Evaluating the effectiveness of non-conformance reporting systems of ISO 14001 certification auditing in South Africa: A certification body's perspective

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PREFACE

This mini-dissertation is submitted in partial fulfilment of the requirements for the degree Masters in Environmental Management at the Potchefstroom Campus of the North-West University.

In my experience both as a Senior Environmental Officer for an organisation and as an auditor in training; verification, in this case, certification auditing, can add value to an organisation if carried out in an effective manner. Verification aids an organisation to identify gaps and address them in order to enhance their environmental performance. I was also cognisant that controversy exists internationally and in South Africa, regarding the need for certification, the quality of certification auditing and whether it truly enhances environmental legal compliance. As the non-conformance reporting identifies the gaps that need to be addressed and initiates the action taken to address them, this step in the processes is key to certification auditing. This, therefore, sparked the initiation of the Masters research in 2017 and has led to a search for knowledge on the effectiveness of the non-conformance reporting systems of ISO 14001 certification auditing in South Africa. The research was undertaken from a certification body's perspective in that the non-conformance reports were obtained from a selected certification body and were evaluated against developed criteria in order to determine the effectiveness of the non-conformance reporting systems of ISO 14001 certification auditing in South Africa.

The research was conducted under the supervision of Dr Claudine Roos in the Faculty of Natural and Agricultural Sciences and Prof Jan-Albert Wessels, between January 2017 and Jan 2019.

The mini-dissertation consists of the following chapters and sections as prescribed by the NWU's Manual for Master's and Doctoral Studies (2016);

- Title Page
- Preface and Acknowledgments
- Abstract
- Table of Contents
- List of Acronyms
- Chapter1: Introduction: Background, research rationale, research aim, objectives and structure
- Chapter 2: Literature review
- Chapter 3: Research design and methodology

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- Chapter 5: Conclusions and recommendations
- Bibliography

First and foremost, I would like to thank and praise God for his guidance in completing the research. I would like to thank both my supervisors, Dr Claudine Roos and Jan-Albert Wessels respectively, for their time and effort invested into supporting me during this research period. I would also like to thank the Certification Body that supplied me with the data, making the research possible. Furthermore, I would like to thank both my family and friends for their support throughout my Masters research.

ABSTRACT

Internationally, a call for research has been made to study third-party certification auditing (Albersmeier *et al.*, 2009; Castka *et al.*, 2015; Heras-Saizarbitoria & Boiral, 2013; Lal, 2004). In South Africa, legal non-compliance from prestigious organisations has led to a waning in the trust of ISO 14001 as a voluntary self-regulatory tool (Craigie *et al.*, 2009; Nel & Wessels, 2010). Across various industries worldwide, scandals in the auditing profession have led to adverse perceptions about auditing (Dimitriu, 2017; Harney, 2005). Furthermore, the quality of non-conformance reporting and follow-up has come into question (Henderson & Gallagher, 2008; Kumar, 2016; Sweeney & Pierce, 2015). As management system auditing activities are similar in nature across various sectors, concerns relating to non-conformance reporting and follow-up may exist in the environmental management system (EMS) auditing as well. The quality of non-conformance reporting plays a major role in the auditing process. Undermining the value of non-conformance reporting may lead to the whole auditing process' value being negated (Birkmire *et al.*, 2007; Tam *et al.*, 2006). The study, therefore, evaluated the effectiveness of the non-conformance reporting systems of EMS (ISO 14001) certification auditing in South Africa from a selected Certification Body's perspective. As "effectiveness" is something that works as intended (Pölönen *et al.*, 2011; Sadler, 1996), the non-conformance reporting systems' intent, as deduced from ISO 14001 (2015), is to identify a non-conformance and take action to eliminate the cause of the non-conformance including the prevention of recurrence.

One-hundred and two (102) non-conformance reports, consisting of audit reports and corrective action plans, of forty-seven (47) clients across various industries were obtained from the selected certification body and evaluated. A scoring model (Glasson & Therivel, 2011; Lee *et al.*, 1999) (where alphabetic scores are assigned based on qualitative criteria) was used to evaluate and categorise non-conformance reports. According to the scoring model, criteria rated as A-C is regarded as a satisfactory, which, in the case of this study, is synonymous to *effective*. The results showed that overall 93% of the non-conformance reports were deemed to be satisfactory, of which 39% received the best performance grade (A-B). The remaining 54% graded a C-score which is indicative of "just satisfactory" despite inadequacies and/or omissions. The study also highlighted areas of weakness that require addressing, with the weakest area being the effectiveness of the acceptance of the root cause analysis. 77% of non-conformances reported, scored an unsatisfactory rating (D-F) due to the root cause, in some instances, only the corrective action plan, being accepted by the certification body without the

root cause analysis. The research furthermore discusses the strengths and weaknesses and providing recommendations for improvement.

Keywords: ***ISO 14001:2015 auditing, Certification Bodies, Effectiveness of non-conformance reporting, ISO standards, Major Non-Conformances, Minor-Non-conformances.***

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CAP	Corrective Action Plan
EIA	Environmental Impact Assessment
EIR	Environmental Impact Reporting
EMS	Environmental Management System
IAF	International Accreditation Forum
IPC	International Personnel Certification Association
ISO	International Organization of Standardization
KPA	Key Performance Area
KPI	Key Performance Indicator
NCR	Non-Conformance Reporting
NEPA	National Environmental Policy Act
NWU	North West University
RCA	Root Cause Analysis
SAATCA	South African Auditor and Training Certification Authority
SACCQA	South African Committee for the Certification of Quality System Auditors
SANAS	South African National Accreditation System

CHAPTER 1 INTRODUCTION

Chapter One introduces the background and rationale of the study, furthermore, outlining the aim and objectives of the study. The chapter concludes with the structure of the mini-dissertation to provide the reader with a framework of this document.

1.1 Background

The following sections provide background to role players in management system certification auditing, and the problem related to the effectiveness of non-conformance reporting and follow-up of third-party certification auditing.

1.1.1 The International Organization for Standardization (ISO)

The International Organization for Standardization (ISO) was established in 1947 to create standardised international guidelines with their name ISO derived from the Greek word "isos" meaning "equal (Latimer, 1997). Contrasting standards create barriers for trade, creating a disadvantage for some and an advantage for others (Martincic, 1997). In an ever-changing environment, organisations rely on each other and foreign partners greatly for business, wealth, socio-economic change and environmental concerns, highlighting the essential need for International standards (Kaziliūnas, 2008). A number of studies have been conducted on the benefits of conforming to standards (Castka *et al.*, 2015; Chang & Lo, 2005; Heras-Saizarbitoria & Boiral, 2013; Iatridis & Kesidou, 2018; International Organization for Standardization, 2014; Tarí *et al.*, 2012) with the main benefits being; a competitive advantage, providing confidence to consumers and also aiding compliance with regulations such as environmental, health and safety legislation. Drawbacks have also been highlighted in that ineffective implementation of the standards such as; adopting it in a symbolic (conformance) based manner rather than substantive (performance) based manner, which reduces the benefits of conformance to standards (Heras-Saizarbitoria *et al.*, 2013; Vílchez, 2017). Further issues include inter alia issues with non-conformance reporting (NCR) and closing out of non-conformances (Henderson & Gallagher, 2008; İNCE, 2016; Kumar, 2016).

1.1.2 The International Accreditation Forum (IAF)

The International Accreditation Forum (IAF) is the world association of Conformity Assessment Accreditation Bodies and other bodies interested in conformity assessment in the fields of management systems and other similar programmes of conformity assessment (International Accreditation Forum, 2017). The IAF has the function of developing a single worldwide program

of conformity assessment which reduces the risk for business and its customers by assuring them that accredited certificates may be relied upon (International Accreditation Forum, 2017). The IAF requires Accreditation Bodies that are members as well as certification bodies that they accredit, to conform to international standards (International Accreditation Forum, 2017). The IAF, therefore, govern certification bodies, thereby ensuring that auditing activities, such as non-conformance reporting and follow up, are performed effectively.

1.1.3 Certification bodies

Certification bodies issue accredited certificates and are guided by the ISO 17021 standard named “Conformity assessment- Requirements for bodies providing audit and certification of management systems”. These bodies also ensure that auditors carry out the verification process in line with the ISO 19011:2018 standard termed “Guideline for auditing management systems”. Certified auditors assure conformance to international standards and follow the ISO 19011:2018 standard’s auditing process rigorously (Kaziliūnas, 2008). Certification auditors indirectly link to the development, implementation, maintenance and improvement of these international standard (Kaziliūnas, 2008). Robinson and Shewitz (2014) mention that these auditors should have the necessary competency and adhere to auditing principles to perform certification auditing activities effectively on international standards such as ISO 14001 “Environmental management systems – Requirements with guidance for use”. The effectiveness of non-conformance reporting and follow up is influenced by the standards, the certification bodies and third-party auditors, making them an integral part of the process.

1.1.4 ISO 14001 certification

The EMS (ISO 14001) International Standard aims to “provide organisations with a framework to protect the environment and respond to changing environmental conditions in balance with socio-economic needs” (ISO, 2015a). It specifies requirements that enable an organisation to achieve the intended outcomes it sets for its environmental management system” (ISO, 2015a).

The ISO survey of 2017 showed that a total of 358 953, ISO 14001 certificates had been issued worldwide, of which 1 230 were issued in South Africa (ISO, 2017). South Africa has adopted the SANS 14001:2015, which is an approval of the ISO 14001:2015 standard in line with the South African Bureau of Standards. SANS 14001:2015 is an identical, authorised implementation of ISO 14001:2015, which complies with Annex 3 of the World Trade Organisation agreement (SABS, 2015) of which several countries, including South Africa, are signatories (SABS, 2018). The South African Bureau of Standards, therefore, sets the precedence of standards in South Africa.

1.2 Research Rationale

Internationally a call for research was made by Lal (2004) on third-party certification bodies and by Heras-Saizarbitoria *et al.* (2013) for studying audits by third parties. As stated by Castka *et al.* (2015), despite this call for research, "little attention has been given to the subject". Albersmeier *et al.* (2009) stated that; "Only a few studies can be found questioning the trustworthiness of third-party certification". The problem in South Africa is that environmental legal non-compliance by prestigious certified organisations in the past, have led to a waning in the trust and merit of ISO 14001 certification as a self- governance instrument (Craigie *et al.*, 2009; Nel & Wessels, 2010). Apart from the waning in the trust of ISO 14001, scandals in the Chinese textile industry (Harney, 2005) and financial auditing industry has led to "adverse perceptions about the audit profession" both internationally and in South Africa (Dimitriu, 2017).

Internationally, a rich body of research exists focused on the financial industry with regards to audit "quality threatening behaviour" (Herrbach, 2001) and it includes behaviour such as sample selection bias, sample size reduction and the acceptance of weak explanations from the clients (Sweeney & Pierce, 2015). Concerns have been raised regarding the quality of non-conformance reporting and weaknesses have been identified in the way that non-conformances have been formulated (Henderson & Gallagher, 2008; Kumar, 2016). Along with the concerns of non-conformance reporting quality, financial auditing research highlighted that appropriate mechanism for audit follow are not followed and that auditors tend to have little concern regarding audit follow up (İNCE, 2016). As management system auditing activities are similar in nature across various sectors, the concerns relating to non-conformance reporting and follow-up may exist in the environmental management system (EMS) auditing as well. The international gap pertaining to certification auditing research, the South African problem of waning trust in ISO 14001 certification, as well as concerns regarding the effectiveness of the non-conformance reporting systems, makes evaluating the effectiveness of the non-conformance reporting systems of certification auditing in South Africa worthwhile.

1.3 Effectiveness defined

The term "effectiveness" can be defined as something that works as intended and achieving the outcome(s) for which it was designed. In other words, a procedure is followed (Pölönen *et al.*, 2011; Sadler, 1996). As deduced from ISO 14001:2015, the overall purpose of non-conformance reporting is to identify a non-conformance and take action to eliminate the cause of the non-conformance, including the prevention of recurrence. The effectiveness of non-conformance reporting and close out can, therefore be broken up into the following areas:

- Quality of the non-conformance statement;
- The effectiveness of root cause analysis;
- The effectiveness of corrective action; and
- Follow-up of corrective action effectiveness.

This research carefully and systematically searches for knowledge on the effectiveness of the non-conformance reporting systems of ISO 14001 certification auditing, with a focus on a South African Certification Body.

1.4 Research Aim and Objectives

In light of the problem statement above the aim of the research is:

To evaluate the effectiveness of the non-conformance reporting systems of ISO 14001 certification auditing in South Africa, from a certification bodies perspective.

In support of the aim of the research, the following two objectives are set:

1. To understand the need for standards such as ISO 14001, the implications of not conforming to standards, and the requirements of effective non-conformance reporting systems.
2. To critically appraise the effectiveness of a non-conformance reporting system of a Certification Body.

1.5 Structure of the mini-dissertation

The structure of the mini-dissertation is imperative as structuring the document in a logical sequence introduces the reader to the context in a systematic manner making them open to the new ideas and conclusions that the reader will be exposed to (Evans *et al.*, 2011).

The structure of the mini-dissertation was compiled as displayed in Figure 1-1 below. The structure serves as a logical sequence as recommended by Leedy and Ormrod (2005), Hart (2018), Evans *et al.* (2011) and the North-West University (2000) to connect the data to the research aim, the supporting objectives and ultimately to the conclusions.

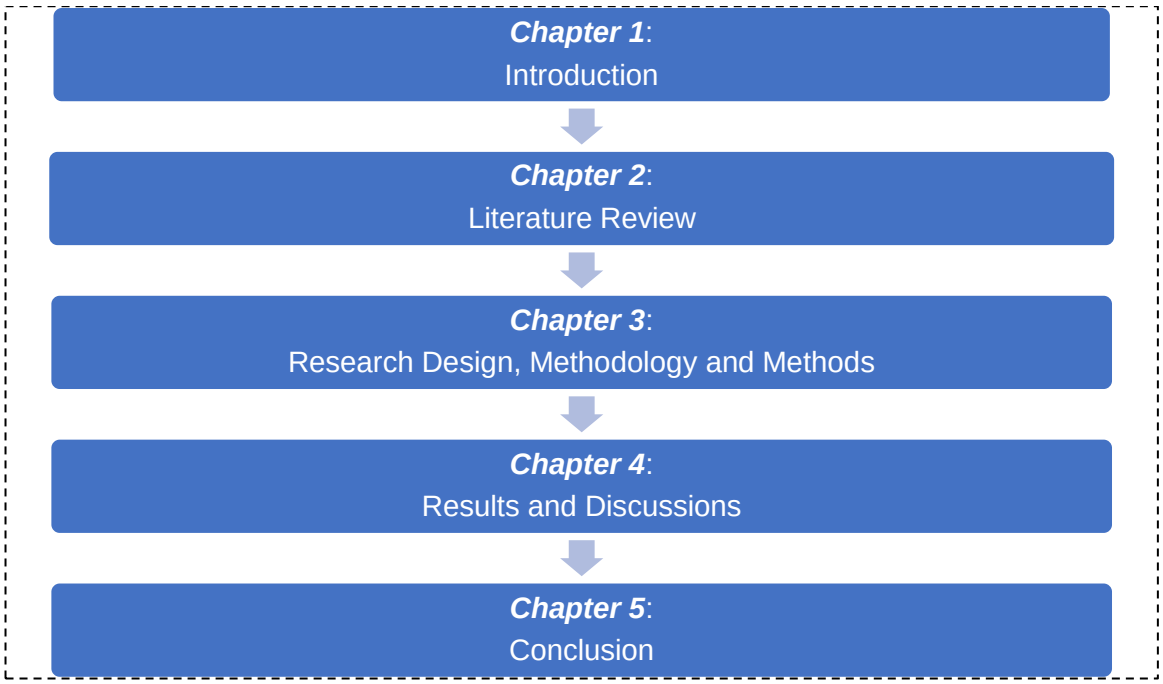


Figure 1-1: Structure of the mini-dissertation

This mini-dissertation comprises of five sections: An introduction, Chapter One (this chapter) which introduces the research problem, background and rationale of the study.

Chapter Two comprises of a literature review concluding on the three elements of the first objective set out above. This chapter establishes the standard principles that constitute effective non-conformance reporting, allowing for criteria to be established and packaged in a tabular format in order to conduct the review.

Chapter Three highlights the design, methodology and methods of the research. The design, methodology and methods of research chosen are credible methods, adding credibility to the research conducted.

Chapter Four delves into the results obtained from the research analysis. The review package developed from the literature (Chapter Two) is used in a method similar to Lee *et al.* (1999) and Glasson *et al.* (2005), to determine the effectiveness of the non-conformance reporting systems of ISO 14001 certification auditing in South Africa, utilising data obtained from a certification body. Each key performance indicator's (KPI) result is firstly deliberated, thereafter each key performance area (KPA) was discussed and lastly, drawing up in the hierarchy, a discussion was held focussing on the overall effectiveness of the non-conformance reporting system. The chapter then concludes on the strengths and weaknesses of the review.

Finally, Chapter Five provides a fundamental conclusion on the results obtained from the developed criteria and what was learnt from the research.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

The literature review is aimed at advancing the understanding of the need for standards such as ISO14001, ISO 17021 and ISO 19011, the implications of not conforming to standards and the requirements of effective non-conformance reporting systems. The research furthermore delves into methods to evaluate effectiveness in other fields of research to aid in developing criteria from the principles and guidelines underpinning the practice of non-conformance reporting systems.

2.2 Understanding standards and their need

Auditing is essentially “truth” finding or verification of the truth. In order to understand the workings of non-conformance reporting, we need to understand the evolution of standards such as ISO 14001 (the “truth” against which organisations are certified), the importance of standards, the process followed to obtain certification; including the process of non-conformance reporting and the factors influencing the reporting process.

2.2.1 The need for ISO 14001

The International Organization for Standardization is the world’s largest developer and publisher of standards comprising of 161 national standards bodies, consisting of one member per country. The Central Secretariat is situated in Geneva, Switzerland (ISO, 2018a). They are responsible for developing the standard to which auditing and non-conformance reporting is performed (which is ISO 17021 and ISO 19011), as well as the standard, in this case, ISO 14001 against which conformance is measured (also referred to as the audit criteria).

Environmental concerns sparked the need for environmental management systems (EMSs) leading to emerging international environmental standards. Due to these emerging international environmental standards and the ISO 9001 - Quality Systems Management standard becoming widely accepted, ISO decided to develop an international environmental standard and released ISO 14001 in 1996 (The British Assessment Bureau, 2017). The ISO 14001 International Standard aims to “provide organisations with a framework to protect the environment and respond to changing environmental conditions in balance with socio-economic needs” (ISO, ISO, 2015a). It specifies requirements that enable an organisation to achieve the intended outcomes it sets for its environmental management system” (ISO, ISO, 2015a) and is, therefore, the measure of conformance.

The 2004 revision of ISO 14001 made its introduction in South Africa in 2005 (Nel, 2017). This revision change was mainly an alignment with its forefather standard, ISO 9001, with no added requirements or text. Thereafter the third revision of the ISO 14001 standard was released in 2015 with substantial changes as it was published nineteen years later (CEM, 2016b). South Africa had voting status as a member of the international working team, tasked with producing the revision (CEM, 2016b). The process followed for the review was called the '"future challenges" of ISO 14001 with the aim of identifying and defining precisely how and to what degree the sixteen-year-old standard should be aligned with present and reasonably predictable forthcoming developments in the environmental management field (CEM, 2016b).

As Vílchez (2017) stated, several studies had been conducted on the benefits of conforming to ISO 14001 such as; statutory and regulatory compliance (ISO, ISO, 2015b), organisational benefits which *inter alia* include; stakeholder involvement (Castka *et al.*, 2015; Heras-Saizarbitoria & Boiral, 2013), a competitive advantage (Delmas, 2001), commercial benefits (Iatridis & Kesidou, 2018), encouraging the enhancement of suppliers environmental performance (ISO, ISO, 2015b), and improvement of corporate reputation (Jiang & Bansal, 2003).

Studies have also been conducted on the drawbacks of ISO 14001 in that it is adopted in a symbolic (conformance) based manner rather than substantive (performance) based manner, which Heras-Saizarbitoria *et al.* (2013) supported. The absence of a clear outlining of environmental performance in standards leads to the environmental management system itself becoming the only available "fact" to be audited (CEM, 2016a). Therefore, the quality of control systems becomes the auditor's prime focus (CEM, 2016a). ISO recognised this as part of the themes that needed to be addressed in the 2015 revision of ISO 14001 and therefore aimed to remove this challenge by migrating the standard to a performance-based standard rather than conformance based (CEM, 2016a). The anticipation, therefore, is that the auditor's focus will also shift from auditing the management system as the only "fact" to environmental performance and therefore a shift in non-conformance reporting is also expected.

Since its introduction in 2005, 1 230 (0,34%) of the 358 953 ISO 14001 certificates issued worldwide have been issued in South Africa. (ISO, 2017).

2.2.2 ISO certification process

Due to a similar process for obtaining ISO certification as well as management systems' framework and structure resemblances, studies pertaining to certain standards may serve as a basis for other management systems (Castka *et al.*, 2015; Heras-Saizarbitoria & Boiral, 2013).

A wide variety of auditing methods exists and are dependent on the audience and their needs (Figure 2-1). Some literature argues that financial auditors perform the “best” audits. Cook *et al.* (2016), however, argued that “environmental auditing is a special case, because it is often difficult to assess improvements in environmental quality in specific sites on the basis of generic standards and criteria, and even more difficult to demonstrate that these improvements are the result of specific measures.”

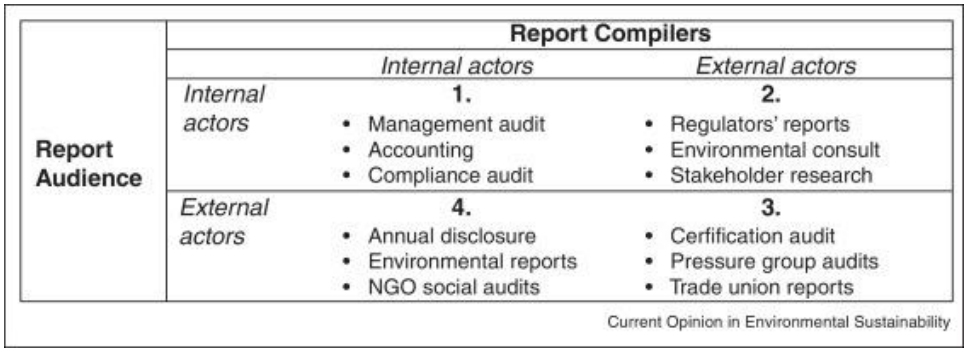


Figure 2-1: Types of audits (Cook *et al.*, 2016)

ISO 14001:2015 defines an “audit” as “systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled”. An effective audit would be an audit conducted

- Independently - The auditor does not audit their own work;
- Objective – Fact-based and not opinion based;
- Regular – Frequency applicable to the scale and hazard;
- Systematic – Scheduled to ensure no process is overlooked; and
- Documented - Audit findings should be in writing and the findings should be well formulated (Campos *et al.*, 2015).

2.2.2.1 Certification audit cycles

Certification audits are conducted over a three-year cycle (Nel *et al.*, 2017). The first audit is known as the certification audit and consists of Stage 1 and a Stage 2 audit (Nel *et al.*, 2017). During the Stage 1 audit, the processes that are in place in order to achieve conformance to the standard, are verified and findings are given to the auditee; including recommendations for improvement (Nel *et al.*, 2017). ISO 19011:2018 defines audit findings as; “results of the evaluation of the collected audit evidence against audit criteria”. The Stage 2 audit looks at the conformance to the processes set out to achieve conformance to the standard, therefore, implementation of the processes (Nel *et al.*, 2017). Should certification be granted, the following

two audits are surveillance audits that verify conformance to requirements (Nel *et al.*, 2017). Thereafter the cycle is repeated, and a recertification audit is conducted (Nel *et al.*, 2017).

2.2.2.2 Non-conformance reporting process

The non-conformance reporting process is generic across the board despite some differences regarding timelines (Russell, 2006). ISO 14001:2015 defines *non-conformance* as "a non-fulfilment of a requirement".

A finding is identified by the auditor whilst performing the audit and is verbally communicated to the auditee (Nel *et al.*, 2017). During the audit team meeting the findings are discussed and graded where the lead auditor has the final decision on the grading, should conflicts exist within the audit team (Nel *et al.*, 2017). Non-conformances are documented and communicated to the organisation during the closing meeting for acceptance (Nel *et al.*, 2017). The organisation may appeal if they do not agree with the non-conformances raised (Nel *et al.*, 2017). The audit report contains all findings and evidence is recorded in an audit report, which is supplied to the organisation in less than a month after the audit (Nel *et al.*, 2017).

The non-conformances raised during the audit are graded as either major or minor. ISO 17021:2015 classifies non-conformances as major "if there is a significant doubt that effective process control is in place, or that products or services will meet specified requirements; — a number of minor nonconformities associated with the same requirement or issue could demonstrate a systemic failure and thus constitute a major non-conformance." It also further states that non-conformances can be classified as minor if it "does not affect the capability of the management system to achieve the intended results."

If major non-conformances arise during the certification audit, a follow-up visit is booked with the client whereby a corrective action plan is submitted to the certification body. ISO 14001:2015 defines a corrective action as "action to eliminate the cause of a non-conformance and to prevent recurrence". The follow-up visit is then carried out to determine the effectiveness of the corrective action and if it is found to be satisfactory;, the certification decision process is initiated, whereby certification is granted. In the event that the corrective action is found to be ineffective; the certification decision process is initiated, whereby the certification could be suspended or withdrawn.

If minor non-conformances are raised, a corrective action plan should be submitted to the certification body. The timeframe stipulated for submission of the corrective action plan is usually 5 days but can be extended based on the complexity of the non-conformance. The

certification body reviews the corrective action plan submitted and if found acceptable initiates the certification decision process whereby certification is granted. The effectiveness of the corrective action is verified at the next visit which would be the following audit should no major non-conformances arise, in which case a follow-up visit is required as stipulated above.

The process followed during the surveillance audit is similar, however, when the effectiveness of the corrective action is verified at the follow-up visit for major non-conformances and found to be effective, the cycle continues. If the corrective action is verified at the follow-up visit for a major non-conformance and found to be ineffective; the same route is followed as in the certification audit, whereby the certification could be suspended or withdrawn

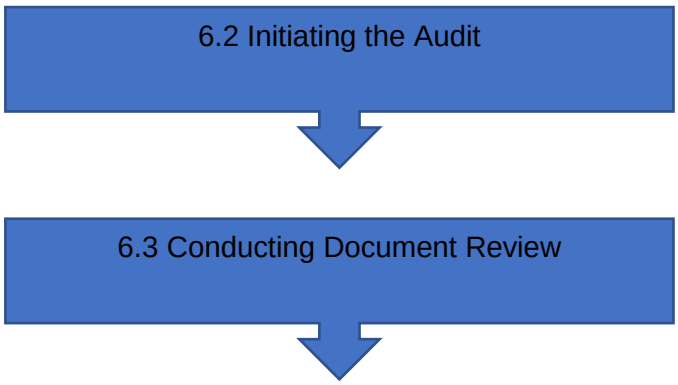
An international call for research on third-party certification bodies (Lal (2004) and third-party audits was made Heras-Saizarbitoria *et al.* (2013). Castka *et al.* (2015) stated that despite this call for research "little attention has been given to the subject".

2.2.3 The need for auditing standards - ISO 17021 and ISO 19011

Conducting audits are complex and the difficulties of conducting audits increases (Kaziliūnas, 2008). The interpretation of requirements for certification may differ from one certification body to another as well as from one auditor to another (Kaziliūnas, 2008), which furthermore highlights the need for a standardisation of the auditing process by means of standards, such as ISO 17021 and ISO 19011. The process of auditing conformance to ISO 14001 is elastic, and auditors interpret and apply standards differently leaning towards a consultancy base (Heras-Saizarbitoria *et al.*, 2013). For audits (of which non-conformance reporting forms part) to be conducted effectively, competent auditors are required that can carry out audits in line with standards.

2.2.3.1 Audit activities

The typical audit activities as stipulated by ISO 19011:2018 are highlighted in Figure 2-2.



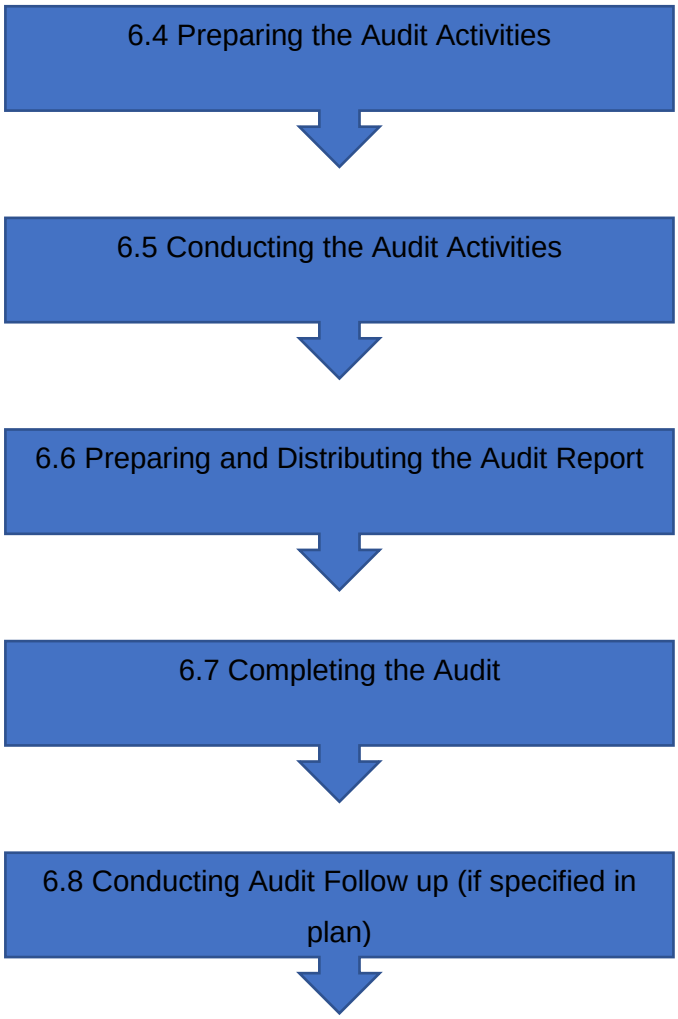


Figure 2-2: Typical Audit activities (ISO, 2018b)

Auditing activities aid an organisation to control the performance of its strategic and operational activities (Tam *et al.*, 2006). A study conducted in Brazil indicated that the performance indicators most used by companies related directly to legal requirements, as it is an obligation to adhere to laws (Campos *et al.*, 2015). The audit activity; non-conformance reporting; which includes adherence to legal requirements, is a key performance indicator that is used by most of the organisations certified to ISO 14001 (Campos *et al.*, 2015) and it provides useful information regarding the performance of an organisation (Tam *et al.*, 2006). Through monitoring non-conformances, an organisation is able to determine aspects of its performance (Tam *et al.*, 2006). Well-formulated findings contribute to how effectively an audit is conducted and highlights the importance of effective non-conformance reporting (Zutshi & Sohal, 2002). The key to effective third-party audits, therefore, depends on how well these activities are performed. A tremendous amount of effort is placed on preparing and conducting the audit, however, the value is negated if the loop is not closed through audit follow-up and the effectiveness of the audit is limited (Birkmire *et al.*, 2007).

2.2.3.2 Competence of auditors and principles of auditing

International trends emphasised the importance of competence instead of training/education of personnel performing the audits (Robinson & Shewitz, 2014).

ISO 19011:2018 guides auditors and lists the following as the principles of auditing:

a) Integrity,
b) Fair presentation,
c) Due professional care,
d) Confidentiality,
e) Independence,
f) Evidence-Based approach.

These principles along with the “EHS Auditor Competency Framework” clearly indicate that technical expertise is not the only competence requirement for conducting audits, therefore highlighting the need for accreditation bodies who accredit certification bodies and bodies who certify auditors, as they influence how effectively non-conformances are reported.

The International Register of Certificated Auditors (IRCA), founded in 1984, is the international body certifying auditors ensuring customers that competent auditors can be relied upon (International Register of Certificated Auditors, 2018) in order to effectively report non-conformances. The need for a framework under which the quality management system could be audited In South Africa sparked the existence of the South African Auditor and Training Certification Authority (SAATCA) in 1986 (SAATCA, SAATCA, 2019) who now also focus on multiple disciplines, such as environmental management systems.

A link between auditor quality, the manner in which organisations implement their management system and the benefits received from conforming to standards, becomes evident to the author. Certification bodies are chosen based on the organisation's trust in their abilities and apart from their reputation the methods in which they conducted the audits also played a large role McDermott (2012). Kaziliūnas (2008) identified that the quality management systems value is dependent on its implementation and leadership style, therefore it should be thoroughly adapted to the standard and not just be an adoption of the current system. External auditors have an effect on both operational and market benefits through affecting the quality of ISO 9001 implementation which could be extrapolated to other standards (Castka *et al.*, 2015; Heras-Saizarbitoria & Boiral, 2013; Kaziliūnas, 2008). This highlights the importance of high quality third-party auditors in order to effectively report on non-conformances.

2.3 Implications of non-conformance to auditing standards

The following sections highlight the implications of not conforming to the principles for auditing as set out by ISO 19011 and ISO 17021.

2.3.1 Non-conformance to auditing principles

Integrity as defined by ISO 19011:2018 is the “foundation of professionalism”, therefore conducting audits in a professional manner. Both ISO 19011 and ISO 17021 highlight professionalism, fair representation and impartiality as the guiding principles of auditing. Non-conformance to these standards would, therefore, be not adhering to these fundamentals of auditing and the implications thereof will now be discussed.

2.3.1.1 Auditor independence

ISO 19011 defines Independence as one of the principles of auditing. The topic of objectivity is however sensitive as independence is viewed as a basis of the ethical foundations of various verification fields (Everett *et al.*, 2005; Hong-Lin & Shore, 2003). Some literature suggests that the social practice of auditing is far from neutral (Dogui *et al.*, 2013; Power, 1991) and that the remuneration model on the auditors posed a threat to impartiality (Boiral & Gendron, 2011; Dogui *et al.*, 2014). The seeming faith in the statement of independence that participants in Dogui *et al.* (2013) study highlighted; was supported through distancing, storytelling, stereotyping and procedural mechanisms driven by the principles of independence. Literature viewed objectivity/neutrality as a given or a norm of good auditing, (Dogui *et al.*, 2013; Sugiura *et al.*, 2012; Ungureanu, 2012). A small part of the literature was concerned with how objectivity/neutrality is used; that auditors cannot remain removed from the situation, but that the results should reflect as neutral and concluded that even though auditing information is seen as objective it is in actual fact the practices that are objective or neutral (Eden, 2008; McDermott, 2012; Pentland, 1993).

Issues regarding auditor independence have been identified in both financial and ISO certification auditing. Boiral and Gendron (2011) stated that auditors have the tendency to act as consultants involved in a supplier-customer kind of relationship. A well-known case in South Africa relates to the KPMG scandal where they stood accused of aiding the Guptas, their client, in falsifying financial statements and evading tax. Heras-Saizarbitoria *et al.* (2013) furthermore showed that in the field of ISO 14001, consultancy does occur which damages the impartiality of the auditors. The concerns relating to impartiality has also been highlighted by the

International Organization for Standardization, and certain auditors with concerns about ISO certification credibility (Network Business Improvement, 2002; Paterson, 2002).

Acts of not being impartial as stipulated by ISO 19011, undermine the “integrity” gained through ISO 14001 certification auditing as well as the “integrity” of certification bodies, as it leads to reputational damage. The corruption scandal of KPMG is evidence of these implications as it had led to a loss of 20 South African listed audit clients since the start of 2017 (Marriage, 2018).

2.3.1.2 Fair representation

As auditing is defined as a “systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled’ (Domingues *et al.*, 2011; International Organization for Standardization, 2018b) the fulfilment of the audit criteria is the “truth” that auditors verify. Albersmeier *et al.* (2009) stated that; “Only a few studies can be found questioning the trustworthiness of third-party certification.”

Events brought to light was that third-party auditors accepted incentives to falsify or shade their reports, corrupting information and reporting untruthfully which undermined regulation in order to sustain a business (Duflo *et al.*, 2013). Examples of such events include; untruthful reporting in the; financial auditing industry (Dimitriu, 2017; Greising, 2002; King Jr, 1999; Levitt, 2000; Loomis, 1999; MacDonald, 2000), Chinese textile industry (Harney, 2005) and compliance industry (Hill, 2015; Oxebridge Quality Resources International, 2017).

Duflo *et al.* (2013) conducted a two-year field experimental study in India of how incentives affected the truth-telling of third-party auditors specifically focused on environmental pollution. Three key findings arose in that audit reporting was corrupted and 29% of auditors falsified reports below the regulatory standards, mostly just below the standard as to not attract suspicion (Duflo *et al.*, 2013). The treatment caused more truthful reporting and showed that treatment plant auditors reported 50%-70% higher than control auditors. Lastly, plants reduced their pollution readings probably because they knew results would be reported truthfully (Duflo *et al.*, 2013).

The problem of auditors reporting untruthfully due to poor incentives exists in all markets of third-party auditing as auditors worldwide are paid via their clients (Duflo *et al.*, 2013). Auditors can be influenced to stay impartial via incentives to report truthfully and because of the fear of being decertified (Duflo *et al.*, 2013). The benefits of truthful reporting justify the means of the cost (Duflo *et al.*, 2013). Regulators can use back checks to monitor third-party auditors and

ensure truthful reporting. Even though the experiment was aimed at a single market, research suggested that it could be used in various countries and probably yield the same results, increasing the value of the experiment (Duflo *et al.*, 2013).

Non-conformance/untruthful reporting leads to ineffective auditing and the quality of audits being compromised. This furthermore leads to a waning in the trust of certification bodies and auditors verifying conformance to standards.

2.3.1.3 Due professional care

Kaziliūnas (2008) pointed out that even with the ISO 19011:2002 standard guiding auditors they still lacked the skills or experience to effectively engage with the organisation and communication between auditors and the customer's stakeholders seemed to be lacking. Communication is key in identifying and formulating findings as well as ensuring that auditees understand the findings especially those relating to non-conformances. Pruett *et al.* (2005) describe third-party certification as a “cat-and-mouse” game between inexperienced and poorly trained auditors and unethical managers, where auditors lacked the skills for effective monitoring. In reality, auditors need to collect verifiable evidence within a given time frame, which highlights the possession of communication skills (Robinson & Shewitz, 2014). As time is limited auditors need to be able to prioritise critical risks, to evaluate and possess knowledge of when to work independently and when to work within a group. Auditors need to be able to effectively communicate with all levels within the organisation, keeping in mind its organisational content, in a manner which puts them at ease but does not compromise its integrity. It would be useful for auditors to go beyond the scope of assessment and also include feedback from external stakeholders (Kaziliūnas, 2008). Auditors could use the “Good Corporation Standard” as an example (Kaziliūnas, 2008).

Apart from technical knowledge, auditors require sufficient training, preparation and sombreness (Heras-Saizarbitoria & Boiral, 2013; Kaziliūnas, 2008; Robinson & Shewitz, 2014). They should possess or develop additional skills to conduct audits successfully and they should have the capability to interface at the top management level (Heras-Saizarbitoria & Boiral, 2013; Kaziliūnas, 2008; Robinson & Shewitz, 2014). Furthermore, effective techniques for auditing should be used, focussing on a process-based approach and taking into consideration the context of the organisation (Heras-Saizarbitoria & Boiral, 2013; Kaziliūnas, 2008; Robinson & Shewitz, 2014). ISO published the ISO 17021-6 - “Conformity assessment. Requirements for bodies providing audit and certification of management systems: Competence requirements for auditing and certification of business continuity management systems” as a guidance document for certification bodies.

Compromising of “professionalism” by auditors would lead to ineffective non-conformance reporting as it forms part of the auditing activities which highlights the link between competent auditors and effective non-conformance reporting.

Despite the improvements in auditing, the debate of credibility and benefits of certification still exist (Kaziliūnas, 2008), which is attributed due non-conformance to both ISO 19011 and ISO 17021.

2.4 Implications of non-conformance to ISO 14001

ISO 14001 defined a non-conformance as “a non-fulfilment of a requirement” As conformance to standards provides various benefits, non-conformance will lead to the negation of these benefits. This furthermore highlights the importance of effective non-conformance reporting in order to effectively address non-conformances for an organisation to achieve the intended outcomes set out by the standard and the organisation.

When looking at the definition supplied by the Oxford dictionary, verification is essentially “truth” finding. Philosophical workings on truth are abundant, however, the debate as to whether the word truth can be defined or not has yet to be settled as previous literature has shown (Norris, 2006; Pritzl, 2010; Schantz, 2002; Wright, 1999). Engel (2002) discussed the main reflections of the literature of analytical philosophers that elaborated on truth and found that truth is connected to the assertion, belief, knowledge and the normative property of our knowledge seeking enquiry and therefore possess substance, but isn’t definable as it cannot be analysed apart from its connections. Martin-Löf (2013) determined that through the implementation of three general laws it was ascertained that if the concepts relating to the question are defined. that it is not possible to have an unanswerable question, unsolvable problems or unpredictable propositions

ISO certification auditors, therefore, have the role of determining the truth/conformance to ISO standards such as ISO 14001 (Wessels, 2015). ISO 14001:2015, furthermore, specifies the intended outcomes as; “enhancement of environmental performance, fulfilment of compliance obligations and achievement of environmental objectives.” As a non-conformance is a non-fulfilment of a requirement, not conforming to the requirements set out in the ISO 14001:2015 standard will jeopardise the achievement of its intended outcomes. This highlights the need for effective non-conformance reporting in order to effectively identify and correct the non-conformance to ensure legal obligations are met and environmental performance is enhanced.

2.4.1 Legal non-compliance

Requirements for ISO 14001 complement legal compliance (Ferguson, 2014) as one of ISO 14001: 2015 intended outcomes is the achievement of legal compliance. Not fulfilling the ISO 14001: 2015 requirements would lead to non-fulfilment of the intended outcome, thus leading to legal non-compliance. Legal non-compliance may lead to authorisations or permits being suspended or withdrawn, or even to financial implications (such as fines) or imprisonment, depending on the severity of the non-compliance (Republic of South Africa, 1998).

In South Africa, fines as big as four million rand have been issued as in the case of Golfview Mining (Pty) Ltd being convicted by the Ermelo Regional Court in Mpumalanga on 17 October 2012 due to numerous contraventions of the National Environmental Management Act, No. 107 of 1998 and the National Water Act, No. 36 of 1998.

2.4.2 Cost of rework

From professional experience, non-conformances identified have led to changes in designs or reworks. Enshassi *et al.* (2017) stated that the cost of reworks related to non-conformance of requirements attributed between 10% and 20% of project costs. Studies exist with regards to the cost of rework due to non-conformances related to the ISO 9001 quality management system (Mastenbroek, 2010; Uma Maheswari *et al.*, 2016). These can be extrapolated to ISO 14001 as the management systems are similar in nature.

2.4.3 Suspension or withdrawal of certification

Section 2.2.2 indicates the accreditation and certification process. As the process is governed overall by the IAF, it is similar in nature across various certification bodies. In the event that persistent or serious non-conformance occurs, certification/accreditation may be suspended or withdrawn depending on the outcome of the decision (BSI, 2015; QMS Certification Services, 2019; South African National Accreditation System, 2018; TUV Nord, 2017).

Organisations experience pressure from stakeholders to obtain ISO 14001 certification due to it giving legitimacy to an organisation (Blackestam & Olofsson, 2013). Withdrawal or suspension of certification could lead to damage in the organisation's reputation.

In South Africa, three prestigious companies certified to ISO 14001:2004, were named by the Green Scorpions (the Environmental Management Inspectorate) as being grossly non-compliant with environmental regulations. This has led to a waning in the trust of ISO 14001 certification.

The various implications relating to non-conformance of standards highlight the need for effective non-conformance reporting. Only through identification of these non-conformances can they be addressed to prevent recurrence and promote improvement.

2.5 Principles of effective non-conformance reporting

ISO standards and best practice highlight what constitutes as effective non-conformance reporting. This can be broken up into four sections respectively; quality of non-conformance reporting, the effectiveness of root cause analysis, the effectiveness of corrective action and the follow up on the effectiveness of the corrective action.

2.5.1 Quality of the non-conformance statement

ISO 19011:2018 states that a non-conformance statement should include “a description or reference to audit criteria, non-conformance declaration, audit evidence, and related audit findings if applicable”. ISO 17021 further requires the non-conformance statement to be graded as as major or minor non-conformance (as explained in Section 2.2.2.2). Based on literature (Henderson & Gallagher, 2008; Liephart, 2017; Russell, 2006; SANAS, 2015); the non-conformance declaration should be clear and concise to be understandable by the organisation and should not require any additional information. The audit evidence should be sufficient and objective and the statement should not be isolated to the incident, but rather to the process/system (Henderson & Gallagher, 2008; Liephart, 2017; Russell, 2006; SANAS, 2015).

2.5.2 The effectiveness of root cause analysis

A *root cause* is the underlying causes of a focus event and not necessarily the immediate or obvious cause as per IEC 62740 (2015). An effective root cause analysis will treat the underlying cause instead of the effect (Motschman & Moore, 1999). The root cause will allow for informed decision-making regarding appropriate actions (IEC, 2015). It should be a structured (ISO, ISO, 2009), systematic approach which includes the following steps: initiation (investigation), establishing the facts (data collection), analysis, validation (root-cause identification) and presentation of results (recommended actions) (IEC, 2015). The systematic process should be backed up by documented evidence (ISO, 2009; Motschman & Moore, 1999). The analysis technique should be justifiable and appropriate; provide results enhancing the understanding of the root cause; be capable of use in a manner that is traceable, repeatable and verifiable. Literature from Tomić and Brkić (2011) supports the criteria.

2.5.3 The effectiveness of corrective action

ISO 14001:2015 states that the corrective action should “eliminate the causes of the non-conformance, in order that it does not recur or occur elsewhere” and furthermore states that it “shall deal with the consequences, including mitigating adverse environmental impacts”. The corrective action “shall be appropriate to the significance of the effects of the nonconformities encountered, including the environmental impact(s)” (ISO, 2015a). Motschman and Moore (1999) supports this and furthermore states that the corrective action should be tested before full implementation.

2.5.4 Follow-up of corrective action effectiveness

According to ISO 19011, the completion and effectiveness of the corrective actions should be verified and the corrective action should take place within a specified timeframe. Motschman and Moore (1999) support this. Although ISO 19011: 2018 specifies that verification of corrective actions may form part of the subsequent audit, personal experience in auditing indicated that the South African National Accreditation System (SANAS) performs random validation checks to determine whether corrective action time frames have been adhered to and as per R 51-08 – “*Suspensions, Reductions, Withdrawals and Re-Instatement of Accredited or GLP/GCP Compliant Organisations*” (SANAS, 2018), and may suspend accreditation if the timeframes were not adhered to. Russell (2006) stipulates that the audit plan should contain the follow-up plan and should be adhered to. As deduced from Sci Qual International (2015), appropriate verification method(s) and timeframe to follow up are essential for effective verification of corrective actions. It will, therefore, be regarded as best practice for the certification body to have a process for audit follow up; including verification frequencies; taking into consideration the agreed timeframes of corrective action implementation and significance of the non-conformance and its consequences. It is, therefore, not just verification at subsequent audits. As deduced from ISO 19011 (2018b) sufficient verifiable evidence should be obtained when verifying information.

Research (IEC, 2015; Sci Qual International, 2015) also indicates a correlation between the effectiveness of the non-conformance statement, the effectiveness of the root cause and the effectiveness of the corrective action.

2.6 Effectiveness review methodology

Extensive research has been done, internationally, over the past two decades relating to quality review of environmental impact reporting (EIR) (Androulidakis & Karakassis, 2006; Glasson *et*

al., 2005; Jalava *et al.*, 2010; Lee *et al.*, 1999). Due to the abundance of literature, the type of research can aid in determining the effectiveness of non-conformance reporting systems as the literature looks at the quality of reports in order to determine the effectiveness of an overall process/system, whilst also relating to the environmental industry. The methods will be discussed in order to aid in deciding on an appropriate method of review for this mini-dissertation.

A review package is the most common methodology used to evaluate the quality of EIRs. The packages are usually structured in a hierarchical fashion, which consists of a series of questions that fall under sub-categories pinned under categories (Sandham *et al.*, 2008). An overall rating is deduced from assigning a grade to each question then moving up to the sub-category and the category (Sandham *et al.*, 2008). Other review methods include project-specific checklists or environmental impact assessment (EIA) compliance legislation checklists (Sandham & Pretorius, 2006; Sutton-Pryce, 2015). The review methods will now be discussed.

2.6.1 The Lee and Colley review package

Lee and Colley developed a four-tier review package in 1989, which was designed specifically to evaluate EIRs in the United Kingdom (Lee *et al.*, 1999). This package is widely adopted as an "International best practice guideline", utilised by regulators, practitioners, NGOs and researchers to assess EIR's against set criteria (Kruger, 2012; Sandham *et al.*, 2008; Sutton-Pryce, 2015). The package is easily adapted to specific countries' legislation or industry and the criteria are clear and concise (Lee *et al.*, 1999; Sandham & Pretorius, 2006). As stated by Lee *et al.* (1999), the Lee and Colley review package has been the basis for several developed review packages.

2.6.2 National Environmental Policy Act (NEPA): Environmental Impact Statement Checklist

The Department of Energy Office of NEPA Policy and Assistance, developed the checklist based on NEPA regulations as well as the Department of Energy Office of Environment, Safety and Health's recommendations for compiling EIRs (DEO of NEPA, DEO of NEPA, 1997). The checklist comprised of two separate lists; one with generic requirements and the other, more project specific requirements (DOE of NEPA, DOE of NEPA, Office of NEPA Policy and Assistance, 1997; 2007). The content of the list is phrased in questions to which columns are provided to answer "Yes", "No" or "N/A", with "Yes" being the preferred answer. As not all the questions relate to all projects and legislation, it should be adapted to the country's legislation and to the project. The checklist identifies if the required information was omitted.

2.6.3 The Oxford-Brookes review package

The package was developed in the United Kingdom by J. Glasson and other Oxford University Scholars (Glasson & Therivel, 2011; Sutton-Pryce, 2015). The review package incorporates many criteria from the Lee and Coley review package and was initially developed as a research study to change the quality of EIAs (Glasson & Therivel, 2011; Sandham & Pretorius, 2006; Sutton-Pryce, 2015).

The similarity between the two packages arises with regards to the grading system, however, they differ in that the Lee and Colley review package has four levels where the Oxford-Brookes review package consist of only three levels (Glasson & Therivel, 2011; Sutton-Pryce, 2015). Consultants and academic researchers usually make use of this review package.

2.6.4 South African review checklist

The South African review checklist rather focusses on determining the completeness of EIRs instead of the quality of the information in the report (DEAT, DEAT, 2004; Sutton-Pryce, 2015). The list comprises of eight simple and easy to use sub-sections (DEAT, DEAT, 2004; Sutton-Pryce, 2015).

The above review methods can aid the author in establishing a review package to determine the effectiveness of non-conformance reporting systems in South Africa with data obtained from a certification body. As a review package's focus is on the quality of the information within a report rather than determining the completeness of the report as in the checklist review, the review package is more suitable to determine the effectiveness of non-conformance reporting and was, therefore, the method (Section 3.3.1) chosen for this the mini-dissertation.

2.7 Conclusion

The aim of the literature review was to understand the need for standards, the implications of not conforming to standards and the requirements of effective non-conformance reporting.

The literature review started off by establishing the need for standards; ISO 14001 and auditing standards; ISO 17021 and ISO 19011, which includes the non-conformance reporting process. The literature indicated the complexities related to ISO certification auditing, highlighting the need for standards. The ISO 14001 standard is a guideline for organisations to implement an environmental management system and organisations obtain certification against the standard due to the various benefits of conforming to the standard (ISO, 2015b). The main benefits include; statutory and regulatory compliance (ISO, 2015b), organisational benefits which inter

alia include stakeholder involvement (Castka *et al.*, 2015; Heras-Saizarbitoria & Boiral, 2013), a competitive advantage (Delmas, 2001), commercial benefits (Iatridis & Kesidou, 2018), encouraging the enhancement of suppliers environmental performance (ISO, ISO, 2015b), and improvement of corporate reputation (Jiang & Bansal, 2003).

High-quality auditors correlate with the high-quality implementation of standards and the operational and market benefits of ISO implementation are increased by high-quality auditors. Certification bodies are guided by the ISO 17021 standard and ensure that the auditors conducting the audits conform to the ISO 19011 standard which ensures the integrity of the certification granted to an organisation. The quality of auditors and modes of auditing are linked to the effectiveness of non-conformance reporting, furthermore, highlighting the need for standards to guide auditors.

Despite various research on the benefits of ISO 14001, research pertaining to third-party certification auditing is of a lesser nature (Heras-Saizarbitoria *et al.*, 2013). In South Africa, legal non-compliance by prestigious certified organisations in the past led to a waning in the trust and merit of ISO 14001 certification as a self- governance instrument (Craigie, 2009, Nel and Wessels, 2010). Non-conformance to these standards lead to ineffective ISO certification auditing and non-fulfillment of the intended outcomes, which inter alia includes legal compliance, set by the organisation and the ISO 14001 standard. Scandals emerging in other industries relating unfair representation has led to “adverse perceptions about auditing” which leads to a waning in the trust of auditing. Non-conformance reporting is one of the key performance indicators of environmental performance of an organisation and well-formulated non-conformance statements are key to effective audit reporting. The value of audits is negated should the loop not be closed which highlights the importance of effective non-conformance reporting and follow up to address the root cause and preventing its recurrence.

The principles of effective non-conformance reporting are furthermore outlined (Section 2.4) from the standards and literature suggesting best practice for non-conformance reporting. Lastly, several review methods are discussed as relating to the quality EIRs as the review methods may aid in addressing the aim of his research. These principles were used to develop criteria (Table 3-2), based on review methods brought about from the literature, against which non-conformance reporting was be measured in order to determine its effectiveness (Chapter 4).

CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY

Chapter Three informs the reader of the research design, methodology and methods to aid in determining the effectiveness of non-conformance reporting systems of ISO 14001 certification auditing in South Africa; through evaluating data obtained from a certification body.

3.1 Research design

According to David and Sutton (2011), a "research design is the overall method chosen to integrate the different elements of the study in a logical sequence, allowing you to address the problem statement effectively and ultimately draw conclusions". It is the "blueprint" for collecting, measuring and analysing data (David & Sutton, 2011; Trochim, 2006). The design framework is based on the following elements:

1. Research definition;
2. The research approach (termed a methodology); and
3. Data collection-, analysis- and presentation method (Creswell & Creswell, 2018).

In this research, the framework as prescribed by Creswell and Creswell (2018), will be used and these elements and their relevance to this study are briefly described in the following sections.

3.2 Research defined

Research may be defined as "a scientific and systematic search for pertinent information on the specific topic" or in short a "search for knowledge" (Kothari, 2004). The Oxford Dictionary (Fowler *et al.*, 1952) defines it as "A careful inquiry specially through search for new facts in any branch of knowledge".

3.3 Methodology

To assist the research, an evaluation approach was followed which has been acclaimed that "…evaluation is a well-established field of study…" (Owen & Rogers, 1999). Evaluation methodologies closely relate to traditional social research, however, it is distinguished in that "…it requires group skills, management ability, political dexterity, sensitivity to multiple stakeholders and other skills…" which is not relied on as much in traditional social research (Trochim, 2006). Evaluation is defined as "the process of making a judgment about the value or worth of an object under review" (Owen & Rogers, 1999). The elements of evaluation should fundamentally include:

1. Developing criteria to judge effectiveness,
2. Establishing principles of standards,
3. Measuring performance on the criteria in relation to these standards,
4. Drawing value judgements from evidence.

3.3.1 Review method

The literature (Chapter 2) was key in deciding on a review method. As a review package's focus is on the quality of the information within a report rather than determining the completeness of the report as in the checklist review, the review package is more suitable to determine the effectiveness of non-conformance reporting. A review package to determine the effectiveness of non-conformance reporting was established from ISO 19011 (2018b), ISO 17021 (2015) , ISO 14001 (2015), IEC 62740 (2015) and other literature sources, including academic sources, referenced accordingly in the literature review (Chapter 2). This literature served as the principles of standards. The objectives aid as an "indication of what needs to be achieved" and were developed from the principles of standards (Retief, 2007). As suggested by Retief (2007) these objectives were used to develop criteria in the form of key performance indicators (KPIs) that are grouped into key performance areas (KPAs).

The KPAs are the topics relating to the principles. As deduced from ISO 14001:2015, the overall purpose of non-conformance reporting is to identify a non-conformance and take action to eliminate the cause of the non-conformance including the prevention of recurrence. The effectiveness of non-conformance reporting and close out can therefore, be broken up into four KPAs:

- Quality of the non-conformance statement;
- The effectiveness of root cause analysis;
- The effectiveness of corrective action; and
- Follow-up of corrective action effectiveness.

The KPIs are "questions that provide an indication to what extent the objectives were achieved by subject participation" (Retief, 2007).

The review package developed (Table 3-2) links the objectives, KPAs and KPIs in relation to these principles of standards, which were established from literature (Chapter 2), from which a judgment was made to conclude on the effectiveness.

3.4 Data collection method

The following section will describe the methods used to obtain the data, how validation was performed to ensure the accuracy of the results, and, furthermore, discussing how an ethical clearance was obtained from both the North West University and the Certification body. As the data obtained from the certification body is of a sensitive nature, credible methods had to be used to ensure the anonymity of the certification body, its auditors and its clients.

3.4.1 Literature review

The objectives of the literature review (Chapter 2) is to understand the need for standards such as ISO14001, the implications of not conforming to standards, and the requirements of effective non-conformance reporting systems. A literature review is conducted to identify, collect and analyse secondary data and similar studies on the effectiveness of the non-conformance reporting system of ISO 14001 certification auditing in order to paint a clear picture on the topic at hand (Hart, 2009). The literature review will aid in identifying the problem and the existing gap in knowledge and will set the basis for empirical research (Hart, 2009).

A scoping method (Grant & Booth, 2009) was used to look at current literature, asserted by past literature, theories and debates relating to the topic. Arksey and O'Malley (2005) describe this review process and suggest the following stages for a scoping review:

1. Identification of the research aim (see Objective 1 for this study to support the research aim);
2. Identification of relevant research;
3. Selection of the studies/sources; and
4. Ordering, summarising and reporting results.

Stage 1: the research aim was obtained as described in Section 1.4. of this mini-dissertation. For stage 2 primary sources (peer-reviewed books, articles, journals, theses, standards); and secondary sources, such as lecture presentations, working papers and Internet sources were identified through screening (Stage 3). The North-West University's (NWU) online directory was the main tool to search for sources as it provides access to databases such as Science Direct, Google Scholar, Juta Law, LexisNexis, Springer and Emerald. A full list of references is included in the bibliography as per the NWU requirement. The screening (Stage 3) was performed by screening titles and abstracts relevant to the topic and then focusing on the sources relevant to the topic, which could provide context and address the first objective (see Objective 1 for this study to support the research aim). Further screening of additional sources was conducted to

aid in the analysis and to report on the analysis set out in Chapter 4 (Stage 4) in order to draw a conclusion (Chapter 5) and achieve the second objective (see Objective 2 for this study to support the research aim). The review concludes, through a review of ISO standards and best practices, on the evaluation criteria (Table 3-2) to determine the effectiveness of the non-conformance reporting system of ISO 14001 certification auditing in South Africa.

The following section will describe/explain the methods used for collection, analysis and reporting of empirical data.

3.4.2 Empirical data collection, analyses and presentation

The sub-sections outline the process of data collection, analysis and presentation.

3.4.2.1 Data collection and dataset

Cambridge University Press (2017) defines a data set as “separate sets of information that is treated as a single unit.” The data obtained from the Certification Body consisted of sensitive information and therefore the method used to collect the data was done in accordance with the literature (Lee, 1993; Oliver, 2003; Wiles *et al.*, 2006) and constituted of;

1. Determining whether ethical clearance was required as described in section 3.4.4.
2. An informal request made to the certification body in the form of a discussion to conduct research on data related to ISO14001 auditing.
3. This was followed by a formal request whereby the research proposal was supplied to the certification body.
4. Written approval was obtained from the Risk Department of the Certification Body under the condition of a signed Non-Disclosure Agreement and that the certification body and its auditors remain anonymous.
5. The Certification Body was also supplied with a signed NWU Code of Conduct for Researchers.
6. The data was then obtained from the Certification Body and a data transfer check performed to ensure the integrity of the data (Statistical Service Centre, 2000).

The scope of the data consists of:

1. One certification body;
2. 102 ISO 14001 audits with their respective corrective action plans (CAPs);
3. 47 Clients;
4. 3 years results (2016 – 2018); and

5. 15 Auditors.

The data consists of:

1. The number of major and minor audit findings per auditor;
2. Corrective Action Plans (CAPs);
3. Audit reports including verification and effectiveness of corrective actions;
4. Auditor profiles;
5. Types of organisations; and
6. The version of the standard audited against (2004 or 2015).

3.4.2.2 Data analysis method

To aid in using the review package, as prescribed by Lee *et al.* (1999) and by Glasson and Therivel (2011), the criteria are ordered in a hierarchical structure (Figure 3-1), starting at the base (Level 1) the reviewer reviews the simple criteria pertaining to specific procedures or tasks; the Key Performance Indicators (KPIs). Drawing on the assessment, the reviewer then moves upward in the structure (Level 2) pertaining to more complex, Key Performance Areas (KPA) of a wider range of procedures and tasks until the overall review (Level 3) of the non-conformance reporting system and close out has been completed.

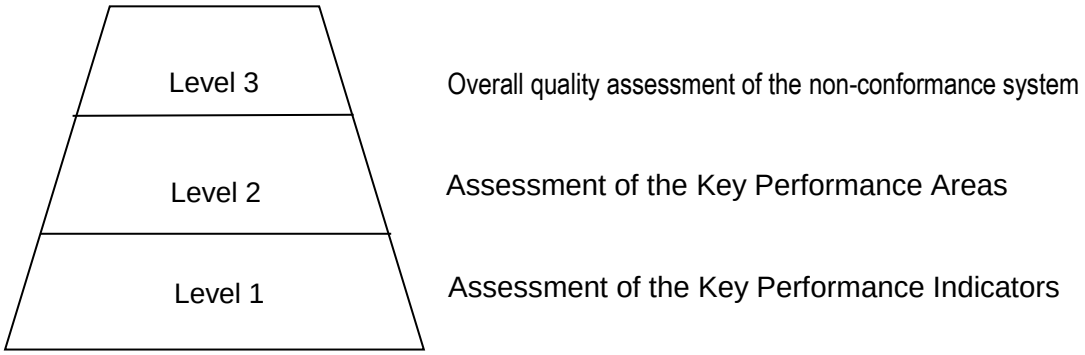


Figure 3-1: Assessment Pyramid (Lee et al., 1999)

As suggested by Lee *et al.* (1999), scores are represented in “letters” ranging from A-F (Table 3-1), instead of numbers to prevent users from using an average that could lead to an overall higher rating. Apart from it preventing averages, the method of scoring is chosen as it is also the method used in the Lee and Colley- and Oxford-Brookes review package. As stated by Lee *et al.* (1999) the Lee and Colley review package has been the basis for several developed review packages due to its adaptability.

Table 3-1: Review Package scoring Symbols (Lee *et al.*, 1999)

Symbol	Explanation
A	"Relevant tasks well performed, no important tasks left incomplete."
B	"Generally satisfactory and complete, only minor omissions and inadequacies."
C	"Can be considered just satisfactory despite omissions and/or inadequacies."
D	"Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies."
E	"Not satisfactory, significant omissions or inadequacies."
F	"Very unsatisfactory, important task(s) poorly done or not attempted."
N/A	"Not applicable. The Review Topic is not applicable, or it is irrelevant in the context of this Statement."
NV	"Not Verified". The task could not be verified with the high-level data that was provided.

The review package can be found in Table 3-2, in a tabular format and is arranged in a hierarchy with a single digit e.g. 1. indicating a KPA and a double-digit e.g. 1.1. a KPI. The table links the objectives, KPAs and KPIs derived from the principles of standard (Chapter 2). The KPAs and KPIs should ultimately provide evidence in order to show/appraise the effectiveness of the system to achieve the "Principles" of the standard (deep rooted criterion/expectation).

3.4.2.3 Data presentation

Creswell and Creswell (2018) prescribe that; "researchers have to be sensitive to audiences to whom they report their research". This mini-dissertation report was written and presented in a formal scientific manner as per the Scientific Skills Series: Report Writing (2000), however, consideration had to be given to different audiences. Using an evaluation approach aided in writing the mini-dissertation in a manner suited for different audiences. The data analysis and results were presented in a tabular format accommodated by graphs, followed by a discussion of the results, in order to present the data in a best-suited manner.

As the assessment Symbol; A: "Relevant task well performed", B: "Generally satisfactory and complete" and C: "Can be considered just satisfactory", all reflect varying degrees of being effective, they are grouped together for interpretation purposes. Between C and D lies the critical boundary as these grades are "just satisfactory" and "just unsatisfactory". To determine the strengths and weaknesses; A-B was grouped together for the "best" and E-F, "not satisfactory" and "very unsatisfactory" for the "worst". Please refer to Table 3-3 for an idea of how the data will be presented.

Table 3-2: NCR Review Package

KPAs "Topic related to principles"	Objective "indication of what needs to be achieved", developed from Chapter Two	KPI's "Questions that provide an indication to what extent the objectives were achieved by subject participation"
1. Quality of the non-conformance statement	1.1. A description or reference to the audit criteria should be included in the non-conformance statement. 1.2. A non-conformance declaration should be included in the non-conformance statement which is clear and concise and does not require any further need for interpretation. 1.3. Sufficient, objective audit evidence should be provided in the non-conformance statement. 1.4. Reference to related findings should be included in the non-conformance statement. 1.5. The non-conformance statement should not be isolated to the incident, but rather to the process. 1.6. The classification of the non-conformance statement should be appropriate.	1.1. Does the non-conformance statement include a description or reference to the audit criteria? 1.2. Is a non-conformance declaration included in the non-conformance statement that is clear and concise and does not require any further need for interpretation? 1.3. Does the non-conformance statement include sufficient objective audit evidence? 1.4. Is reference to the related findings included in the non-conformance statement? 1.5. Does the non-conformance focus on the process instead of isolated to the incident? 1.6. Is the classification of the non-conformance statement appropriate?
2. The effectiveness of root cause analysis	2.1. The underlying causes of a focus event should be identified by the root-cause analysis. 2.2. The root cause should allow for effective decision making. 2.3. A systematic approach should be followed to identify the root cause analysis. 2.4. Documented evidence should back-up the process. 2.5. The analysis technique should be; justifiable and appropriate; 2.6. The analysis technique should provide results enhancing the understanding of the root cause; 2.7. The analysis technique should be capable of use in a manner that is traceable, 2.8. The analysis technique should be repeatable and verifiable.	2.1. Does the root-cause analysis identify the underlying cause of a focus? 2.2. Does the root-cause allow for effective decision making? 2.3. Has a systematic approach been followed to identify the root cause? 2.4. Does the process include documented evidence? 2.5. Is the analysis technique justifiable and appropriate? 2.6. Does the analysis technique provide results enhancing the understanding of the root cause? 2.7. Is the analysis technique capable of use in a manner that is traceable? 2.8. Can the analysis technique be repeated and verified?
3. The effectiveness of corrective action	3.1. The corrective action should eliminate the cause therefore recurrence. 3.2. The corrective preventing actions should deal with the consequences which include the mitigation of adverse environmental impacts	3.1. Has the cause been eliminated to prevent recurrence of the non-conformance? 3.2. Does the corrective action/s deal with the consequences including the mitigation of adverse environmental impacts?

KPAs "Topic related to principles"	Objective "indication of what needs to be achieved", developed from Chapter Two	KPI's "Questions that provide an indication to what extent the objectives were achieved by subject participation"
	3.3. The action taken should be appropriate to the significance of the effects of the non-conformance which included environmental impact.	3.3. Is the action/s appropriate to the significance of the effects of the non-conformance which included environmental impact?
	3.4. The action taken should be within the agreed upon timeframe.	3.4. Was the action/s taken within the agreed upon timeframe?
4. Follow up of corrective action effectiveness	4.1. A follow-up process should be in place that specifies verification frequencies.	4.1. Is a follow-up process in place that specifies verification frequencies?
	4.2. The verification frequencies should be appropriate to the agreed upon timeframes and the significance of the consequences of the non-conformance.	4.2. Is the verification frequency appropriate to the agreed upon timeframes and the significance of the consequences of the non-conformance?

Table 3-3: Presentation of overview, KPA and KPs scores for all NCRs

Overview of all NCRs		A	B	C	D	E	F	N/A	NV	% A-C	% A-B	% C-D	% E-F
Summary of Key Performance Area		A	B	C	D	E	F	N/A	NV	% A-C	% A-B	% C-D	% E-F
1	Quality of the non-conformance statement												
2	The effectiveness of root cause analysis												
3	The effectiveness of corrective action												
4	Follow up of corrective action effectiveness												
Summary of Key Performance Indicators		A	B	C	D	E	F	N/A	NV	% A-C	% A-B	% C-D	% E-F
1.1.	Description or reference to the audit criteria included.												
1.2	Clear and concise non-conformance declaration.												
1.3	Sufficient objective audit evidence included in non-conformance statement.												
1.4	Reference to the related findings included in the non-conformance statement/s.												
1.5	Non-conformances focus on the process instead of isolated to the incident.												
1.6	Appropriateness of the classification of the non-conformance statement/s.												
2.1	Identification of the underlying cause of a focus through the root-cause analysis.												
2.2	Allows for effective decision making.												
2.3	A systematic approach followed for the root cause analysis.												
2.4	The inclusion of documented evidence in the process.												
2.5	Justifiable, appropriate technique.												
2.6	The root cause understanding of enhancement through the analysis technique.												
2.7	Traceability of the analysis technique.												
2.8	The repeatable and verified analysis technique												
3.1	Elimination of the cause.												
3.2	Corrective action/s deal with the consequences.												
3.3	Appropriateness of the action.												
3.4	Action/s taken within the agreed upon timeframe.												
4.1	Follow up process in place.												
4.2	Appropriateness of the verification frequency.												

3.4.3 Limitations of research

As stated by Robson and McCartan (2016), “Validity and generalizability are central concepts for making a study believable and trustworthy”. As the research methodology is based on social research, the author had to be cognisant of the risk and associated terms. It is, therefore, acknowledged that the research design, methodology and methods have both strengths and limitations.

3.4.3.1 Time constraints

One of the main limitations were time constraints due to the author working full time as well as a change in organisations that lead to the requirement of an adaption to a new overall environment, which reduced the time available furthermore.

3.4.3.2 Accessibility of data and sample size

The data obtained from the certification body was sensitive in nature. This reduces the willingness of certification bodies to grant access to the information and therefore a sample could only be obtained from one certification body in South Africa. As the data obtained was high-level data in some instances it did not allow for verification against the criteria.

In order to address the limitations and ensure that the sample could be representative of South Africa, a large sample size was obtained from the certification body.

3.4.3.3 The review package

A research strength, however, is that it produces a review package that can be used on either a single non-conformance statement or various non-conformance statements in order to evaluate a single statement, a whole report, or numerous reports pertaining to a client. The review package produced can be built upon, opening the field of research to be explored in more detailed research in future. To further marginalise the limitations, strategies were used to ensure credibility. The strategies include the use of credible research design (Creswell & Creswell, 2018), methodology (Owen & Rogers, 1999). and methods (Grant & Booth, 2009; Lee *et al.*, 1999; Lee, 1993; Oliver, 2003; Wiles *et al.*, 2006). Data transfer checks were performed to ensure verified data can be relied upon (Statistical Service Centre, 2000). Furthermore, the review package was tested for applicability and reviewed by experienced researchers in the field before conducting the analysis. The final strategy was the constant review of the research and results by PhD supervisors and a final review by the certification body.

3.4.3.4 Missing data

The data obtained from the Certification Body was saved on a record system that requires the upload of information from the auditors. In some instances, the data was not available on the system and could not be verified as it does not indicate that the task was not performed, but that the data is simply not available.

It was, therefore, important to ensure that the data was handled correctly in order to not produce bias results (Graham, 2009; Kang, 2013). In statistical research it is acceptable to drop the values should they be less than 5% of the sample size (Graham, 2009; Kang, 2013). In the event that the KPI could not be verified, it was indicated as NV and dropped from the analysis as shown in Chapter 4 of the dissertation.

The accuracy of the results was still maintained using this method of handling the missing data, as the % of the values dropped would not have a major influence on the results achieved.

3.4.4 Ethical Considerations

It is an NWU requirement that all research considers the ethical implications thereof. Due to the research pertaining to sensitive data, ethical implications had to be considered. Literature (Lee, 1993; Oliver, 2003; Wiles *et al.*, 2006) guided me in conducting the research in an ethical and anonym manner as follows;

- It was determined that the research did not require ethical approval from the research ethics committee through following the process as set out in the NWU “Rules for the Institutional Research Ethics Regulatory Committee (IRERC) of the NWU” and signing of an ethical clearance document.
- An informal request was made to the certification body in the form of a discussion to conduct research on data related to ISO14001 auditing.
- This was followed by a formal request whereby the research proposal was supplied to the certification body.
- Written approval was obtained from the Risk Department of the Certification Body under the condition that a Non-disclosure agreement is signed and that the certification body and its auditors remain anonymous.
- The Certification Body was also supplied with a signed NWU Code of Conduct for Researchers.
- The data was then obtained from the Certification Body and a data transfer check performed to ensure the integrity of the data (Statistical Service Centre, 2000).

- No results were fabricated during the study.
- The review of the non-conformance reports is kept on record and may be produced upon request to ensure transparency of the analysis.

Every effort was made to use accurate and truthful information, to ensure that the research design, methodology and methods used to acquire knowledge on the non-conformance reporting system in South Africa (data obtained from a certification body), is structured logically. This logical structure allows for the connection of the data to the research aim, the supporting objectives and ultimately to the conclusions.

CHAPTER 4 RESULTS AND DISCUSSION

The research findings and analysis will be discussed in the following chapter. In this section, the results and discussion will be structured in a hierarchical fashion as per the analysis method highlighted in Chapter Two. The Key Performance Indicators areas (Level 1) will firstly be discussed drawing upward to the Key Performance Areas (Level 2). Lastly drawing upward to determine the overall effectiveness of the non-conformance reporting (NCR) system (level 3). The chapter will then conclude on the strengths and weaknesses of the review.

The review package Table 3-2 was used to evaluate a total of one-hundred and two (102) NCRs for forty-seven clients (47). Refer to Table 3-1 for the scoring definitions.

As the assessment symbols: A: “Relevant task well performed”, B: “Generally satisfactory and complete” and C: “Can be considered just satisfactory”, all reflect varying degrees of being effective, they are grouped together for interpretation purposes. Between C and D lies the critical boundary as these grades are “just satisfactory” and “just unsatisfactory”. To determine the strengths and weaknesses; A-B was grouped together for the “best” and E-F, “not satisfactory” and “very unsatisfactory” for the “worst”. Please refer to Table 4-3 to for the overview of the results of the one-hundred and two (102) NCRs reviewed, to determine the effectiveness of the non-conformance reporting system.

4.1 Key Performance Indicators Results

The results of all the reviews’ KPIs are summarised in Table 4-1. Each KPI is discussed in the sub-sections to Section 4.1. Data that was missing that did not allow for verification was also included in the table and was excluded from the percentage calculation to ensure the accuracy of the results.

4.1.1 Quality of the non-conformance statement

KPI 1.1 was satisfactory (A-C) and scored 100%, as most NCRs not only contained a reference to the applicable clause but also contained an extract of the clause in the statement. There were some instances where a more suitable clause could have been referenced. In some instances findings were either grouped together that should have been two separate non-conformances or they were raised as separate non-conformances and could have been grouped. This accounted for the 5% of “generally satisfactory” ratings and 2% “just satisfactory” ratings.

Table 4-1: Summary of KPI scores for all NCRs

Summary of Key Performance Indicators		A	B	C	D	E	F	N/A	NV	% A-C	% A-B	% C-D	% E-F
1.1.	Description or reference to the audit criteria included.	95	5	2	0	0	0	0	0	100	98	2	0
1.2	Clear and concise non-conformance declaration.	78	24	0	0	0	0	0	0	100	100	0	0
1.3	Sufficient objective audit evidence included in non-conformance statement.	56	43	3	0	0	0	0	0	100	97	3	0
1.4	Reference to the related findings included in the non-conformance statement/s.	13	6	1	2	18	0	62	0	50	47,5	7,5	45
1.5	Non-conformances focus on the process instead of isolated to the incident.	85	14	2	1	0	0	0	0	99	97	3	0
1.6	Appropriateness of the classification of the non-conformance statement/s.	99	2	1	0	0	0	0	0	100	99	1	0
2.1	Identification of the underlying cause of a focus through the root-cause analysis.	27	45	9	3	10	4	0	4	83	74	12	14
2.2	Allows for effective decision making.	27	45	9	3	10	4	0	4	83	74	12	14
2.3	A systematic approach followed for the root cause analysis.	0	0	0	0	0	102	0	0	0	0	0	100
2.4	Inclusion of documented evidence in the process.	0	0	0	93	1	4	0	4	0	0	95	5
2.5	Justifiable, appropriate technique.	0	0	0	0	0	102	0	0	0	0	0	100
2.6	Root cause understanding enhancement through the analysis technique.	0	0	0	0	0	102	0	0	0	0	0	100
2.7	Traceability of the analysis technique.	0	0	0	0	0	102	0	0	0	0	0	100
2.8	Repeatable and verified analysis technique	0	0	0	0	0	102	0	0	0	0	0	100
3.1	Elimination of the cause.	35	35	16	4	7	1	0	4	88	71,4	20,4	8,2
3.2	Corrective action/s deal with the consequences.	72	16	3	3	3	1	0	4	93	90	6	4
3.3	Appropriateness of the action.	76	16	4	1	0	1	0	4	98	94	5	1
3.4	Action/s taken within the agreed upon timeframe.	0	0	0	0	0	0	0	102	0	0	0	0
4.1	Follow up process in place.	102	0	0	0	0	0	0	0	100	100	0	0
4.2	Appropriateness of the verification frequency.	91	5	4	0	1	0	1	0	99	95	4	1

The non-conformance statements were satisfactory (A-C) with regards to being clear and concise (KPI 1.2) and scored 100%. In some instances, the non-conformances were instructions instead of statements of non-conformance and as stated above some statements were grouped together where they should have been separate or separate where they could have been grouped together. This made up 24 % of the B grades (“generally satisfactory) due to 0 of the grades scoring “just satisfactory” (C).

The audit evidence included in the audit reports (KPI 1.3) were satisfactory (A-C) as they scored 100% in the grading. 97% formed part of the best ranking (A-B) with only 3% on the critical border (C-D). The factor that contributed to the 3% was that the audit evidence was not always uniquely identified which may cause issues regarding traceability.

Various non-conformance statements did not have related findings and were therefore not applicable to the KPI 1.4. They were excluded from the results. Looking at KPI 1.4: “reference that is made to related findings” in the NCRs, it was 50% satisfactory (A-C), 47,5 % of which was within the best grading (A-B). Only 7,5% of the KPI was on the critical border where 45% were in the worst (E-F) rating. The factors that contributed to the 50% unsatisfactory rating (D-F) were that either related findings came up, to which no reference was made, or reference is made, but they are not uniquely identified to ensure traceability.

Non-conformances were mostly focussed on the process rather than on isolated instances (KPI 1.5) and therefore scored 99% satisfactory (A-C). 97% of the NCRs scored within the best (A-B) rating of this KPI. Only 3% of the NCRs was on the critical borderline (C-D) of the KPIs score. This was due to non-conformance focusing on incidents more than the process in some instances. 0 NCRs scored the worst ranking (E-F) in this KPI.

Overall, 100% of the non-conformance statements were satisfactory (A-C) classified according to ISO 19011 (KPI 1.6). 99% scored within the best rating (A-B) with only 1% scoring “just satisfactory” on the critical border (C-D). Incorrect classification of findings attributed to the 1% C-ratings.

4.1.2 The effectiveness of root cause analysis

The NCR scored 83% satisfactory (A-C) with regards to the root-cause analysis identifying the underlying cause of a focus (KPI 2.1). 74% of the score was within the best performance (A-B). 12% fell within the critical border (C-D) and 14% within the worst rating (E-F). The factor that contributed to the unsatisfactory grade (D-F) is that the certification body accepts root cause analysis from the client that does not address the underlying cause.

KPI 2.2 indicated the same results as 2.1, as identifying the underlying cause is what allows for effective decision making (European Committee for Electrotechnical Standardization, 2015).

When determining if a systematic process was followed to determine the root cause (KPI 2.3), it was noted that the root cause analysis is not submitted to the certification body. The root cause is also submitted without the analysis on the CAPin some occasions. The certification body,

therefore, does not analyse the root cause analysis for effectiveness. This accounts for the 100% unsatisfactory rating (D-F) of which 100% was “very unsatisfactory” (F), as this was not attempted.

KPI 2.4 indicated 100% unsatisfactory (D-F) with regards to documented evidence of the root cause analysis process. 95% was rated as “just unsatisfactory” (D) due to the root cause being submitted to the certification body and documented evidence of the action being reviewed at the following audit, however evidence of root cause analysis process is not documented. The 5% that fell within the worst rating (E-F) was due to a root cause not being submitted at all to the certification body.

KPI 2.5 to KPI 2.8 presented the same results as KPI 2.3, as the root cause is submitted to the certification body, however, the analysis is not submitted.

4.1.3 The effectiveness of corrective action

Eliminating the cause to prevent recurrence (KPI 3.1) performed 88% satisfactory (A-C). The author was cognisent of the fact that recurrence of the finding could not be the only indicator of this KPI, as auditing is based on sampling, therefore recurrence may not have been picked up at the follow-up. Furthermore just because a finding did not recur in the specific audit, it might still occur should the root cause not be addressed, as the recurrence is dependent on whether the root cause is addressed and therefore links with KPI 2.1. 71,4% achieved the best performance ranking (A-B). 20,4% performed on the critical border (C-D) which was due to the root cause submitted being one or two levels away from the underlying cause. Where the root cause analysis was not addressed it contributed to the 8,2% weak grading (E-F).

KPI 3.2, whether the corrective action dealt with the consequences including the mitigation of adverse environmental impacts, performed 93% satisfactory (A-C). Within this KPI a 90% was achieved in the best performance ranking (A-B). 6% scored on the critical borderline (C-D) which was due to mitigation of adverse environmental impacts not mentioned in the corrective actions submitted. 4% achieved the worst ranking (E-F) as the factors contributing to this rating was that corrective actions were either not submitted or not implemented when verified at the follow-up.

Whether the action/s was appropriate to the significance of the effects of the non-conformance which included environmental impact (KPI 3.3), graded 98% satisfactory (A-C) of which 94% ranked in the best performance (A-B) category. The factors that contributed to the 5% critical border grading and the 1% worst performance grading (E-F), is where the action did not include appropriate actions to the significance of the effects of the environmental impact or where no corrective actions were submitted or implemented as verified in the follow-up.

With the high-level data provided it was not possible to determine whether the action is taken within the agreed upon timeframe. The client stipulates the timeframe for the corrective action within the CAP submitted to the certification body, which is then approved by the certification body. The onus lies with the client to take the corrective action within the agreed upon timeframe. The certification body then verifies the effectiveness of the corrective action taken at the following visit, however, the certification body does not keep a record of the implementation date in order to determine whether the action was taken timeously. The record of the implementation date lies with the client and could therefore not be reviewed for the purposes of the research. This envokes recommendations for future research that will be discussed in Chapter 5.

4.1.4 Follow-up of corrective action effectiveness

The certification body has a non-conformance and corrective action process in place. The process specifies that if a minor non-conformance is raised it will be followed up in the following visit. Iin the event that a major non-conformance is raised, a follow-up visit should be carried out within 30-90 days after the audit to verify the effectiveness of the corrective action. The next visit is communicated to the client and furthermore documented in the audit report submitted to the client, which formed part of the data provided for this review. This allowed for the NCR system to achieve a 100% satisfactory rating (A-C) with regards to a process in place that specifies verification frequencies.

With regards to the appropriateness of the agreed upon timeframes and the significance of the consequence of the non-conformance (KPI 4.2), the NCR scored 99% satisfactory (A-C), 95 % of which scored the best performance ranking (A-B). 4% was graded on the critical border rating (C-D) as the frequency was not adopted in some instance where findings recurred and even escalated in certain instances due to recurrence. The 1% of the NCR that scored in the worst performance (E-F) ranking for this KPI was due to a corrective action not being submitted by the client as observed in the following audit report and the certification body not adapting the verification frequency accordingly.

4.2 Key Performance Areas Results

Distribution of the scores of the four Key Performance Areas is presented in Figure 4-1, whereas the summary of the scores can be found in Table 4-2.

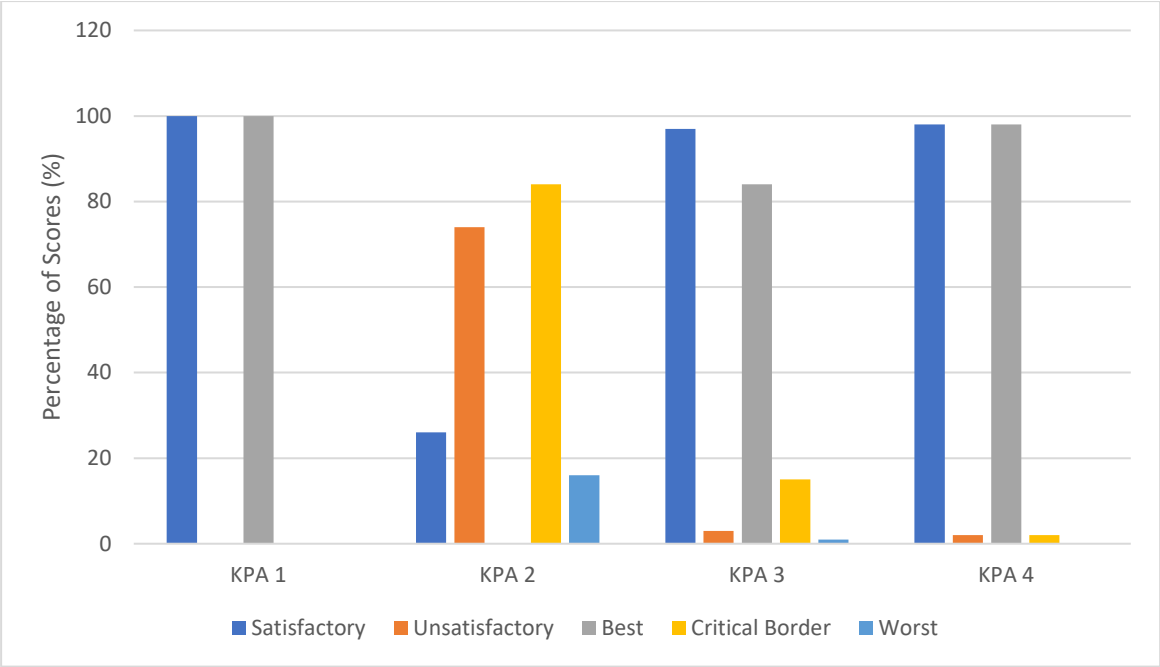


Figure 4-1: Overall percentage scores of the KPA

Table 4-2: Summary of KPA scores for all NCRs

Summary of Key Performance Area		A	B	C	D	E	F	N/A	NV	% A-C	% A-B	% C-D	% E-F
1	Quality of the Non-conformance statement	23	79	0	0	0	0	0	0	100	100	0	0
2	Effectiveness of Root Cause analysis	0	0	25	57	12	4	0	4	26	0	84	16
3	Effectiveness of Corrective Action	33	49	13	2	0	1	0	4	97	84	15	1
4	Follow up of corrective action effectiveness	91	9	0	1	0	0	1	0	98	98	2	0

4.2.1 Quality of the non-conformance statement

The quality of the non-conformance statement (KPA1) can be seen as effective as all 102 (100%) NCRs achieved satisfactory grades (A-C). KPA1 scored the best as all the NCRs scored within A-B rankings. Zero NCRs were ranked borderline or achieved the worst performance.

Henderson and Gallagher (2008) identified issues that correlate with the results obtained in the KPIs relating to the quality of the non-conformance statement;

- Statements are written as “incident-specific” rather than process based (Henderson & Gallagher, 2008). This issue was identified in the results and attributed to the 3% C rating obtained in KPI 1.5.

- Non-conformance statements are not clear and concise in order for the organisation to understand them (Henderson & Gallagher, 2008; Russell, 2006). From the results obtained this was the issue that attributed to the 24% B-rating for KPI 1.2.
- The non-conformance statement did not identify the actual requirement transgressed. From KPI 1.1 this was mostly not the case as not only were the correct requirements referenced, an abstract of the requirements was also included in the statement in most cases. This issue did, however, account for the 5% of “generally satisfactory” ratings (B) and 2% “just satisfactory” ratings (C).
- Objective evidence was not identified by the non-conformance statement. This was not the case with the results obtained from KPI 1.3, as the objective evidence was identified, however, factors contributing to the 3% C-ratings was that it was not uniquely identified in order to trace.

4.2.2 The effectiveness of root-cause analysis

The effectiveness of the root cause analysis (KPA2) was not well performed as it performed mostly unsatisfactory (D-F) at a score of 74%. 0 of the ratings achieved the best performance (A-B). Most of the NCR ratings were within the critical boundary (C-D) at 84% with 16% of the NCR ratings performing at the worst performance (E-F). KPA2 has the most of the worst performance ratings in relation to the other three KPAs.

KPA 2 performed poorly due to the Certification Body only accepting the root cause as part of the Corrective Action Plan (CAP), the method of the root cause analysis is not submitted to the certification body. In some instances, the CAP is even accepted without a root-cause stated.

For over sixty years various industries; such as health care industries, complex business, government organisations and even educational industries have used the Root Cause Analysis (RCA) to identify the origin of complex issues (Sobel, 2017). The quality of the investigation of RCA has however been questioned (Nicolini *et al.*, 2011; Peerally *et al.*, 2017). Issues identified in international literature relating to RCAs will now be discussed.

4.2.2.1 Insufficient evidence

International literature pertaining to the healthcare industry have highlighted issues regarding RCA in that the investigation is not carried out effectively (Nicolini et al., 2011; Peerally et al., 2017). The willingness of personnel to provide data as well as the insufficient collection of evidence aids ineffective RCA (Nicolini et al., 2011; Peerally et al., 2017). This correlates with the results obtained from the KPIs relating to the root cause analysis as insufficient evidence was

obtained or was not even attempted resulting in this KPA performing the worst in comparison to the other three KPAs.

Furthermore, the methods for obtaining the root cause is inconsistently being used (Nicolini et al., 2011; Peerally et al., 2017). As seen from the results, the certification body does not retain evidence relating to the method used to determine the root cause analysis. The certification body approves or rejects the corrective action plan based on the root cause provided and, in some instances, only on the corrective action provided. As determined from the literature review the ISO 14001 auditing process is elastic, and auditors interpret and apply standards differently (Heras-Saizarbitoria *et al.*, 2013), therefore the way in which they conduct RCAs may differ from one another and from the client.

4.2.2.2 Numerous sector involvement

Within the organisation, a wide variety of persons sections and organisations with unclear roles and responsibilities are involved with the event or problem (Sobel, 2017). This is furthermore exacerbated by strict timelines and pressure as well as a lack of independence within the organisation (Motschman & Moore, 1999; Nicolini *et al.*, 2011; Peerally *et al.*, 2017).

In the case of this certification body, it is another sector involved in the event or problem creating further complexities. Timelines are also stipulated by certification bodies in submission and acceptance of the corrective action plan that contributes to strict timelines and pressure being placed on both the auditee and the auditors that evaluate and approve the corrective action plan.

4.2.2.3 Complex causation

Identifying the root cause is not always straight forward and may be difficult to determine through the use of exterior observations or any one person's expertise (Sobel, 2017) which is the case with the certification body evaluating the cause (Motschman & Moore, 1999).

4.2.2.4 Single incident focus

The RCA approach focuses on a single incident in isolation of the process (Nicolini et al., 2011; Peerally et al., 2017). The results from KPI 1.5 indicated that this was not only the case in the RCA, but also in the non-conformance statement as the 3% that scored on the borderline (C-grading) was attributed to the statement focussing on a single incident instead of the process.

The issues highlighted lead to the acceptance of weak root cause analysis by auditors (Henderson & Gallagher, 2008; Sweeney & Pierce, 2015).

4.2.3 The effectiveness of corrective action

The effectiveness of the corrective action (KPA3) performed well as 97% of the NCRs scored a satisfactory rating (A-C) of which 84% ranked within the best performance (A-B). 15% scored in the critical border (C-D). The 2% of D grades that fell within the critical border (C-D), accounted for the 3% unsatisfactory rating (D-F) as 0% fell within the worst performance ranking (E-F).

A link exists between the root cause analysis and the effectiveness of corrective action as the root cause will allow for informed decision making regarding appropriate actions (IEC, 2015; Motschman & Moore, 1999). The link was not imminent when looking at the overall results of the KPAs (KPA2 and KPA3) which could be contributed to KPIs in KPA2 not being attempted and KPI 3.4 not being verified. The KPIs were therefore not displayed when drawing the comparison between KPA2 and KPA3, refer to Figure 4-2. When looking at KPIs; 2.1, 2.2, 3.1, 3.2 and 3.3 the link is, however, visible as highlighted by IEC 62740.

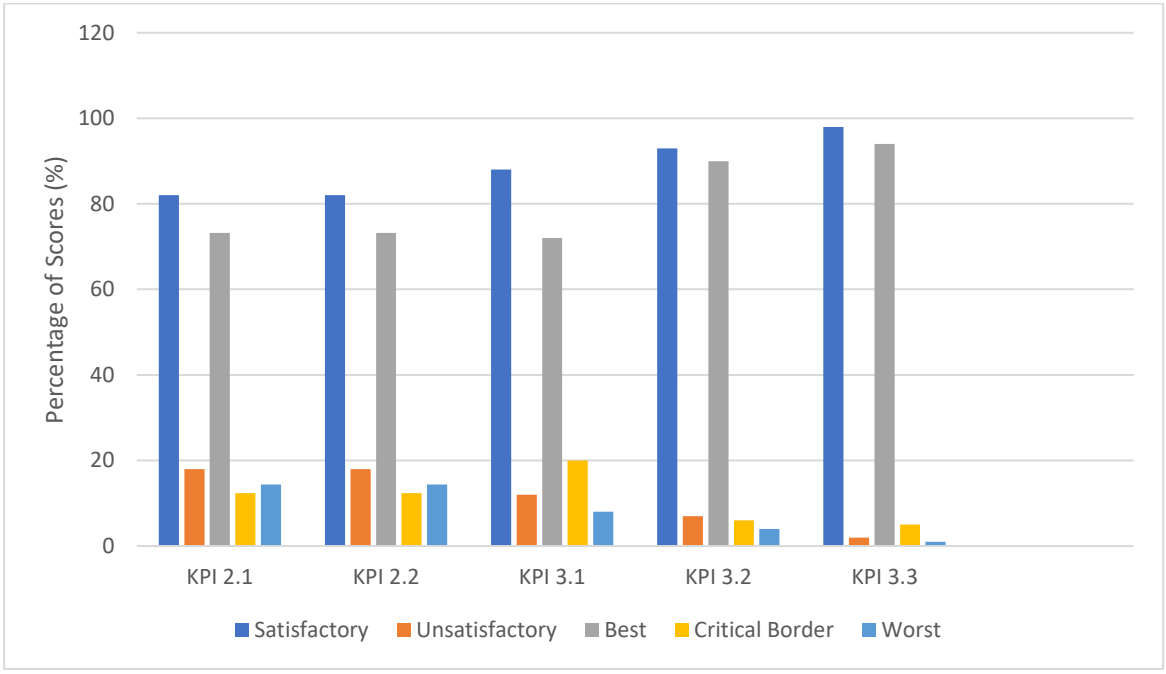


Figure 4-2: Overall percentage scores of the KPA

Tomić and Brkić (2011) highlight the issue relating to corrective action in that the first solution is usually proposed even if it not the best fit. This was shown in the results obtained in KPI 3.1 as 20% performed on the critical border (C-D) due to the corrective action not speaking to the root cause. Thiswas due to the root cause not being identified or being one or two levels away from the underlying cause.

Auditors accept weak explanations of root causes and corrective actions (Henderson & Gallagher, 2008; Sweeney & Pierce, 2015) due to the issue highlighted above.

4.2.4 Follow-up of corrective action effectiveness

Key Performance Area 4, follow up on corrective action effectiveness, performed second best with 98% of the NCRs grading as satisfactory (A-C). 98% of the NCR score was of best performance (A-B). Only 2% of the NCRs were on the critical borderline (C-D) with 0 % scoring the worst grading (E-F).

Henderson and Gallagher (2008) felt that an issue regarding non-conformance reporting was that there was no evidence that corrective actions had been followed up at NC closure. This was however not the case in the results obtained as KPI 4.1 showed that the certification body has a non-conformance and corrective action process in place which attributed to the 100% "satisfactory" score (A-C). KPI 4.2's result was however in line with international literature (Birkmire *et al.*, 2007; Russell, 2006) as it indicated weakness with regards to the appropriateness and frequency of audit follow-up, which attributed to 4% critical border rating (C-D) and the 1% worst performance (E-F) ranking.

4.3 Overview of the effectiveness of the non-conformance reporting system

The analysis of the overall non-conformance reporting effectiveness of one-hundred and two (102) NCRs, revealed that 93% of the reporting scored satisfactory (A-C), therefore being performed effectively.

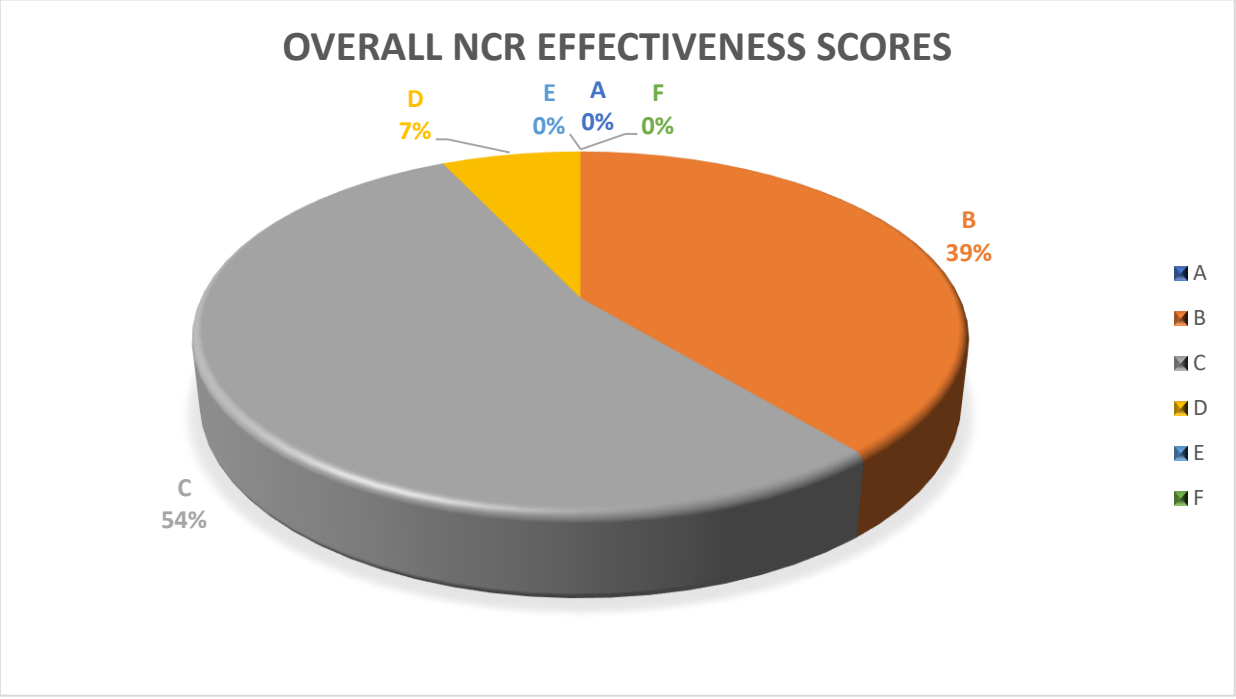


Figure 4-3: Overall percentage scores of the effectiveness of the NCR

As shown in Figure 4-1, 0% of the overall percentage score of the reviewed NCRs rated an A ranking (“well performed”). 39% of the overall percentage of NCRs “was generally satisfactory” (B ranking). This accounts for 39% of the strength rating (A-B) as displayed in Table 4-3. This, therefore, indicates that 39% of the reports were generally satisfactory with minor omissions. Fifty-four (54%) of the NCRs reflected a C rating (“just satisfactory”), which indicates that the majority of reports were just satisfactory despite inadequacies and/or omissions. 7 % scored a D rating (“just unsatisfactory), which both the C and D ratings respectively account for the 61% critical boundary rating (C-D). 0 of the NCRs scored an E rating classified as “not satisfactory and zero of the NCRs scored an F rating indicating “very unsatisfactory”. This accounted for 0% of the weakness rating (E-F).

Table 4-3: Summary of 0verview score of all NCRs

A	B	C	D	E	F	N/A	NV	% A-C	% A-B	% C-D	% E-F
0	38	53	7	0	0	0	4	93	39	61	0

4.4 Strengths and weaknesses of the NCRs summarised

When taking a look at the “best” and “worst” performed grading where the “best” is classified from A-B and the “worst” from E-F, a number of strengths can be identified which is evident from the high number of A-B scores and fewer E-F scores, that can be considered as weaknesses. The overall quality of the four Key Performance Areas indicated that only KPA 2, relating to the effectiveness of root-cause analysis, performed unsatisfactorily scoring a 74% unsatisfactory rating (D-F). The KPA 1, which relates to the quality of the non-conformance statement, performed the best with KPA 4, relating to the follow-up of the corrective action effectiveness and KPA 3, the effectiveness of the corrective action, trailing slightly behind.

Although weaknesses were predominant in KPA 2, there were also weaknesses identified in KPA 1. The weakness identified are listed below;

- KPI 1.4 - Reference to the related findings included in the non-conformance statement/s.
- KPI 2.4 - Following a systematic approach
- KPI 2.5 - Justifiable and appropriate technique
- KPI 2.6 - Root cause understanding enhancement through the analysis technique.
- KPI 2.7 - Traceability of the analysis technique.
- KPI 2.8 - Repeatable and verified Analysis technique

The key strengths were also identified and all A-B scores that scored more than 80% are summarised below.

- KPI 1.1 - Description or reference to the audit criteria included.
- KPI 1.2 - Clear and concise non-conformance declaration.
- KPI 1.3 - Sufficient objective audit evidence included in non-conformance statement.
- KPI 1.5 - Non-conformances focus on the process instead of isolated to the incident.
- KPI 1.6 - Appropriateness of the classification of the non-conformance statement/s.
- KPI 3.2 - Corrective action/s deal with the consequences.
- KPI 3.3 - Appropriateness of the action.
- KPI 4.1 - Follow up process in place.
- KPI 4.2 - Appropriateness of the verification frequency.

The main findings are that:

- 93% of the NCRs achieved an overall satisfactory rating of which 39% achieved “best” performance (A-B).
- The aspects relating to the quality of the non-conformance statement, the effectiveness of the corrective action and follow up of the corrective action, performed satisfactorily and are deemed effective.
- The Key Performance Area displaying the biggest weakness relates to the effectiveness of root cause analysis.

CHAPTER 5 CONCLUSION

The research evaluated the effectiveness of the non-conformance reporting system of ISO 14001 certification auditing in South Africa, from a certification bodies perspective. This chapter concludes on the results of the research, followed by recommendations for future research.

An international gap pertains to certification auditing research despite calls made by Lal (2004) on third-party certification bodies and by Heras-Saizarbitoria *et al.* (2013) for studying audits by third parties. Adverse perceptions exist with regards to auditing due to scandals in various industries and in South Africa; environmental legal non-compliance has led to a waning in the trust of ISO 14001 certification as a self- governance instrument (Craigie, 2009, Nel and Wessels, 2010). Furthermore, concerns have been raised with regards to the quality of non-conformance reporting and follow up (Henderson & Gallagher, 2008; Kumar, 2016).

5.1 Understanding the need for standards

The literature reviewed identified the operational and market benefits of conformance to standards, which the main benefits include; statutory and regulatory compliance (ISO, 2015b), organisational benefits which inter alia include stakeholder involvement (Castka *et al.*, 2015; Heras-Saizarbitoria & Boiral, 2013), a competitive advantage (Delmas, 2001), commercial benefits (Iatridis & Kesidou, 2018), encouraging the enhancement of suppliers environmental performance (ISO, ISO, 2015b) and improvement of corporate reputation (Jiang & Bansal, 2003). The link between these benefits and the quality of audits is imminent from the literature. The quality of auditors and modes of auditing are linked to the effectiveness of non-conformance reporting, furthermore, highlighting the need for standards to guide auditors.

5.2 The implications of not conforming to standards

Legal non-compliance and non-conformance to standards lead to the “integrity” of ISO standards and the auditing process being compromised also leading to reputational damage of the ISO 14001 standard and certification auditors. Non-conformance to certification auditing standards lead to adverse perceptions of certification auditing. As certification auditing standards form part of the principles of effective non-conformance reporting, non-conformance to these standards would lead to ineffective non-conformance reporting. This indirectly leads to the negation of the benefits obtained from ISO 14001, due to the link between the effectiveness of non-conformance reporting, audit quality and benefits of ISO 14001.

5.3 The requirements of effective non-conformance reporting systems.

The principles of effective non-conformance reporting are outlined (Section 2.4) and were derived from the standards and literature suggesting best practice for non-conformance reporting. The literature discussed several review methods relating to the quality of EIRs, as a review method aided in addressing the aim of his research. A review package (Table 3-2) was chosen as the method for this research design as it focusses on the content of the report and does not only determine its completeness as in a checklist review (Glasson *et al.*, 2005; Lee *et al.*, 1999)

5.4 Evaluating the effectiveness of a non-conformance reporting system of a Certification Body.

The study appraised the effectiveness of the non-conformance reporting systems of ISO 14001 certification auditing through a review of 102 non-conformance reports for 47 clients over various industries and performed by 17 different auditors. An evaluation research methodology was used to establish criteria (Table 3-2), to measure the reports against principles identified in the literature (Section 2.4) in order to determine the effectiveness of the non-conformance reporting systems of ISO 14001 certification. A scoring model (Glasson *et al.*, 2005; Lee *et al.*, 1999) (where alphabetic scores are assigned based on qualitative criteria) was used to evaluate and categorise non-conformance reports. The study showed that overall 93% of the NCRs were graded satisfactory (A-C), of which 39% achieved the “best” rating (A-B). This, therefore, indicates that non-conformance reporting systems of ISO 14001 certification auditing in South Africa are *effective* when looking at it from the certification bodies perspective.

The quality of the non-conformance statement, the effectiveness of the corrective action as well as the follow up on the effectiveness of the corrective action, performed well seeing that the majority of the NCRs achieved the “best” rating (A-B). This indicates that auditors can form non-conformance statements well and that the certification body has an effective system for accepting corrective actions and following up on their effectiveness. Room for improvement is however always possible seeing that 0% of the overall effectiveness achieved an A-rating. Weaknesses identified in the results correlate with issues identified in international literature pertaining to the subject (IEC, 2015; Henderson & Gallagher, 2008; Nicolini *et al.*, 2011; Peerally *et al.*, 2017; Sobel, 2017; Sweeney & Pierce, 2015).

Even though the majority of the results were positive, it was evident that there is a need for improvement with regards to the acceptance of the root cause analysis from the client. This is in line with international research indicating ineffectiveness with root-cause analysis relating to, documented evidence, numerous section involvement, complex causation and single incident

focus (Henderson & Gallagher, 2008; Nicolini *et al.*, 2011; Peerally *et al.*, 2017; Sobel, 2017). The root cause is submitted to the certification body along with the corrective action plan. The certification body does not receive the analysis which could attribute to the acceptance of weak explanations from the client as Henderson and Gallagher (2008) and Sweeney and Pierce (2015) stated. The root-cause analysis is an important part of the non-conformance reporting as it allows for effective decision making to eliminate the cause and prevent recurrence of the non-conformance)(IEC, 2015; ISO, 2014). If not performed well it could lead to inappropriate actions and recurrence of the non-conformance.

5.5 Learning from the method

As the min-dissertation is a partial fulfilment of the requirements for the degree Masters in Environmental Management, the work is required to be the authors own work. As the evaluation is perception based, it is recommended that the review be conducted by two independent reviewers and where large discrepancies occur, that the two reviewers convene to agree on a score as suggested by Lee *et al.* (1999)

5.6 Recommendations to practice

From the research conducted a weakness was evident regarding the acceptance of the root cause analysis by the certification body. I would, therefore, recommend that the evidence of the root cause analysis be submitted to the certification body as it is key in identifying the underlying cause in order to correct it and prevent recurrence of the non-conformance (IEC, 2015).

Furthermore, I would recommend that the certification body use the analysis, which contains information on the auditor performing the work, to pinpoint exact issues in order to address them.

5.7 Recommendation for future studies

As the study pertained to a Certification Body, it is recommended that the study is extended to organisations' internal non-conformance reporting as the environmental performance lies with them as key. As the external audit is over a short period, various non-conformances can be picked up internally that may not have been picked up during the external audit (Russell, 2006; Tam *et al.*, 2006). Furthermore, it will allow the determination of whether corrective actions are taken timeously with the organisation, which is a KPI that cannot be verified from the Certification Bodies perspective.

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