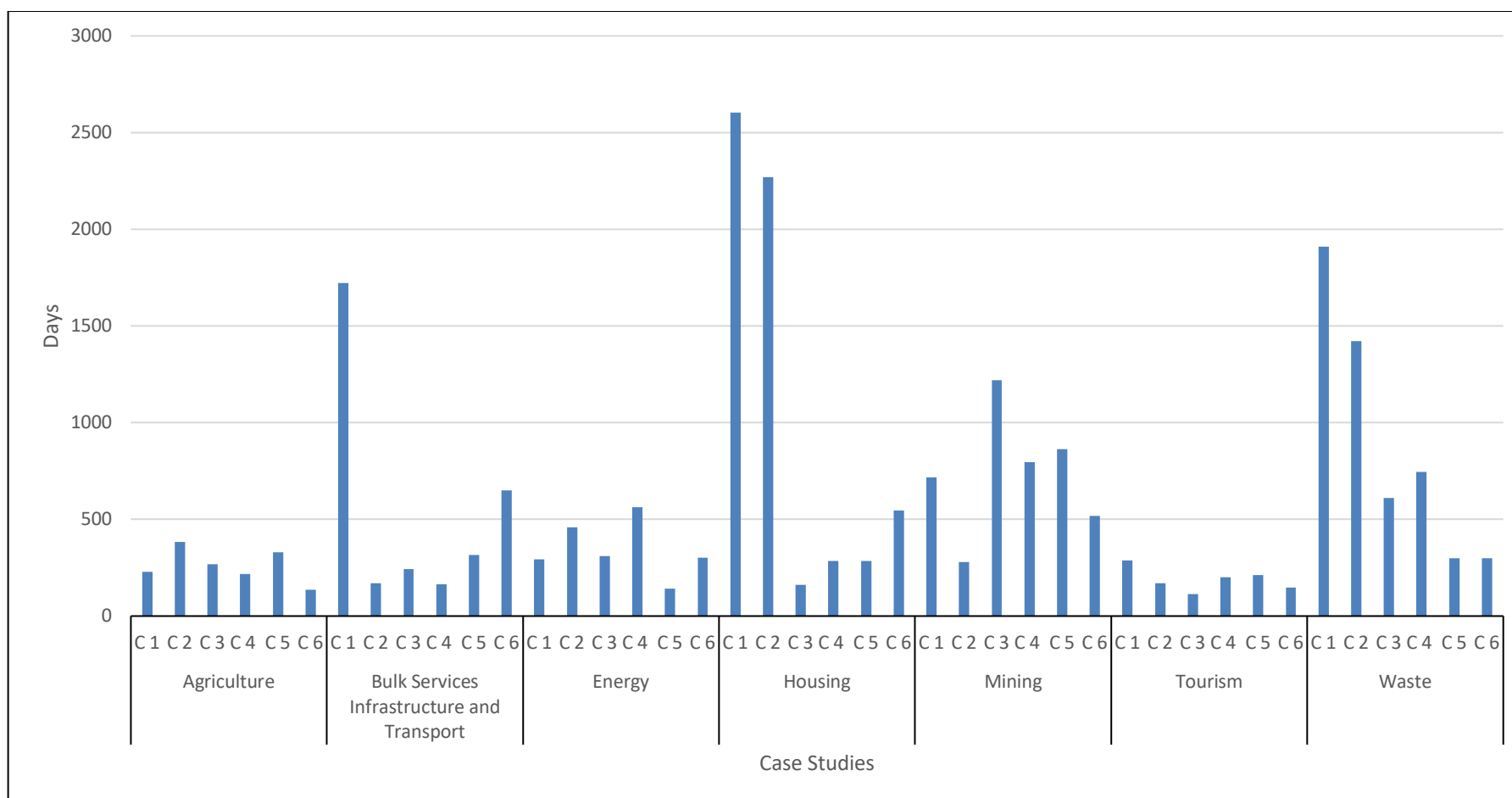


Figure 4-5: Total EIA timeframe from registration to environmental authorization

4.4 Output Component: Quality

The output component represents the final goods or services that the intervention delivers (DMPE, 2011), which in this case relates to the EIA reports (i.e. Scoping, Basic Assessment, EIA, EMPr) used to inform authorisation decision making by the competent authority. Essentially the output component evaluation focus on the quality of report content, which relates to the assumption that an efficient process, as defined by the set timeframes, will produce good quality reports. The literature review shows that research on the quality of EIA has certainly been the most prominent area of EIA research in South African. In terms of reviewing the quality of EIA Reports, various review packages and guidelines have been developed, some date back to the 1990s (Lee & Colley, 1992; EC, 1994; Glasson, 1996). The Lee-Colley package is probably the most well-known and widely applied in developed and developing countries (Lee & Colley, 1992; Ibrahim, 1992; Mwalyosi & Hughes, 1998). Extensive progress has been made to adapt international report review packages such as the Lee Colley review package to the South African context (Sandham & Pretorius, 2007). These packages have been used to review EIA quality over time/temporal, for different provinces as well as for different sectors and themes. The extent and outcome of the report quality review research in South Africa is extensively covered in Chapter 2 of this thesis.

For this evaluation a total of 26 KPIs were designed to evaluate the outcome component for the 42 cases. A distinction is made between indicators dealing with completeness and indicators that deal with substance. The evaluation results in terms of completeness and substance is discussed in the following sections.

KPIs relating to completeness

KPI 3.1 – Was a description of the proposed activity provided?

KPI 3.2 – Was need and desirability described?

KPI 3.3 – Were key issues identified?

KPI 3.4 – Have alternatives been considered?

KPI 3.5 – Was a plan of study included?

KPI 3.6 – Was significance determined?

KPI 3.7 – Was significance dealt with before and after mitigation?

KPI 3.8 – Was public participation conducted?

KPI 3.9 – Was an EMPr submitted which describes mitigation measures?

KPI 3.10 – Was an impact summary statement provided?

KPIs relating to substance

KPI 3.11 – Was the description of the activity provided sufficient to inform the identification of listed activities?

KPI 3.12 – Was the information provided sufficient to justify the identification of key issues (scoping)?

KPI 3.13 – Was the timing of the development justified in relation to need and desirability?

KPI 3.14 – Was the location of the development justified in relation to need and desirability?

KPI 3.15 – Did the plan of study incorporate the key issues as identified during scoping?

KPI 3.16 – Were reasonable alternatives present and assessed?

KPI 3.17 – Was significance determined according to a justified methodology, which includes the method and its application?

KPI 3.18 – Was the determination of significance consistently applied across specialist disciplines?

KPI 3.19 – Was justification provided for the different proposed mitigation measures against the mitigation hierarchy?

KPI 3.20 – Has the significance rating after mitigation been justified?

KPI 3.21 - Were the proposed mitigation measures as described in the impact assessment incorporated into the EMPr?

KPI 3.22 – Were roles and responsibilities assigned meaningfully in relation to management actions in the EMPr?

KPI 3.23 – Was there any supplementary information submitted to the authorities that was not in the public domain?

KPI 3.24 – Were all comments from IAPs adequately responded to in the impact assessment process and reports (not relegated to comments and response reports)?

KPI 3.25 – Were all key IAPs consulted in the impact assessment process?

KPI 3.26 – Were the key recommendations from the impact assessment justified and clearly summarised in a non-technical fashion?

4.4.1 Completeness

Figure 4-6 shows the outcome of the report quality evaluation results in terms of completeness across sectors. The results show a particularly good overall performance. The NA scores refers to Basic Assessment applications which do not require a Plan of Study for Scoping (KPI 3.5). The overall good result means that no sector specific trends are observed. It can reasonably be concluded that in terms of covering the basic content of what is required, the EIA system ‘tick all the boxes’. The explicitly prescribed content requirements reflected in legislation, guidelines and report templates (i.e Basic Assessment template) serves to facilitate completeness.

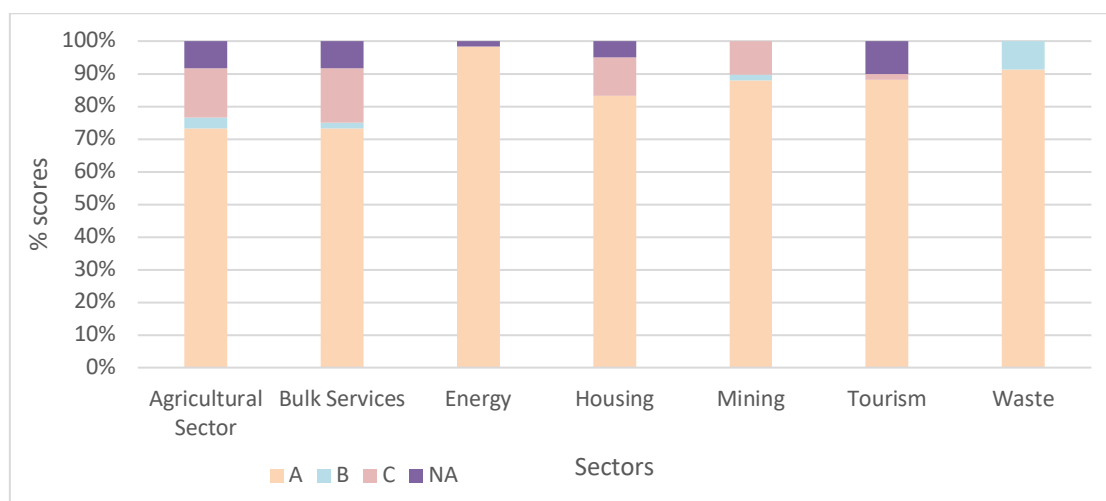


Figure 4-6: Performance results for completeness output component per sector

Although the completeness of the reports seems to be well addressed, the next section deals with the substance of the EIA reports, which is evidently more important when informing decision making.

4.4.2 Substance

The analysis of substance considered performance across sectors as well as in relation to particular KPIs as reflected in **Figure 4-7** and **Figure 4-8**, respectively. The results are varied with meaningful areas of good and weak performance across both sectors and KPIs. The substantive aspects performance overall produced 343 As, 118 Bs, 174 Cs, 28 NAs. Nine KPIs could not be scored based on the file content. The following main conclusions are made from the results:

- In the majority of cases the description of the activity was sufficient to identify listed activities (see KPI 3.11 with only 17 Bs and 3 Cs). However, examples were also found where at the time of application it was too early in the project design phase to provide a detailed project description, and/or the project design changed during the EIA process. Both these scenarios have implications for identifying the listed activities upfront with serious procedural and legal implications later on in the process. For example, mining cases where the project was only described as open cast mining or a project was only described as being the construction of on surface infrastructure for underground mining.
- The project description is critical in justifying the identification of key issues as basis for the assessment, generally understood as the scoping phase. Scoping is based on the premise that the assessment needs to focus only on the most important issues to optimize resources and avoid obfuscation. In this regard KPI 3.12 performed poorly with almost half the scores being either Bs or Cs (i.e 23 As, 9 Bs and 10 Cs). The weakness in identifying key issues not only refers to instances where key issues were missed but also instances where unnecessary issues were included and specialists involved. For example, comprehensive heritage and archaeological assessments in questionable areas of heritage or archaeological significance. However, the evaluation does suggest consistency between the identification of key issues and the content of the plan f study for scoping (PSS) (KPI 3.15). The lack of a formal scoping phase in the BA process, combined with a BA report template, does not seem to assist with the identification of key issues and focussing the assessment.
- Need and desirability is based on the (sustainability) principles of Section 2 of NEMA - it requires the timing and location of the particular activity to be justified, as well as presenting a number of questions that requires an engagement with the sustainability principles of NEMA. This KPI, especially considering the importance thereof, was poorly addressed as almost half of the scores for KPIs 3.13. and 3.14 were either B or C. The lack of up to date policy guidance in some sectors exacerbates the difficulty in contextualising the appropriateness of development proposals (i.e. understanding the timing and need for development and to scope the key issues). Location considerations, as one of the need and desirability considerations, are slightly better considered in instances where IDPs, SDFs, SEAs and EMFs provide a spatial context. The renewable energy sector which have developed a strong strategic and policy context is an example where need and desirability has been well addressed. Other policy contexts where the policy context did exist were not always well considered. For example, the consideration of climate change and energy policy in coal mining applications. This suggest that short term socio-economic factors are prominent with the assumption that development (even coal mining) in general is desirable.

- Results related to KPI 3.16 shows that dealing with alternatives is a particular area of weakness, with more than half of the scores being Bs or Cs. Apart from the waste sector all other sectors seemed to have struggled with considering alternatives. There were instances where no alternatives were considered. Broadly speaking the lack of alternatives reflects a lack of mitigation thinking and failure to realize the value adding potential of alternative considerations. For example, the failure by applicants in several cases considered to adequately consider technology or location alternatives or statements around mining applications that there are no alternatives available. Admittedly the timing of EIA also influences the feasibility of certain alternatives, with in some cases much of the alternatives thinking having happened during the feasibility stage preceding the EIA. In one instance, alternatives thinking was found to have a substantial influence on the project, which ultimately resulted in an open cast mine being converted to an underground mine with great cost implications so as to minimise environmental impacts. It is recommended that the role of alternative also be debated in terms of its role in the application of the Impact Mitigation Hierarchy, especially the first step in the avoidance of impacts.
- Dealing with significance related to KPIs 3.17 and 3.18 is a particular weakness of the EIAs evaluated with 30 As, 13 Bs 36 Cs scores. The weaknesses are caused by inconsistencies in how significance is defined and measured, with specialists for example using widely different significance methods. The common use of quantitative scoring for subjective value judgements is methodologically flawed. For example, differing specialists on a single project, rating impacts on a sensitive wetland differently. Moreover, it is highly questionable that for all 42 cases not a single high significance rating was achieved after mitigation. In some instances, the significance findings of the specialists never made it into the EIA report and therefore inconsistencies exist. For example, statements by a specialist that the significant impact on a wetland is unavoidable, despite mitigation, not being included in the EIA report. Clearly guidance is needed on how to deal with significance in EIA. Cumulative effects are poorly dealt with as also reflected in the lack of cumulative considerations and thinking in significance ratings. None if any of the cases reviewed provided clear statements and showed an understanding of the cumulative impacts associated with the particular project.
- Dealing with mitigation is closely linked to significance. KPIs 3.19, 3.20 and 3.21 related to mitigation performed particularly poorly with 41As, 25Bs and 58Cs. The main weaknesses related to the lack of application of the mitigation hierarchy, the jump between significance before and after mitigation as well as inconsistency between the mitigation measure recommended by specialist studies and the content of the final EIA report and EMPs. Finally, the outcome that all impacts for the 42 cases were mitigated to a point of medium to low significance is questioned.
- The quality of EMPs related to KPI 3.22 scored relatively well with 26As, 8Bs and 6Cs. However, the generic nature of the content of the EMPs presents some cause for concern.
- The public participation aspects related to KPIs 3.23, 3.24 and 3.25 were particularly well addressed with 98 As, 13 Bs and 10 Cs. However, the adequacy of responses to issues raised was difficult to verify without also engaging with the public, which was not possible as part of this evaluation. However, based on the content of the project files and the reports we consider public comments well captured and addressed. The use of comments and response tables seemed to work particularly well in summarizing and communicating outcomes. Much could still be said about the adequacy of the responses contained in these tables, and if they qualify as being sufficient. For example, in numerous cases reviewed, consultants would make statements to the

effect that IAP concerns around certain impacts were noted, and would be addressed through the implementation of the mitigation hierarchy as contained in the EMPr. As stated above the EMPrs are often generic and lacking sufficient details as to exactly how mitigation will be effected.

- Communication of results related in terms of KPI 3.26 scored mostly As, with only 9 Bs and 10 Cs. Although the overall performance seems relatively good there are still important room for improvement.

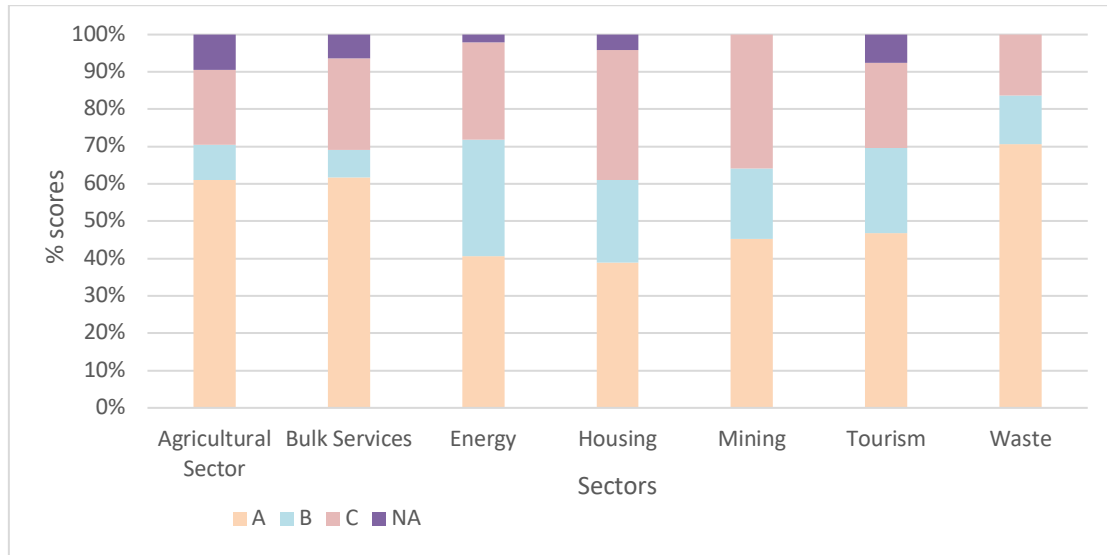


Figure 4-7: Performance results for substance output component per sector

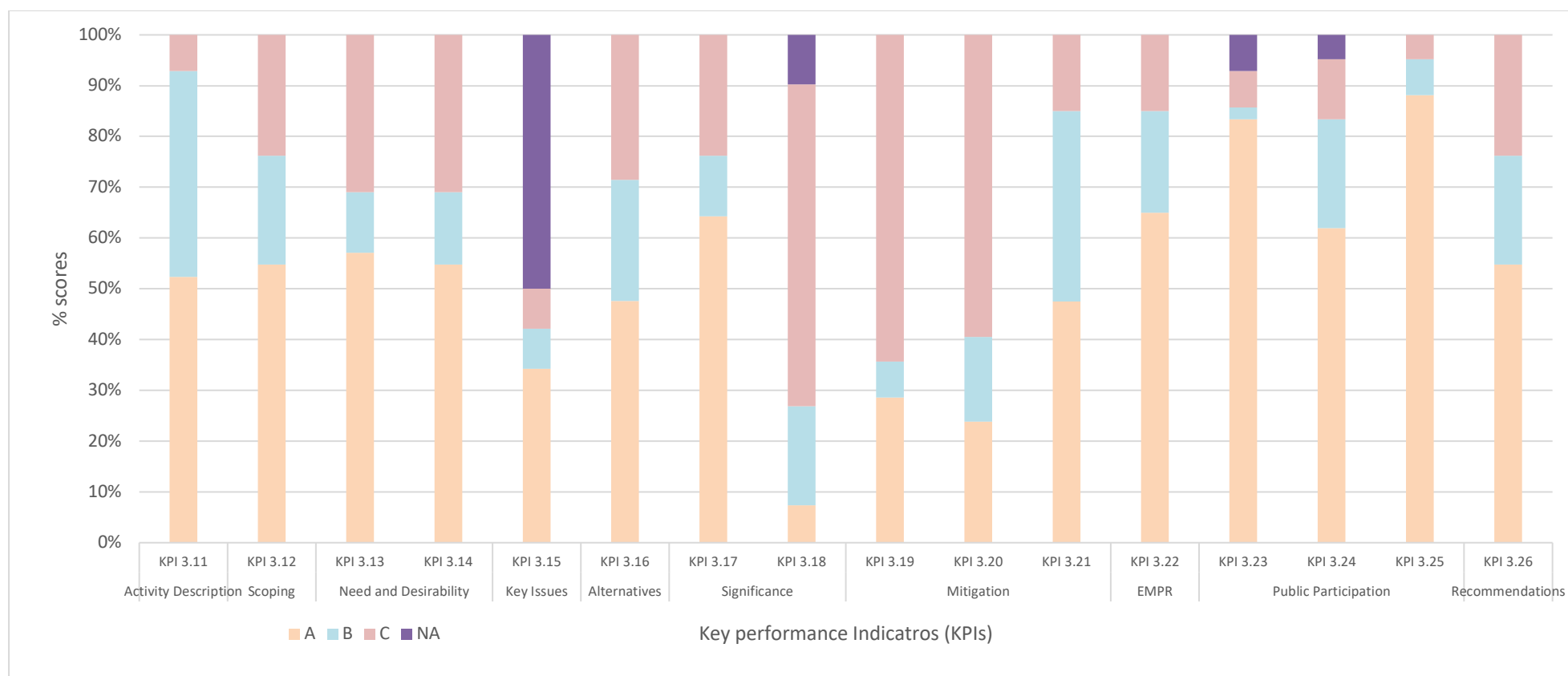


Figure 4-8: Performance results for substance output component per KPI

4.5 Outcome Component: Effectiveness

The outcome of the EIA process is a decision in the form of and environmental authorization which needs to be lawful, procedurally fair and reasonable. This requirement is underpinned by the constitutional right contained in section 33 which requires all that all administrative action be lawful, reasonable and procedurally fair. The aforementioned right is further given effect to by the promotion of Administrative Justice Act 3 of 2000. The requirements relating to administrative justice within the EIA context was addressed in the literature review (**Chapter 3 of this thesis**). In essence when a decision is taken around an application, that decision must be supported by the evidence before it. It must be rationally based on the facts presented and the consequence of that decision must be proportional to the intended outcome. it can compellingly be argued that a decision-maker who does not attribute an appropriate weight to the considerations under his or her scrutiny will have acted unreasonably and the decision may then be taken on review. (Kidd et al, 2018, Retief et al, 2019) Very little empirical research exists on the effectiveness of EIA in influencing decisions as highlighted in **Chapter 3**. In order to evaluate the outcome component for this evaluation three KPIs were designed and applied to the 42 cases.

KPI 4.1 – To what extent did the application authorise the correct listed activities?

KPI 4.2 - To what extent did the process comply with minimum legal procedural requirements?

KPI 4.3 – To what extent was the decision described in the environmental authorisation consistent with and based on the content of EIA reports?

The results from the case evaluation are presented in **Figure 4-9**.

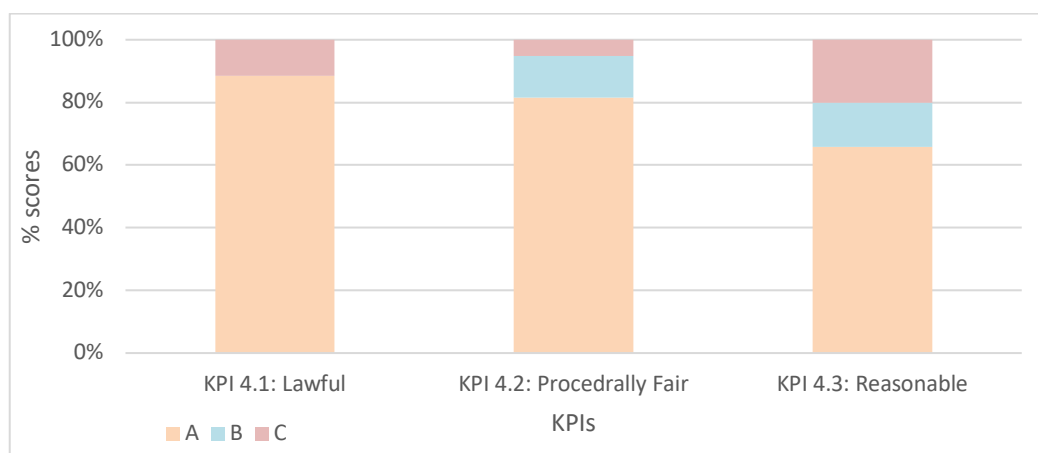


Figure 4-9: Performance results for the outcome component per KPI

The main findings from the outcome component evaluation are the following:

- The outcomes were generally lawful in terms of KPI 4.1 with the correct listed activities authorised for the majority of cases. The exceptions were cases where certain listed activities were missed, or the activities applied for in the application form did not correspond with the activities specified in the authorisation.
- The outcome of the EIA process could be considered procedurally fair in terms of KPI 4.2 with only 4 Bs and 3 Cs scores. This evaluation result aligns well with the good overall activity component results. Therefore, the procedural requirements are prescribed in law is well complied with.
- The reasonableness (i.e rational and proportional) of the decision was measured against KPI 4.3, which asked if the content of the EIA report was reflected in the content of the environmental authorisation. Mixed results were achieved with a meaningful number of non- and partial conformance (7 Cs and 5 Bs). The instances of conformance might also be somewhat misleading because in some cases weak substance was translated into the authorisation, which would still suggest a weak outcome, albeit rational.

4.6 Impact Component

The impact component represents the results of achieving certain outcomes (DMPE, 2011). In this case the impact of the EIA system should be measured against the extent to which effect is given to the progressive realisation of the environmental right contained in Section 24 of the Constitution, as well as the extent to which it achieves the objectives towards delivering more sustainable outcomes reflected in the Section 2 principles of NEMA. The main causal assumption (between the outcome and impact components) is that lawful, procedurally fair and reasonable decisions underpinned by NEMA Section 2 principles, will lead to the realization of Section 24 and lead to more sustainable outcomes.

The impact component was evaluated through interview questions administered anonymously. The questions were answered orally and in writing with 34 interviewees representing different stakeholder groups. The interviews with different stakeholder groups recognise the pluralistic nature of dealing with effectiveness in EIA (Roos *et al.*, 2020) with the understanding that different groups have different expectations and therefore different views on effectiveness. The following sections present the interview data analysis results against the following three interview questions which aimed to address the six KPIs designed in relation to Section 24 of the Constitution:

- What are the main potential impacts /contributions of EIA?
- What are the main realized impacts or contributions of EIA?
- What can be done to bridge the gap between potential and realized impacts?

4.6.1 Main potential impacts or contributions of EIA

A total of 68 potential impacts were identified in relation to the first interview question, by the 34 interviewees, representing the four different stakeholder groups. The analysis suggests these 68 identified impacts can be grouped into the following nine (9) key impact themes as listed below. **Figure 4-10** shows the relative weight of the different impact themes in percentages while **Figure 4-11** shows which stakeholder groups raised which potential impact. We now provide a description of each theme, also in relation to **Figure 4-10** and **Figure 4-11**.

The following five impact themes represent 85% of the total impacts raised (see **Figure 4-10**):

- Key impact theme 1 – promotion of sustainability in decision making: This was the most commonly raised theme with 35% of interview responses (see **Figure 4-10**). Moreover, the responses were equally representative of different stakeholder groups which suggest some level of agreement (see **Figure 4-11**). However, it was evident that a range of different understandings and discourses of what sustainability means exist. Therefore, although there is agreement to promote sustainability, there is also a need to define what is meant by the term. The use of terms such as sustainable development, ecological sustainable development, sustainable services, economic sustainability, etc. in combination with or as synonymous with sustainability were reflected in the interview outcomes.
- Key impact theme 2 - promotion of wellbeing through a safer environment: This theme includes views that see EIA as a safeguard for environmental protection which ultimately promotes wellbeing. The EIA system is seen as an important mechanism to regulate the relationship between human activities toward a safer environment. It was the second most common theme with 16% of the total interview responses (see **Figure 4-10**) and was generally supported by three of the four stakeholder groups (see **Figure 4-11**).
- Key impact theme 3 - promotes public participation: This theme was supported by different stakeholder groups and delivered the fourth most responses (see **Figure 4-10** and **Figure 4-11**). Public participation is considered a very important contribution in all EIA systems internationally, and justifiably even more so within South Africa's constitutional democracy after 1994. It is often mentioned that EIA is sometimes the only mechanism that provides a voice to communities about decisions and developments that affects them.
- Key impact theme 4 – establishment of an environmental assessment profession: It is evident that the EIA system has produced a new profession with numerous contributions in the public and private sector such as new skills, new knowledge and research, new academic programmes, a registrations authority, etc. The various contributions related to this impact theme was mainly raised by the competent authority stakeholder group (see **Figure 4-11**).
- Key impact theme 5 – avoidance, minimization and mitigation of environmental impacts: This theme covers contributions around impact identification, avoidance and mitigation. Since EIA is a regulatory instrument it provides the potential to regulated potential environmental impacts through purposefully designed mitigation measures.

This impact theme was the fourth most prominent with 13% of the impacts raised (see **Figure 4-10**), mainly by EAPs and competent authorities, and to a lesser extent NGOs (see **Figure 4-11**).

The following four impact themes represent 15% of the total impacts raised (see **Figure 4-10**). They are also each raised by a single stakeholder group:

- Key impact theme 6: - promotes just decision making: The EIA system provides for procedural certainty and transparency in decision making that should be lawful, procedurally fair and reasonable. However, competent authorities also warn against the potential for the decision making process to be abused through obstructive behaviour and frivolous appeals and legal actions, causing frustration and delaying decision making. This impact theme makes up 3% of impacts raised (see **Figure 4-10**).
- Key impact theme 7 - promotes a cleaner and healthier environment: This theme relates to theme 2 above, and talks specifically to the avoidance and management of pollution towards protecting human health. Not surprising the 2% of impacts raised under this theme were raised by the NGO stakeholder group, who represents those affected by pollution and environmental degradation.
- Key impact theme 8 – cost implications for business and development: The implications of additional cost burden to business made up 3% of responses (see **Figure 4-10**) and was specifically raised by the competent authority stakeholder group (see **Figure 4-11**). Of particular concern was the effect of over-regulation on small enterprises.
- Key impact 9 - increase environmental awareness: The EAP stakeholder group raised the potential impact of the EIA system of general environmental awareness (see **Figure 4-11**). The impact theme includes 4% of all the responses (see **Figure 4-10**) and relates to theme 3 around public participation. It is maybe understandable that the impact is raised by EAPs since they are mostly involved with this aspect of EIA through their interactions with IAPs during EIA processes.

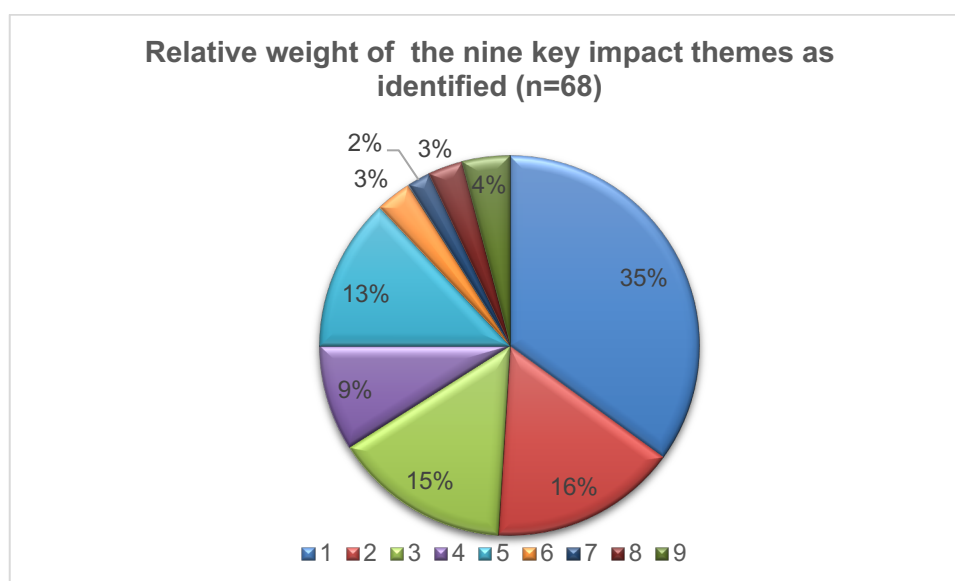


Figure 4-10: Relative weight of the nine key impact themes as identified (n=68)

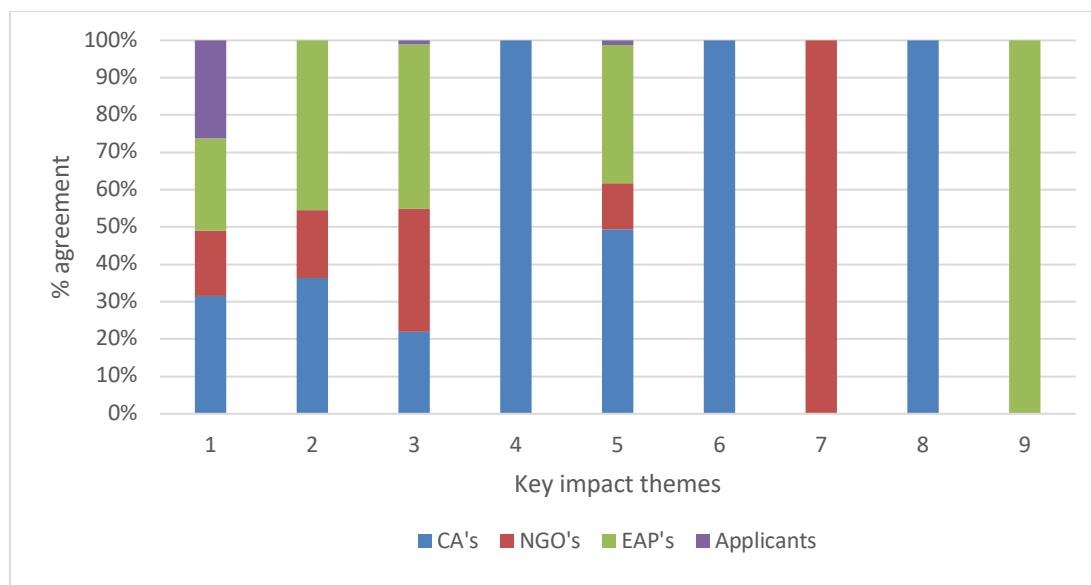


Figure 4-11: Cross stakeholder analysis of the potential impact of EIA

4.6.2 Main realized impacts or contributions of EIA

Interviewees were also asked to identify those impacts that they perceive to have been realised. It needs to be stressed that the evaluation requested respondents to raise their views and did not ask of they disagreed with certain views put to them. This is important because the outcome of the analysis suggest emphasis on certain issues rather than disagreement with certain issues. The research concluded as follows:

- All potential impact themes were achieved to some extent, but views differ between stakeholder groups as to the extent to which certain impacts were achieved – see **Figure 4-12**. The outcome of the stakeholder analysis shows that:
 - The competent authorities (CA) considered eight of the nine impact themes to have been achieved to some extent.
 - Environmental awareness was not explicitly raised as an impact by the CA, although it might be that the support for public participation in general implicitly covers this impact.
 - NGOs supported three of the nine impact themes namely promotion of a safer environment, public participation and raised awareness. These themes align well with the general focus of NGO groups which is on giving a voice to IAPs and ensuring a safer environment. Therefore, this should be seen as a positive outcome from an NGO perspective.
 - EAPs supported seven of the nine impact themes and most strongly the promotion of sustainability and a safer environment. The establishment of a profession and mitigation of impacts were not explicitly highlighted by the EAPs. It is however evident that although not explicitly mentioned EAPs benefit directly from the establishment of a profession and all the impacts that results.

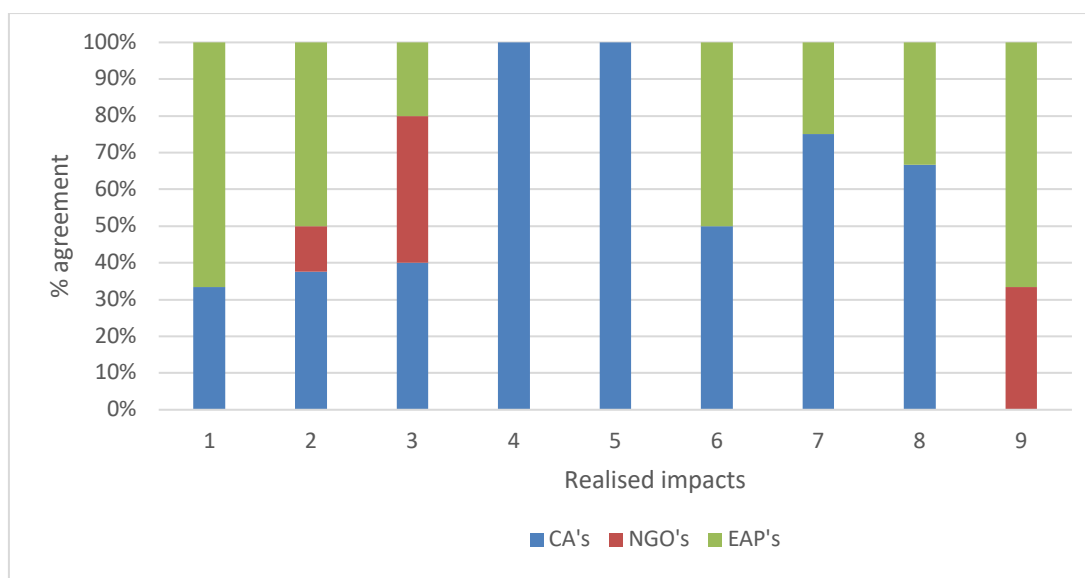


Figure 4-12: Overview of cross stakeholder opinions on realized impacts

For the evaluation of the impact component six KPIs were designed in relation to Section 24 of the Constitution. The nine identified key impact themes align well with the six impact KPIs as shown in Table 4-1., which shows that five of the six KPIs are being achieved to some extent. The only KPI not addressed is KPI 5.4 related to the promotion of conservation. It seems from the analysis that the EIA system is not explicitly considered by those interviewed as a tool for conservation. This maybe reflects the focus of EIA as more of a tool towards facilitating and/or promoting just socio-economic development than pure conservation outcomes. Analysis of the above is important as it confirms the view that EIAs is not about green issues, in fact the opposite seems to be true as it is perceived to be a facilitator of development and not a custodian of conservation. This being the fact despite EIA being a mechanism to achieve section 24 of the Constitution which explicitly mentions the promotion of conservation. It also highlights the fact that potentially conservation is a case-specific issue that is not consider in the majority of cases, whereas socio-ecological and socio-economic issues are foremost in stakeholders' mind when participating in, doing and reviewing EIAs.

Table 4-1: Impact component KPIs versus realised impact themes

Key Performance Indicators		Related achieved key impact themes
5.1	To what extent did the EIA realize an environment that is not harmful to health and well-being?	7

Key Performance Indicators		Related achieved key impact themes
5.2	To what extent did the EIA achieve protection of the environment over the immediate and long term?	2
5.3	To what extent did the EIA succeed in preventing pollution and ecological degradation?	5
5.4	To what extent did the EIA promote conservation?	-
5.5	To what extent did the EIA secure ecologically sustainable development?	1
5.6	To what extent did the EIA promote justified economic and social development?	3, 4, 6, 8, 9

4.7 Concluding remarks

Chapter 4 has provided an analysis and discussion of the EIA system evaluation results (**Research objective 3**). The South African EIA system was evaluated against the developed evaluation questions and corresponding KPIs developed as **research objective 2**. The following chapter will provide the conclusions and recommendations for improvement as distilled from the above results.

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Key findings of the study

The overall aim of the research was:

“to apply the Theory of Change method of evaluation, to a selected EIA system, with a view to making recommendations for improvement”

In order to achieve the research aim described in the previous section, three key research objectives were identified and formulated as contained in **Table 5-1** below.

Table 5-1: Research objectives

Research Objectives	
1.	To apply the ToC evaluation method to a selected EIA system
2.	To develop performance evaluation criteria within the ToC approach against which the system may be evaluated
3.	To evaluate the system against the criteria

The research was structured around five phases and compiled within five chapters as set out in **Figure 5-1**.

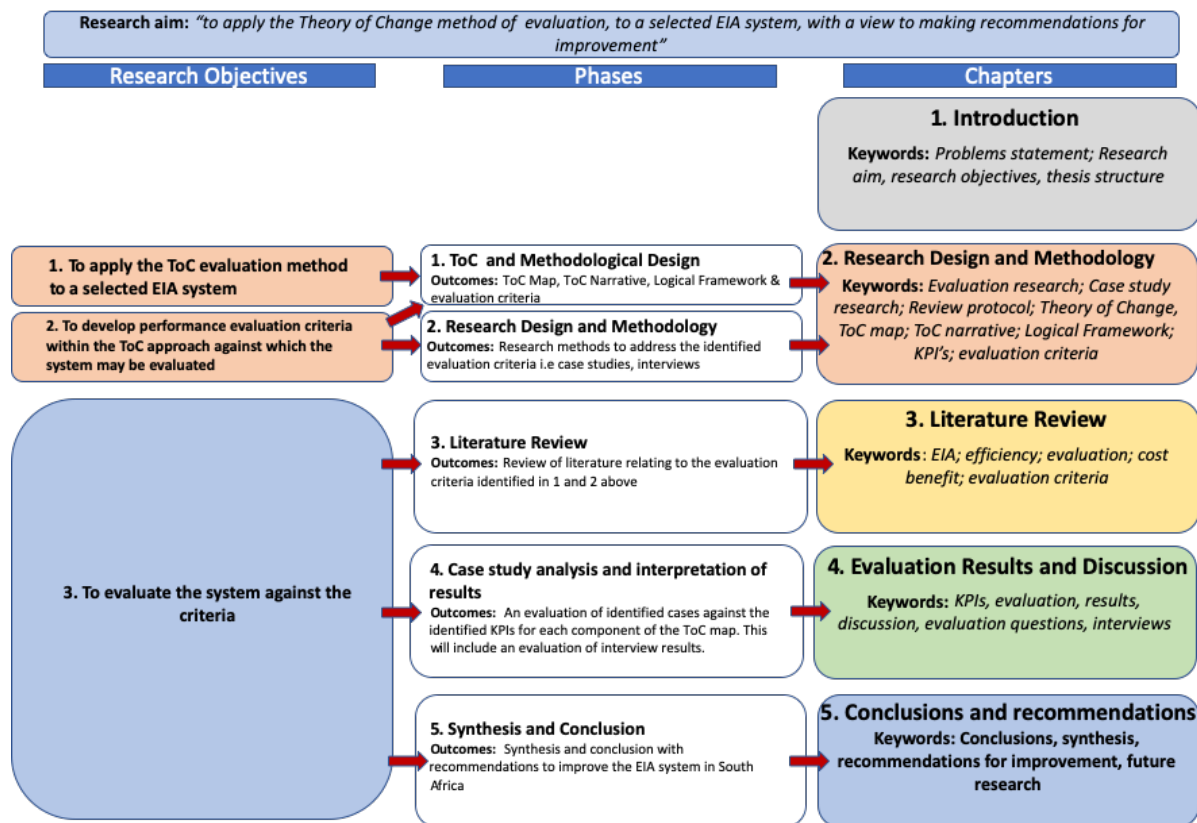


Figure 5-1: Research objectives, phases and chapters

Phase 1 of the research entailed the application of the Theory of Change Method to the South African EIA system and resulted in a ToC Map (Figure 2-4), a theory of Change Narrative (Box 2-2) as well as a logical framework (Table 2-3) which identified and set out 7 key evaluation questions which would be used for the system evaluation. This resulted in **research objective 1 and 2** being met.

Research objective 1 was to apply the ToC method of evaluation to a selected EIA system, which in this instance was the South African EIA system. Although it is noted that the ToC approach is a recognised evaluation method (DPME, 2011; Alberts, *et al.*, 2019) preferred in the South African context for policy and programme implementation evaluations, some weaknesses exist when applying it to EIA system evaluation. The first such weakness is that the inner logic of EIA has already been developed, agreed upon and prescribed in South African legislation, so the ToC in this process reflects a description of what is, which does not lend itself well to a process where the ToC is expected to be 'designed' through a participation process for example. This inner logic, as it describes the South African system, aligns well with the manner in which EIA is expected and accepted to function internationally and is based on almost half a century of EIA practice. The application of the ToC in this research did thus not concern itself with the design of the EIA system, accepting instead that the system is what

it is, as described in legislation. The ToC in this process reflects a description of what is, which does not lend itself well to a process where the ToC is expected to be 'designed' through a participation process for example. Accordingly, the ToC described in this research is not controversial or contentious and was not 'designed' – but describes the agreed inner logic of how the EIA system works in the South African context, as well as the assumptions that underpin the logic. Despite the design of the south African EIA system being easily discernible, it is the aims of the EIA system which are difficult to measure and in most cases not quantifiable. This differs from other interventions where ToC is used, as these typically rely on well-defined and quantifiable outcomes and impacts. Moreover, the success of EIA in achieving its aims (or having an impact) can only be determined over years or even generations. Applying the ToC approach of the South African EIA system was also a particularly resource intensive process as it requires substantial time to access and work with the wide range of stakeholders necessarily involved in the EIA system. The need for agreement on the ToC map, narrative, underlying assumptions and developed KPIs, requires an iterative and time-consuming process (Mackenzie and Blamey, 2005). The focus on highly complex, multi-site interventions consequently required measurement at multiple levels (the individual or EAP, group i.e. NGO, organization and government) making the processes subject to practical and conceptual difficulty. In addition the ToC had to be continually revised to ensure that all possible inputs were considered.

It is against this background that the research was mindful of the strengths and weaknesses posed by the ToC approach as it relates to causal reasoning. Critics of ToC argue that it may be too linear, for example assuming that inputs lead to outputs and that outputs lead to outcomes and so on. Although this may be the case, it is often argued that causation within complex systems cannot be so easily explained as there is never certainty as to what influence certain factors within that system may have over others. See the classic discussion of conformance and performance perspective on effectiveness by Barrett & Fudge 1981 and more specifically in relation to strategic EIA (Arts, 1998). That being said, the key feature of the ToC method is the development of causal pathways that link actions and outcomes to defined objectives. ToC may thus help to more robustly engage with complexity and more rigorous systems analysis. It is through this process that ToC may help to identify underlying assumptions which are outside the boundaries of the system evaluation, but which may ultimately affect the desired outcome. Identifying and considering these assumptions ultimately allows one to grapple with the uncertainties they present in achieving the desired outcomes of the particular system or intervention. It is through engaging with these assumptions that the ToC method allows researchers to slowly accrete their learning through evaluations. ToC does not therefore not propose to deliver what Blamey and Mackenzie

(2007) call “big bang answers” to programme or policy effectiveness. It is this slow learning which may serve to underpin and support critical thought with regard to EIA system evaluations.

Critical thinking is defined as “*The process of actively and skilfully conceptualising, applying, analysing, synthesising, and evaluating information to reach an answer or conclusion*” (Foundation for Critical Thinking, 2019). To be adept and skilled in the act of critical thinking, requires that one is able to interrogate and take apart one’s thinking systematically, and to evaluate it for consistency and robustness (Paul and Elder, 2002). The systematic evaluation of thought has a long history in philosophy and typically relies on the identification of so-called critical elements of thinking (also sometimes called critical elements of logical reasoning). One of the most important and critical elements of critical thinking is the assumptions we make, that underpin our thinking and/or reasoning. Unexamined and flawed assumptions are commonly considered the Achilles’ heel of critical thinking (Archibald *et al.*, 2016). Assumptions imbue implicit knowledge and can be a resource or a risk to critical thinking validity. The extent to which an assumption functions as a resource or a risk depends on the extent to which it is explicated. Therefore, engaging in critical thought, means engaging intimately with the robustness and validity of assumptions.

However, assumptions that underpin our thinking, further reflects even more fundamental and deep rooted notions. Nkwake (2013) provides a lucid understanding of the nature of underlying assumptions and their vital role in the generation and evolution of knowledge. Moreover, Hartse *et al.* (1984) contend that the act of fact seeking, which is in essence the goal of science, proceeds on countless assumptions that always need to be verified. These assumptions commonly manifest in everyday life as explicit or implicit beliefs, belief systems, or theoretical paradigms. Pursuers of knowledge gathers evidence in light of known assumptions and hereby test and question underlying beliefs and paradigms (Nkwake, 2013). When evidence shows an assumption to be flawed, a new theory or belief statement emerges, hence a paradigm shift. Paradigm shifts emerge when people question their assumptions, whether they are tacit or explicit. Notwithstanding the wealth of literature and research on EIA, the basic understanding of how EIA works and its basic principles have been largely unchanged since its inception in the early 1970s (IAIA, 1999; Bartlet and Kurian, 1999; Morgan, 2012). Through the application of ToC, this research has identified 19 underlying key assumptions which may influence the manner in which EIA systems are deemed to be effective. It is these assumptions which may then result in new thinking or paradigm shifts regarding EIA system effectiveness. In order for EIA to evolve, there exists a need to continually evaluate, more critically, the underlying core assumptions of how EIA works. If the

underlying core assumptions are found to be flawed, then the beliefs on which the EIA policy system is based are flawed, and a paradigm shift must occur. Failure to act would perpetuate flawed assumptions and beliefs, and result in an ineffective EIA policy context fixed in stasis. The application of the ToC approach to the South African EIA system resulted in the identification of 19 key assumptions underpinning the system. These 19 assumptions were interrogated by means of identified evaluation questions, 7 in total. In addressing the 7 key evaluation questions through carefully designed KPIs, the researcher was able to determine to what extent the underlying assumptions were true or not.

The 19 underlying assumptions were considered in the logical framework which was developed based on the ToC map and the resulting ToC narrative. It is this logical framework which yielded the 7 evaluation questions relating to the South African EIA system. Addressing the 7 evaluation questions, will in turn provide answers to the 19 underlying assumptions. The 7 evaluation questions were developed as part of **research objective 2**. It is these 7 key evaluation questions and the corresponding KPIs which provide a new framework for EIA system evaluation.

Research objective 2 was further pursued through **phase 2** of the research which set out the research methods which would be used to address the identified evaluation questions. Once the methods for the evaluation were determined, **research objective 3** could be pursued, which was to evaluate the selected EIA system against the developed evaluation criteria.

In providing an analysis and conclusion along with recommendations (**research objective 3**), each of the identified evaluation questions (**research objective 2**) will be addressed. The section provides a summary of the key evaluation questions and how they relate to the evaluation components, main conclusions and recommendations. In order to assist the reader in making these links a table format is used and included as Table 5-1. In addressing research objective 3, the researcher was mindful on how to generalize results from the cases used. How to generalise from case study research has been a topic of debate amongst scholars for decades. To deal with this question the research followed the so-called 'replication logic' and not 'sampling logic' approach (see Yin, 2017). Accordingly the research did not make broad generalisations but rather attempted to make context specific conclusions that could be expected to be replicated under similar conditions or within similar contexts or sectors. Secondly it is acknowledged that certain inputs and activity indicators are more significant in influencing outputs and outcomes than others. However, until a better understanding is gained of how the EIA system functions, it would not be desirable to prioritise or weigh the relevant importance of each indicator. Following the logic and assumptions contained in the ToC did, however, provide a rational basis for arguing the relative importance of different

indicators. Given the limited baseline targets or indicators for EIA system evaluation, the indicators used in this research and system evaluation had to be designed from scratch and therefore no blueprint in terms of targets and indicators existed.

Evaluation Question 1: The objectives of EIA are as follows: Within South Africa, the EIA System is prescribed and vested in law (RSA, 1996; RSA, 1998; RSA, 2000; RSA 2014a-e). It must assist in the realisation of the environmental right described in Section 24 of the Constitution of the Republic of South Africa (RSA, 1996) as well as the promotion of the Section 2 principles of NEMA (RSA, 1998). Furthermore, it must aid the achievement of sustainable development as defined in NEMA and relevant case law. This aligns well with the origins of EIA as described by Caldwell (1988) who states that the purpose of EIA was to protect the public and the environment from the consequences of reckless or inadequately informed policies or decisions. Furthermore, the design of the EIA system in South Africa ensures the realisation of section 33 of the Constitution (RSA, 1996) which requires just administrative action. The just administrative component of EIA further aligns with Caldwell who states that one of the factors which shaped the development of EIA was the legislative desire to reinforce administrative accountability (Caldwell, 1988). The design of EIA in South Africa, read together with its objectives, correlates with what is considered by Glasson and Therivel (2019) to be the purpose of EIA, namely, an aid to decision making, an aid to the formulation of development actions, a vehicle for stakeholder engagement and an instrument for sustainable development. The assumptions dealt with in Evaluation question 1 is that a command and control (CaC) based approach geared towards regulating future activities is an effective way to give effect to the environmental right of all South Africans. CaC based instruments are one of the oldest and most common approaches used by governments to achieve policy objectives (Schneider and Ingram, 1990). It is supported by the basic assumption that public policy almost always attempts to get people to do things that they might not otherwise do, or it enables people to do things that they might not have done otherwise. The use of CaC instruments, such as EIA, further assumes that citizens will do what is expected of them - even without tangible payoffs (Kelman, 1981). Furthermore, loyalty to duty is assumed to be an inherent virtue of citizens in civic life and of officials in government structures. In short, and in the context of EIA, we assume we can regulate and enforce our way to the achievement of policy aims such as sustainability. Finally, and possibly most importantly, CaC instruments assume agreement on the outcomes to be achieved. The latter is possibly the most significant challenge, and at the same time flawed EIA assumption. No clearly defined and tangible outcome has been agreed for EIA, so how can it be effective as a regulatory instrument? We therefore assume agreement on what EIA should deliver, but actually in reality no common agreement exists. It is well acknowledged that the expectation

of what EIA should deliver differs for different role players (Petts, 1999, Cape *et al.*, 2018). Acknowledging the limitations of CaC opens the discussion to other policy approaches and instruments with which EIA could align and that are less regulatory and more incentive based, such as fiscal- and civil based approaches.

Recommendations: No recommendations are made regarding the outcome of this evaluation question, however several of the recommendations below relate to possible law reforms, which may by implication result in a tweak of the design of the EIA system.

Evaluation Question 2: How is EIA expected to achieve its objectives?: EIA recognises the validity of quantitative and qualitative data, thereby accommodating more subjective elements of impact predictions, values and views as well as objective evidence. EIA is understood to be both an ‘art’ and a ‘science’ (Morgan, 2012). This alludes to the assumption that EIA is a scientific exercise. The state is mandated to authorise and regulate activities, after considering the potential consequences or impacts of these activities on the environment. Legislation in South Africa (RSA, 2014a-b) provides clear procedural and content requirements as basis for decision making, which requires decisions to be procedurally fair, lawful and reasonable, that is to say, rational and proportional (Retief *et al*, 2019). The implementation of the EIA system is reliant on sufficient inputs around skills and competencies as well as time and money (Morrison-Saunders, *et al*, 2015c). This relates to the assumption that sufficient skills and competencies existing to implement the EIA system. Regarding skills and competencies as inputs, the consultant qualifications evaluated in the case studies seem to meet NQF level 8 standards. The specialist skills and competencies can be clearly divided between those specialist fields with focussed qualification and registration authorities such as the ecologist, archaeologists, heritage specialists, engineers, and those who don’t such as SIA, VIA and noise impact assessment. The lack of specific training and registration options for certain fields of specialisation within the South African context continue to present a particular challenge to the credibility of the EIA outcomes. Officials seem to be qualified in relevant fields of study with reasonable experience beyond two years. There seems to be a particular need for officials to extend their qualification to NQF level 8.

Recommendations: There is a need to verify the incorporation of the developed unit standards for environmental assessment practitioners across different university programmes. Furthermore, it is recommended that the legalised EIA process be amended to confirm the designation of the individual EAP/consultant throughout the process. In doing so, situations are avoided whereby uncertainty exists as to whether the initial EAP reflected on

the application form, actually dealt with the entire application up until the point of the decision making. There seems to be a specific need for further post graduate studying opportunities for government officials. This recommendation may be valid for not only the South African context, but to most developing countries, especially within the Southern African region (Machaka *et al.*, 2013)

Evaluation Question 3: What has been the economic impact of the EIA process on identified sectors?: In terms of transactive effectiveness, the following observations are made. There is no existing literature on the full economic impact of EIA on specific sectors in South Africa. Determining the economic impact of EIA is exceedingly difficult from a conceptual and methodological perspective as highlighted in chapter 3. Evaluation question 3 therefore deals with the assumption that the benefits of doing EIA outweigh the costs. The successful adoption of EIA can be traced to the implicit or explicit assumptions that the benefits of doing EIA outweigh the associated costs and resultant economic impacts (Retief & Chabalala, 2009). Although it has been stated internationally that the aim of any EIA system should be to maximise environmental benefits, to minimise environmental costs, and to minimise the costs to the proponent (i.e economic impact), it has been argued that it would be impossible to establish precisely either the benefit or the cost of EIA (Wood, 2003). The reason being that comparing the benefits and costs of EIA is ultimately a matter of judgment, dependent on how the factors are weighted, which was and still remains extraordinarily difficult to measure and largely unquantifiable (Arrow *et al.*, 1996; Sadler, 1996). Debates centred around EIA cost invariably raise basic fundamental and often contentious questions around the need for EIA, whether it has or adds value, and if EIA is ultimately worthwhile pursuing.

Recent years have seen increasing and renewed pressure building around EIA systems internationally to become more efficient and to demonstrate its added value (Retief *et al* 2007a; Bond *et al* 2014, Morrison-Saunders *et al* 2015c, Loomis & Dziedzic, 2018, Alberts *et al.*, 2019). That being said, research dealing with the fundamental issues related to cost has been limited, both internationally and especially within the South African context (Retief & Chabalala, 2009). This may probably be ascribed to the substantial conceptual and methodological challenges presented by such research, which includes the difficulties associated with trying to clarify terminology and disentangling what is actually meant by the 'cost' of EIA. Past research (Retief & Chabalala, 2009) based on 148 cases suggests that the average direct cost of EIA in South Africa is particularly low compared to international EIA systems. It is however true that certain sectors are more affected than others. As a percentage of total project costs (international benchmark being 1% of total project cost), EIA in South

Africa compares with the higher spectrum of international practice. This suggest that a large number of EIAs are being conducted for relatively small scale projects, which might be placing a notable cost burden on small and medium enterprises. The EIA requirements for larger, more complex projects in the mining, energy, bulk services and housing sector for example, with potential significant impacts, do not seem to present a major cost burden to the sector and support the assumption that the benefits of EIA outweigh the costs. It seems evident that a meaningful economic burden results for certain projects in the agriculture and waste sectors such as small scale waste management and small scale agricultural developments. In these cases, the cost benefit of EIA is questionable and that perhaps more cost effective regulatory instruments such as generic norms and standards or EMPs may be considered. The economic burden could be addressed should the EIA regulatory requirements be applied in a more discretionary manner, taking to account for example project size, location and environmental impact during the application and screening phase. There should be a mechanism n law to allow for discretion around the need for and extent of EIA related to such small projects.

Recommendations: To amend the current screening mechanism for small to medium size activities in order to reduce the EIA regulatory cost burden. However, the environmental impact is not only a function of project size, for example the high potential impact of feedlots and waste management facilities. Therefore, the researcher recommends a referral system which requires interpretation and discretion by government on the need for and extent of EIA required on a case by case basis for lesser impact activities typically listed in the current listing Notice 1(RSA, 2014b). This approach reflects the options for exemption and/or exit after scoping as under the previous ECA regime prior to 2006. The current initiatives around EMF and delisting as well as Listing Notice 3 which deals with activities only in sensitive areas or environments (RSA, 2014d) could also contribute. This approach is well supported internationally, and within developing country contexts (Sandham & Pretorius, 2008). The potential benefits of the 'exit after scoping' option are considered by Borioni *et al.* (2017) who contend that despite the complexities associated with in depth environmental impact scoping, proper scoping may lead to and result in more cost effective assessments along with avoiding excessive resources to be spent on minor impacts together with better governance and increased effectiveness of the EIA process (Arts *et al*, 2012). Providing developers with the scenario whereby they may exit after scoping, provides an opportunity for proper scoping to be done, realising all the benefits associated therewith, whilst affording developers the opportunity to demonstrate their development need to be subject to the full EIA process given the low impacts associated therewith, possibly reducing the financial burden associated with EIA for smaller developments.

Evaluation Question 4: To what extent has the EIA process been efficiently implemented?:

In terms of evaluation against the concept of procedural effectiveness, the following observations in relation to the South African EIA system may be made. Measured against meeting legal timeframes, a high level of efficiency has been achieved. The procedural amendments of the EIA regulations seemed to have consistently produce processes of around 300 days which is the envisaged time frame implemented by the 2014 EIA regime in South Africa (RSA, 2014a). To this end, the EIA system presents a high degree of procedural certainty in terms of timeframes for developers and proponents, which allows for proper project planning. It is worth highlighting that under the ECA EIA regime 50% of applications were completed within six months and around 30% received Section 28A exemption. Therefore, the ECA regime produced arguably the best efficiency results measured purely against number of days from registration to decision. The mechanisms under ECA that made this possible was exemption provisions (during screening) and early exit options (after scoping). The latter however, was supported by allowing a degree of government discretion and overall more procedural flexibility. To further improve efficiency it is recommended that early exit options be considered, for example during the screening and scoping phases of the EIA process. This relates to the assumption that a non-discretionary list based screening effectively triggers the need for EIA. Results from the research would suggest that discretion, particularly with regards to screening and which activities require EIAs to be conducted, could speed up efficiency in terms of timeframes. It must however be noted that the drive for procedural efficiency and/or 'streamlining' has also been shown to erode many of the important benefits of EIA such as transparency, public participation and consultation (Bond *et al.*, 2014). Moreover, the quality of EIA could also suffer with less time for specialist studies to be conducted and less time for proper consideration of the outcomes of the assessment. Clearly a balance needs to be achieved between providing a reasonable time for the EIA and also avoid unnecessary delays for applicants (DEA, 2014). Further assumptions dealt with under evaluation question 4 relate to the ability to identify key issues during scoping and the ability to determine and deal with significance. South African studies on EIA quality (Sandham & Pretorius 2007; Sandham *et al.*, 2008a, 2008b, 2010) as well as international studies (Barker & Wood 1999; EC 1996; Lee, 2000; Pöhlönen *et al.*, 2010) have highlighted the fact that EIA reports score lower grades in the more analytical areas (i.e scoping and significance) compared to the higher grades in the more descriptive and presentational areas of evaluation. This also correlates with the assumption that we make regarding the accuracy of prediction.

EIA is fundamentally a predictive policy implementation instrument. Therefore, based on this understanding, and for EIA to be effective, we have to assume a high level of accuracy in

prediction. Notwithstanding, it has been generally understood and acknowledged that accuracy of prediction is typically low (Holling, 1978), and given rising uncertainty in future, accuracy will become even more difficult to achieve (Retief *et al.*, 2016). To this end, it has been recommended that EIA rely more on disciplines such as scenario planning and that EIA professionals typically consider multiple possible futures to deal with the uncertainties encountered when making future predictions. Moreover, an even greater focus on adaptive management is recommended to deal with this acknowledged lack of accuracy in prediction. Challenging the core assumption around accuracy of prediction potentially require fundamental changes (or paradigm shifts) in thinking about the nature and function of EIA as a predictive decision support instrument.

Effective EIA depends on the assumption that decision makers, including reviewers and appeal authorities, will act rationally when provided with objective information, the so-called technical rational paradigm (Owens, *et al.*, 2004). Furthermore, and maybe even more fundamental, it is assumed that: decision makers read and understand reports, they are impartial, unbiased and objective, and, ultimately, we assume that good quality EIA reports will lead to good, rational decisions (i.e. positive correlation between report quality and good decision making). However, it has been generally recognized in the decision making sciences, since the 1950s, that people are not rational beings and that we are all limited in, for example, our ability to understand complex information (Etzioni, 1964). Admittedly, various EIA scholars have also pointed this out over the years, notwithstanding, practice and policy design seem to doggedly continue along the technical rational paradigm based on the assumption of rational decision making (Kornov & Thissen, 2000; Nitz & Brown, 2001).

Recommendations: It is recommended that early exit options be considered, during the screening and scoping phases of the EIA process as discussed under evaluation question 3 above. This may serve to shorten the time frames associated with smaller low impact activities and to alleviate the administrative burden created by following the entire EIA process as regulated. Also relating to process efficiency, the total number of EIA consultants in South Africa is not known. However, the registration database to be developed by EAPASA over the next few years should provide a clearer picture of the number of EAPs in the private and public sector. Thus it should be possible to develop a capacity formula for government that sets an optimum standard in terms of the number of EIAs assigned per official, to guide capacity decisions related to the profession in future. The registration of EIA professionals with a particular body aligns with international thinking (Bond *et al.*, 2017). It is argued that certification or accreditation of EIA professionals or practitioners may help to improve EIA quality, through inter alia process efficiency (Bond *et al.*, 2017).

Evaluation Question 5: What is the quality of EIA reports and processes?: Quality is much sought after in, and a basic foundation for, any well-functioning EIA system (DEA, 2014). However, the term is rarely defined, has an uncertain relationship with EIA effectiveness, and it means different things to different stakeholders. This researcher agrees with the recent conceptualisation by Bond *et al.* (2018a) who concluded that effective EIA depends on good quality EIA and that, simply stated, good inputs lead to good outputs. The latter understanding also directly reflected in the evaluation. The evaluation shows that in terms of ‘completeness’ the cases performed well. The detailed legislative requirements and prescribed report templates no doubt assisted in producing completeness. The report quality in terms of ‘substance’ performed poorly in relation to dealing with aspects such as alternatives, significance and mitigation. The assumption addressed in evaluation question 5 is that of an efficient process, as defined by the set timeframes, producing good quality reports. To this end the evaluation shows that in terms of ‘completeness’ the cases performed well. The detailed legislative requirements and prescribed report templates no doubt assisted in producing completeness. The report quality in terms of ‘substance’ performed poorly in relation to dealing with aspects such as alternatives, significance and mitigation. Explanations on why the quality of EIA reports were weak in terms of ‘substance’ remain somewhat speculative, although certain causal arguments could be made. For example, the following causal questions could be asked:

- To what extent the drive for procedural efficiency is eroding the substance quality of EIA reports?
- How is it that consultants with seemingly appropriate training and experience produce weak substance reports?
- Why do government officials with seemingly appropriate qualifications and experience approve weak substantive reports?
- How is it possible that across 42 EIAs (in seven sectors including mining, bulk services infrastructure, energy, etc.) not a single case found a high significant impact after mitigation? Can all impacts therefore be mitigated to low and medium significance?

Recommendations: It is evident that clarification around the concept of significance is needed to improve the quality of EIA report substance. In particular, a common understanding is needed in terms of different methodological approaches to significance. It is therefore recommended that clarification and guidance be provided from a legal and methodological perspective. Improving EIA quality in terms of significance will indirectly also positively address a number of other weaknesses such as need and desirability, alternatives and mitigation. This sentiment is shared by Erlich & Ross (2015) who state that internationally,

'there has remained a long-standing need for increased clarity on how significance determinations are ultimately reached by significance determiners, those who, on behalf of governments, make a legal determination of significance in EIAs.'

Evaluation Question 6: To what extent has EIA influenced decision making?: When considering the extent to which EIA influences decisions making in South Africa, little EIA follow-up research on enforcement and compliance monitoring happens. This coupled with little empirical data on the effectiveness of EIA in general, and its influence on decision making in particular, makes it difficult to address this question. Evaluation question 6 addresses three assumptions related to decision making namely the assumptions that: Good quality reports will lead to informed decisions. Decisions made by the competent authorities are underpinned by the NEMA Section 2 principles and all decisions made by the competent authorities are lawful, reasonable and procedurally fair. The evaluation results show that overall, with some minor exceptions the environmental authorisations were lawful in that the activities approved correlated with the activities applied for. The good performance in terms of procedural efficiency and compliance suggest that the decisions were generally procedurally fair, based on the legislative standards. The compliance in terms of public participation requirements also supports this conclusion. The content and environmental authorisations did reflect the content and recommendations from the EIA report and therefore a level of reasonableness (which includes rationality and proportionality) was achieved. However, many EIA reports produced weak substance on which to base decisions, which puts into question the quality of decisions made from a substantive perspective. So the question is: Can we make good decisions based on substantively deficient EIA report quality? Are lawful, procedurally fair and reasonable decisions enough to make an impact? **Recommendations:** The recommendation to improve the outcomes of the EIA system (i.e the decision making) relates to the improvement of the substantive quality of the EIA report described above.

Evaluation question 7: To what extent has the EIA process been effective in achieving its objectives towards sustainable development?:

Measuring the contribution of EIA to sustainability is difficult to conceptualise and evaluate empirically as set out in the literature review (Chapter 3 of this thesis) (see for example: Retief, 2011; Retief 2013). The interview method, which mainly tested the perceptions of different stakeholders, was used to deal with this challenge, as it is common practice internationally (see for example Arts, et al., 2012; Lyhne et al., 2017; Loomis & Dziedzic, 2018). The perceived impact of the EIA system does speak directly to important NEMA Section 2 principles and the content of Section 24 of the Constitution. The only aspect of Section 24 not explicitly achieved to some extent is the promotion of conservation outcomes. It's not possible

to measure the impact of the EIA system towards specific goals or objectives because the objectives of EIA defined in NEMA and Section 24 of the Constitution has not been quantified (if this is even possible?). The overall outcome of the system evaluation does however support the international understanding (discourse) that EIA systems produce incremental gains contributing towards sustainability (see Pope et al 2017). In the case of South Africa the incremental gains refer to the progressive realization of NEMA Section 2 principles and Section 24 of the Constitution. These findings address the assumption that Informed decisions regulating future activities, that are lawful, reasonable and procedurally fair as well as underpinned by NEMA Section 2 principles, will lead to progressive realization of the Section 24 environmental right.

Recommendations: This research and system evaluation suggests that as it stands, the impact of the EIA system cannot be measured and/or evaluated until such time as well defined and measurable objectives are developed. This is due to the lack of quantifiable and well defined targets and objectives for the EIA system as a whole. In pursuing the question as to what the perceived benefits of EIA are within the South African context, recent research (Roos *et al.*, 2020 & Cilliers *et al.*, 2020) has revealed that from a regulators perspective EIA is seen as contributing towards the achievement of aspects such as increased public participation and awareness, protection of biodiversity, access to information and certain immediate economic benefits. The contribution of EIA to sustainable development was not an explicit benefit as perceived by two thirds of the EIA regulators in South Africa. The research indicates that the benefits of EIA are perceived to be short term project specific, with regulators battling to identify any long term contribution by EIA to sustainable development (Roos *et al.*, 2020 & Cilliers *et al.*, 2020)

5.2 Contribution to knowledge and future research

The research, in applying the Theory of Change Method has contributed to existing knowledge by identification of the underlying assumptions which underpin our understanding of EIA systems. This together with the related evaluation questions and identified KPIs provides a novel framework for EIA system evaluation which may be easily adapted and applied to EIA systems other than the South African one. The fundamental contribution to knowledge being the fact that the underlying assumptions should be tested, and if found wanting, then our understanding of the inner logic on which EIA is predicated, should be re-examined.

Notwithstanding the wealth of literature and research on EIA, the basic understanding of how EIA works and its basic principles have been largely unchanged since its inception in the early 1970s (IAIA, 1999; Bartlet & Kurian, 1999; Morgan, 2012). It is therefore reasonable to believe

that there are numerous key assumptions underpinning EIA, which have been unchanged and unchallenged for 50 years across international EIA systems. This research has through the application of ToC addressed and tested the underlying assumptions on which the South African EIA system is based. Furthermore, the application of the ToC method to the South African EIA system, and the subsequent evaluation of the system, has helped gain insight into the current effectiveness of the system, and helped inform our understanding of the system subsequent to the 2008 evaluation conducted by DEA.

To this end, the research revealed a number of areas that could be explored in future research studies. These areas relate to the application of ToC as a method for evaluation of other environmental policy implementation tools within the South African context such as Environmental Management Frameworks, Strategic Environmental Assessments and Environmental Planning Instruments. Internationally the developed evaluation questions and KPIs may be adapted for similar EIA system evaluations, specifically within the developing world context. Further research may also be conducted in relation to the impact component, in order to gain a better understanding as to why the perceptions of the relevant stakeholders groups are what they are regarding EIA, specifically the perception that EIA does not contribute to conservation despite this being a central mandate within section 24 of the Constitution. It is also recommended that future research into the cost of EIA be considered, given the complexities highlighted in this research as well as that of Retief & Chabalala (2009) around the conceptualisation and understanding of direct and indirect EIA costs. Furthermore, future research relating to measurable objectives for sustainable development or sustainability will assist in measuring the effectiveness of the EIA system in achieving section 24 of the Constitution.

Finally, the research has provided a review of the South African EIA system together with recommendations for improvement. The first such system wide review since 2008 and the first to review the EIA regimes spanning from 2010 to the present.

5.3 Conclusion

The research applied the ToC evaluation approach to the selected case study, being the South African EIA system. In so doing the research demonstrated that the ToC approach may be used to better understand the working of the system, by highlighting the different system components from design, inputs, activities, outputs, outcomes and impacts. The underlying assumptions underlining the working of the system may thus be better identified and then addressed by clearly formulated evaluation questions and purposefully designed KPIs. These

evaluation questions were then addressed and key recommendations regarding the south African EIA system were made.

In order for EIA to evolve, we need to continually evaluate, more critically, our underlying core assumptions of how EIA works. If the underlying core assumptions are found to be flawed, then the beliefs on which the EIA policy system is based are flawed, and a paradigm shift must occur and hence the need for punctuated equilibrium have been created. Failure to act would perpetuate flawed assumptions and beliefs, and result in an ineffective EIA policy context fixed in stasis. Applying the ToC methodology to EIA has proven to be a plausible way to identify and evaluate core assumptions underpinning EIA system, and serves as basis for the evolution of EIA into the 21st century.

Table 5-2: Summary of conclusions and recommendations related to the evaluation components and key evaluation questions for strengthening the South African EIA system

EVALUATION COMPONENTS	KEY EVALUATION QUESTIONS	CONCLUSIONS	RECOMMENDATIONS
DESIGN (See Assumption 1)	What are the objectives of EIA in South Africa?	• EIA System is prescribed and vested in law. • Realisation of the environmental right described in Section 24 of the Constitution of the Republic of South Africa. • Promotion of the Section 2 principles of NEMA. • Achievement of sustainable development as defined in NEMA and relevant case law. • Ensure the realisation of section 33 of the Constitution which requires just administrative action	• No recommendations. However, there are various recommendations listed below which might require law reform which will change the design component towards improving the overall system performance.
INPUT: SKILLS AND COST (See Assumptions 2)	How is EIA expected to achieve its objectives?	• EIA recognises the validity of quantitative and qualitative data, thereby accommodating more subjective elements of impact predictions, values and views as well as objective evidence. EIA is understood to be both an 'art' and a 'science'.	• No recommendations. See recommendations described below related to key evaluation questions on skills and competencies as well as cost.

EVALUATION COMPONENTS	KEY EVALUATION QUESTIONS	CONCLUSIONS	RECOMMENDATIONS
		- The state is mandated to authorise and regulate activities, after considering the potential consequences or impacts of these activities on the environment. - Legislation provides clear procedural and content requirements as basis for decision making, which requires decisions to be procedurally fair, lawful and reasonable (rational and proportional). - The decision making mandate is vested with provincial and national spheres of government where administrative capacity is provided. - The implementation of the EIA system is reliant on sufficient inputs around skills and competencies as well as time and money.	
	Is there sufficient skills and competencies to implement the EIA System?	The consultant qualifications seem to meet NQF level 8 standards. However, the fields of study vary widely, with seemingly no standardised EIA training. Therefore, it is difficult to gauge the extent of skills and competencies related to different programmes. Although the experience of	There is a need to verify the incorporation of the developed unit standards for environmental assessment practitioners across different university programmes. This action should aim to address the need for standardised training for EAPs across different programmes. We suspect that this function will typically reside with EAPASA.

EVALUATION COMPONENTS	KEY EVALUATION QUESTIONS	CONCLUSIONS	RECOMMENDATIONS
		consultants was not always verifiable, many had more than five years' experience. - The specialist skills and competencies can be clearly divided between those specialist fields with focussed qualification and registration authorities such as the ecologist, archaeologists, heritage specialists, engineers, etc. and those who don't such as SIA, VIA, noise impact assessment, etc. The line of distinction seems to be between the so-called hard and soft sciences. The lack of specific training and registration options for certain fields of specialisation continue to present a particular challenge to the credibility of the EIA outcomes. - Officials seem to be qualified in relevant fields of study with reasonable experience beyond two years. However, from the cases evaluated there seems to be a particular need for officials to extend their qualification to NQF level 8.	- Ideally certain fields of specialisation commonly used in EIA, should be working towards formal qualification standards and registration bodies to strengthen the credibility of the EIA outcomes. In particular SIA and VIA. - Provision needs to be made to confirm the designation of the individual EAP/consultant throughout the process. This is to ensure that responsibility and accountability can be assigned. - There seems to be a specific need for further post graduate studying opportunities for government officials, in view of the fact that many don't comply with NQF level 8. Interaction between tertiary education bodies and environmental authorities might be required.
	What has been the economic impact	There is no existing literature on the full economic impact of EIA on specific sectors in South Africa.	To amend the current screening mechanism for small to medium size activities in order to reduce the EIA regulatory cost burden. However, the environmental impact is not

EVALUATION COMPONENTS	KEY EVALUATION QUESTIONS	CONCLUSIONS	RECOMMENDATIONS
	of the EIA process on identified sectors? (See KPI 1.1)	• Determining the economic impact of EIA is exceedingly difficult from a conceptual and methodological perspective. • Research based on 148 cases suggests that the average direct cost of EIA in South Africa is particularly low compared to international EIA systems. • As a percentage of total project costs (international benchmark being 1% of total project cost), EIA in South Africa compares with the higher spectrum of international practice. This suggest that a large number of EIAs are being conducted for relatively small scale projects, which might be placing a notable cost burden on small and medium enterprises. • Certain sectors are more effected than others. The EIA requirements for big projects in the mining, energy, bulk services and housing sector for example, with potential significant impacts, do not seem to present a major cost burden to the sector and support the assumption that the benefits of EIA outweigh the costs.	only a function of project size, for example the high potential impact of feedlots and waste management facilities. Therefore, we recommend a referral system which requires interpretation and discretion by government on the need for and extent of EIA required on a case by case basis for lesser impact activities (typically listed in the current listing Notice 1). This approach is common internationally and reflects the options for exemption and/or exit after scoping under the previous ECA regime. The current initiatives around EMF and delisting as well as Listing Notice 3 could also contribute. •

EVALUATION COMPONENTS	KEY EVALUATION QUESTIONS	CONCLUSIONS	RECOMMENDATIONS
		It seems evident that a meaningful economic burden result for certain projects in the agriculture and waste sectors such as small scale waste management and small scale agricultural developments. In these cases the cost benefit of EIA is questionable. However, this economic burden could be addressed should the EIA regulatory requirements be applied in a more discretionary manner, taking to account for example project size, location and environmental impact during the application and screening phase. There should be a mechanism in law to allow for discretion around the need for and extent of EIA related to such small projects.	
ACTIVITIES (See Assumptions 4-14)	To what extent has the EIA process been efficiently implemented?	- Measured purely against meeting the legal timeframes as prescribed under different EIA legal regimes, a high level of efficiency has been achieved. The procedural amendments introduced through the 2014 EIA Regulations seemed to have consistently produce EIA processes of around 300 days. - The EIA system therefore presents a high degree of procedural certainty in terms of timeframes. This result is significant from an	It is worth highlighting that under the ECA EIA regime 50% of applications were completed within six months and around 30% received Section 28A exemption. Therefore, the ECA regime produced arguably the best efficiency results measured purely against number of days from registration to decision. The mechanisms under ECA that made this possible was exemption provisions (during screening) and early exit options (after scoping). The latter however, was supported by allowing a degree of government

EVALUATION COMPONENTS	KEY EVALUATION QUESTIONS	CONCLUSIONS	RECOMMENDATIONS
		indirect cost perspective because it suggests that developers can have a high degree of certainty in terms of the EIA timeframes, which could then be built into project planning to avoid delays and related construction cost inflation.	discretion and overall more procedural flexibility. To further improve efficiency it is recommended that early exit options be considered, for example during the screening and scoping phases of the EIA process. • The total number of EIA consultants in South Africa is not known and impossible to determine through traditional surveys. However, the registration database to be developed by EAPASA over the next few years should provide a clearer picture of the number of EAPs in the private and public sector. Once the numbers are known, it should be possible to develop a capacity formula for government that sets an optimum standard in terms of the number of EIAs assigned per official, to guide capacity decisions related to the profession in future.

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OUTPUT (See Assumption 15)	What is the quality of EIA reports and processes?	• The evaluation shows that in terms of 'completeness' the cases performed well. The detailed legislative requirements and prescribed report templates no doubt assisted in producing completeness. • The report quality in terms of 'substance' performed poorly in relation to dealing with aspects such as alternatives, significance and mitigation. • Explanations on why the quality of EIA reports were weak in terms of 'substance' remain somewhat speculative, although certain causal arguments could be made. For example, causal questions could be asked: • To what extent the drive for procedural efficiency is eroding the substance quality of EIA reports? • How is it that consultants with seemingly appropriate training and experience produce weak substance reports?	• It is evident that clarification around the concept of significance is needed to improve the quality of EIA report substance. In particular, a common understanding is needed in terms different methodological approaches to significance. It is therefore recommended that clarification and guidance be provided from a legal and methodological perspective. Improving EIA quality in terms of significance will indirectly also positively address a number of other weaknesses such as need and desirability, alternatives and mitigation.

EVALUATION COMPONENTS	KEY EVALUATION QUESTIONS	CONCLUSIONS	RECOMMENDATIONS
		• Why do government officials with seemingly appropriate qualifications and experience approve weak substantive reports? • How is it possible that across 42 EIAs (in seven sectors including mining, bulk services infrastructure, energy, etc.) not a single case found a high significant impact after mitigation? Can all impacts therefore be mitigated to low and medium significance?	
OUTCOME (See Assumption 16)	To what extent has EIA influenced decision making?	• The evaluation results show that overall, with some minor exceptions the environmental authorisations were lawful in that the activities approved correlated with the activities applied for. • The good performance in terms of procedural efficiency and compliance suggest that the decisions were generally procedurally fair, based on the legislative standards. The compliance in terms of public participation requirements also supports this conclusion. • The content and environmental authorisations did reflect the content and recommendations from the EIA report and	• The recommendation to improve the outcomes of the EIA system (i.e the decision making) relates to the improvement of the substantive quality of the EIA report described above.

EVALUATION COMPONENTS	KEY EVALUATION QUESTIONS	CONCLUSIONS	RECOMMENDATIONS
		therefore a level of reasonableness (which includes rationality and proportionality) was achieved. However, many EIA reports produced weak substance on which to base decisions, which puts into question the quality of decisions made from a substantive perspective. So the question is: • Can we make good decisions based on substantively deficient EIA report quality? • Are lawful, procedurally fair and reasonable decisions enough to make an impact?	
IMPACT (See Assumptions 17-19)	To what extent has the EIA process been effective in achieving its objectives, towards sustainable development?	• The interview results show that the perceived impact of the EIA system do speak directly to important NEMA Section 2 principles as well as the content of Section 24 of the Constitution. The only aspect of Section 24 not explicitly achieved to some extent seems to be the promotion of conservation outcomes. • The overall outcome of the system evaluation supports the international understanding (discourse) that EIA systems produce incremental gains contributing towards sustainability (see Pope et al 2017). In the case of South Africa the incremental	• The system evaluation suggests that as it stands, the impact of the EIA system cannot be measured and/or evaluation until such time as well defined and measurable objectives are developed. This is due to the lack of quantifiable and well defined targets and objectives for the EIA system as a whole.

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		gains refer to the progressive realization of NEMA Section 2 principles and Section 24 of the Constitution. • It is not possible to measure the impact of the EIA system towards specific goals or objectives because the objectives of EIA defined in NEMA and Section 24 of the Constitution has not been quantified (if this is even possible?).	

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APPENDICES

Appendix A: Documentation Evaluation Sheet

DOCUMENTATION EVALUATION SHEET					
EIA Project:			Evaluation Date:		
			Evaluators:		
Checklist Ref.	Documentation evaluated:				
	Person/s interviewed (if applicable):				
A = Conformance	B = partly conformed	C = Non-conformance	NR = not evaluated	NA = not applicable to the scope	? = Status could not be established during the evaluation
KPIs	Question			Value	Comments
INPUTS COMPONENT					
KPI 1.1	Did the direct EIA costs fall below the international benchmark of 1% of total project cost?				
KPI 1.2	To what extent do the skills and competencies of the consultants conform with NQF level 8?				
KPI 1.3	To what extent do the skills and competencies of the consultants conform with relevant fields of study?				
KPI 1.4	To what extent do the skills and competencies of the consultants reflect relevant experience?				
KPI 1.5	To what extent do the skills and competencies of the specialists conform with relevant specialist registrations?				
KPI 1.6	To what extent do the skills and competencies of the specialists conform with relevant fields of study?				

KPI 1.7	To what extent do the skills and competencies of the officials conform with NQF level 8?		
KPI 1.8	To what extent do the skills and competencies of the officials conform with relevant fields of study?		
KPI 1.9	To what extent do the skills and competencies of the official reflect relevant experience?		
ACTIVITY COMPONENT			
KPI 2.1	Did the competent authority acknowledge and accept the application within the prescribed timeframe?		
KPI 2.2	Were the regulatory timeframes met for public participation?		
KPI 2.3	Did the consultants submit their reports within the prescribed timeframes (only 2014 Regulations applicable)?		
KPI 2.4	Did the competent authority acknowledge the final report submissions within the prescribed timeframe?		
KPI 2.5	Did the competent authority make and communicate their decision within the prescribed timeframe?		
KPI 2.6	Was the appeals process conducted according to the prescribed timeframes?		
OUTPUT COMPONENT			
	The following indicators are indicative of the <u>completeness</u> of the EIA report content (but does not talk to substantive quality).		
KPI 3.1	Was a description of the proposed activity provided?		
KPI 3.2	Was need and desirability described?		
KPI 3.3	Were key issues identified?		
KPI 3.4	Have alternatives been considered?		
KPI 3.5	Was a plan of study included?		
KPI 3.6	Was significance determined?		

KPI 3.7	Was significance dealt with before and after mitigation?		
KPI 3.8	Was public participation conducted?		
KPI 3.9	Was an EMPr submitted which describes mitigation measures?		
KPI 3.10	Was an impact summary statement provided?		
	The following indicators are indicative of the <u>substance</u> quality of the EIA report content.		
KPI 3.11	Was the description of the activity provided sufficient to inform the identification of listed activities?		
KPI 3.12	Was the information provided sufficient to justify the identification of key issues (scoping)?		
KPI 3.13	Was the timing of the development justified in relation to need and desirability?		
KPI 3.14	Was the location of the development justified in relation to need and desirability?		
KPI 3.15	Did the plan of study incorporate the key issues as identified during scoping?		
KPI 3.16	Were reasonable alternatives presented and assessed?		
KPI 3.17	Was significance determined according to a justified methodology, which includes the method and its application?		
KPI 3.18	Was the determination of significance consistently applied across specialist disciplines?		
KPI 3.19	Was justification provided for different proposed mitigation measures against the mitigation hierarchy?		
KPI 3.20	Has the significance rating after mitigation been justified?		
KPI 3.21	Were the proposed mitigation measures as described in the impact assessment incorporated into the EMPr?		
KPI 3.22	Were roles and responsibilities assigned meaningfully in relation to management actions in the EMPr?		

KPI 3.23	Was there any supplementary information submitted to the authorities that was not in the public domain?		
KPI 3.24	Were all comments from IAPs adequately responded to in the impact assessment process and reports (not relegated to comments and response reports)?		
KPI 3.25	Were all key IAPs consulted in the impact assessment process?		
KPI 3.26	Were the key recommendations from the impact assessment justified and clearly summarised in a non-technical fashion?		
OUTCOME COMPONENT (IMMEDIATE)			
KPI 4.1	To what extent did the application authorise the correct listed activities?		
KPI 4.2	To what extent did the process comply with minimum legal procedural requirements?		
KPI 4.3	To what extent was the decision described in the environmental authorisation consistent with and based on the content of the EIA reports?		

Appendix B: Interview Design Sheet

INTERVIEW DESIGN SHEET					
Interview Date:					
Interviewer(s):					
Checklist Ref.	Person interviewed:				
GENERAL INTERVIEW QUESTIONS					
Question 1	In your opinion, what are the main potential impacts/contributions of EIA?				
Question 2	In your opinion, what are the main realized impacts/contributions of EIA?				
Question 3	In your opinion, what can be done to bridge the gap between potential and realised impacts/contributions?				
A = Conformance	B = partly conformed	C = Non- conformance	NR = not evaluated	NA = not applicable to the scope	? = Status could not be established during the evaluation
KPIs	Question			Value	Comment
IMPACT COMPONENT					
KPI 5.1	To what extent did the EIA realize an environment that is not harmful to health and well-being?				

KPI 5.2	To what extent did the EIA achieve protection of the environment over the immediate and long term?		
KPI 5.3	To what extent did the EIA succeed in preventing pollution and ecological degradation?		
KPI 5.4	To what extent did the EIA promote conservation?		
KPI 5.5	To what extent did the EIA secure ecologically sustainable development?		
KPI 5.6	To what extent did the EIA promote justified economic and social development?		

Appendix C: Synthesis of the Literature Review Report in relation to the Evaluation Questions

EVALUATION COMPONENTS	EVALUATION QUESTIONS	SYNTHESIS FROM LITERATURE REVIEW
DESIGN	What are the objectives of EIA in South Africa?	• Progressive realisation of the environmental right described in Section 24 of the Constitution of the Republic of South Africa. • Promotion of the Section 2 principles of NEMA. • Achievement of sustainable development as defined in NEMA and relevant case law. • Ensure the realisation of section 33 of the Constitution which requires just administrative action.
INPUT	How is EIA expected to achieve its objectives?	• 'Critical realism' is an appropriate ontological position for EIA as it recognises the validity of quantitative and qualitative data, thereby accommodating more subjective elements of impact predictions, values and views as well as objective evidence. EIA is understood to be both an 'art' and a 'science'. • The state is mandated to authorise and regulate activities, after considering the potential consequences or impacts of these activities on the environment. • Legislation provides clear procedural and content requirements as basis for decision making, which requires decisions to be procedurally fair, lawful and reasonable (rational and proportional). • The decision making mandate is vested with provincial and national spheres of government where administrative capacity is provided. Skill requirements are prescribed for EAPs in legislation and qualification standards. In terms of skills training, significant progress seems to have been made with personnel in most provinces having sound qualifications, although overall staff shortages and inexperience are highlighted as key challenges.
ACTIVITIES	To what extent has the EIA process been efficiently implemented?	• Compared to international EIA practice, the number of EIAs conducted in South Africa is exceptionally high. • Anecdotal evidence suggest that EIA processes are generally conducted within set legal timeframes and that effective frameworks for monitoring procedural efficiency exist in government. • Serious questions are being asked to what extent the drive for procedural efficiency is eroding the potential benefits of EIA in terms of improving decision making and providing for transparency and participation.

EVALUATION COMPONENTS	EVALUATION QUESTIONS	SYNTHESIS FROM LITERATURE REVIEW
OUTPUT	What is the quality of EIA reports and processes?	• Report quality has been evaluated over time as well as for different provinces and sectors. • Overall report quality decreased slightly from the ECA (pre 2006) to the NEMA regime (post 2006). • Lower quality grades are achieved for dealing with impact identification, alternatives, mitigation and significance. • Higher quality grades are achieved for dealing with more descriptive and presentational areas of assessment.
	What has been the economic impact of the EIA process on identified sectors?	• There is no existing literature on the full economic impact of EIA on specific sectors in South Africa. • Determining the economic impact of EIA is exceedingly difficult from a conceptual and methodological perspective. • Research suggests that the average direct cost of EIA in South Africa is particularly low compared to international EIA systems. • As a percentage of total project costs, EIA in South Africa compares with the higher spectrum of international practice. This suggest that a large number of EIAs are being conducted for relatively small scale projects, which might be placing a notable cost burden on small and medium enterprises.
OUTCOMES	To what extent has EIA influenced decision making?	• EIA has a significant mandate to positively influence decision making towards sustainable development. • There is limited empirical research on the extent to which EIA influences decision making with most research focussing on post-decision follow-up. South Africa has made significant progress in law and administrative arrangements to deal with compliance monitoring and follow-up. • Research has emphasised the importance of post decision monitoring and adaptive management to deal with unforeseen impacts.
IMPACT	To what extent has the EIA process been	• There is limited research available on the extent to which EIA has delivered sustainability and/or more sustainable outcomes.

EVALUATION COMPONENTS	EVALUATION QUESTIONS	SYNTHESIS FROM LITERATURE REVIEW
	effective in achieving its objectives, towards sustainable development?	• There seems to be some ignorance amongst both officials and practitioners in respect of the sustainable development mandate and purpose of EIA. • Research has demonstrated that in the South African context EIA already has a very strong and explicit sustainability mandate which means that the challenge for EIA does not lie with the mandate (or the establishment of appropriate enabling legislation) but rather with giving effect to this mandate in practice. • Particular challenges in applying sustainability thinking in EIA are related to incorporating longer term thinking and dealing with uncertainty.

Appendix E: Cases Selected for the Case Study Evaluation

Bulk Infrastructure	
Esimnyameni - Mkhambathi Access Roads And Low Lying Bridge ECP/EIA/0000208/2016	
Construction Of A Maize Meat Hub In Maclear ECP /EIA /0001124/ 2014	
Proposed construction of water supply pipeline LIM EIA 0000946 2014	
Upgrading Of Rural Access Road (D281) Between Volksrust And Daggaskraal MPP EIA 0000121 2016	
BA for proposed Bulk Water Supply System for Onseepkans NC BA 12 NAM KHA ONS1 2016	
Establishment of additional surface infrastructure at Sedibelo Platinum Mine NWP EIA 89 2011	
Waste Sector	
Proposed rand water Vereeniging water residue pipeline, Gauteng & Free State Project reference number: 14/12/16/3/3/3/33	
Upgrading of Losperfontein Prison sewage treatment facility, North West Project reference number: 12/12/20/2615	
Extension of ash dams at Hendrina Power Sation, Mpumalanga Project reference number: 12/12/20/21/75	
Extension of the ash disposal facility, Camden Power Station, Mpumalanga Project reference number: 12/12/20/2300	
Proposed sewer treatment plant for Bloemfontein Airport, Free State Project reference number: FSP/EIA/0000063/2016	

Renewable energy power project near Stanger: Gledhow Sugar mill, KZN Project reference number: 14/12/16/3/3/3/67
Agricultural Sector
Development of 5 chicken houses near Jan Kempdorp, Nedersetting B382, Phokwane LM, Northern Cape. Project Reference number: NC/BA/20/FB/PHO/JAN/2015
Alteration of natural and transformed land (old lands) for agricultural use on portion 2 of Herculina 155 UJ: Hectorspruit area, Mpumalanga. Project reference number: 1/3/1/16/1E44
Construction of an abattoir for Bridgeway butchery on erf 2648 Tzaneen Extension 40, Limpopo. Project reference number: 12/1/9/1 - M125
Construction of Benade abattoir on the remaining portion 1 of the farm Benadeplaats 93, JO, Mahikeng LM, North West. Project reference number: NWP/EIA/44/2016
Proposed Establishment of 40 000 broiler and 1 500 slaughtering facilities at Bantu Bonke Community, Gauteng. Project reference number: GAUT 002/15-16/E0179
Poultry farming at Portion 5 of the farm Steenkoolspruit 302, JR Mpumalanga. Project Reference number: 1/3/1/16/1N - 78
Energy Sector
Coega Wind Farm, Eastern Cape Province Project reference number: 12/12/20/3/3/2/2085

Sasol Commercial 75W PV near Lephalale, Limpopo Province Project reference number: 14/12/16/3/3/302
75MW PV, Naledi Local Municipality – NW Province Project reference number: 14/12/16/3/3/2/390
Sasol Commercial 75W PV/CPV near Upington, Northern Cape Province Project reference number: 14/12/16/3/3/2/336
Wheatland Urban Solar Farm – 9.3 MW, Gauteng Province Project reference number: Gaut 002/17-18/E0062
Maralla Wind Farm, North of Laingsburg, Northern Cape Province Project reference number: 14/12/16/3/3/2/963
Housing Sector
Construction of Staff Accommodation and Associated infrastructure within the Barberton, Mpumalanga DEA Reference: 14/12/16/3/3/1/1575
Township Establishment extension of Boipela, Taung Local Municipality, North West Province, September 2016 (Application, BAR – March 2017) NWP/EIA/42/2016
Proposed Development in the Farm Rietfontein, Ekurhuleni, Gauteng – Palm Ridge Mega housing project Gaut 002/15-18/E0260
Proposed Residential Development on Plot 10 Spitskop Small Holdings 2671, Bloemfontein, Free State Province EMB/27/16/19
Proposed Development of Coolbreeze Ext 1, Ekurhuleni, Gauteng, March 2010 Gaut 002/09-10/N0242
Proposed Bardale Village on Erven 20733 and 7584 in Blackheath, Western Cape, July 2007 E12/2/3/2-A4/46-0455/07
Mining Sector

Springboklaagte Mine Project reference number: 17/2/3GS-109
Overlooked Colliery Project reference number: 17/2/3GS-201
Underground manganese ore mining Project reference number: NC/EIA/10/JTG/GA/MAM/2013
Koornfontein Opencast Project reference number: 17/2/3N-245
Eyethu Coal Pty(Ltd) Kromdraai North Colliery Opencast Project reference number: 17/2/3N-410
Construction of surface infrastructure at the Nokhule colliery, Ogies Area, Mpumalanga province Project reference number: 17/2/3N-334
Tourism Sector
Dawid Kruiper Rest camp in the KGNP Project reference number: 14/12/16/3/3/1/1826
Development of Infrastructure and visitor accommodation at Nooitgedacht Nature Reserve, Mpumalanga (14/12/16/3/3/1/686)
Construction of Modern Education Centre and Self-Catering Dormitories and associated infrastructures and structures in Mphaphuli Nature Reserve, Thulamela Municipality, Limpopo (LIM/EIA/0000315/2017)
The Upgrade of the Kraalbaai Day Visitors Facilities situated within the West Coast National Park, Saldanha Bay Local Municipality in the Western Cape Province 14/12/16/3/3/1/1747
Proposed Shangoni Gate Development within the Kruger National Park, Limpopo Province (14/12/16/3/3/1/1730)

Proposed Establishment of the Zuurberg Peace Memorial in Addo Elephant National Park, Eastern Cape (EA166858 14/12/16/3/3/1/1758)