

**Effective implementation of third-party
recommendations in the mining
industry**

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Abstract

The research work herein details the findings in the investigation of factors that determine the success of implementing third-party recommendations in the South African mining industry context. The South African mining industry is characterised by a unique combination of challenges such as increasing production costs, sustainability pressures, aging mines, low adaption of new technologies, reverting to the old tried and tested methods and deteriorating productivity. This paper discusses these success factors by addressing three main areas namely, the role of consultants in formulating recommendations for process improvement, the context in which implementation is carried out, and the drivers for successful implementation of the consultant recommendations.

The research was conducted by carrying out an empirical study of the perspectives and experiences of mining industry professionals by means of semi-structured interviews with 15 respondents, identified using purposive and convenience sampling, who participated in the study. The respondents were drawn from two groups, consultants and mining company middle to senior management, and their perspectives, were consolidated into one set of findings. The survey instrument was an interview questioning guide developed by literature review and pilot interviews with industry experts. The interviews were followed by a qualitative analysis of the data using the MERIL-DE model and interactive systems framework (ISF).

An eight-component factors model, a guideline for developing key factors for successful implementation of consultant recommendations in different operations in the South African mining industry was developed by adapting the MERIL-DE model and ISF frameworks. The factor components are organisational structure, management, project leadership, performance management, stakeholder alignment, expected outcomes, client-consultant dynamics and risk management. The research has also given factors that enables business to make considerations of the far-reaching implications of decisions on sustainable mining, sustainable communities and sustainable resource depletion. This knowledge will enhance implementation of business solutions leading to business improvement and systems optimisation. It will also promote improved adaption of technological solutions and the evolution of innovative, self-improving mining operations in the South African mining industry.

Keywords

Implementation

South African context

Recommendations

Process improvement

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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List of abbreviations

CPR	Competent Person's Report
CRM	Customer Relationship Management
ISF	Interactive Systems Framework
MERIL-DE	Measure, Evaluate, Report, Improve & Learn – Drive and Engagement
PWC	Price Waterhouse Coopers
SAIMM	The South African Institute of Mining and Metallurgy
SAMREC	The South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (the SAMREC Code)

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1. Chapter 1: Introduction to research problem

This research was on the factors that are key in promoting successful implementation of consultant recommendations in the mining industry. A lot of companies fail to bridge the gap between planning, in the form of consultant recommendations, and executing the recommendations, aptly termed the “implementation gap” or “execution gap”, (Olivier & Schwella, 2015) in order to achieve process improvement. This research will unearth the key drivers and impediments, for the mining context, which can be adapted for use in other contexts, as implementation success is context driven (Bryson & Bromiley, 1993; Peters, Adam, Alonge, Agyepong & Tran, 2013; Radnor & O’Mahoney, 2013).

This chapter presents the motivation behind the decision to research the critical factors for effective implementation of solutions, recommended by external consultants (third-party) in the mining industry.

1.1 Introduction

This chapter is divided into three sections. Section one describes why this topic was chosen and articulates the need for the research, section two describes the research problem and section three defines the research objectives.

1.2 Choice of topic

Research into the successful implementation of third-party recommendations in the mining industry was motivated by two factors, namely the author’s own experience and career trajectory.

The researcher worked in both operations and consulting in the mining industry which led to exposure to both the client and consultant perspectives in the third-party consulting interaction. As a client, the researcher interacted with external consultants which have since been recognised in early literature (Robinson, 1982), to be necessary for systematic and strategic planning, and in this role, experienced dilemmas of implementation failures which are discussed further in Section 2.5. As a consultant, the researcher observed documentation and reports that revealed that some consultant recommendations were not implemented, some of which had the potential to have made a significant positive impact on operations, with as much as 75% of projects failing at the implementation stage (Dalcher, 2018). Context has an influence on implementation success (Bryson & Bromiley, 1993; Peters et al., 2013; Radnor & O’Mahoney, 2013) thus the researcher recognised the need to expand implementation research to the South African mining context, where previously, it had largely been on the medical field (Peters

et al., 2013). The research was also aligned with the author's career path which lies in consulting to the mining industry.

1.2.1 Implementation versus execution

The Oxford Dictionary, like other researchers such as Alharthy, Rashid, Pagliari and Khan (2017), uses the term implementation interchangeably with the term execution and, both are defined as putting a plan into action. The Collins Dictionary's definition of the two terms give subtle differences, defining implementation as making sure something planned is carried out. In the same light, execution is defined as carrying out a plan. Using the Collins definitions, implementation emphasises putting together resources that set the action wheels into motion while execution is completing a task. The researcher thus preferred to use the word implementation in the research title because it provides the foundation for successful execution, which eludes a lot of projects (Dalcher, 2018; Olivier & Schwella, 2018).

1.2.2 Recommendations versus strategy

The research was an investigation of plans and actions in terms of recommendations as opposed to management strategy because strategy involves long term plans which morph over time (Buytendijk, 2015), and which are seldom fully implemented as originally set, in this ever-changing business environment where the operating environment in terms of customers, trends, inputs, technology, communication, regulations and economics are always changing. Management brings in consultants (Darkow, 2015) who come up with recommendations that will allow the business to morph towards the overall business goals.

1.2.3 Why third-party recommendations?

The researcher was specifically interested in third-party recommendations as opposed to general recommendations, so as to get a better understanding of the role that consultants play in facilitating change in mining organisations. Giving recommendations is one of the key deliverables from consulting companies, and organisations pay a lot of money for consulting services (Poulfelt, Olson, Bhambri, & Greiner, 2017), therefore this research will help businesses understand the drivers for maximising the outcomes of these expensive services. Businesses have since realised the importance of finding out-of-the-box solutions to operational problems or for generating new ideas in order to remain relevant and competitive. External consultants thus have a significant role to play in this (Leiby, 2018).

1.2.4 Context

The study focused on the mining industry because in this industry, implementation failures have far reaching implications (Durlak, 2016) in terms of macroeconomic effects, safety, labour and sustainable development implications (Alharthy et al., 2017; Plenkers, Kwiatek, Nakatani & Dresen, 2010).

From a macroeconomic perspective, South Africa is a services economy (Carmody, 2019) and even Botswana which was boosted by diamond mining gets twice its GDP contribution from services than from mining (tradingeconomics.com, n.d.). Despite all this, mining still contributes significantly to GDP (Chamber of Mines of South Africa, 2016), and mining enables the fulfilment of more than half of the NDP goals (Baxter, 2015). The effects of mining are also demonstrated by how fluctuations in commodity prices have ripple effects across most other sectors (Arezki, Dumitrescu, Freytag, & Quintyn, 2012).

Mining in South Africa began over one hundred years ago leading to the gold rush when the Witwatersrand gold basin was discovered at the Langlaate farm in 1886 (Jones, 2016). Since then, shallow deposits and easily accessible deposits are a rare find, with the majority of mines suffering increasingly poor accessibility. In fact, the world's deepest gold mine, Mponeng is situated on Gauteng's west rand (Manzi, 2014; Ptak, Podolska & Podolski, 2018). A consequence of having deeper mines is that seismicity increases and accidents become more prevalent (Plenkers et al., 2010), therefore any corrective action around depth challenges require swift implementation. In general, mines in Africa are not well coordinated (Mitchell, 2016) and are still labour intensive (Neingo & Tholana, 2016). As a result, in addition to facing serious human safety consequences (Willis, Dixon, Cox, & Pooley, 2004), the mines also have labour relation challenges (Plageron, Patel, Hochfeld, & Ulriksen, 2019) which need to be addressed by agile implementation of recommendations when issued (Verma, Khan, Maiti, & Krishna, 2014).

Although the study was taken in the mining context, the results thereof can be applied to other contexts and have ripple benefits in many sectors of business as the concept of implementation and the use of external consultants covers all sectors of any economy.

1.2.5 Research scope

This research covered the fields of strategic management, performance management and innovation, and is aimed at uncovering the critical factors that drive uptake and implementation of consultant recommendations in the mining industry.

Third-party consultants are an outsourced service employed by management to help meet strategic goals. This involves either helping management solve operational problems that are derailing the attainment of strategic goals, or to optimise and find the best solution possible to quickly and efficiently attain these goals.

Stowe and Grider (2014) identified implementation as one of the components of innovation, a key ingredient for competitive advantage (Coccia, 2017; Hinterhuber & Liozu, 2017).

1.2.6 Background to the research problem

Companies in the mining industry, like companies in other sectors, seek external advice and support (Srinivasan, 2014). External consultants are hired mostly to, among other things, diagnose problems, provide solutions and provide specialist resources. External consultants can also come in to form partnerships to achieve systemic improvement and provide independent, unbiased and objective opinions (Hazle-Bussey, Welch & Mohammed, 2014). However, successful implementation of the solutions or strategies seems to remain problematic, and as a result, companies do not benefit from the solutions because they are not effected (Olivier & Schwella, 2018).

The mining industry in South Africa has been plagued by negative publicity around issues regarding safety and industrial relations (Hill & Maroun, 2015) and the researcher asserts these to be symptoms of execution gaps. Evidence of this is provided in literature. For example, Power and Gwanyanya (2017) found that one of the reasons for the Marikana massacre was failure to implement good housing conditions. Further afield, one of the reasons for the accidental oil spill by BP off the Gulf of Mexico was caused by implementation failure (Griggs, 2011). Mining in South Africa has been taking place for decades, and as mines get older and deeper (Manzi, 2014)., new technologies are required for efficient extraction, improved safety and better risk management (Domingues, Baptista, & Diogo, 2017). However, most mines have been unable to successfully implement new technologies (Macfarlane, 2001), which can enable reconfiguration to meet new challenges or build dynamic capabilities to pre-empt potential shifts in the operating environment (Harreld, O'Reilly & Tushman, 2007).

Bringing in external consultants is viewed with resentment by some managers who think they come in, make obvious recommendations, and leave them to pick up the pieces (Hass, 2015). Despite this, the value of the dynamic capabilities and fresh perspectives brought on board by third parties cannot be denied. Particularly when disruptive innovation demands these dynamic capabilities. It is important to note that a significant

proportion of external consultant engagements do not result in implementation of the intended interventions. This is due to the focus on leaving the client with reports (Turner, 1982) containing recommendations that are tucked away in unopened reports (Sull, 1999) that are based on non-peer reviewed and therefore non-credible evidence. Some are just re-packaged known problems, and tested solutions which consequently lead to another consultant's services being requested (Oliver, 2014).

Implementing strategy and expert-derived recommendations are important in the South African mining industry which has increasing mechanisation, sustainability and safety concerns (Plenkens et al., 2010), prompting this research into key factors for implementation success in this context.

1.2.7 Significance of research

The process of finding alternative methods to improve operations or diagnosing the cause of problems in a business, providing recommendation to solve these problems and implementing the recommendations are important stages of business improvement. They are critical to keep processes migrating to keep up with the pace of the business environment, to keep up with competition and to make room for new innovations (Popa, Preda & Boldea, n.d.). Leiby (2018) shows how companies may fail to identify the benefits of process improvement and thus employ external consultants to help prove these benefits. The external consultants can do this by looking at the business with a fresh pair of eyes, objectively as they are not intimately involved in the business, and bringing fresh insights (Back, Parboteeah & Nam, 2014) to an otherwise stagnant, jaundiced and often biased view offered by internal employees. However, in the business improvement cycle of diagnosing, recommending and implementing, implementation is the stage that requires effort from the firm (Alharthy et al., 2017). This comes in the form of mobilising human and capital resources and because of the effort required, many businesses fail to follow through at this stage (Alharthy et al., 2017), and thus fail to achieve business improvement. This research unearthed how mining as a primary industry, in an emerging African economy context needs to action external consultant recommendations as catalysts of change and innovation. The research demonstrated to the rest of business how implementation is paramount for business to remain competitive.

1.2.7.1 The business need for the study

This study is relevant to business because the engagement of external consultants' results in recommendations that are designed to realign the business with management goals to help meet strategic objectives.

The consulting industry is a billion-dollar industry which is growing (Kaplan, 2017), more so now as it migrates towards digitalisation and lean staffing, emphasising its relevance and awarding importance to the output of consultancy services in business. The cost of consulting alone ought to motivate companies to follow through on consultant recommendations so as to maximise the benefits of this costly service, but surprisingly, a lot of companies experience implementation failure. In addition, following through on implementing business improvement recommendations means companies are innovating in increments (Popa et al., n.d.). Innovation, which is defined as developing new and unique ways of addressing societal wants and needs (Jali, Abas & Ariffin, 2017) or inventing new products or services (Ebikake, Sassanelli & Terzi, 2018) can either be radical or incremental. Uber is one of a handful of companies that achieved dramatic innovations and achieved exponential success due to new and inventive approach to dealing with societal challenges (Christensen, Raynor & McDonald, 2015). However, such radical innovations are few and far between and there was need to recognise incremental innovation that average businesses can identify with. The key must lie in the implementation of recommendations for process improvement. If a business for example faces an operational challenge and fails to implement technical recommendations either by internal or external experts, it fails to utilise process improvement opportunities presented by the process of elimination and developing new and inventive ways of thinking which necessitates engaging external consultants because the ideas from internal professionals would have been exhausted.

The mining industry, as the sector of focus, requires disruption to optimise mineral extraction and exploitation of scarce resources, as well as to minimise loss of life. However, it still faces implementation challenges which inhibit innovation in addressing operational and mining business improvement. Investigating the success factors for implementation in the mining context can then be adapted for other business environments.

1.2.7.2 Theoretical need for the study

The theoretical need for this study was grounded in the need to understand the application of implementation frameworks in the mining business and to delve into the

South African mining context as a construct, investigating its role in influencing implementation. This paper was intended to contribute to research in the role of implementation in driving change in the mining industry. The role of implementation in opening doors for innovation was also articulated, especially given that innovation has been recognised as a key driver of competitiveness (Back et al., 2014).

1.3 Research problem

The problem that was addressed by this research was the implementation gap facing business in the South African mining industry, which is economically fragile due to labour problems, buckles easily with commodity price fluctuations (Domingues et al., 2017) and is susceptible to unfavourable policy changes in South Africa's unpredictable policy environment (Butler, 2013; Harvey, 2013; Redl, 2018). Past research addressed the implementation gap for business in general (Alharthy, et al., 2017; Chetty, 2010; Olivier & Schwella, 2018; Sterling, 2003) but did not address the South African mining context.

This research addressed implementation in the South African mining context through a qualitative investigation of the factors that influence the successful uptake and actioning of external consultants' recommendations.

1.4 Research objectives

While a number of papers discuss the operational challenges faced by the mining industry (Macfarlane, 2001) little work has been found on implementation in this context. Implementation, if not followed through, or done correctly, does not benefit the firm (Leiby, 2018), so this research examined the critical factors for successful implementation in South African mining by applying the Interactive Systems Framework (ISF) (Wandersman et al., 2008) and the MERIL-DE model (Olivier & Schwella 2018), and extended the analysis to the effects of implementation on innovation in the mining industry. The researcher had these three main objectives:

1. Establishing the role of the external consultants in driving implementation of own solutions;
2. Identifying the critical factors that lead to successful implementation as well as understand the ones that lead to failure in the South African mining context by addressing how the South African mining environment influences the critical success factors;
3. Developing a structured approach to implementing third-party recommendations and identifying how successful implementation is defined in mining.

Establishing success factors for the firm will enable South African mining companies to optimise the continuous cycle of evaluating, planning (Talen, 1997) and implementing projects and for cost effective consultation from external consultants.

This research contributes further knowledge about maximising the benefits of engaging consultants in deriving innovative solutions that will propel the mining industry forward. Back et al. (2014) found that, though external consultants drive innovation, the benefits may not always be realised if the recommendations from these consultants are not carried out, so the researcher wanted to determine the critical success factors in the South African mining environment.

2. Chapter 2: Literature review

This chapter describes the literature that led to the formulation of this research, and provides a summary of the previous work done in the field of implementation. It addresses the main research areas, the research gaps that were found as well as theoretical frameworks that were developed, whose application relevance was investigated in this study.

2.1 Introduction

This chapter is divided into four sections which constitute a review of previous literature on the subject of implementation. Section one looks at previous authors, their different approaches to implementation studies and the frameworks that they applied. Section two looks at how previous authors viewed the role of third-party consultants and the findings in literature of the role they played in implementation research. Section three discusses the South African mining context and how it might affect implementation and section four addresses the concept of implementation and summarises the challenges and success factors identified in literature, and also delves into how literature views implementation in relation to innovation and process improvement.

2.2 A brief description of previous work

Previous research and the identified gaps in academic literature that motivated the need for the research herein are summarised in this section.

2.2.1 Bodies of literature

To carry out the theoretical inquiry, the researcher focused on three broad bodies of literature, firstly looking at the consulting industry and its role in implementation of recommendations, secondly the South African context and its effect on implementation and finally looking at implementation and execution, and their role in process and business improvement. The literature was searched for using two methods, firstly using key word computer searches in the research databases primarily Google Scholar, EBSCOhost and JSTOR and secondly combing through the references from journals identified using the first method.

2.2.1.1 Lead authors

In the last five years, scholarly research on the topic of the engagement of management consultants has been around the role of consultants in facilitating the adaption of digital platform in business (Christensen, Wang & van Bever, 2013), and the scholarly research

on implementation has been in the medical field (Chambers, 2012; Oliver, 2014; Peters et al., 2013).

In the field of implementation and execution, one of the lead authors is R. S. Kaplan who together with D. P. Norton (Kaplan & Norton, 2001), carried out extensive work on performance management from the mid-1990s. These two authors are well known for developing the balanced scorecard as a measure of management effectiveness in implementation of project action plans.

In the field of strategy, well known theorist R. Rumelt authored a book that differentiated good strategy from bad strategy (Rumelt, 2017). In this book, Rumelt defined one of the characteristics of good strategy as having a set of coherent actions, a characteristic which reflects implementation, and articulates the foundational factors, critical for developing plans that command seamless implementation.

Studies on innovation have been conducted for decades with different theories on how to innovate as well as the definition of innovation itself evolving over time. Innovation was considered to be borne of focusing on problem framing (Yeo, 1995) and inviting professionals to consider conditions and environments that help them to think (Hargrove and Nietfeld, 2015) and thus become innovative.

Studies into effectiveness of consulting have been conducted since the 1970s with works by Professor Arthur Turner studying consulting and developing the hierarchy of consulting purposes framework (Turner, 1982), which listed eight roles of consultants, of which provision of recommendations and assisting in implementation were among the roles identified as traditional.

The South African mining environment is unique in that it has not just complex business and economic environment (Redl, 2018), but has unpredictable physical factors such as location affecting logistic, social and environmental affecting social license to operate and mineral resource definition (Butler, 2013; Harvey, 2013; Macfarlane, 2001).

The journals that were foremost in the hosting publications on implementation were the strategic leadership, strategic management, strategy and leadership and the MIT Sloan management review journals. The implementation science journal looks at the medical field (Peters et al., 2013), but general implementation challenges and success drivers from these were used in this research.

2.2.1.2 Approaches to study

The success factors driving implementation have historically been around the execution of company strategy (Alharthy et al., 2017; Beer & Eisenstat, 2000; Chetty, 2010; Dalcher, 2018; Durlak & Dupre, 2008; Krishnakumar, 2015; Miller, 1997; Richardson, 2008) and review of previous literature revealed two main themes. The first theme was that implementation of company strategy was internally driven (Chetty, 2010; Kaplan & Norton, 2008; Olivier, 2015), thus there is an element of intrinsic drive to meet own-goals. The second theme was that strategy, which is basically desired outcomes (Rumelt, 2017) that are based on the company's vision and mission, is not usually accompanied by step by step clear-cut how to. There was thus a need to refocus implementation studies at a level that allows for the application of implementation models that provided the basic recipe for implementation success. Companies thus turn to consultants to identify appropriate models as they possess intellectual property that can suitably inform selection (Ernst & Kieser, 2002)).

Research into the value derived from utilising the services of external consultants and the effectiveness of their solutions has been in three main facets namely engagement (Chelliah & Davis, 2011), process improvement (Lemus-Aguilar & Hidalgo, 2015) and implementation of proposed process improvements (Durlak & DuPre, 2008)). Significant research has been around management consulting (Brandon-Jones, Lewis, Verma & Walsman, 2016; Srinivasan, 2014) with much less on specialty consulting, and less so, in the mining industry, so this research followed up on the implementation facet by applying it to the mining context to identify key drivers in this sector.

2.2.2 Debates in implementation research

The main debates in implementation research in the past have resulted in four main themes on implementation success emerging. The first was around what was considered successful implementation and this evolved around the expected and actual outcomes. The second was around alignment (Dalcher, 2018) which has two facets namely buy-in from the team and whether company resources and capabilities were designed to see out the implementation. The third theme was strategy formulation in particular when it comes to the feasibility of the plan and fourthly, closing what is termed the execution gap which was studies on how to achieve implementation success (Olivier & Schwella, 2018) which is the crux of this research.

Understanding implementation continues to elude management hence some of the implementation failures (Cummings, 2010; Sull, Sull & Yoder, 2018). This research

therefore delved into factors that cause this, particularly for the South African mining industry.

2.2.3 Recent developments in implementation research

Following through with operations improvement recommendations continues to be a challenge for a lot of companies, let alone recommendations from third parties, and as a result there is a continuous loop between engaging consultants who develop recommendations, implementation and performance measurement to determine implementation execution success. In the past few years Sull, Turconi, Sull and Yoder (2017) have published research articles in the MIT Sloan management review on strategy management, while work by Brandon-Jones et al. (2016), Bronnenmayer, Wirtz and Göttel (2016), Chelliah and Davis (2011) reviewed the consultant relationship with particular emphasis on implementation of recommendations.

Recent works on strategy acknowledge that planning was prioritised over implementation in operations management but both were critical in achieving company goals (Alharthy et al., 2017; Dalcher, 2018; Hass, 2015). Implementation is now being researched in detail with several works focusing only on the strategy implementation gap (Alharthy, et al., 2017; Chetty, 2010; Olivier & Schwella, 2018; Sterling, 2003).

Olivier and Schwella (2018) demonstrated the importance of contextualising the concept of implementation by investigating implementation in the public sector framework and developing the MERIL-DE framework for successful implementation in public sector projects. The health profession has set up forums to support implementation research in order to speed up implementing the practice of interventions discovered in medical research (Chambers, 2012).

2.2.4 Recent developments in the consulting industry

The consulting industry has in the last decade experienced extreme digital transformation (Nissen, 2018) which is now seeing an increase in what Seifert and Nissen (2018) termed virtual consulting, where self-service platforms or internal processes solution models are built for clients (Christensen et al., 2013). Demand for consulting services continues to grow (Krivokapić, Savić & Čudanov, 2016; Srinivasan 2014) as clients derive value from among other benefit, unique business solutions, not having expensive employees on a company's payroll as well as having a dynamic team of external consultants (Alharthy et al., 2017).

The competition in the consulting industry and the number of consulting companies being formed is ever increasing due to the attractiveness of the consulting fees. However, more and more clients are demanding value for the costs they have to pay (Srinivasan, 2014), so the value-based pricing model is becoming the preferred billing model (Christensen et al., 2013), and implementation plays a significant role in the realisation of value (Alharthy et al., 2017). The increase in the number of consulting start-ups is further fueled by retrenchments and retirements in the mining industry affecting competent personnel who have to then offer their expertise and technical know-how on a consultancy basis and start consulting companies instead of going back into employment (Dychtwald, Erickson & Morison, 2004).

The last few years has seen the transformation of what were traditionally accounting and financial audit firms into management consulting companies (Krivokapić et al., 2016; Kubr, 2002). Such companies include Deloitte, PWC and Ernst and Young. The degree of technical know-how demanded of internal personnel goes beyond educational qualifications and years of experience of the individual in carrying out the task (Biggs, 2017). They now also need to think outside the box to bring new solutions to old problems, have good people skills and project management skills as well. The ability to think outside the box will help co-develop good strategies and new ways of looking at and tackling business issues (Schoemaker and Krupp, 2015).

In the late 1970's to early 1980s, the role of consultants included implementation (Turner, 1982), but had in the past decade, excluded implementation as part of the consultant roles (Srinivasan, 2014) as they were seldom in control of the projects. However, since implementation plays a significant role in the realisation of the value of using consultants, it is becoming one of the important roles of consultants (Olivier, 2015).

2.2.5 Frameworks and models used in recent implementation research

Implementation studies, particularly in the field of execution, have culminated in several implementation models, though few are suitable for a third-party intervention framework, nor are they applicable to the South African mining context as it is difficult to make existing models suit multiple contexts (Chambers, 2012). In addition, most frameworks put more emphasis on the definition of the plan and do not address implementation with the gravity it deserves (Richardson, 2008).

Table 1 analyses the main implementation models and frameworks developed over the years and provides an analysis of why the model or framework was not adapted for this research.

Table 1: Summarised implementation research models

Model/Framework	Adaption comment
<p>Five obstacles to strategy execution model Hrebiniak (2006) developed the five obstacles to strategy execution model which named key obstacles as poor management, poor or vague strategy, poor dissemination of the plan, poor alignment of the plan to current organisational structure and poor definition of roles and responsibilities.</p>	<p>This model did not fit this research because it pointed to internal processes in an organisation as opposed to third-party external forces which were the focus of this research.</p>
<p>The ecological framework In this model Durlak and DuPre (2008) investigated eight aspects of implementation which were fidelity, dosage; quality, participant responsiveness, programme uniqueness, comparison conditions, programme reach and modification made during execution.</p>	<p>This model takes a reactive approach to solving the implementation dilemma, whereas this research aimed to find proactive measures or models for successful implementation.</p>
<p>Execution premium process model Kaplan and Norton (2008) developed the execution premium process model for strategy execution which comprised six steps namely, developing the strategy, planning the execution, aligning the organisation, setting up operations, monitoring the process and finally adapting the strategy.</p>	<p>This model was found to be inapplicable for this research because it could not be applied at project level as it is intended for significant changes to the organisation which is not practical for multi-project scenarios which are typical in the mining setup.</p>
<p>ISF Wandersman et al. (2008) developed the ISF which is used in the adaption of new methods, technologies or processes by identifying and classifying the key implementation drivers into three systems of synthesis, dissemination and process.</p>	<p>This framework was adapted for this research as it covers not just the key success factors of implementation in general, it also addresses the context, emphasises the need to translate the vast research on strategy to action, and also identifies the important role of consultants in developing solutions for the implementation of new processes or solutions that mining companies have little or no experience in.</p>
<p>Stages framework Fixsen, Blasé, Naoom and Wallace (2009) developed the stages framework which consists of six steps of implementation namely exploration, installation, initial implementation, full implementation, innovation and sustainability, all which have a nonlinear complex order of occurrence</p>	<p>The researcher did not apply this model because the initial and full implementation stages were found to be unsuitable to the mining context which is fickle and is a one-chance discipline particularly in terms of safety and sustainable resource extraction.</p>
<p>Four-step model Sull, Homkes and Sull, (2015) discuss a four-step model, summarised as the translation of strategy into objectives, cascading of the objectives, performance measurement and reward. They also outlining four-myth framework to guide managers away from the pitfalls of execution failure which emphasises the importance of having an agile organisation, culture and the organisational structure.</p>	<p>Although this model speaks to the uncertainty and the need for effective communication in this highly unionised and community sensitive mining environment, it tends to focus on the internal processes of the organisation.</p>
<p>Four disciplines of execution model McChesney, Covey and Huling (2016) developed the four disciplines of execution</p>	<p>This model was unsuitable for the research context where nothing is considered</p>

Model/Framework	Adaption comment
model which they describe as having been developed by trial and error which are essentially focussing on a narrow set of objectives, acting on lead measures, keeping score and clearly defining accountability.	unimportant. Which refutes disciplines one and two.
Four factors model Alharthy et al. (2017) developed a framework that grouped the success factors into four major groups of management decision, employee engagement, organisational systems and organisational performance	These four steps cover the keys factors for implementation by putting them in broad categories, however, they are more suitable for internal processes.
MERIL-DE model Olivier and Schwella (2018) developed the MERIL-DE model which identifies nine components that are key to successful implementation and these are leadership, strategic planning, project management, alignment, performance management comprising the Measure, Evaluate, Report, Improve and Learn MERIL elements, drive, engagement, risk, and stakeholder management. This model was developed for the public sector and it addresses the context of application as well as the regional innovation systems model developed by Van den Heiligenberg (2017).	This model was adapted for the research as it provides practical key factors that relate to the South African mining context.

The ISF for dissemination and implementation by Wandersman et al. (2008), coupled with the MERIL-DE framework (Olivier & Schwella, 2018) were applied to this research as they both cover the context of the research and together summarise and detail the necessary steps to achieve successful implementation.

The ISF was developed for the medical field (Brodowski et al., 2013) and it emphasises application in context as well as the translation of a body of research into practise (Wandersman, 2016). The field of strategy has been significantly researched (Alharthy et al., 2017; Kaplan & Norton, 2001) but despite this, many businesses failed and it was found that implementation was key (Krishnakumar, 2015; Olivier & Schwella, 2018), and key to business survival (Alharthy, 2017). The ISF is a leading framework for translation of research into application (Brodowski et al., 2013; Chambers, 2012), however it does not support continuous improvement (Reed, Green & Howe, 2018).) and therefore, the author coupled the ISF with the MERIL-DE framework which addresses this in the MERIL cycle of the framework (Olivier, 2015).

2.2.6 The research gaps identified in literature

The following summarises some research gaps in previous literature which were addressed in this particular study.

Olivier and Schwella (2018) proposed further research around the testing the robustness of MERIL-DE model to other contexts and implementation research.

Alharthy et al. (2017) recommended future work on implementation around investigating different industries and companies which achieved successful implementation.

One of the research gaps identified by Chetty (2010) was extending the sample to include executives who were not successful in executing company strategy, however the current research was success neutral.

2.3 The role of external consultants

The literature review into the reasons why companies engage the services of external consultants was carried out to understand the work done so far to addresses the first research objective of understanding the role of external consultants. The review highlighted five main need areas namely:

- Access to up-to-date management practices (Evers & Menkoff, 2002; Glückler & Armbruster, 2003; Radnor & O'Mahoney, 2013),
- providing support and advice to top management (Bonnenmeyer, 2016; Ernst & Keiser, 2002; Evers & Menkoff, 2002; Fincham,1999; Owusu-Manu, Addy, Agyekum, Aidoo & Okide, 2017; Srinivasan, 2014; Vukotić, Aničić & Vukotić, 2017; Wang & Chen, 2014)
- supplementing technical capacity (Chelliah & Davis, 2011; Cohen, 1999; Wang & Chen, 2014)
- new projects and new technologies (Cohen, 1999), (Oliver, 2014; Poulfelt et al., 2017; Radnor & O'Mahoney, 2013; Seifert & Nissen, 2018; Vukotić et al., 2017; Wang & Chen, 2014)
- consultants' diverse knowledge, experience and intellectual property (Ernst & Keiser, 2002; Evers & Menkoff, 2002; Nissen, 2018; Sarvary, 1999; Seifert & Nissen, 2018; Turner, 1982; Vukotić et al., 2017; Williams, 2004)

Consultants go beyond just providing experts, but providing a wealth of knowledge (Lăzăroiu, 2015) from the consultant's intellectual property and in literature, are often referred to as knowledge entrepreneurs (Sarvary 1999; Wang & Chen, 2014; Williams, 2004), for the provision of independent and fresh ideas in solving business problems and supplementing staff for tasks that require technical skills, or were lean staffing is employed to cut costs (Baatartogtokh, Dunbar & van Zyl, 2018). They also isolate projects as the area needing consultants due to the implementation challenges, as well as new

technologies and up-to-date management practices experienced in projects. Vukotić et al. (2017) summarises the need for consultants to be around solving challenges and introducing new technologies to an organisation.

Consultants play a pivotal role in implementation (Vukotić et al., 2017), with larger companies being better at implementation and using local consultants improving the chances of getting implementable recommendations Wang and Chen (2014). Lemus-Aguilar and Hidalgo (2015) have also shown how consultants drive innovation because as their recommendations are implemented, the company (client) becomes a dynamic engine as it identifies, actions and solves issues, cultivating innovation as they find improved and better ways to operate. However, implementation is dependent on many factors such as the principal-agent problem (Beer & Eisenstat, 2000) and acceptance threats (Bourgoin & Harvey, 2018) as well as how the proliferation of consulting firms, each offering the same product packaged differently, has contributed to the low uptake of designed implementation programmes (Samman & Quenniche, 2016).

External consultants are also hired to bring diverse views and to act as coaches for change (Evers & Menkoff, 2002). They play a significant role as destabilisers and teachers who introduce the trending business solution methods to organisations (Williams, 2004). The role of regulation in driving need for third-party engagement, should not be under-estimated as consultants play significant role in legitimising management decisions by providing independent reviews and certifying management parameters (Ernst & Keiser, 2002).

Olivier (2015) emphasises the need for the client-consultant to not only derive solutions together, but to implement the recommendations together and this was also investigated in this study.

2.3.1 The definition of consultants

External consultants in the context of this research, in part referred to as third parties, outside help or as simply consultants include any person or organised entity that provides advisory services in a temporary role (Krivokapić et al., 2016; Van den Berg, 2011). It excludes contractual appointments and outsourcing services such as load and haul, construction or drill and blast.

2.3.2 The demand for consultant services

Due to rapid digital transformation, the continual development of new technologies, and the need to harness the benefits of up-to-date management practices, the demand for

consulting services continues to rise as companies seek to remain competitive (Cohen, 1999; Krivokapić et al., 2016; Oliver, 2014; Poulfelt et al., 2017; Radnor & O'Mahoney, 2013; Seifert & Nissen, 2018; Vukotić et al., 2017; Wang & Chen, 2014). The boom in consulting services was recognised even in the late 1990's (Ernst & Keiser, 2002), and can be attributed to the fourth industrial revolution and the subsequent demand for dynamic capabilities as well as increased demand for corporate images (Brès & Gond, 2014).

2.3.3 Consultants as agents for implementation success

Consultants, whether participating in projects or operations are, as with other operational functions, helping managers in directing companies' resources and energy, towards meeting its operational and/or strategic goals. Recommendations are an incremental approach to achieving these goals because they are as a result of attending to specific problems that have derailed the business processes, or to specific projects that are either to accelerate or compliment the business processes. Consultants are independent and objective (Sonnenberg, 2003) complementing management's inclination towards subjectivity in decision making, problem analysis and implementation (Buchanan & Henig, 1998).

2.4 Context

Different contexts present consultants with unique challenges (Peters et al., 2013; Radnor & O'Mahoney, 2013) and the structure of an industry influences the success factors for implementation (Owusu-Manu et al., 2017). This spurred this research into the mining industry context, which is also unique in its high susceptibility to safety challenges (Gowrisankaran, He, Lutz & Burgess, 2015; Willis, Clarke & O'Connor, 2017). The researcher reviewed literature that addressed elements of the second research objective of identifying a suitable contextual framework, to analyse these variables for the South African mining setting.

Why the South African mining environment? The researcher recognised the importance of understanding implementation in the South African mining context as the mining industry in South Africa has a significant role to play in attracting FDI (Kothari, Kotabe & Murphy, 2013) sparking interest in this research. South Africa is also in a unique position of being an emerging economy (Meyer, Estrin, Bhaumik & Peng, 2009), in a continent of undeveloped countries and neighbour countries like Zimbabwe that are currently considered poor economic performers (Larochelle, Alwang & Taruvinga, 2014). This paper thus intended to analyse implementation success in this context for mines which,

under normal circumstances, already face escalating production costs, commodity price fluctuations, currency exchange vulnerability, skills shortages and productivity challenges (Neingo & Tholana, 2016).

The consulting industry as a major player in driving firm strategic goals (Alharthy et al., 2017; Turner, 1982), had a significant role to play in this context, and thus following through on their recommendations was identified as a key area for research. In addition to the macro-economic environment, mining companies in the South African mining context face greater risks as mines are getting deeper, mining methods more complicated, sustainability, labour issues (Lester, 2014; Mkhize, 2016) and safety taking centre stage and moves are towards automation (Conradie, 2018).

As with the need to speed up implementation in other key fields such as medicine in order to speed up the conversion of research into practise (Chambers, 2012), speeding up implementation in the mining sector is important, and is imperative for three reasons:

1. To keep a safe working environment, which in South Africa which has been mining for over 100 years (Neingo & Tholana, 2016) is becoming more elusive as mines get deeper and resources in structurally simple environments become scarcer;
2. To speed up environmental sustainability and environmentally friendly waste rock disposal and surface excavation rehabilitation. This includes operating with legal environmental frameworks for maintaining local communities in which mining operations are located; and
3. Sustainable mining – not to sterilise and make key mineral resources inaccessible as well as identifying and protecting strategic reserves (Malan, 1981).

The South African mining context has many challenges and opportunities (Baxter, 2016; Limpitlaw, 2004) that require complex strategies and innovative solutions, and consultants often provide recommendations for overcoming some of these challenges and exploiting the opportunities for achieving company goals.

Geographically, South Africa is considered the most competitive in Sub-Saharan Africa (Grobler & De Bruyn, 2018). Some of its neighbours such as Zimbabwe are economically unstable and thus South Africa sees an influx of economic refugees (Pretorius & Blaauw, 2015). The mines are some of the key destinations for the lower end migrant labour (Adekoye, Asuelime, & Okem, 2015), while the executive positions are also to a much lesser extent being filled by foreign nationals as a skilled labour brain drain also sees exiting of specialised skills (Mogotsi, 2005) due to South Africa's own post-apartheid challenges.

Socially, the engines of the mining industry, the mines themselves, are located in remote areas, and over the years, driven by the desire to have labour close, the mines established housing around the mines (Gough, Yankson, & Esson, 2018)) which have evolved into towns and some such as Rustenburg have become major metropolitan cities. These cities and towns rely heavily on the mine and auxiliary services that service the mine, and its workers for economic viability otherwise they dissolve into ghost towns. Unemployment and poor education in these remote towns sees mines facing a social burden and social responsibility to upskill and employ these youth (Oluwajodu, Greyling, Blaauw, & Kleynhans, 2015). Communities continue to play a significant role even affecting major management decisions and regulation in some aspects of the mining business as stipulated in the Mineral and Petroleum Resources Development Act (Act 28 of 2002) (Department of Mineral Resources, 2018) which requires mines to consult with the community before making certain decisions (O'Faircheallaigh, 2002).

Mines have been migrating towards mechanisation, for a while now (Egerton, 2004). Despite this however, South African mines are still heavily labour intensive (Singh, 2016) and the State is under pressure to protect jobs (Harvey, 2013). It is the inability at mine scale, to understand the benefits of mechanisation, which inhibits the ready adaption and implementation of mechanisation in South African mines (Gumede, 2018).

Unionism plays a major role in the South African mines giving significant power to employees and in some cases crippling operations due to industrial action (Lane, Guzek & van Antwerpen, 2015; Moloi, 2014) as was witnessed in August 2012 at Marikana Mine (Webster, 2016). These labour challenges, coupled with the need to increase production efficiency and maintain good safety record motivates the argument for mechanisation (Gumede, 2018), but this is a challenge in South Africa which suffers high unemployment (Oluwajodu et al., 2015).

The mining industry is a capital-intensive business and therefore risk aversion is also proportionally large (Simonsen & Perry, 1999) leading to the slow adaption of out of the box technologies (Hermanus, 2017; Jordaan & Hendricks, 2009). Kniesner, Viscusi and Ziliak (2014) explored the concept of the value of a statistical life in relation to the appetite to making a trade-off between risk exposure and a better job, in this case, more productive operations. In Despite that, the South African mining industry is fertile ground for innovation (MacFarlane, 2001) as competitive advantage opportunities present themselves in being able to mine deeper, overcome labour challenges, optimise extraction and being able to exploit low grade ("uneconomical") deposits as mineral resources are depleted.

Driving around Johannesburg presents looming waste dumps that are testament to its mining past. These dumps present health hazards particularly in Johannesburg South where dump dust storms raise health concerns for surrounding communities (Nkosi, 2016). Environmental issues and sustainability are also occupying centre stage in mining, with mines required to set aside significant financial reserves for aesthetic rehabilitation as well as sustainability of the communities they operate in (Milaras, Ahmed & McKay, 2014).

The inequality in South Africa poses an ever-looming social welfare challenge which has manifested in the mining industry as strikes and calls to correct wealth imbalance through a revised beneficiation strategy, minimum wage debates, land reform and resource nationalisation (Lane et al., 2015, Robinson, 2017), all which until finalised, pose policy uncertainty, affecting and hindering timeous decision making (Macfarlane, 2018) and implementation.

South Africa has eleven official languages which poses communication challenges, particularly in the mining industry where some jobs require minimal business language literacy. Although the mining industry has managed to circumvent this problem by developing a common language called fanagalo (Greef, 2016), diversity of cultures still causes disconnect between intended and perceived instructions which affects implementation as well as exclusion which negatively affects leadership (Daya, 2014).

Mining companies are traditionally owned by foreign-based companies (Butler, 2013; Robinson, 2016) and this sees major decisions being made offshore (Robinson, 2016), making South African companies lose agility affecting the prioritisation and timing of implementation decisions.

Implementation in this unique environment was the focus of this paper to provide South African mining companies or investors planning to do business in South Africa's mineral sector, with key considerations to achieve implementation success.

2.5 Implementation

2.5.1 The concept

Implementation is defined as taking and putting plans into action (Krishnakumar, 2015), or converting a planned programme into practice (Durlak & DuPre, 2008). However, an academic definition of implementation has seldom been researched or defined in literature (Alharthy et al., 2017). The oxford dictionary (2008) interchanges execution and implementation which according to Back et al. (2014) are part of the process of

evaluating, planning, implementing, a continuous loop for business improvement, which opens doors for innovation, giving a firm the competitive advantage. This study refers to implementation in terms of its fidelity, dosage, quality and programme reach components as defined by Durlak and DuPre (2008) and also in terms of acceptability, adaption, appropriateness, feasibility, fidelity, cost, coverage and sustainability as defined by Peters et al. (2013).

Consulting companies have a strategic role to play in helping companies to be innovative (Lemus-Aguilar & Hidalgo, 2015) and to gain competitive advantage which can be achieved by the institution of effective implementation (Krishnakumar, 2015). This section is a review of previous work that partly addresses the third research objective of defining the success factors for implementation of consultant recommendations.

2.5.2 Importance

The importance of implementation lies in its definition, which is the conversion of plans into action (Krishnakumar, 2015). A significant proportion of project failures lie with poor implementation (Sull, et al., 2017), and a lot of companies with excellent strategies on paper, fail in delivering expectations because of implementation failure. Thus, for business success, in addition to strategy formulation, the implementation is also key for success.

In relation to recommendations put forward by consultants, whether they were engaged for process improvement, or attending to operational challenges, following through on the propositions opens doors for alternative solutions (Fui-Hoon Nah, Lee-Shang Lau & Kuang, 2001).

2.5.3 Implementation failures

Failure itself is subjective due to the complexity of a lot of projects or operations (Pinto, 2004) however, Pinto and Mantel (1990) found that projects fail depending on the definition of the failure, the type of project and the stage of project when the failure is declared. This relates to implementation as well. Implementation failure can be defined as for example, carrying out the recommendations but not achieving the desired outcome, failure to stay within budget or timeframe or failure to impress stakeholders. Failure can also be defined by when it occurs during the implementation. Firstly, there is failure to even commence the actioning of recommendations (Domingues, 2017) which has largely to do with motivation. In this instance, gaps in operations or business solutions are identified by the third-party, but management does nothing to put these

recommendations into practice. Secondly, attempting to action but failing to complete the actions (Harvey, 2013; Lane et al., 2015). This has to do with lacking the momentum to see a task through and research was around under-estimating the resources and operational stamina required (McManus & Wood-Harper, 2008). Failure can also be due to misunderstanding the mandate set out in the recommendations, modifications of the task or the misalignment of the timing of the action with the operational environment. Thirdly failure can be defined based on the type of project in order to contextualise the failure. Pinto (2004) emphasises the importance of project management for implementation success and this, among other factors were investigated during this research.

2.5.4 Successful implementation

Rumelt (2017) defines a good plan, as heavily reliant on the understanding of and clear definition of the task at hand, objectives and desired deliverables before attempting to implement it. Success is hinged upon four components which are alignment of the team, alignment of resources, having a competitive advantage over rivals in keys aspects of the business and how practical the strategy is. This practicability talks to the implementation of the strategy (Rumelt, 2017). Agility, more specifically, agile project management is another key to implementation success (Pinto, 2004) and this was investigated in this research.

Although there is little empirical definition of a successful management consulting project (Bronnenmayer et al., 2016), different authors have proffered varying definitions around successful implementation of consulting recommendations, which adds richness to understanding success factors in the consultant engagement. Weiner, Lewis, Stanick, Powell, Dorsey, Clary Boynton and Halko (2017) present three measure of success which are, feasibility, acceptability and appropriateness. Management consulting has become important as technology proliferates (Cohen, 1999) and for improving competitiveness for a variety of firms (Bronnenmayer et al, 2016). Further, Durlak and DuPre (2008) defined success as the transfer of effective programmes into real world settings, which involves putting all available resources and knowledge in context for everyone by information sharing (Kakhbod, 2013). They defined it not as a static concept, but a complex process consisting of four phases namely, the dissemination of the implementation strategy, adaption, implementation and sustainability which is maintaining the strategy programme (s). Durlak and DuPre (2008) revealed that there are four critical success factors namely:

1. support from top management;

2. project championship;
3. having representation in senior levels of the organisation; and
4. setting clear goals.

However, Fixsen et al. (2009), found the factors of successful implementation to be:

1. Staff selection/recruitment;
2. Training;
3. Ongoing coaching and consultation;
4. Staff performance evaluation;
5. Decision support;
6. Facilitative administrative support; and
7. System intervention.

Mohammed, Welch and Hazle-Bussey (2015) looked at the level of expertise and trust partnership. Business now operates in a fast-paced environment adding time as another factor determining implementation success (Krishnakumar, 2015). Krishnakumar (2015) proposes a strategic change model focusing on time, change readiness, capabilities, change dimensions, change drivers and strategy continuum as the six factors to be considered before implementation. Williams (2004), found that managers were filters for ideas who are the key to the institutionalisation and implementation of recommendations and this was investigated in the study.

Differing views and factors on methods of how to close the 'implementation gap, have been developed. However, the practicality of these solutions in the highly technical unpredictable mining environment is still to be investigated. Professional services such as consultancy services cannot provide cut and paste generic solutions so even if the success factors are unearthed, each project has to be approached differently in order to develop customised solutions from project to project because of the different working environments, platforms, knowledge base and different capital requirements (Brandon-Jones et al., 2016)

2.5.5 Challenges

Some of the major challenges of implementation that were identified in previous research were mainly internal organisational factors and adding the consultant-client challenges to this scenario, imports further challenges which are mainly around the relationship which affects the commonality of goals (Appelbaum & Steed, 2000). There are challenges that reflected leadership, communication, learning, relationship and organisational deficiencies in the general business environment and in the client-

consultant engagement (Beer & Eisenstat, 2000). These deficiencies were inadequate leadership, inappropriate management style (Beer & Eisenstat, 2000), an ineffective management or project team (Beer & Eisenstat, 2000), poor communication (Beer & Eisenstat, 2000; Heide, Grønhaug and Johannessen, 2002), unclear objectives (Beer & Eisenstat, 2000), limited consultant competence or practical exposure (McLachlin, 1999), the complexity of the solution (Lau et al., 2015), lack of trust between the client and the consultant (McLachlin, 1999; Nikolova, Möllering & Reihlen, 2015), selective knowledge sharing (Nesheim & Hunskaar, 2015), working in silos or poor interdepartmental coordination (Beer & Eisenstat, 2000; Heide, Grønhaug and Johannessen, 2002) and inadequate change readiness (McLachlin, 1999).

All these are internal organisational factors which were observed during the research in relation to factors caused by external influence (the consultants) and the client-consultant interaction (Brandon-Jones et al., 2016; Bronnenmayer et al., 2016). For the successful implementation of strategy/recommendation, Leonardi (2015) argues that formulation and implementation are not two distinct activities, but formulation includes designing technologies that work.

McLachlin (1999) revealed that lack of trust between the client and the consultant was identified as the onset of resistance to change (Nikolova, et al., 2015), which also manifested as asymmetrical knowledge sharing between employees compared to between employee and external consultants, impacting implementation of the consultant's recommendation (Nesheim & Hunskaar, 2015). As a result of these challenges, the study focussed on identifying the key challenges that reflect context, as well as how projects can be successfully implemented despite these challenges.

2.5.6 Success factors

Success factors were grouped in line with the framework developed by Alharthy et al. (2017) which looked at management decision, employee engagement, organisational systems and organisational performance. Success was also defined using the implementation outcome variables which measure implementation success namely acceptability, adaption, appropriateness, feasibility, fidelity, cost, coverage and sustainability (Peters et al., 2013).

2.5.7 The implementation and innovation relationship

The study delved into the relationship between implementation and innovation as identified by Stowe and Grider (2014). Innovation, described by Gërguri-Rashiti,

Ramadani, Abazi-Alili, and Ratten (2017) as the introduction of anything new based on Schumpeter's theory (Emami-Langroodi, 2017). Stowe and Grider (2014) identified implementation as one of the components of innovation, defined to include incremental changes to products or continual improvement of products and services (Popa et al., n.d.). Implementation of new methods, processes, techniques and approaches to business and operations as recommended by external consultants asserts Schumpeter's process of creative destruction, and this research aims to inflate the importance of implementation as the process by which a business transitions incrementally to achieve innovation.

2.6 Conclusion

Having reviewed academic literature on implementation and consultant solutions, the evidence showed how external consultants play a pivotal role in providing management with business solutions that related to the current business environment, and are pivotal in providing recommendations on how (mining) businesses can remain competitive. However, implementation success needs to be contextualised (Bryson & Bromiley, 1993; Durlak & DuPre, 2008; Olivier & Schwella, 2018; Owusu-Manu et al., 2017; Peters et al., 2013; Radnor & O'Mahoney, 2013) and literature was lacking in addressing the mining context.

The South African mining environment employs consultants in all facets of the mining value chain (Stacey, Steffen & Barrett 1999) but still suffers implementation failure (Domingues, 2017; Harvey, 2013; Lane et al., 2015), which was also investigated in this study.

There appears to be a strong relationship between implementation effectiveness and internal organisational factors (Alharthy et al., 2017; Heide et al., 2002) which directed this research into investigating whether the recurring labour problems in the mining sector (Mkhize, 2016) were a symptom of implementation failure, and in addition, identifying what organisational factors are key for implementation success.

3. Chapter 3: Research questions/ propositions/ hypotheses

In order to unearth the drivers for successful implementation, the following three research questions were addressed: The constructs that were central to the development of the research were also articulated in this chapter.

3.1 Introduction

This chapter is divided into three sections, each discussing a research question and how it links this research with previous works around implementation research and the mining context.

3.2 Research question one

Question one: What role do external consultants play in the mining industry?

This question aims to identify why mining companies engage external consultants and why, despite having consultants on board, they continue to be plagued by predictable cyclic challenges such as annual labour strikes, operating on the brink of collapse with commodity price drops, skills shortages and safety disasters. External consultants play a significant role in working with management to resolve operational challenges, including predicting and mitigating effects of future challenges (Bonnenmeyer, 2016; Chelliah & Davis, 2011; Owusu-Manu et al., 2017; Srinivasan, 2014; Vukotić et al., 2017; Wang & Chen, 2014), but how do they help with instituting these recommendations? This research challenged the role of external consultants in implementing their own recommendations in the mining industry, in order to uncover why mining companies are failing to be proactive about recurring challenges such as labour and fall of ground (Bonsu, Van Dyk, Franzidis, Petersen & Isafiade, 2017). This was achieved in business by addressing the following:

Proposition 1a: Companies engage consultants because their resources have limited capabilities to provide the level of service required.

Proposition 1b: Recommendations are a key deliverable in consultant engagement.

3.3 Research question two

Question two: To what extent have third-party recommendations been implemented in the South African mining industry?

This question was intended to uncover the extent to which the programme reach component of implementation (Durlak & DuPre, 2008; Durlak, 2016) is fulfilled in mining projects. This construct looks at the level of acceptance of implementing, in this case, consultant recommendations, and the willingness of project teams and management, to see recommended actions fully realised. This question unravels the characteristics that make the South African mining context unique, and what implementation factors determine success in this context by testing the propositions:

Proposition 2a: Companies fully embrace third-party processes for company improvement.

Proposition 2b: Implementation failure is the main cause for some of the challenges faced by the mining industry.

3.4 Research question three

Question three: When is implementation considered effective?

This question partly investigates proposed research by Durlak, (2016) which suggested research into when implementation is considered “good enough”, and what outcomes result in implementation being considered as successful, by addressing the following propositions:

Proposition 3a: Effective implementation manifests as either process improvement, performance improvement or increase in profitability.

Proposition 3b: Companies which engage external consultants and follow through on their recommendations are more agile, cost effective and are quicker at problem solving.

The consistency matrix in Appendix 1 was used to maintain the golden thread. It summarises how the research questions, research objectives and propositions are linked to literature and the research instrument.

4. Chapter 4: Research methodology

This chapter details the approach taken by the researcher in carrying out the research.

4.1 Introduction

This chapter is divided into seven sections which provide a detailed discussion of the methodology applied, the research design, the resources used to make the research a success, how the author got access to respondents, the time lines to demonstrate the time commitment awarded each aspect of the research and the peer support received by the author.

4.2 Nature of the study

Despite the existence of considerable research into the engagement of external consultants particularly in the field of management consultancy (Glückler & Armbrüster, 2003), the researcher found little literature around the specific field of mining consultancy. The researcher was aware that there are failings in the implementation of recommendations developed by third parties, but was still not sure what form those failings are taking or why they existed in an industry that direly needed proactive interventions (Leonardi, 2015) for safety and sustainable extraction of non-renewable mineral wealth.

The research was of a qualitative nature as it addressed social aspects (Choy, 2014), with a purpose to understand the factors behind the successful uptake and implementation of the recommendations made by third-party consultants in the mining industry. A pragmatic philosophy, where the research questions and research objectives determine the design and flow of the research (Saunders & Lewis, 2018), was applied. The research questions are discussed in sections 3.2 to 3.4 of this research report.

The research was an exploratory qualitative study which involved reframing elements of the topic (Saunders & Lewis, 2018), starting with unstructured enquiries with a select few industry experts, then using the data collected to design semi-structured interviews to give the researcher more insights into the topic (Saunders & Lewis, 2018). Interviews with experts were performed at the onset of the research to guide the direction of the research, experts being defined as knowledgeable persons (Stevenson 2010) in the area or field under consideration.

The theories in this research were developed using a deductive approach by testing six propositions which were developed to collect data for the three research questions (Saunders & Lewis, 2018) detailed in chapter three.

Semi-structured interviews were selected, recognising Welman, Kruger and Mitchell (2005) assertions of their usefulness when the researcher had a broad list of themes that could be narrowed down as the interviews progress. Interviews were extended to professionals in mining companies to gain a deeper understanding of implementation shortcomings, and to generate data to develop possible theories around this construct. The researcher also reviewed technical reports to draw conclusions about the implementation status of technical recommendations by external consultants. An archival research strategy was also adapted which involved reviewing previous documentation.

The layout of the research report was set out using the guidelines set out in the integrative business research report regulation (Gordon Institute of Business Science, 2018) and also using flow and layout inspiration from Owens (2015).

4.3 Population

The research was based on three groups of sample data which were subsets of a larger populations which were inaccessible to the researcher (Zikmund, 2000).

The first two samples were chosen to bring in perspectives from both the client and consultant sides, as well as getting implementation perspectives from senior to junior level, which Durlak and DuPre (2008) also found to be necessary to give a good understanding of the concept of implementation. The first sample comprised mining consultants who were contracted to either find solutions to problems, to diagnose problems, or to be change agents to help increase operational efficiencies.

The second sample was the mining company professionals from mining companies whose operational capabilities and business potential could be propelled by implementing solutions from the consultants, whose accumulation of knowledge and expertise the company can leverage to gain competitive advantage and growth (Lemus-Aguilar & Hidalgo, 2015).

The third sample comprised public reports which contain business solutions requiring implementation (van Heerden, 2016).

The consultant and mining company samples comprised purposively selected participants from the mining industry. The public reports samples were conveniently sampled archival technical reports which were used to deduce the implementation status of recommended technical solutions.

4.4 Unit of analysis

The unit of analysis for this study was the insights from the experiences and perceptions of the professionals in the mining and consulting companies. The researcher analysed these insights to create a balanced view of the factors behind implementation success and to fulfil the overall research objectives.

4.5 Sampling method and size

Non-probability sampling, often used in qualitative studies (Saunders & Lewis, 2018) was employed for this research. It is a technique used in the absence of the full list of the population, meaning one is not able to work out probabilities (Saunders & Lewis, 2018). Two different variations of the non-probability sampling technique were used for the two units of analysis.

For the public reports, convenience sampling (Zikmund, Babin, Carr & Griffin, 2013) was employed as this depended on what reports are available in the public domain. Private reports were not used due to the high intellectual property protection in the industry. For the consultants and mining company samples, purposive sampling, a method based on the researcher's judgement to select the sample members (Saunders & Lewis, 2018). In this case the basis was the number of years' experience in the mining industry, the seniority of roles held and the company brands they worked for in those senior roles (Stevenson 2010).

The researcher accessed a sample of respondents who were able to give diverse views on the reasons for non-adaption of recommendations. The participant selection was aimed at individuals with the ability to meaningfully contribute towards answering the research questions and meeting the research objectives. The sample size was determined by the saturation point when data collected was deemed adequate to support the study.

4.6 Measurement instrument

The measurement tool was an interview questioning guide (see Appendix 2). The researcher was equipped with questions derived from literature research and these were designed to guide the interview process and align with the research objectives. In addition, the interview process itself was designed to avoid unnecessary interruptions that would potentially introduce undesired effects such as haste to the interview process. The reliability of the data collection methods, as detailed in Section 4.7.7, was ensured by avoiding factors that might have resulted in inconsistent findings such as biases and

observer errors. This was achieved by asking all the respondents the same questions and asking unambiguous questions.

4.7 Data gathering process

This section describes how the researcher collected the data used for the research.

4.7.1 Data collection tools

The data for the research was collected by either recording the interviews, taking notes during the interviews or review of academic literature and public reports. The interview schedule detailed in Appendix 2 was used to guide the interview process. There were eleven face to face, one telephonic, and three Skype interviews, the difference in the interview methods depending on the geographic availability of respondents, because most mining operations are located out of town. Interview five, six and seven were carried out in one sitting in a round table format, in order to fit into the respondents' schedules. In this case, the interview questions were addressed to each respondent individually in succession. A voice recording device was employed for all interviews where the respondent consented. The interviews and responses were transcribed for analysis and inclusion into the report.

4.7.2 Pilot interviews

In order to be consistent in the way questions were asked and to develop the skills needed to interview the respondents, the researcher carried out three pilot interviews on peers in the consulting industry as suggested in Table 2. Majid, Othman, Mohamad, Lim and Yusof (2017) describe pilot interviews as important for the researcher to understand how improvising can redirect the research. These did not form part of the research sample. Interaction with respondents for the pilot interview followed the same consent procedures described in Section 4.7.4. After developing a level of self-efficacy with the interviewing skills. Interviews commenced on the actual targeted respondents.

Table 2: Targeted respondents

Job title	Type of interview	Number of respondents
Middle to senior management	Pilot	3
Senior professionals	Expert	8
Mid-tier professionals	Regular research	7

4.7.3 Research interviews

The researcher conducted three pilot interviews which were unstructured and in which enabled the researcher to explore the topic in more depth (see Table 2), allowing the

respondent to provide as much insight as possible (Saunders & Lewis, 2018). Subsequently interviews were carried out with consultants from the ranks of principal consultant, senior consultant or directors of consulting firms as well as mining company senior technical personnel or executives until saturation was reached.

4.7.4 Ethical considerations

Before any contact was made with respondents, the researcher sought ethical clearance from the GIBS' Ethics Committee and sought written consent from the respondents to conduct interviews and record interview proceedings. Sample consent statement and form that respondents were required to complete before commencement of interviews are in Appendix 3 and Appendix 4. These ethical and consent processes were designed to ensure confidentiality and access to information and improve respondents' willingness to take part in the study. Unethical conduct is either falsification of data, failure to credit sources of data, plagiarism, conflicts of interest or intentionally biased project design (Siegel 1991). In light of this, a compilation of consent documentation accompanies the research paper. Appendix 5 shows a confirmation of the ethics approval granted to the researcher.

4.7.5 Confidentiality

The details of the respondents who participated in this research will remain confidential. Only the signatures of respondents are used and they have not been named in this report (Appendix 6), and the responses to interview questions were assigned number identifiers to maintain confidentiality. The researcher did not use any company specific data in the research report, and no video recordings or pictures were employed.

4.7.6 Public domain data

Public reports that informed the research were collected from the public domain from annual and technical reports for mining companies. These were sourced from the websites listed in Appendix 7. The companies selected are listed on the Johannesburg Stock Exchange (JSE) as of 10th February 2019 and the sources listed in Appendix 7 were links redirected from the JSE website. These reports were used to glean information regarding the status of the mining industry, conditions which support or refute research objectives and commentary or recommendations that answer the research questions.

4.7.7 Validity and reliability

In order to demonstrate the validity and reliability of the data collected, defined by Saunders and Lewis (2018) as the extent to which data collection methods accurately measure the intended variable (Saunders & Lewis, 2018), the researcher committed to carrying out extensive research, and carried out the interviews to saturation. The researcher demonstrated credibility using triangulation, defined as the use of multiple data sources to establish an understanding of the topic and transferability defined as showing how the research finding can be adapted for use in other contexts (Lewis, 2009).

4.7.8 Data analysis approach

The qualitative data collected comprised text data which included email communications, notes, interview schedules filled in during interviews and public reports; and non-text data included audio recordings, voicemail, or Skype interviews. The researcher transcribed all non-text data to text so that it could be analysed as text data.

Data analysis commenced soon after the second interview so that key themes could be picked up early, which then guided the direction of the research and to determine whether or not saturation had been reached (Saunders & Lewis, 2018).

The software ATLAS.ti was used to analyse the qualitative data using codes and categories that are populated in Appendix 8. The researcher prepared the transcribed interview data in a consistent format and using the conventions suggested in Saunders and Lewis (2018), so that it was suitable for qualitative analysis.

The ISF and MERIL-DE models were adapted for use to systematically analyse that factors, and were tested for use in the mining industry. The ISF was developed by Wandersman et al. (2008) for developing medical research into practise and upscaling pilot technologies. It was adapted for this research as a tool to analyse and classify the factors that promote the implementation of consultant recommendations, identified in the research. The ISF, as described in Section 2.2.5, not just addresses the South African mining context (Chambers, 2012), but emphasises the need to translate the vast research on implementation into action. The ISF also acknowledges the important role of consultants in developing solutions for the implementation of new processes, new methods, new technologies or solutions (Garney, McCord, Walsh & Alaniz, 2016) that mining companies have little or no experience. This framework is ideal with the acknowledgment that implementation is a critical phase in process improvement and

business optimisation. The MERIL-DE framework was adapted from recent work by Olivier (2015) and this focusses on performance management and alignment elements.

4.8 Assumptions

The assumptions, described by Leedy and Ormrod (2005) to be self-evident truths, the sine qua non of research pertained to the research sample. These were as follows:

1. The managers approached are senior enough to make significant project decisions;
2. Respondents selected are competent enough to understand the topic fully; and
3. The respondents have enough years' experience to give objective insights.

4.8.1 Limitations

This section highlights the limitations related to the research methodologies applied. The main limitations related to timeframe, sample accessibility, biases and subjectivity as described below:

4.8.1.1 Time

The collection of primary data was time-consuming, and the interviews required about an hour with each respondent, the time slots allocated to each interview depended on the schedules of the respondents.

4.8.1.2 Access

Access to the right experts in the field was challenging as October 2018 to early January 2019 was a busy period, which as when the data was being collected. However, experts who provided valuable insights contributing to the research were successfully engaged.

Some of the client-consultant engagements came with intellectual property and confidentiality commitments limited the extent of information access. This was circumvented by discussing non-project specific insights.

4.8.1.3 Bias

The research involved capturing of the personal opinions of respondents which inherently introduced opinion biases which had the potential to influence either the direction of the research or the findings. In addition, because the researcher had significant background working in the consulting industry the risk of confirmation bias was high but this was avoided by utilising grounded theory approach as well as using frameworks grounded in previous research.

4.8.1.4 Subjectivity

Since the research was based on experiences and insight of professionals from the consulting and mining companies, subjectivity was potentially high as each respondent bases their views on their own perceptions and tended to be defensive of their professional roles and functions.

5. Chapter 5: Results

This chapter presents the results from the data collected from 15 respondents who participated in the research by consenting to an interview with the researcher. The interviews were based on the schedule in Appendix 2 which was used to guide the interviews. The interview questions were not asked in the same sequence as shown in the interview guide because the researcher-built questions based on the responses.

5.1 Introduction

This chapter is divided into four sections where the first section describes the research samples and the rest of the sections presents the responses received during interviews, presented for each of the three research questions.

5.2 A description of the sample obtained

The research sample comprised three groups of data namely consulting professionals, industry professionals who are middle to senior management and public reports which comprise the final product from consultants containing recommendations from consultants. The list of respondents is detailed in Appendix 6 and the databases used for the reports are detailed in Appendix 7

5.2.1 Description of sample one

A total of seven interviews were held with individuals who are currently consultants in the South African mining industry. All the consultants interviewed were either principal consultant, senior consultant or directors of consulting firms. Three of the interviews were face to face, three were executed via Skype and one was telephonic to accommodate the respondents' busy schedules. A voice recording device was employed for all the interviews.

Detailed profiles of the sample-one respondents are given in Table 3 below which presents a description of their experience and relevance for this study, without identifying the organisations they own or work for.

Table 3: Respondent profiles for sample one

Respondent ID #	Respondent group	Rank	Expertise	Experience and exposure in mining
3	Consultant	Senior	Engineering	An industrial minerals engineering and mining consultant with over 35 years working in the mining industry. He is currently the principal consultant in his own consulting company based in Boksburg.
8	Consultant	Med	Geology	This geologist has 11 years as a consultant for a niche geological advisory services provider and worked with the clients on long term projects involved in implementing of project scope.
9	Consultant	Senior	Mining	With 28 years' experience in the mining industry on projects across EMEA, this respondent has worked in senior roles in major international companies and currently is currently the principal in her own mining consulting company based in Sandton, Johannesburg.
11	Consultant	Senior	Mining	An expert in geological exploration and geographical information systems, this respondent is a senior level professional with over 25 years' experience in projects all over the world.
13	Consultant	Senior	Geology	This respondent has over 15 years' experience in the consulting industry first as a software solutions specialist then as a resource estimation specialist and is currently a principal partner in a well-respected South African consulting firm.
14	Consultant	Senior	Mining	With over 35 years' experience, this mining engineer has held senior level position such as vice president in a large mining company and is the principal in his own consulting company.
15	Consultant	Senior	Strategy and finance	Qualified as a finance professional, this respondent has 11 years' experience as a third-party consultant. He worked on major strategy projects for companies such as BHP Billiton, a nuclear plant in the USA in Boston, as well as De Beers Venetia diamond mine among others. His consulting role entailed improving processes, energy efficiencies, or solving operational challenges.

As shown in Table 3, the sample included six consultants, five of which hold senior roles in their organisations. The consultants were from the fields of geology, mining and engineering with an average of 25 years working in the mining industry.

The following tables summaries the profiles of the respondents:

Table 4: Summary of sample one age groups

Age Range	<30	30-39	40-49	50-59	>59
Number of respondents	0	1	2	1	2

None of the consultants used in the research was below the age of 30 as shown in Table 4, which reflects an elevated number of years of experience which justifies their inclusion in the consultant pool, commensurate with some level expertise.

Table 5: Summary of sample one total year's work experience

Years	<10	10-15	16-20	21-25	>25
Number of respondents	0	1	1	2	3

All the consultants had over ten years' experience as shown in Table 5 above.

Table 6: Summary of sample one years working as external consultants

Years	<10	10-15	16-20	21-25	>25
Number of respondents	0	2	2	0	2

The consultants in the sample all worked for mining companies at some point in their careers which elevated their efficacy as consultants due to their first-hand experiences in the mining industry. This is reflected in the lesser number of years working for a consulting company in Table 6 compared to the number of years' experience shown in Table 5.

5.2.2 Description of sample two

A total of eight interviews were held with individuals who have worked in the South African mining industry as middle management, senior management or senior technical personnel or executives. One respondent's experience in the mining industry was in Zimbabwe, but worked in other sectors in South Africa, and the other in the Australian mining industry; to give perspective to the contextual argument. Six of the interviews were face to face and two were carried out using Skype as some mining operations are located out of town. Respondents five, six and seven were interviewed together as there was a time constraint. The respondents were asked to answer questions based on their

experiences to avoid getting theoretical answers which could be influenced by other respondent's replies. A voice recording device was employed for all the interviews.

A more detailed description of each of the respondents' experience and relevance for this study is given below, without identifying the organisations they own or work for.

Table 7: Respondent profiles

Respondent ID	Group	Rank	Expertise	Experience and exposure in mining
1	Management (former financial auditor)	Mid	Finance	With 16 years working as a finance professional, this respondent has a firm grip on the South African context, having worked in the South African banking, entertainment sectors as well as management consulting and logistics companies. She has also carried out accounting audits on mining companies in South Africa.
2	Management	Senior	Geology	A senior geologist based in Perth with over 25 years working in the mining industry in South Africa, Australia and Zimbabwe.
4	Management	Senior	Accounting	A financial services manager for a major pharmaceutical, this respondent has worked for several sectors of the economy and has worked for an exploration company prospecting for nickel, platinum and gold.
5	Management (Former consultant)	Med	Geology	This respondent heads mineral resource management for a major manganese miner and has over eight years' experience in South African mining.
6	Management	Senior	Geology	A senior mineral evaluation specialist with nine years on South African deep level Witwatersrand gold mines, manganese and with exposure as a consultant for three years.
7	Management	Med	Mining	Currently the project manager for a colliery, this respondent has 12 years as a mining engineer in the coal sector and has worked with several consultants on multiple capital-intensive projects.
10	Management (Former consultant)	Med	Geology	Currently a mining industry innovation and strategy consultant, this respondent has worked for over 12 years in the South African mining industry on multiple projects and has been a consultant for five years of her career.
12	Management	Med	Geology	A middle management mineralogist in a public company that primarily utilises internal consultants, this respondent has eight years' experience in the mining industry on PGM and iron ore.

The client sample comprised middle to senior management with an average 10 years in the mining industry. The sample, as shown in Table 7, includes two financial managers who have been involved in auditing mining companies from the financial perspective.

The following tables summaries the profiles of the respondents:

Table 8: Summary of respondent age groups for sample two

Age Range	<30	30-39	40-49	50-59	>59
Number of respondents	0	6	2	0	0

The managers in the sample were mostly in their thirties as shown in Table 8 with some in middle management with recent experiences in junior management to give perspective of the workers on the ground.

Table 9: Summary of respondent total year's work experience

Years	<10	10-15	16-20	21-25	>25
Number of respondents	0	6	1	0	1

The managers in the sample, all had over ten years' working experience (Table 9) which afforded ample time to have accumulated enough project involvement to contribute to this implementation research.

Table 10: Summary of respondent years working for or with external consultants

Years	<10	10-15	16-20	21-25	>25
Number of respondents	4	3	0	0	1

As shown in Table 10, some of the respondents had less than ten years of working external consultants which enriched the breadth of knowledge about the expectations about working with external consultants as well as bringing a millennial perspective about implementation of consultant recommendations.

5.2.3 Description of sample three

The third sample consisted of independent technical reports and competent persons' reports all sourced from the public domain. The reports were selected based primarily on four things, firstly availability on public online resources, secondly reports released from 2013 to present were used, thirdly reports on South African projects or assets and finally reports compiled by external consultants.

Corporate integrated annual reports contained high level strategic recommendations which had to be gleaned from the body of the reports, and whose implementation was

difficult to assess, and as a result they were not used in the study. The competent persons' and independent technical reports were clear in recommendations set out by the consultants, and these were the main focus of the report analysis as summarised in Appendix 9. The researcher managed to get 16 public reports on consultant work for mining companies.

The following section discusses the questions asked in the research interviews and the general findings from responses received from the respondents.

5.3 Results for research question one

Research question 1: What role do external consultants play in the mining industry?

This research question aimed to determine the programme reach (Durlak & DuPre, 2008; Durlak, 2016) of implementation of mining projects. Programme reach being defined as the acceptance and willingness to see an implementation programme by programme participants (Durlak, 2016). This approach was to find out from samples one and two, how senior professionals viewed the significance of consultants in the mining business, uncover whether implementation of business improvement recommendations was the intent from the onset of engaging external consultants, and to determine the extent of consultant use and their effectiveness in the South African mining context given its current challenges such as skills shortage and constrained spending budgets. This section presents the comments received from samples one and two in response to the interview questions that address research question one, as well as the reasons stated in the reports that comprise research sample three.

5.3.1 Why companies engage external consultants

The following question was designed to determine the ultimate goal of the client-consultant engagement to establish if implementation of plans, strategies or programmes, was the end goal.

Why do companies engage the services of external consultants?

Most of the sample one and sample two respondents (sample one and sample two) were clear about what they required from consultants, or what was required of them in their consultant roles, because they were quick to answer with clear requirements for the client-consultant engagement. The responses received ranged from the experiences of the participants either as managers who identified the need for consultants, or as consultants based on the mandates they received from clients or potential clients, as well as theoretical responses based on the respondents' perceptions of required

consultant services. The sample three reports obviated the requirements from consultants in the mandate which are clearly stated in the reports.

Table 11 below summarises the requirements from consultants, constituted from the sample one and two interviews as well as from the sample three reports.

Table 11: Reasons for requiring consultant services

Rank	Reason	Response frequency
1	Regulatory requirement/sign-off	15
2	Boost staff compliment/to avoid costly permanent appointments/project specific/once-off projects/test-work and pilot projects	15
3	Independence and/or objectivity	14
4	Up to date technologies and methods	12
5	Increase decision confidence/peer review/improve credibility	12
6	Broad range of knowledge and exposure	11
7	Outside/new perspective	9
8	Expert opinions (for transactions or feasibility studies)	7
9	Expertise, specialised skills or competence	7
10	Identify gaps or diagnose and solve problems	6
11	Training	5

The table above shows that the biggest reason why mining companies engage external consultants is to comply with regulatory requirements for making public declarations or for listing on the JSE (Johannesburg Stock Exchange Limited, 2017). All of the respondents also acknowledged engaging consultants for their specialised skills in projects where they only needed temporary staff, or where an expert was required to fulfil a specific mandate. A classic reason was that companies could not afford to employ people permanently for projects which were short-term or patchy, as well as when they wanted good experts but didn't want on a full-time basis, as they then become costlier in the long run. This reflected the cost-cutting culture in the mining industry which faces high labour costs (Macfarlane, 2001), where companies need to keep their staff books as lean as possible.

Consultants are also brought in for projects in which the company has little experience for example to erect a shaft, projects which are highly specialised and if not executed properly, have many associated risks, or for community engagement issues which have ability to damage the company's reputation, so they manage that risk by bringing in change management and stakeholder engagement experts (Hughes, 2016). This also applied to anything new like new technological innovation projects or business restructuring.

Respondents found that, in their experiences, the manpower on operations, prioritised production, and their performance measures were production based. In addition, meeting production targets was the primary focus of most technical functions on a mine

be it drawing tonnes, ore quality or equipment and plant availability and utilisation. Therefore, consultants were brought in for tasks that were not core business as they could prioritise the project and work towards the best outcomes and to boost the manpower capacity, and for other technical services that don't happen regularly enough to warrant having those experts in-house full time

Mining companies are not immune to internal company politics, so bringing a third-party was ideal because they are not involved, they are not influenced by background knowledge, they are objective (Respondent one), and they are not biased. Mining personnel were often too close to the problem or the situation to see the problem and the hope was that by bringing in external consultants who are not close to the problem, and don't have a vested interest, they might reframe the problem (and solve it).

Most of the respondents articulated having internal experts, and hiring consultants as agents to verify and add credibility to internal technical opinions. Consultants also provide reviews on completed work so they provide a peer review or an opinion on whether there are any fatal flaws in the work or whether there can be alternative approaches.

Consultants, because of the attractive broader range of knowledge and experience that they bring and may point a mining client on an optimal course of action. Consultants are brought in to add new perspective to operational challenges, and as Respondent number two aptly put it "what companies are really looking for when they hire consultants is to get that something extra that they usually don't get from their own employees"

Consultants also help identifying bottlenecks, inefficiencies, waste, redundancies or anything that causes the mine not to perform optimally (Respondent 15). Some of the roles involve teaching and coaching new process or how to operating newly introduced systems.

The scope or mandates given to consulting companies are detailed in Appendix 10 and summarised in Table 12 below which shows the reasons for the consultant engagement, as derived from sample three:

Table 12: Sample three consultants' mandates

Report requirement	Count	Rank
Independent Competent persons' report	7	1
Independent technical report	5	2
Transactional report	4	3
Geotechnical report	3	4
Mineral asset valuation	2	5
Feasibility study	1	6
Financial model update	1	7

As clearly stated in most of the mandates, consultants were required to produce reports, which in all instances, contain a recommendations section of actions that need to be carried out to change the outcomes of the current status quo. The study revealed that about 40% of the reports available on the public domain indicated that consultants were required to carry out an independent competent persons' assessment', a required regulatory sign-off for listed companies, and they all clearly state the requirement for a report.

5.3.2 Appetite for implementing consultant recommendations

The following question was asked to the respondents:

In a case where you worked with consultants. Was it you who engaged them, or was it another level of management that engaged them? If the former, what are your views on getting external expertise when you are there as the inhouse expert? If the latter, why did you need them when you had in-house expertise?

This question was not asked verbatim as presented above as the interview questioning followed the flow of the conversation between the researcher and the respondent. It was asked to determine the extent of the overall capacity and management appetite for implementation success. This was determined from firstly, management commitment to solve operational challenges, gauged by their readiness to avail resources such as the consultants (Leonardi, 2015), and secondly, the buy-in from the employees who would be involved in the final implementation and how willing they would be to fully corporate with the external consultants to support and participate in implementation programmes.

The responses and the mandates from sample 3 (Table 12) show a high level of senior management involvement in the decision to hire external consultants translating to availing of resources for the implementation of recommendations from the consultant engagements. The involvement of management was also necessary to provide inter-departmental coordination as some programmes affected more than one department

Respondents reported experiencing instances where upper level management-imposed experts on project teams who became resentful and became loathe to cooperate or provide information. Most expressed concern over management tending to question the work of internal experts and second guessing their opinions, and this has results in internal projects not being implemented as management only do so after verification by external consultants.

The results of testing the buy-in from technical management showed that all the participants presented low levels of acceptance threats to the consultants (Bourgoin &

Harvey, 2018). There was actually a common thread of maturity and professionalism for both middle and senior technical levels of management, in that they felt that whether engaged by them or more senior ranks in their companies, they welcomed working with consultants as they felt that consultants provided a peer review and official verification of their internal findings. Even when asked how they felt about hiring consultants to tell them what they already know, in line with the famous notion that consultants “borrow your watch to tell you the time” (Bourgoin & Harvey, 2018), the respondents gave unanimous views of acceptance of consultants as necessary for verification and endorsement of their internal findings, a stamp of approval that is necessary to get projects finally going and implemented as shown in the following responses:

5.3.3 Necessity of external technical support

The researcher explored management sentiment on the role of consultants as this had the potential to affect not just synergies and buy-in (Kaplan, Nolan & Norton, 2018), but the commitment to implementing resultant recommendations (Turner, 1982). This was achieved by asking the following question:

Are external consultants really necessary?

The following were some of the responses received:

Although this question wasn’t asked directly in some of the interviews, the flow of the questions and the views of the respondents showed a strong belief that they felt that consultants were necessary. Regulation made consultants necessary and the high level of demand for consultants shows that the market agrees that consultants are necessary.

The research revealed that in South Africa, one of the major reasons external consultants are really necessary is to enable mining companies to adapt lean staffing in a bid to control costs (Baatartogtokh et al., 2018), to introduce new up-to-date technologies, adapt industry best practice and methods as well as to prioritise projects which would otherwise be subordinated to production.

5.3.4 The role of management

The following responses were received to a question designed to uncover the relevance of management in the client and consultant relationship. The question was:

What is the role of management?

The following table summarises the tally rankings of the roles that the respondents played in their management roles as well as their perceptions of management roles:

Table 13: Management roles

Rank	Reason	Response frequency
1	Give direction/motivation	11
2	Project management/manage resources/manage timelines	9
3	Facilitator (funding, implementation), report to executives	7
4	Problem identification/justify the work and hire the consultants	6
5	Verify what is presented	3
6	Prioritising (recommended) work and decision making	3

As shown in Table 13, management's main roles in the client-consultant was giving direction given that they are the ones who know the company's overall strategy and goals. Project management was a key role in which the respondents felt that the management of the time spent by consultants on a project needed to be well managed, with Respondent number three saying if management is not in control then "you're in trouble because then the consultants can make lots of money."

Most of the respondent felt that the role of management first is to identify the needs for the consultants and this involves identifying gap in terms of skills or technology. They then have to motivate for the engagement of consultants to senior management and to obtain the necessary resources to carry out the project. Once the consultant has been identified and given the job then the role of management, is to prioritise and lead the project, making sure that the consultant understands what is needed, what are the deliverables, and is given a clear mandate, confirming work by Rumelt (2017), and understands the contexts so that they can give practical solutions and work in line with the business strategy. Management must at all times be in control and must be able to verify what they've been presented therefore they have to possess some level of technical expertise in order to assess consultant recommendations and make sure that they deliver according to their contract. Once the recommendations have been delivered management takes over to manage the implementation

5.3.5 Expected services and deliverables

The main deliverables received from consultants was investigated. The researcher asked respondents to provide their expectations of what they expected, and what they have received in past projects, from third-party consultant by asking the question:

What services offered, expertise or methodologies applied by third-party consultants make them attractive? What are the expected deliverables?

This question, unlike question 1-1 which talks to actual experience, looks at the theoretical perceptions of what consultants can do. This relates to special skills that they

have and the unique position as an independent third-party exposed to other projects in foreign and competitors' jurisdictions.

Twelve out of the 15 of the respondents felt that opinions were the most attractive deliverable from consultants, the attraction being due to the fact that the opinions were backed by the broad pool of knowledge that consultants had access to from their exposure to multiple projects and their intellectual property, as well as their knowledge about current methodologies, technologies and problem-solving tools. The other two main attractions were the provision of expertise that was not available internally, and the verification of technical findings.

5.3.6 Practicality of consultant recommendations

In order to determine whether consultant gave implementable recommendations, the respondents were asked the following question:

Do third-party consultants give practical recommendations/solutions?

Besides one respondent who answered the question with a direct yes without offering to qualify their response, all the respondents expressed the same sentiment, that the recommendations presented by consultants, often to not relate to the context of the company. The general feeling was that consultants provided solutions that probably worked for other companies but proved ineffective because the company in question was in an operating environment that was incompatible with proposed recommendations, or was simply ill equipped or under-resourced to implement the recommendations. The respondents felt that the recommendations had to be around the resources the company had access to. Respondent number five went on to give a near-vivid description of a day in the life of a geologist, which related to the impracticality of some consultant recommendations. However, two respondents felt that the practicality of recommendations was the responsibility of the client and not the consultant, while Respondent number five felt that a contributing factor to the development of impractical solutions by consultants is that they make incorrect assumptions about the capabilities of the mine's technical team. Another failure was the lack of technical know-how in the client's team. Consultants are as good as the people who hired them. So if they are not managed properly, they give solutions that are hard to implement.

5.3.7 Shortcomings from consultant engagement

The researcher extended the research by gauging what factors would have resulted in management developing reservations if at all, towards implementing consultant recommendations. This was achieved by asking the question:

In your experience, what shortcomings did you find from the results of working with consultants?

The responses to the question did not reveal a general theme, but the most common shortcoming identified by respondents was the resultant lack of internal knowledge by mining companies. The following summarises the shortcomings identified by the respondents:

- Internal staff may feel excluded
- Consultants can compromise themselves if put under pressure by the client,
- Trust deficiency leading some mining companies to employ another consultant to verify another consultant's job. This also happens when the client lacks technical expertise, when they don't trust the consultant's competence (Nikolova et al., 2015) or if solutions are too diverse from previous findings.
- Mining companies then fail to build long-term knowledge
- Consultants have no in-depth knowledge of the company so they often come with theoretical recommendations that are not practical.
- Appointment of fresh graduates without practical experience into the roles of consultants

5.3.8 Role of consultants in closing the implementation gap

In order to explore the role that external consultants play in the actual implementation of their proposed solutions the researcher asked the question:

In your experience, do consultants help with implementation of recommendations?

The general response was that it depended on the scope or mandate given to the consultant. The mining company just then needs to manage the consultant's time diligently in order to control costs as the implementation time component is difficult to predict. The study showed that the involvement of consultants is rare in core business operational tasks, however they were quite involved in the implementation of totally new innovations. In such cases, the mines usually take over the implementation stage in order to manage costs among other reasons, and it has been found that consultants and the mine's technical team co-design the solutions, when they anticipate running the implementation together, with the mine personnel managing the project, and the consultant's major role being support (Turner, 1982). Consultants are in some instances also retained for post implementation support.

5.3.9 Conclusion for research question one results

The implementation success factors which emerged in uncovering roles and responsibilities in the client consultant relationships were: the reason for the engagement; the level of knowledge demonstrated by the consultant; the level of commitment from management; the level of experience of the consultant, particularly, the practical experience they had in mining, and the exposure they had in similar projects; whether the project originated due to management push or push from technical team; whether the recommendations proposed were a confirmation of gaps already identified internally; the cost of the recommended actions; the reach of the intervention; whether the opinions related to the recommendations cast the company in a positive light; the size to the consultant's brand which reflects level of self-accountability; the level of knowledge transfer (Lăzăroiu, 2015) and demonstration of consultant's expertise; and whether the solutions were co-designed or consultant worked in isolation.

5.4 Results for research question two

Research question 2: To what extent have third-party recommendations been implemented in the South African mining industry?

This research question aimed to determine the appropriateness, feasibility, fidelity and sustainability outcome variables (Peters et al., 2013). This research question reflected on the characteristics that make the South African mining context unique and what implementation factors determined success in this context. This section presents the comments received from samples one and two in response to the interview questions that address research question two.

5.4.1 Common challenges

This question was designed to determine the factors that impede or promote successful implementation, by testing the fidelity implementation outcome variable (Peters et al., 2013). The questions was:

In your experience, have you implemented all recommendations put forward by consultants? If not, what were the challenges?

The discussions held with the respondents showed a general agreement that most mining companies now try and implement recommendations by consultants in order to justify the cost, with audits completed to follow-up on these in some instances. However, in the experiences of the respondents, in the instances when all or some recommendations failed to be actioned, there were three primary challenges. The first challenge that stood out was the lack of buy-in from the project participants that the

recommended interventions would work. The second challenge was inadequate commitment to the recommended actions by management who then do not prioritise the programme, do not provide adequate resources, or do not follow-up. The third challenge that resonated with participants was not aligning the recommendations with context resulting in underestimating requirements for the implementation programme. The outcomes seen were either running out of financial resources or having inadequate human skills resources to see programmes through.

5.4.2 Holding consultants accountable

The researcher addressed the question of consultant liability, and what they would jeopardise if they were to give irresponsible recommendations, thus driving the delivery of implementable recommendations to the client. The question asked was:

To what extent should consultants be held accountable for implementation failure?

In general, the respondents were of the view that consultants cannot be held accountable for the implementation of their recommendations because they had no control on implementation which is an internal operational function. The internal project managers have control and the consultants jurisdiction ends at their role as advisors (Collins & Butler, 2019). Companies cannot defer their accountability, they cannot give it to consultants. So, are they not accountable at all? The study showed that the consulting industry is generally self-regulated because the consultants in the study group felt they were effectively reigned-in by professional bodies, the need to maintain a good professional reputation and expressed aversion to jeopardising the chances of getting future work or favourable referrals.

5.4.3 Characteristics of the South African mining industry?

The question that addressed what made the South African context different from other mining jurisdictions or other operating environments seeking implementation success was:

What is unique about or what are the characteristics of the South African mining industry?

The responses did not generate a theme because the respondents were basing their responses on their own experiences resulting in a broad list of challenges, which the researcher proposes, should be tested in future research, are as follows:

- Annual labour remuneration conflict;
- Silo work culture between department along the mining value chain (Beer and Eisenstat, 2000);

- An immature worker mentality resulting in employees failing to collaborate, often, as observed in practise by some respondents, deteriorating to an ineffective utilisation of people, material and capital (Neingo & Tholana, 2016);
- Poor change management (Hughes, 2016);
- Little worker engagement/little buy-in sought from employees and poor communication;
- Unfavourable societal dynamics (inequality, poverty, unemployment etc.);
- Few consulting jobs many consulting companies;
- Poor quality education;
- Large capex requirements and little investment in new projects;
- Unstable employment environment;
- Uncertainty regarding the mining charter and the MPRDA amendment bill (Department of mineral resources, 2018).
- Some recommendations do not yield immediate returns and because the mining industry is driven by short term bonuses, they tend to be short-sighted
- South Africa has expensive labour and is pricing itself out of the market in which, coupled with labour strikes, is limiting the investment inflows into the country
- South Africa is slow to adapt change and looking at the costs and the productivity, it needs to adapt new technologies in order to make operations more economical by reducing labour and changing mining methodologies.

5.4.4 Context-specific challenges

The question of the effects of the South African mining context was explored in the research. This question asked during the research, was delivered in such a way as not to prompt for the generic challenges in the South African mining industry, but to pry out technical operational challenges experienced by the respondents. The question was **What, in your opinion, are some of the challenges in implementation that are specific to the mining industry?**

A summary of the challenges mentioned by the respondents is as follows:

- The harshness of the mining environment
- Labour intensive with influential unions that are averse to operational efficiency solutions such as mechanisation
- Failure to raise finance as mining is capital intensive
- Inability to scale up from pilot and test-work phase
- The mining industry is heavily regulated and it takes long to be granted licences
- Dealing with local communities and sustainability reputation challenges

- Bureaucracy in mining companies, particularly the large mining houses
- Complex or under-estimated geological complexity
- Under-estimating the resources required
- Poor change management

5.4.5 Determinant conditions

The researcher probed the conditions which, in their experiences and lived observations, the respondent felt were determinants of implementation failure or success. The following question was asked to determine these:

What conditions (in the mining industry) impede or promote implementation?

The responses given by Respondent number 13 give a holistic view of some of the conditions that work for or against implementation, and that summarised the views from the other responses. The respondent talks about:

- The silo work culture that results from having different departments meaning departments don't collaborate and the company finds it harder to adapt to change;
- Company head offices that do not support projects which are motivated by staff on the mine site;
- Lack of project champions in head office to make sure projects have capacity and resources for full implementation;
- An immature worker mentality that fails to recognise that consultants present opportunities to solve operational problems;
- The need for many variables and multiple departments to align and increase the chances of success; and
- Mining organisations tend to have a blame and witch hunt culture

5.4.6 Perceived success factors

Although this is the objective of this research, the researcher tested the views and experiences of the respondents in order to get a practical and lived perspective. The question asked was very similar to question 2-5 (Appendix 2), but was asked that way in order to pry as much information out of the respondent as possible. The question was:

What are the success factors for implementation of consultant recommendations (in mining)?

Table 14 summarises a tally ranking of the factors that the respondents felt were critical for implementation success:

Table 14: Experienced success factors

Rank	Factor	Response frequency
1	Management commitment and buy-in	13
2	Alignment and buy-in from implementation participants	13
3	Project representation in senior ranks	9
4	Professionalism and a mature introspective culture	8
5	Good change management	8
6	Performance management and follow-up	8
7	Trust	8
8	Interventions that increase process efficiency	7
9	Make sure implementation programmes are well resourced	6
10	Project prioritisation	6
11	Solutions that reflect appreciation of the harshness of working on operations (fit)	6
12	Improve safety	5
13	Pro-active management team	5
14	Clear and concise recommendations	5
15	Planning implementation with a broad view of the operations to see how the programme affects other departments and how other departments can contribute to the project and coordinating the collaboration.	5
16	Working within a specific time-frame as change in conditions with time can render some implementations variables useless	5
17	Follow-up from the consultant to verify the implementation is on track	5
18	Have teams that are driven, are open to trying new things, change and have the necessary skills	3
19	Knowledge sharing which improved the onboarding of new technologies and implementing innovative methods in operations (Obeidat, Al-Suradi, Masa'deh & Tarhini, 2016)	3
20	Compelling justification to senior decision makers	2

The research showed a common sentiment about management role in the implementation of consultant recommendations and the institution of implementation success as a key performance indicator (KPI) for senior managers. It was established that already, the major mining companies have implementation incorporated in CEO's innovation and technological innovation KPIs as implementation is a major component of innovation (Stowe & Grider, 2014).

A trust relationship between the client-consultant engagement was identified as a success factor. Firstly, due to brand reputation. The bigger or more reputable the consultant's brand, the more likely that decision makers trust the potential effectiveness of the proposed interventions and recommendations. Secondly, due to the on-site consultant's practical experience. The research showed that mining professionals have more faith in the implementability of recommendations from consultants who have actual mining experience. Thirdly, a previous working relationship improves the trust particularly where the recommendations resulted in positive outcomes. Fourthly, where the consultant exudes confidence and shows heightened level of knowledge during the client-consultant interactions.

5.4.7 Does size matter?

In order to test findings by Wang and Chen (2014), that large companies, with well-established policies, standard operating procedures and specialised job roles, are well equipped for and achieve effective implementation, the following question was posed:

Are larger companies better at implementation?

No, it's not the size of the company but the willingness of the people, the cooperation and the buy-in sought before and during the consultant engagement to arrive at the solutions that need to be implemented.

5.4.8 Conclusion for research question two results

The study showed that implementation success in the South African mining context is compromised by the tendency, in the mining industry, to revert to tried and tested technologies. The technologies have proven safe, agreeable with labour and communities and have effected productive mineral extraction, while new technologies, in addition to being untested, run the risk of not conforming to requirements of a stakeholder group, or invoking costly time consuming safety processes that pose the potential to handicap the implementation itself. The mining industry has to make a trade-off between the uncertainty of the new risk exposure brought on by the implemented recommendations, and the safety, health, productivity, regulatory and social implications (Kniesner et al., 2014), particularly where process changes are implied. In addition, policy uncertainty brought on by resource nationalisation debate (Robinson, 2017) and mineral policy clarity, means implementation of key decisions is impacted (Macfarlane, 2018).

5.5 Results for research question three

Research question 3: When is implementation considered effective?

This research question partly investigated proposed research by Durlak, (2016) which suggested research into when implementation was considered successful, by addressing what components of implementation the respondents viewed as defining success.

5.5.1 The role of implementation in translating company vision

The question that explains the role of implementation in management strategy was asked in order to demonstrate the importance of implementation in translating vision (here, consultant recommendations) into action. The question was:

Strategy and implementation-How to you consolidate this relationship?

The responses received communicated the importance of implementing recommendations that aligned with company's strategies. This reflected the importance of management in the client-consultant engagement as filters and prioritisers of implementation programmes. Respondent number 15 answered the question in a way that aptly summarised perceptions of the strategy and implementation relationship by saying: "Implementation basically speaks to your strategy saying fine for us to get there, this is what we need to do."

5.5.2 Expected outcomes

The researcher examined the perceived and expected outcomes from implementing consultant deliverables in order to gauge the motivation for following through with implementing consultant recommendations. The question asked to gather this information was:

With reference to a project or two, what were the expected outcomes from the implementation of external consultants' recommendations?

The study revealed three main outcomes that the mining clients expected when they engage external consultants, an expectation which then drives implementation were:

- Regulatory compliance
- Efficiency
- Process improvement
- Improved safety record/performance
- Cost-effectiveness
- Job retention
- Reduced risk exposure
- Knowledge retention (Jordaan & Hendricks, 2009)
- Audience of the report or recommendations
- Reflects context and harshness of mining environment.

Summarily, the mining companies expect not just to tick boxes in terms of the expected deliverables, but as Respondent number 14 aptly put it, to receive professionally delivered reports and mineral projects that are valid, trustworthy, dependable and correct.

5.5.3 Definition of implementation success

The researcher delved into the respondents' perceptions of implementation success by asking the following question:

What is effective implementation?

This question was asked as a variant to successful implementation in an attempt to get exhaustive views from the respondents. One respondent's view of the self-explanatory nature of this question was reflected in their answer by stating that the effectiveness can only be measured based on whether the objectives at the onset were met. This implies the fulfilment of the dosage, fidelity and quality implementation variables (Durlak & DuPre, 2008; Peters et al., 2013), however, Durlak and DuPre (2008) have shown that it is impossible to achieve perfect implementation. This study also showed that implementation programmes are not static and evolve with time, as Respondent number 15 gave an example of ten-year old programmes having still been in place, and been improved over time. The researcher managed to get positive definitions, one from Respondent number 13, who worked almost exclusively in the consulting industry, that to be effective, the implementation programme for the recommendations had to take into account all the other functions or departments of the business without being done in isolation; and the other from Respondent number one whose response talked to the need to have sustainable implementation programmes which are effected by positive change, change in operations, change in behaviour change and a change in work culture.

5.5.4 Management commitment

In order to understand the drivers of management commitment and the role of management in promoting ideal conditions for successful implementation, the researcher asked the following question:

Does management prioritise recommendations from external consultants?

Some of the respondents confirmed the experiences of the researcher where consultants literally write the same report year in year out, and point out the same issues. But that is slowly changing as mining companies are pushing for internal accountability by setting up audit teams to ensure implementation of consultant recommendations, as an important tool to identify issues, is carried out.

Five factors were identified as important determinants of the priority given to recommendations and these were the client-consultant relationship, the consultant's brand, the originator of the recommendations, the type of work that resulted in those recommendations and the technical knowledge of the project team. Consultants and mining clients build relationships over time so often, there is a trust relationship and that relationship boosts the chance of translating recommendations into action. The consultant's brand is also key. The bigger the brand name, the greater the chances of implementation. It was established that there was keener interest from top management when a big brand name is used, and finance departments demand value for the costlier

service from the bigger brand. Mining personnel also tend to give higher priority to recommendations that were originally identified by their own personnel, then independently confirmed by the external consultant. This is because the internal personnel know the project better, resulting in them allotting the critical factors safety and environmental considerations that they deserve (Gowrisankaran et al., 2015), and also in situations where the competence of the consultant is questioned. Prioritisation also depends on the type of work done by the consultant, for example audit recommendations are usually carry a fair amount of weight because they indicate systems inefficiencies and issues in processes, procedures and reporting. A lot of mining companies have audit committees and audit project champions who follow-up, and whose mandate is to ensure issues are identified and fixed for overall process improvement. In those cases, the recommendations were awarded higher priority. A lot of mining companies also carry out annual audits and so management prioritise any recommendations so that they do not reappear in subsequent audits. What is clear is that the respondents felt that company management must have adequate technical knowledge to be able to assess the recommendations to prioritise and to act on them. And one of the classic prioritisation criteria was based on the recommendation

5.5.5 Do professional appreciate importance of implementation?

In order to gauge mining industry professionals' appreciation of the importance of implementation of any operational or business improvement recommendations, the researcher posed the question:

Has competitive advantage been gained by implementation?

None of the respondents were emphatically positive about implementation lending competitive advantages to operations. One interesting outcome was from the discussion with Respondent number 12 about the implementation of training recommendations. The respondent was clear that there were no competitive advantages to be gained by implementing consultant training recommendations as anyone could access open source training online, and access the same resources as the consultant brought. Another sentiment was that one of the motivators to implementing consultant recommendations was to avoid regret, with no real benefits outweighing not implementing consultant recommendations. Respondent number four was also not positive about the advantages of implementing consultant recommendations, stating how the current South African operating environments puts mining companies at a disadvantage and cannot be said to be competitive at all unless the contextual matters are solved first.

“South Africa has still got a long way to go in terms of its competitiveness because if you look at the environment it’s not conducive to the mining industry where you look at all the social issues that the country is currently facing so for us to be competitive globally those issue’s need to be addressed. And it’s not small feat and it cannot happen overnight” (Respondent number four).

5.5.6 Management as drivers of implementation

The researcher examined the appreciation by the mining industry professionals, of the role that management plays in facilitating implementation of consultant recommendations. The following responses were received to the question:

Managers are key in deciding what goes and what doesn’t. In your experience, how instrumental was management, as a filter, in implementing (all) recommendations?

The study showed that the common perception among respondents is that the manager’s role lies in giving direction. Managers coordinate different departments, and work to get the information, input and effort required to implement recommendations as required. The research also presented the need for management to be flexible in order to accept change and to operate according to environmental changes, agility which can drive success (Serrador & Pinto, 2015). Management prioritises work and filters out what is not necessary, even at the implementation phase so it is crucial that they are technical experts in their own right as they need to effectively allocate resources for implementation. They also need to ensure that there is adequate support and resources for implementation of given recommendations. Respondent number 15 expressed managers as spears, the tip of the arrow, in driving change and they need to lead the change of the organisation’s culture, by changing their culture first.

5.5.7 Conclusion for research question three

The study revealed that in summary, implementation is considered effective when the result is positive results, positive change and delivery of expectations. This entailed, according to the responses, when the implemented recommendations conform with the company’s strategy and values, it results in inter-departmental cohesion and working towards common goal, when it results in sustainable positive change in behaviour and work culture and when it meets or exceeds management expectations.

5.6 Conclusion

The results of the interviews held with the 15 interview respondents (see sample response in (Appendix 11) and 16 technical reports indicated a strong dependence on context as a driver of the interaction of the factors for successful implementation of consultant recommendations. The views of consultants and managers of mining companies were similar with a strong emphasis on professionalism in middle to senior management. The interview sample provided was 15 participants as the researcher felt that in terms of gathering insights and experiences about success factors for implementation of recommendation, data saturation had been reached.

6. Chapter 6: Discussion of results

This chapter discusses the findings around each research question, research propositions and how these relate to previous research and the theoretical frameworks as well as a synthesis of the findings and how the research meets its objectives.

6.1 Introduction

The chapter was divided into five sections of which sections one to three discuss the findings around each research question, section four integrates the findings into relevant frameworks and then section five was be a synthesis of the findings.

6.2 Discussion of the results for research question one

This section presents a discussion of the findings from the responses that answer research question number one which was:

What role do external consultants play in the mining industry?

The researcher explored the experiences and perceptions of the research respondents on their roles, and how this relates to the theory discussed in chapter two.

6.2.1 Discussion on findings for proposition 1a

Proposition 1a was that companies engage consultants because their resources have limited capabilities to provide the level of service required. In order to prove or disprove this proposition, the researcher began by asking questions that assisted in analysing the reasons behind their engagement, with particular focus on whether the engagement had an implementation focus, the incorporation of the consultants into the project team and how this affected team dynamics, as well as understanding the role of management as the engine that ensured that the overall goal of the client-consultant engagement was met.

6.2.1.1 The role of external consultants

There were four reasons why external consultants were hired based on the respondents' experiences. The first reason is to harvest the expertise and knowledge that the external consultants accumulated, working in multiple other operations and projects (Seifert & Nissen, 2018; Turner, 1982; Vukotić et al., 2017). This acknowledged that, though they might have internal experts, expertise most probably gained by years of working on an operation, senior managers in mining companies recognised the limitations of internal experts in terms of the lack of industry experience or exposure to solving operational problems. They lacked the expertise as having never come across such challenges

before and they lacked the expertise to have the tools or modern methods to deal with the challenges (Vukotić et al., 2017) such as improving operational efficiency.

Secondly, consultants were hired for temporary projects which do not justify a permanent staff (Van den Berg, 2011), in order to supplement staffing capacity (Wang & Chen, 2014). Most projects in mining companies were carried out on an ad-hoc basis or are run to pilot new methods or tools, once the pilot proved itself, the existing staff compliment fully adapted it or if the pilot failed, the project was abandoned. In either case the pilot team became redundant. Thus, for skills required temporarily, opinions from experts or teams whom the company would not be sustainably able to keep on their books on a permanent basis, mining companies used the services of external consultants (Chelliah & Davis, 2011; Cohen, 1999).

Thirdly for independence and objectivity which were mainly required either to legitimise management decisions (Ernst & Keiser, 2002) or as a regulatory requirement for independent technical reports or for independent verification of for example financial status, mineral resource endowment or the feasibility of profitable extraction of mineral reserves. Oliver (2014) lamented the fact that consultant sell back ideas they gleaned from clients, but this study has shown that the mining professionals view and welcomed this as verification, which affords their work, greater chance of being implemented.

Fourthly, consultants were hired to facilitate learning (Turner, 1982) and provide guidance on any new technologies, processes or methodologies that a company was not familiar with, had little exposure in or lacked the inhouse expertise (Vukotić et al., 2017).

What made external consultants attractive to work with came from the theoretical perceptions and expectations of mining executives, about what they would gain from the consultants (Chelliah & Davis, 2011). This related to special skills that they had and the unique position as independent third parties exposed to other projects in foreign and competitors' jurisdictions as well as the exposure of internal personnel, to interaction with these experts. This research sample held the opinions of consultants in high regard, and these opinions were communicated via reports or verbal communication in formal or informal settings. This was because, mining companies recognised that consultants, had exposure that they, working for a number of operations at a given time, did not have (Vukotić et al., 2017). Twelve out of the 15 respondents felt that their opinion was the most attractive deliverable from consultants, the attraction being magnified by intellectual property, as well as knowledge about current methodologies, technologies and problem-

solving techniques. Thus, besides reports, consultants did not produce a physical product. Their opinion or the intervention was the product (Fixsen et al., 2009), both which are intangible.

The respondents all agree that external consultants are necessary, and not just in the mining industry, and this reflected the sentiments of senior mining management and the consulting practitioners themselves. Most of the respondents, in justifying why they felt external consultant were necessary, went on to list again, the reasons for hiring them and what makes them attractive, but as Respondent number 13 observed, “the market agrees”. The high demand for external consultant services (Krivokapić et al., 2016) and the proliferation of consulting companies is testament to their necessity, and consultants know and understand their markets enough to create the demand for their services (Brès & Gond, 2014). Respondent number 13 aptly summed it up by saying “just the fact that that market is there tells you that its necessary”.

The question that the researcher answered was around programme reach (Durlak & DuPre, 2008; Durlak, 2016) by determining the level of support given to consultants, to improve their understanding of the problem enough to come up with practical solutions that address the operating environment, and are implementable. The researcher thus investigated the attitude of the inhouse professionals and experts, towards external consultants, and responses from samples one and two show acceptance of external consultants as necessary to corroborate internal findings and in so doing, facilitate the approval of decisions and get things going. The research showed that in wanting things done and decisive action taken to solve operational issues, managers in the mining industry realise that, without the proverbial “stamp of approval” from consultants, company decision makers were loathe to provide resources for programme implementation ((Kakhbod, 2013). They long since recognised that even though they might have completed the work and identified solutions and courses of action, they cannot implement because management generally does not avail the necessary resources unless their findings are confirmed or backed-up by independent consultants. This approach to decision making is also becoming best practise in mining because they realise that some internal decisions are mired by internal politics (Krishnakumar, 2015) and personal agendas (Kapoutsis & Thanos, 2016). The researcher expected to find some level of resentment towards external consultants (Hass, 2015) influenced by what Respondent number ten described as the feeling that consultants ‘show up’ employees to senior management, but instead found a level of maturity and professionalism in

appreciating that endorsement by external consultants is often what it takes to facilitate implementation.

The mandates from sample three (Appendix 10) showed a high level of senior management involvement in the decision to hire external consultants translating to availing of resources for the implementation of recommendations from the consultant engagements. The researcher acknowledges that sample three is public domain reports and it is likely that recommendations in these publicly available reports are more likely to be implemented in order to demonstrate value for money to stakeholders (Chelliah & Davis, 2011; Srinivasan, 2014) as opposed to internal reports which were not available for scrutiny.

6.2.1.2 The role of management

The research showed that management's main roles in the client-consultant was to motivate project participants (van Knippenberg & van Kleef, 2016) and to prioritise projects given that they are the ones who know the company's overall strategy and goals, to motivate for financial and material resources and to provide leadership for individual projects. In the client consultant engagement, the respondents felt, affording the consultants priority, availing resources and managing the consultant in terms of time was important, with Respondent number three saying if management is not in control then "you're in trouble because then the consultants can make lots of money.", in reference to management of time management by consultants.

Mining leadership increasingly realised, and increasingly demand value services from external consultants, with the comment by Respondent number two: "...why get a consultant, pay them if you're not make use of those recommendations...", and it is their role to ensure that they get value for money. This is driven by their technical competence, project management skills and interaction with the consultant.

6.2.2 Discussion on findings for proposition 1b

Proposition 1b was that recommendations are a key deliverable in consultant engagement. This proposition was designed to articulate the shortcomings of external consultants, and in so doing, provide an understanding of how this affected the suite of their desired deliverables which go beyond the provision of recommendations (Krivokapić et al., 2016); providing insights of whether their (anticipation of) involvement in the implementation phase influenced whether they give practical recommendations.

6.2.2.1 Expected deliverables from consultants

External consultants, as well as the client-consultant engagement had shortcomings that narrowed the extent of the services required, as well as have the potential to undermine the prioritisation of implementation. This research unearthed four major shortcomings of consultants and the client-consultant engagement. Firstly, consultants are expensive (Gill, 2015). In fact, they are so expensive, they are well known for this (Christensen et al., 2013), and this means either hiring consultants becomes the prerogative of successful companies, and for junior green fields mining companies, this puts pressure to produce glowing prelisting documents to justify the cost which related to the second shortcoming, that external consultants have the potential to compromise themselves in order to secure future work (Sonnenberg, 2003). The consulting industry has a lot of competition, and given a few years relevant experience (the SAMREC Code, 2016), one can qualify as competent and once a consultant lands a contract, in order to generate perpetual call backs from positive referrals, which constitute an important portion of the consulting business (Berman, 2016) they tend to produce deliverables that do not quite mis-represent the truth, but do not fully disclose the truth. Clients on the other hand, already have their opinions when they engage a consultant, and tended to be happier to retain consultants who agreed with them, so the consultant know this and can potentially compromise their professional judgement and twist the truth in order to concur. Respondent number 14 even painted a picture which reminded the researcher of the medical field being termed a “practise”, by also saying consultants also give recommendations that are sometimes designed to generate more work for themselves, or are a trial and error solutions, that if they don’t work, move on to another “possible” solution, all at the expense of the mining company, and representing more work for the consultant. The third shortcoming that came out strongly as a bone of contention, particularly with the older generation consultants with over 20 years’ experience in the mining industry was that consultants tend to employ graduates with no prior industry experience and present them to clients as “consultants” when in fact, they have no experience working in the mining industry. The respondents lamented having to literally mentor these consultants on the practicalities of their solutions and to teach them how to do basic things like read mine plans, all at the client’s expense. However, research by Brandon-Jones et al. (2016) showed that the more knowledgeable the consultant, the less time they spent with the client, reducing interaction exposure for knowledge transfer. The fourth major shortcoming is that by hiring consultants, the mining companies fail to build long term knowledge. Particularly when they don’t have inhouse expertise, and this also tends to build a perpetual dependence on the consultants who will most likely be

too happy to hook these vulnerable clients by giving recommendations that keep them coming, but not necessarily adding value for the client.

In order to be implementable, the recommendations delivered by consultants need to be practical. But how practical are they? The research revealed two reasons that impacted the practicality consultant recommendations. The first was that consultants tended to give solutions that were out of context and did not relate to the complexities of the project at hand. They tended to give blanket solutions owing to the theoretical basis of some of the junior consultants' "expertise". Without considering the macro-environment, each mine had conditions related to its unique geographic location, geological environment, extent of mining, mining methods and extraction efficiencies, the labour and social environment as well as the competencies of the team and how well understood the problem at hand was. All these factors require some level of efficacy in working in a mining environment, as Respondent number five lamented "If somebody walked in and said I understand what it takes to get to work at 06:30hrs get changed, go two and a half kilometres underground, come up, plot, do this do this do this. Now let me take that day I know what it feels like, let me show you how to do it better.". These consultants can give solutions that do not reflect an appreciation of the harshness of working underground, and as a result, their recommendations were not implemented because they were impossible to effect.

The second reason that impacted the practicality of consultant recommendations was giving solutions that were in keeping with the resources available to the company. Some respondents related how the companies they worked for were too under-resourced, financial or skill, or too ill equipped to effect the recommendations proposed by consultants. And a lot of the consultants, probably due to their lack of practical experience, failed to appreciate this. Anyone can give flamboyant solutions that can get the company to the moon and back, but a great consultant can talk to the situation on the ground, work with resources, equipment and software available to the company, and only within that context, develop solutions that work (Sonenshein, 2014).

Quite an important area that the researcher wanted to address was whether involving consultants in the implementation phase led them to give practical recommendations. Consultants play a pivotal role in implementation (Vukotić et al., 2017), however, the study confirmed that implementation of company strategy was internally driven (Chetty, 2010; Kaplan, 2017; Olivier, 2015) based on them having limited management autonomy (Van den Berg, 2011), their expensive service (Gill, 2015), and an inability to define the amount of time needed as implementation has too many uncontrollable variables to apply a time constraint.

The general response to whether and how consultants could be involved in the implementation phase was that it depended on the initial contract between the mining company and the consultant. The consulting practitioners in the research sample, seemed all too keen to implement, welcoming the idea, with no indication that their recommendations would be any different if they were involved in the implementation or not.

6.2.3 Conclusion for research question one

The research has shown that consultants play a significant role in the mining industry and this was answered primarily by the question of whether they were necessary or not, of which research revealed a general agreement that the demand in the market, as well as the size of the market for consultants reflected the significance of their role in the industry. Consultants are required for their expertise mainly for short term projects and for their independent opinions for regulatory requirements conformance (the SAMREC Code, 2016), working together with mining management who provide leadership and prioritisation as well as the representation of the consultant to executive management and vis versa. The mining professionals also tended to agree that external consultants were important to endorse the findings by internal technical experts (Hazle-Bussey et al., 2014), and get programmes implemented and this realisation has led to professional approach to the engagement which is instrumental in ensuring buy-in from the teams on the ground, and ultimately smooth implementation of operational improvement recommendations. Although the consultants are notoriously, expensive (Gill, 2015), they use inexperienced graduates as experts, who gain knowledge that could have been accumulated internally, but give solutions that do not relate to the resources, skills or operational context of the mining company. The consultants however, remain relevant in that their solutions remained forward looking and reflected current trends in the industry without necessarily confining the company to the extent of its resources. It must be acknowledged however, that these young consultants have advanced cognitive skills which enable better problem-solving skills (Hargrove & Nietfeld, 2015) which is attractive for companies seeking new solutions and new approaches.

6.3 Discussion of the results for research question two

This section presents a discussion of the findings from the responses that answer research question number two which was:

To what extent have third-party recommendations been implemented in the South African mining industry?

The researcher examined the results of the experiences by professionals on what the impediments and promoters of successful implementation in the context of the South African mining industry were, and how these related to the theory presented in chapter two. Some of the unique characteristics of the South African mining context and how they affect implementation were also explored.

6.3.1 Discussion on findings for proposition 2a

Proposition 2a was that companies fully embrace third-party processes for company improvement. This proposition articulates whether or not companies are able to implement all the recommendations they are given, and if not, what challenges they face and whether consultants should be held accountable for giving not just implementable recommendations, but recommendations that solve the issue at hand.

6.3.1.1 Implementation challenges

In order to understand the factors that influence successful implementation of third-party recommendations, the researcher investigated the experiences of project participants in terms of what the challenges they had faced, particularly, in the instances when they failed to implement some or all of the recommendations. The research has shown that from the client's perspective, there was considerable appreciation of the need to fully implement consultant recommendations in order to justify the cost of consultation fees, and some went as far as to carry follow-up audits to ensure recommendations were carried out (Respondent number two). However, the research also revealed three major challenges that impeded implementation and these were low buy-in, lack of management commitment, and under-estimating implementation project requirements.

The respondents communicated a lack of trust in the effectiveness of the recommendations as one of the main reasons for buy-in problems and this stemmed from being presented with consultants who had little industry experience or who demonstrate levels of incapability (Nikolova et al., 2015). The consulting industry had in the last decade, been at the forefront of the delivery of out-of-the-box solutions to business problems, and there is a general belief that the young generation hold the key to these solutions. The millennials, as they are fondly termed, particularly, the ones hand-picked from reputable tertiary institutions, were believed to have the metacognitive capacity to reframe problems (Yeo, 1995) even with no prior work experience in mining, and come up with solutions that no-one has ever thought of. The problem was whether the mining industry was ready for this. The second reason for implementation failure was a lack of management commitment and this is reflected in the lack of a project champion

(Fui-Hoon Nah et al., 2001) on the executive level, non-provision of resources which could be skills, equipment and finances, as well as not prioritising implementation (Dalcher, 2018). In the mining environment, production pressure was found to be a major priority (Hutton, 2015)) and if a project was not provided personnel who are excused from the production equation, implementation was more likely to fail (Krishnakumar, 2015). The third common reason is under-estimating project implementation requirements and this was as a consequence of not understanding the complexity of the mining environment or under-estimating the financial costs.

There are some implementation challenges that affected companies depending on the operational context, particularly mines due to geographic location, age of mines, labour intensiveness of South African mines, infrastructure, safety, health as well as environmental challenges (Willis et al., 2017). The research sample indicated that the current operational environment in mining faces challenges related to:

Harshness of the mining environment – Respondent number five gave a vivid description of not just the harshness of the mining environment, but the general feeling from the employees who are expected to implement recommendations by saying: “So the moment that somebody comes up and says deep gold mining great I know you’ve got ventilation issues you’re probably coming out dead tired...so for me to expect you to be wide-awake and alert enough to go and digitise what you just found and make it accurate is not going to work for me...”. The respondent also mentioned of some of the logistical issues that the mining environment, with its limited ingress and exit scenario presented by saying “...sometimes the logistics of the shaft make the cage late and somebody comes out at three o’clock and I’m still expecting them to close the 24-hour loop of reporting...” which impacted flexibility if work was to be carried out underground. The harshness here has to do with underground mines being damp, slippery, wet, poorly ventilated, cavernous, pitch black, claustrophobic, humid made worse by the long walking and climbing distances as well as the burden of carrying heavy safety gear specifically the self-rescue packs, and wearing uncomfortable safety clothing. The harshness on open pit mines referred to the heat, the suffocating dust, and climbing and descending on rubbly slopes as well as wearing uncomfortable poorly ventilated safety clothing in the heat.

The mining industry is labour intensive (Conradie, 2018; Mkhize, 2016) and the labour unions have become quite powerful and influential (Lester, 2014) which means mines are limited in what they can implement, particularly if it threatened jobs in any way. That means decisions to cease non-profitable operations, or mechanise, cannot be taken

lightly without prior extensive consultation with the unions, government, community leaders and workers. Consultations that not only affect the time component of implementation, but the outcome.

Other challenges included lacking financial resources to see an implementation project through to completion, the capital intensiveness, challenges of scaling up from test-work phase or pilot projects, strict licencing particularly regarding environmental sustainability or lengthy times to be granted licences for example water licences, which can stall or result in the abandonment of projects. Another significant challenge was the bureaucratic processes through which projects are subjected to, particularly in the large mining houses which have headquarters offshore (Robinson, 2016).

Given that in some cases not all the recommendations proffered by external consultants were implementable, also bearing in mind the challenges presented by the structure of the mining industry, the research was extended to determine the perceptions of the respondents around how accountable they felt consultants should be for failed implementation of their recommendations. This related to whether the consultant did their homework enough to understand the context and practicality of their recommendations, as well as the extent of the commitment to seeing problems resolved. This research has shown that mining professionals as well as the consultants to the mining industry do not believe that consultants should be held accountable for the implementation of their recommendations. This stems from the reality that consultants do not control the implementation process (Van den Berg, 2011) in terms of manpower, resources, time frame and prioritisation, which is an internal operational function, and thus the accountability should fall with the client. Hazle-Bussey et al. (2014) identified the importance of clearly defining accountabilities as one of the keys for an effective consultant engagement, thus it must be clear from the onset, that the client remains fully accountable for implementation outcomes. However, to curb irresponsible, impractical or unattainable recommendations, the respondents felt that consultants were reigned-in by three main factors: firstly, their membership to professional bodies which affords them accreditation as professionals in their field. For example, a mining engineer can become accredited with the Engineering Council of South Africa and becomes recognised as an engineering practitioner by the designation Pr.Eng. after their names or a geologist with the SACNASP with the Pr.Sci.Nat. designation. Due to their membership to these bodies means any misconduct on their part is reported and they could be stripped of their designation (SACNASP, n.d.). Without the designation, it would be difficult to be recognised as a practising professional, particularly in the consulting industry or for

senior roles in the industry. Secondly, the need to maintain a good professional reputation is a deterrent enough for a lot of professionals (Ardelean, 2015) and they, as a result, strive to maintain excellent work ethic. The third reason was that consultants could not jeopardise their chances of getting future work or favourable referrals, and thus they worked towards producing excellent deliverables. The second and third measures were a form of self-regulation and are the major deterrent for irresponsible engagements with clients.

6.3.2 Discussion on findings for proposition 2b

Whereas previously it was shown how the conditions in the mining industry caused implementation failure, Proposition 2b was that implementation failure is the main cause for some of the challenges faced by the mining industry. This also addressed the feasibility of implementing the recommendations by external consultants. The researcher intended to show cause and effect between implementation and the challenges in the mining industry, and in so doing, exhibit the complexity of this context.

6.3.2.1 The South African mining context

Without regurgitating the characteristics of the South Africa mining macro environment, the researcher focussed on the lived experiences of the respondents in determining what they felt was top of head in the uniqueness of the South African mining environment. The responses generated, as intended, a wide array of conditions, which the researcher felt were all worth mentioning, as shown below, the frequency of which was reflected in the order in which they are presented, the most commonly mentioned challenges being mentioned first:

The annual labour remuneration conflict experienced particularly in platinum mining, was a symptom of failures of which implementation was one of them (Adavbiele, 2015). Every year, the mining industry braces itself for often debilitating labour “negotiations” that bring the mining industry to its knees (Harvey, 2013; Williams, 2017), and reduces productivity (Neingo & Tholana, 2016; Williams, 2017). This has been found to be due to failures to implement negotiated terms that addresses wage increases and the socio-economic challenges faced by mine workers (Adavbiele, 2015; Williams, 2017).

The perceptions of the respondents were generally that in a bid to operate within the bounds of the stringent mining regulations such as The Mine health and safety act No. 29 of 1996 (Department of mineral resources, 1996), which carries up to three-year imprisonment for having a seriously injured worker (Section 86 sub section 2a), mining companies were slow to adapt new processes or technologies whose safety

performance, by virtue of the newness status quo, is unknown, therefore tending to be avoided by sticking to proven and tested methods. This reflected the complexity of the mining context (Willis et al., 2017) with particular reference to human safety.

The study indicated that the regulatory framework is the biggest hurdle for implementation, particularly with regards to fulfilling safety, environmental and labour requirements. Investment in South African mining has been depressed, production costs have been increasing (Neingo & Tholana, 2016), and annual labour bill increases and subsequent recurring post-negotiation strikes means annual productivity is decreasing. As a result, mines face viability problems but cannot close down without engagement with local communities, government and workers. The established and disclosure of the mineral resource endowment on mining properties is also defined within the limits of mineral law in order to protect investors.

Mine safety has a significant impact on implementation in the mining industry. Owusu-Manu et al. (2017) found that priorities change as changes are effected in a company, but in the mining industry, to top priority on operations remains the same, safety. Any new work has to be preceded by task safety assessments, and they have to have manuals for the different elements of the task before it can be carried out. During the implementation, task observations are carried out and any perceived safety violations or risks have to be remedied. Most mines' safety personnel have the authority to effect work stoppages until safety issues are resolved. It has been shown that safety precautions cause a reduction in productivity as monitoring manpower is increased and safety measures instituted (Gowrisankaran et al., 2015). Safety issues have the effect of delaying the commencement of recommended actions, particularly if it involves new methods, or of causing delays during the process as safety issues are identified and remedied.

Mining companies traditionally have about five to seven main departments based on the functions namely, geology to do with determining the quantity and quality of the ore, mining to do with breaking the ore, load and hauling it to the plant for processing, engineering services for machinery, equipment and facilities maintenance, processing for extraction of the product from the ore, administration for the welfare of human capital and finance and the health, safety and environment. These departments, all critical along the mine value chain, traditionally have a silo work culture (Awa, 2016) which sees communication breakdown, blame culture, power plays and self-preservation that can affect overall mine operational efficiency. Sull et al. (2017) have shown in part that this can also be due to management not understanding how the different parts of the

business come together to create common value. Thus, a step further to communicating is to ensure that there is common understanding (Sull et al., 2015).

The respondents lamented the poor adaption and acceptance of change in mining (Dhookie, 2016) and they felt that because the mining industry in South Africa is over 100 years old (Neingo & Tholana, 2016), and technologies used long ago, are still being used today and still work, arguments are against change. In addition, the mining industry is, unlike the IT or technology industries which are dynamic and are run by “millennials”, it is run by the mature experienced professionals (Van der Merwe, 2011) who are set in their ways and are averse to change. They also felt that this, coupled with poor change management, meant that a lot of projects failed at the implementation stage (Hughes, 2016; Imran, Rehman, Aslam, & Bilal, 2016). The respondents pointed out the feeble commitment by companies to embracing new technologies, demonstrated by experiences where mining companies buy new software that they don't utilise or have the internal skills for, as a significant manifestation of this trend.

The setup of mining companies with the mine operations being in remote locations and with decision-making and administrative functions head-quartered elsewhere (Butler, 2013; Robinson, 2016) in major cities and often offshore, means there is a communication chasm that technology cannot close because of the lack of human connection, often leading to decisions that lead to labour problems. Another result is there is little if any, worker engagement/little buy-in sought from employees for major decision that affect their work, working conditions and their attitude towards work.

The mining industry, due to its cost cutting initiatives, is having fewer and fewer consulting jobs, preferring to solve their problems inhouse. Consultants are only called in to fulfil the independence element of the regulatory requirements. However, due to the proliferation of early retirements, experts land in consulting and the conversion of traditionally accounting audit firms into large solution houses that can now technically service the mining industry, the consulting industry is flooded, and that threatens the integrity of the industry, and the quality of the recommendations proposed.

The South African education system sees a huge portion of learners subjected to poor quality education (Oluwajodu et al., 2015), and this is seen and felt in the working environment. The mining industry is not immune, workers have poor communication and poor literacy, affecting even the basic fundamentals such as the comprehension of safety education.

The mining industry, by the very nature of the scale of its operations and the technical logistics of rock extraction, has large capex requirements (Mohutsiwa, 2015). However, currently, there is little investment in new projects in the mining sector and this is primarily due to political and policy uncertainty (Redl, 2018), as well as evidence of mass corruption by significant role players in South Africa (Knutsen, Kotsadam, Olsen & Wig, 2017)). This translates also into reluctance to implement projects.

The major mining houses have been retrenching over the years and still retrenchments loom (Niselow, 2018; SABC News, 2018) curbed by regulation (Section 52 of the MPRDA and Section 189 of the labour relations act 66 of 1995) but still presenting an unstable employment environment, which impacts employees. The uncertainty presented by the constant threat of job cuts in the South African mining industry negatively impacts operational performance by drawing the focus of employees away, not just from carrying out tasks effectively, but from forward thinking and being proactively involved in developing solution to improve operation efficiencies (Ahmed, Kakkar & Sharma, 2016).

The mining industry has recently been facing uncertainty regarding the BBBEE clauses of the mining charter (Macfarlane, 2018) and the consultation process at deriving the conditions in the charter thereof. This has the potential to impact the level of investment in the mining industry which filters down to implementation of project scale programmes.

There were three factors affecting implementation, found to require change management and behaviour-based interventions. These were, the work culture compounded by immature worker mentality; deficiencies in senior executives' support; and the almost countless different ways contextual variables come together making each face operation unique challenges (Respondent number 13).

The silo work culture that results from having different departments meaning the company finds it harder to adapt to change (Beer & Eisenstat, 2000). In these cases, there develops a blame and witch hunt culture which fortifies these silos and causes breakdown in collaboration, particularly where an intervention directly impacts many departments. An immature worker mentality means employees fail to see the bigger picture and fail to recognise the opportunities to solve operational problems, that were presented by collaborative effort, and deteriorates to an ineffective utilisation of people, material and capital (Neingo & Tholana, 2016).

The study also revealed a general observation by the respondents, that company head office executives do not generally support projects which are motivated by staff on the

mine site. This was a consequence of mine management trying to be pro-active, or trying to circumvent bureaucratic processes in order to gain implementation momentum. So, in those instances, unless they identified project champions (Fui-Hoon Nah et al., 2001) in the head office to make sure projects had capacity and resources for full implementation, as well as putting together project status monitoring structures (Damoah, Akwei & Mouzughi, 2015), projects failed before or during implementation. Research by Alharthy et al. (2017) supports the observation that most projects failed at the implementation stage.

The study also suggested that beyond the work culture and executive support, it was not so much specific conditions that can promote or impede implementation of consultant recommendations, but the coming together and alignment of several variables. Thus, the challenges faced by the South African mining industry do not make it unique as pointed out by Respondent number 13, but the combination of the challenges was what it unique. In effect, it is combining conditions such as the unequal societal dynamics such as black tax, post-apartheid divisions, quality of education, the age of South African mines and the BBBEE initiatives, over and above the operational context factors, that make it unique.

6.3.2.2 The success factors

The researcher also investigated the factors that are top-of-mind for the respondents when it comes to what they consider as the success factors for implementation which were used to assimilate the findings for the overall research. The researcher felt the research would not be complete without getting the views from the mining practitioners themselves. The factors fell into four main categories namely project management, alignment, the professionalism of the consultant and the client-consultant dynamics as shown in Table 15.

Table 15: Summary of respondents' success factors

Project management
Pro-activeness Project time-frame Provision of adequate human and capital resources Follow-up on project progress Good change management Project champion (Beer & Eisenstat, 2000; Fui-Hoon Nah et al., 2001)
Alignment
Buy-in from employees Introspective culture Justification to senior decision makers Interdepartmental synergy (Beer & Eisenstat, 2000) Driven teams willing to learn and change Organisational structure (Heide et al., 2002)
Consultant professionalism
Reputable brand Consultants with mining experience
Client-consultant dynamics
Open trust relationship Good communication (Beer & Eisenstat, 2000; Heide et al., 2002) Transparency Practical recommendations that reflect context Interventions that increase productivity and efficiency

The success factors are due to internal conditions in the mining company as well as the factors that impact the perceptions of the competency of the consultant as shown in Table 15. Research by Sull et al. (2018) shows how alignment is often over-estimated and this study affirms the need to pay attention to this concept in implementation.

6.3.3 Conclusion for research question two

The research has shown that the context plays a significant role in the feasibility of implementing consultant recommendations, as well as the trust of the mining client towards the consultant.

6.4 Discussion of the results for research question three

This section presents a discussion of the findings from the responses that answer research question number three which was:

When is implementation considered effective?

The analysis of what the respondents considered as effective implementation, as well as the expected outcomes of effective implementation, was carried out within the framework of the outcomes model (Peters et al., 2013) and some of the theory presented in chapter two as discussed in this section.

6.4.1 Discussion on findings for proposition 3a

Although this proposition that effective implementation manifests as either process improvement, performance improvement or increase in profitability, appears self-fulfilling and obvious, the researcher developed questions which were meant to draw out not only understanding of effectiveness from mining practitioners, but to understand the constructs of strategy and implementation as well as to understand if there are companies that suffered a disadvantage by not engaging external consultants.

6.4.1.1 Effective implementation

The relationship between strategy and implementation was communicated here to highlight the crucial role that implementation plays in process optimisation, and how the implementation of recommendations by consultants is in some cases designed to guide the client towards meeting their strategic objectives (Darkow, 2015). The research showed that management tends to prioritise only the recommendations that aligned with company strategy. Another view which reflected and acknowledged the fast paced fourth industrial revolution was from Respondent number one who felt that strategy should not be cast in stone (Serrador & Pinto, 2015), that long term plans should now leave room for flexibility (Sull et al., 2015) and this reflects a deep understanding of the unpredictability of the current competitive environment.

The researcher also asked the respondents to give examples of instances or what outcomes they expected to achieve by implementing the recommendations by external consultants to give more insights on what they would consider as effective implementation. The senior managers in the research sample communicated that when they decide to implement recommendations, one of the outcomes they expect is operational efficiency, efficient ways to work to reduce the workload on the gruelling mining conditions either in terms of the physically demanding tasks or efficiencies for the administrative components that follow the physically challenging day underground or working in the pits.

Mining managers and project leaders in mining know their mine or project more intimately than consultants and the research has shown that more often than not, the mine personnel already know the answers to their technical challenges. As observed from the sample, when mine leadership engage consultants, they have pretty good understanding of what is outstanding on their projects and thus have an idea of what the consultants are going to recommend, so initially they expect recommendations that are basically and independent endorsement of what they already know. They also have a good idea of what it is they expect if those recommendations are implemented so their expected

outcomes were generally an exercise of ticking the boxes and optimal mineral extraction. One respondent summed it up as ultimately an accumulation of all the effort along the mine value chain, with external consultants steering the company, and achieving one of their ultimate goals of being able to sell the final mined product profitably.

The study indicated that effectiveness of the implementation of consultant recommendations was based on three factors which were:

- whether the objectives at the onset were met (Bronnenmayer et al., 2016)
- must take into account, and is supported by all the other functions or departments of the business without being carried out in isolation. And this was largely from looking at recommendations holistically and taking into account all the technical functions, resources, skills, departments, input and outputs and how these link to derive the desired result.
- the extent to which it effects positive and sustainable change in operations, behaviour and work culture (Emami-Langroodi, 2017). This then relates to a breakdown of the silos and a collaborative work culture for recommendations that affect more than one area in the mine value chain.

These factors relate to four of the eight outcome variables for implementation (Peters et al., 2013) namely acceptability which is a measure of how much stakeholders buy-in to the intervention, coverage which looks at the extent to which stakeholders benefit from effecting the implementation, fidelity which is whether or not and the extent to which the objectives were met, and sustainability which is whether the implemented intervention is maintained.

6.4.2 Discussion on findings for proposition 3b

Proposition 3b was that companies which engaged external consultants, and followed through on their recommendations are more agile, cost effective and quicker at problem solving. The approach to confirm or disconfirm this proposition was to ask questions around the involvement of management and their role in expediting implementation, whether size mattered and whether the expected outcomes related to cost effectiveness and problem solving. To start, it was clear from most of the interviews where the question of agility was addressed, that the mining industry is intrinsically not agile. In fact, it is a slow to effect changes, with research by Butler (2013) showing that investment is lower where there is less innovation, thus only the questions of cost-effectiveness and problem solving were addressed. Back et al. (2014) cited lack of institutional and resource support as being one of the inhibitors of innovation, and in the mining industry where mechanisation is still being introduced, the sustainability of the drive comes to question.

The larger the capacity to move large volumes of ore translates to significant economies of scale (Hutton, 2015), however, as indicated in the research, size is irrelevant when it comes to implementation, which disproves the work by Wang and Chen (2014). The size of the company was an important variable to investigate in the South African context due to the dominance of mining companies owned by multinationals, or mining companies operating several mine operations (Robinson, 2016). Large companies struggle with bureaucracy, while smaller companies struggle with funding (Slater, 2017) and external expertise so contrary to previous findings that larger companies are better at implementation (Wang & Chen, 2014), in South Africa, the size of the company does not matter.

6.4.2.1 The advantages gained from implementation

An important question that was addressed in addition to the one that questioned the necessity of consultants was whether companies that engaged consultants and implemented their recommendations gained competitive advantage over those that did not. Now this question morphed into a two-part question, the first question being whether there was competitive advantage gained by engaging external consultants, the second part went a step further to question whether with these consultants, further advantages were gained by implementing their recommendations.

For the first question, the research showed that very rarely did mining companies not engage the services of external consultants. After the Bre-X scandal (Rupprecht, 2017), mining regulation made it mandatory for mining companies to seek independent assessments of the mineral endowments and the feasibility of establishing a profitable operation (Samcode, 2016). These services are provided by external consultants. However, without an independent technical review, it can be argued that mining companies cannot list (Johannesburg Stock Exchange Limited, 2017), thus limiting their access to capital. Thus yes, the first question got an affirmative answer.

For the second question, none of the respondents felt that companies that implemented consultant recommendation were at an advantage over those that did not. What came out though was that getting those recommendations, was the advantage, because at least knowing the solutions to the problems, or knowing possible sources of operational inefficiencies was better than “going blind”. The other advantage was that consultants verified internal findings which then increased the level of support from senior management for implementation.

6.4.2.2 Management support

The management of mining companies prioritised the recommendations of external consultants and this had largely to do with maximising value from consultant services. Companies also realised the value of having internal technical expertise to be able to decide how to prioritise and implement the consultant recommendations.

6.4.2.3 Management perception

Management, by the very nature of their role, are a filter for the company, in deciding what goes and what doesn't and when, prioritising work (Dalcher, 2018) and deciding how much, when and what resources to provide for each project. Therefore, they play a key role in implementation. The recommendations of consultants provide the validity of what is probably already known in the company thus helping mine leadership to prioritise work, and as communicated by the respondents, management is important for decisions about which recommendations to implement, how, when, in what time frame, and with what resources. All these having an effect on the effectiveness of the implementation programme of proposed recommendations. The "how to implement" question has its answer from the consultant recommendations, and the management needs the technical expertise within their ranks to decide whether or not to accept these at face value or not. In some instances, mining companies engage one external consultant to verify the work of another, in order to endorse their decisions. The "when to implement" question was critical as some interventions rely heavily on the situation and in mining, the conditions of the macro-environment heavily affect project scale outcome and given the uncertainty in the South African mining industry (Macfarlane, 2018; Redl, 2018), decisions need to be set with given time boundaries. Management is crucial in deciding the resource allocation for projects (Leonardi, 2015) and can only operate to the extent of these budgets thus limiting what new technologies or people they can introduce. They can only implement what they had the financial, human and operational resources for, thus bringing the perception by the respondents that what makes a good consultant is giving solutions that relate to the client's budget and capabilities.

In the client consultant engagement, a driver for positive management perception and implementation support is the technical motivation, the consultant's brand and expertise and the expected outcomes. The main deliverable from the consultant is a report or a platform and the research showed that quality of the report and recommendations reflected the quality of outcomes if implementation of the recommendations was actioned.

Summarily, management positively drives implementation when they expect to see positive results, reflected in professionally delivered reports (and recommendations therein) that are valid, trustworthy, dependable and correct.

6.4.3 Conclusion for research question three

The effectiveness of the implementation programme is affected by not just what the recommendations were, but also by the resources allocated to the implementation programme (Leonardi, 2015), the timing of implementation and the technical know-how of the management team.

6.5 Thematic analysis

A qualitative analysis of the study data was carried out using the MERIL-DE model and the ISF.

6.5.1 Coding

The software ATLAS.ti was used to analyse the qualitative data. Codes were developed from the patterns and key words that emerged from the interview transcriptions. The codes were populated as shown in Appendix 8. The codes were then subsequently grouped into code families as solid themes developed. The final themes were then incorporated into existing ISF and MERIL-DE frameworks to test the application of these frameworks in the mining industry context.

6.5.1.1 Code families

The code families shown in Table 16 and detailed in Appendix 12, emerged in the research based on the interrelationships of the codes in practise, their effects on implementation, as well as their general classification.

Table 16: Coding families and resultant modified ISF components

Code families	Modified ISF component
Organisational culture	Organisational culture
Management	Company leadership
Project feasibility	
Change management	
Project team	Project leadership
Project management	Performance management
Context	
Alignment	Alignment
Compliance	
Learning	
Communication	
Outcomes	Expected outcomes

Code families	Modified ISF component
Consultant characteristics	Client-consultant engagement
Client-consultant relationship	
Knowledge sharing	
Risk management	Risk management
Problem framing	

The code families resulted in themes which were then consolidated into the ISF to come up with eight final implementation success categories.

6.5.2 The ISF

The ISF, was used to analyse and classify the success factors identified by the respondents as key to achieving successful implementation. This is because it not only addresses the implementation gap, but the context as well.

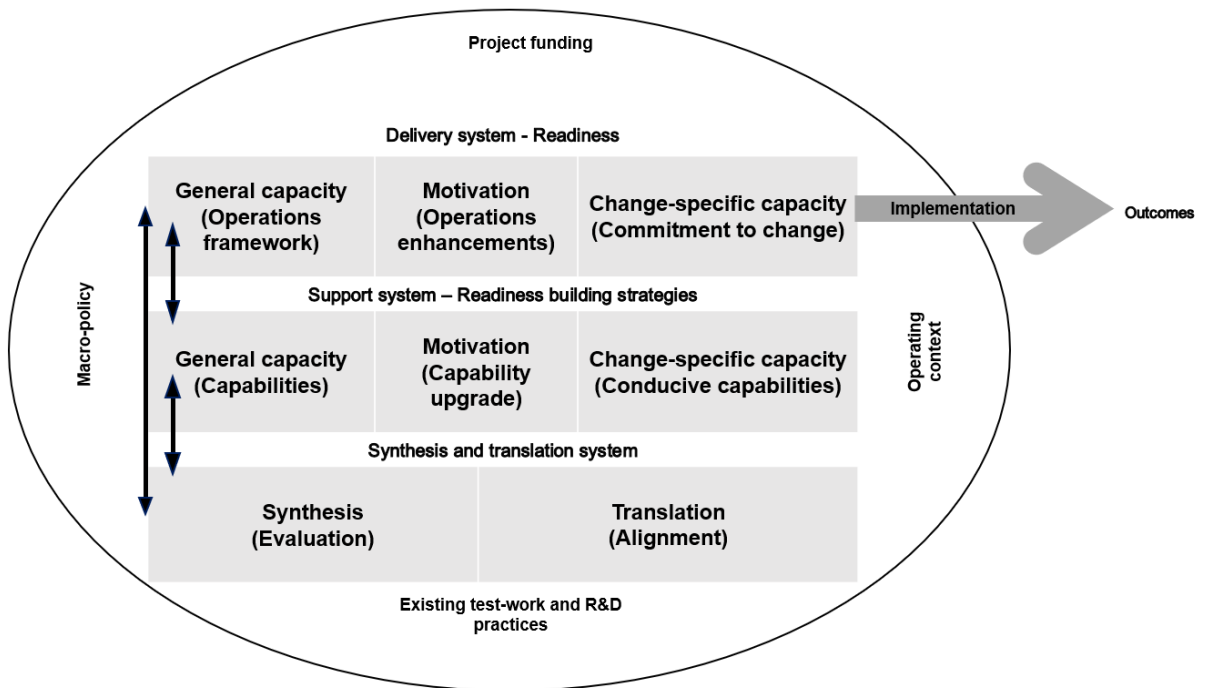


Figure 1: The Interactive systems framework (adapted from Garney et al., 2016; Wandersman et al., 2008)

The activities and processes for implementation were analysed and classified into the three components of the ISF shown in Figure 1, namely synthesis and translation, support system and delivery system.

The synthesis and translation component entailed gathering available data, framing the problem (Yeo, 1995) and understanding as much of the project and the task at hand as possible and ensuring all the stakeholders are aligned, involved and have committed to support the whole consultant engagement process all the way to full implementation.

Project technical evaluation and project feasibility evaluations are some of the key reasons for the engagement of the consultants in the mining industry, to harness their objectivity, expertise and drawing on their experiences in other similar projects, to identify and deliver the best solution. Table 17 lists the front-end factors that were mentioned by the respondents as key for successful implementation of consultant recommendations.

Table 17: Factors in the synthesis and translation component

Synthesis	Translation
Project evaluation Process audits Technical reports Consultant reputation/brand Source of instruction/Support from top management	Scope of work/clear objectives Buy-in Alignment Communication Trust Manage expectations Consultant brand and competence

Depending on the mandate given to the consultant, other front-end foundations that are laid differ. When the consultant is engaged for operational improvement, problem diagnosis, process optimisation, skills upgrade or to introduce a new operating platform, they must audit the current system to understand the real problem (Krishnakumar, 2015) and identify deficiencies, review previous work to lend continuity to the consultant engagement process, and then they must communicate their findings clearly, effectively and concisely. Lau et al. (2015) showed how complex implementation strategies are hardly put into effect. The communication can be informal while physically assessing the operations during walkabouts or carrying out pertinent tasks, or it can be delivered in a formal presentation setting or in the form of a technical report. Communication also includes disseminating mineral endowment and project feasibility to stakeholders through public reports, press releases and annual reports.

The expected project outcomes that are communicated by the consultants are also key to whether implementation occurs. In the mining environment, the study has shown that outcomes such as increased operational efficiencies, process optimisation, elimination of bottlenecks and reduction in workload elicit better audience for implementation.

The planning and development of solutions all happen in a theoretical framework, and is still to be subjected to real world operational challenges. The consultants, in deriving their recommendations, do so with optimistic ideal situation context. As a result, the risk is quite high, that projects fall at the implementation phase when operationalised. Support system component highlights the resourcing and ensuring that the operational environment is ready and conducive for implementation as shown in Table 18.

Table 18: Factors in the ISF support component

General capacity building factors	Motivation	Change-specific support
Training Tools Team Technical assistance Resources	Risk management SHE training	Stakeholder involvement Competence Change management

Due diligence is carried out to understand the feasibility of instituting identified change, understand the resources and requirements needed and the risks in terms of safety, change and process disruption as learning occurs. The effects of the new intervention on other areas of the business, need to be understood as well as the support required for effective implementation and development of a sustainable solution. Other key areas that must be addressed are the organisational culture, change management and stakeholder engagement, to ensure adaptation and acceptance of the new changes or project.

The delivery system component included action items for implementation, items that ensured the project management structure, the functional equipment and resources were available (Wandersman, 2008), and the human resource and management components had been addressed as detailed in Table 19 below:

Table 19: Factors in the ISF delivery component

General capacity		Change-specific capacity
Work culture Change readiness Resource utilisation Experience Time management Professionalism	Fit /compatibility (meeting needs) Performance management	Technical competence) Program Champion Inter-departmental collaboration

The implementation process must be within the bounds of the resources and capabilities within the organisation (McManus & Wood-Harper, 2008) and implementation success was found to be determined by the infrastructure in place which includes plant, equipment and logistical capabilities, the team alignment including communication and management prioritisation, the co-design element where the consultants work with the client team as part of skills transfer and ensuring project sustainability as well as ensuring visible leadership and follow-up structures to ensure project is feasible in the mine environment which is characteristic by incessant pressure to meet production targets.

The three ISF components, synthesis and translation, support and delivery, need to work in the following conditions (Wandersman, 2008) which were identified in the study as critical contextual factors for implementation success in the South African mining environment namely the macro-economic policy, regulatory and funding environment as well as within the limits of test-work and R&D practices.

Mining companies, led by the large mining houses have considerably resourced and innovative research and development departments, set up to investigate and improve performance (Gërguri-Rashiti et al., 2017), by investigating new resource definition, mining and extraction technologies. (Roberts, 2016; Vale, 2012). The new technologies then need scaling up for full implementation, necessitating this current research, particularly with the use of the ISF framework which has been adapted in this research to focus on scaling up pilot projects and test-work to full production scale.

6.5.3 Adaption of the ISF

The ISF was adapted to synthesis the success factors identified by respondents, was further modified by consolidating not just the factors highlighted by the respondents, but including factors identified in the role of the consultant, as the contextual factors highlighted as impediments or promoters of implementation success.

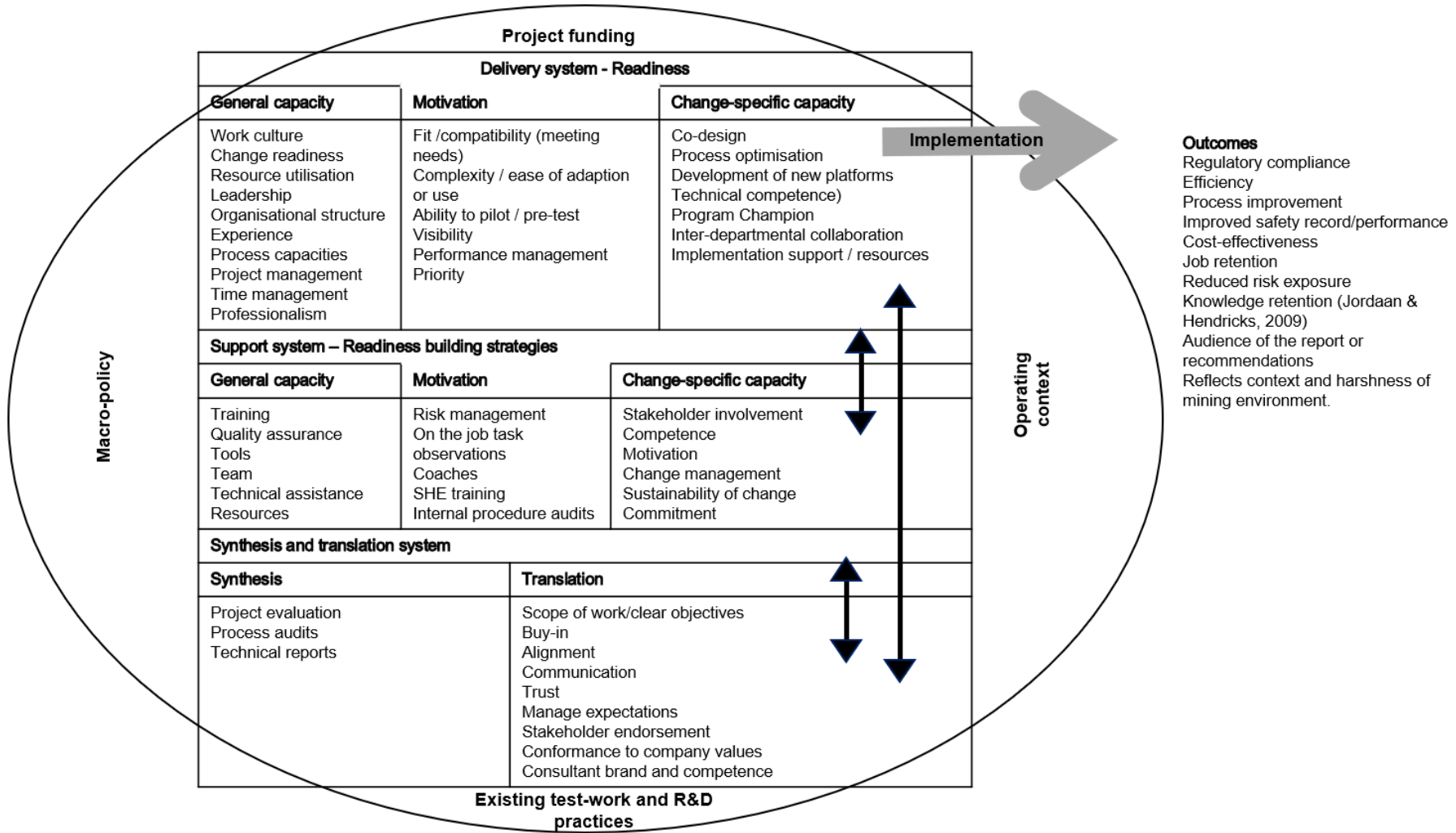


Figure 2: Detailed Interactive systems framework (adapted from Garney et al., 2016; Wandersman et al., 2008)

The factors that fall within the synthesis and translation, support system and delivery system components of the ISF are detailed as shown in Figure 2 above.

6.5.3.1 Synthesis and translation

The synthesis and translation component entailed problem framing and stakeholder alignment, stages in which consultants are heavily involved and need to work together with management to address. Appendix 13 details the success factors in this component. The factors highlighted in the study have also been identified in previous studies as indicated by the references.

6.5.3.2 Support system

The success factors in terms of the capabilities of the company are detailed in Appendix 14 . In the mining environment, as indicated in the study, the regulatory compliance and safety and environmental factors are some of the main mining context factors identified in addition to the general business readiness building strategies that are apply to business in general. Safety to compliance regulations becomes an increasingly critical factor as the mining operation get older, deeper and more prone to seismic activity (Plenkers et al., 2010).

6.5.3.3 Delivery system

The delivery system component is the commitment and organisational readiness factors that were consolidated from the as detailed in Appendix 15. Some of the main drivers were visibility, and work culture. Making the benefits of the recommendations to be implemented immediately obvious, or visible, to the end users, particularly with respect to improving the physical workload was one of the drivers for implementation identified among mining professionals.

6.5.3.4 The ISF context element

The inter-relationships between the factors in the three ISF components are unique from company to company and from site to site because of the context (Applebaum & Steed, 2000) in which they manifest (discussed in Section 6.3.2.1) and thus this research, though highlights the main factors highlighted in the study, but the researcher shied away from ranking them due to the unique contextual operating conditions experienced at each site and company, namely synthesis and translation, support and delivery, need to work in the following conditions which were identified in the study as critical contextual factors for implementation success in the South African mining environment namely the macro-

economic policy, regulatory and funding environment as well as within the limits of test-work and R&D practices.

Despite the research indicating that implementation success is not related to the size of the mining company, the researcher acknowledges, from the literature review and experience, that the large mining houses have considerable resources and innovative research and development departments, set up to investigate and improve performance (Gërguri-Rashiti et al., 2017). This is in tandem with the change-specific capacity of the ISF support system component. Larger mining companies thus have the capacity to investigate new resource definition, mining and extraction technologies. (Roberts, 2016; Vale, 2012), which in turn, after due diligence, are scaled up for full implementation. This aspect is in line with the change-specific capacity of the ISF delivery system component. Just using the ISF frame work in relation to R&D thus shows how companies with established R&D practices are better suited to fulfilling implementation of not just consultant recommendations, but new technology projects, and scaling up pilot projects and test-work to full production scale.

6.5.4 The MERIL-DE model

The factors that fit into the MERIL-DE framework were primarily the performance management and alignment factors. The model also has a strong correlation with the use of consultants in that their role are described by the components, supported by management as the drivers of the change with full alignment and engagement of the relevant stakeholders for success.

6.5.5 Adaption of MERIL-DE model elements

The MERIL-DE framework, Figure 3, was adapted because it supports continuous improvement and highlights factors that promote the sustainability of implemented programmes.

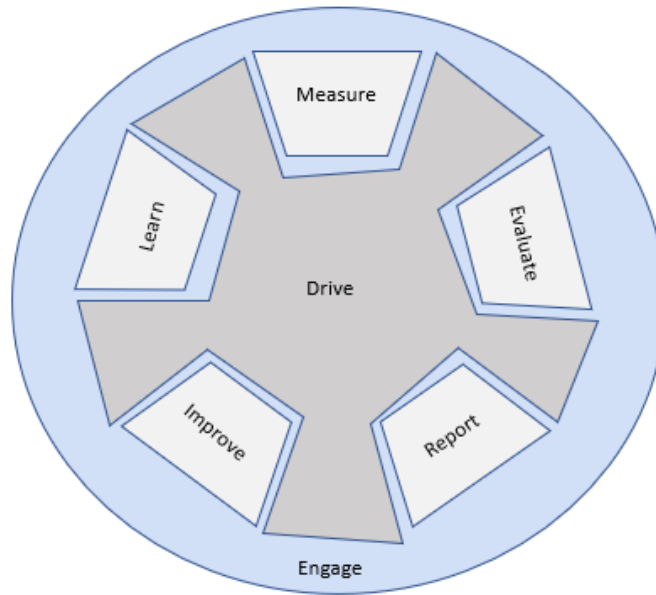


Figure 3: The MERIL-DE model (adapted from Olivier, 2015)

The implementation success factors that support continuous improvement are classified according to the MERIL-DE model components as tabulated below in Table 20 below:

Table 20: MERIL-DE factors

Measure (sense)
Process audits Risk analysis Measure compliance to regulation and adapt best practice
Evaluate (Make sense)
Process/project evaluation Mineral resource evaluation
Report (Communicate)
Produce reports Meetings Discussions
Improve
Process optimisation Have internal expertise Retain knowledge Align recommendations with context
Learn
Training Staff development
Drive
Management support Project management Labour buy-in/inclusion Project champion (Fui-Hoon Nah et al., 2001) Adequate resourcing Motivation Professionalism Culture Change management

Engagement
Communicate
Stakeholder engagement
Collaborate
Risk awareness
Regulatory compliance
Co-design
Stakeholder endorsement
Social licence

6.5.6 Model development

Synthesis of the success factors within the frameworks of the ISF and MERIL-DE models has resulted in an eight-component factors model being developed from this research as shown in Figure 4 below.

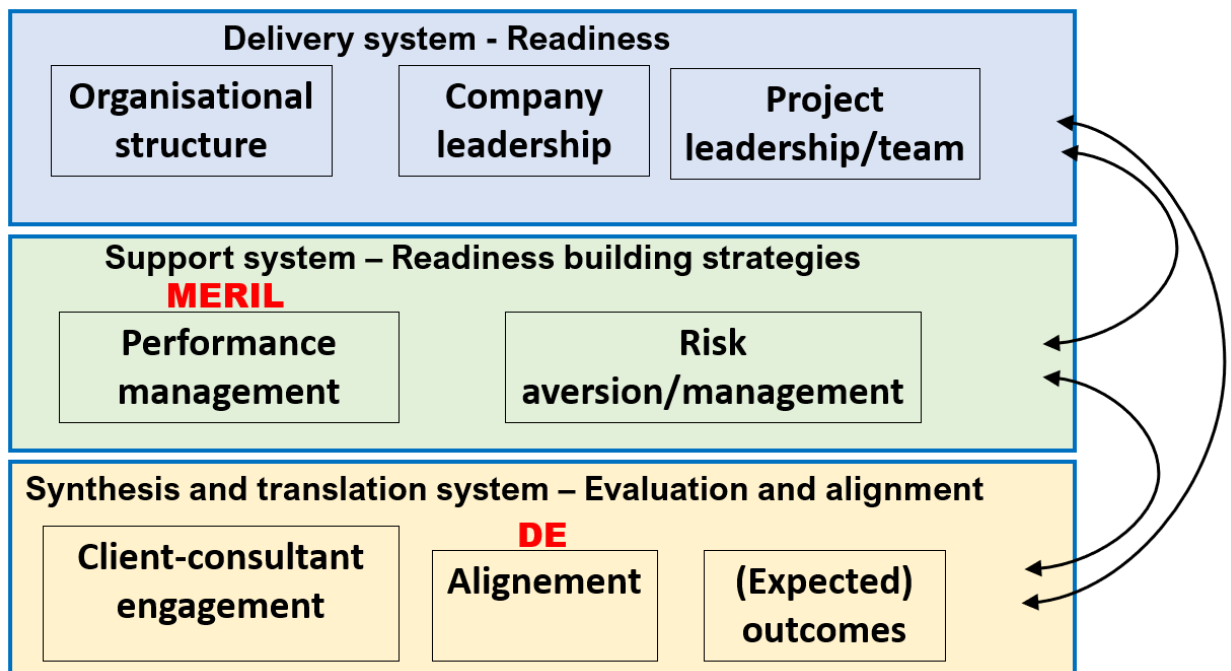


Figure 4: Eight-component factors model - modified from ISF model by Wandersman (2008)

The detailed implementation success factors (Appendix 16) fall into eight categories which make up the eight-component factors model which follows the work carried out by Olivier (2015) when he developed eight factors using the MERIL-DE framework. This researcher took Olivier's work a step further, by not just incorporating the MERIL-DE framework into the factors model, but the ISF as well, which is ideal as it addresses context and closing the implementation gap.

The eight-component factors, which fall with the ISF framework as shown in Figure 4 are:

1. Organisational structure (Alharthy et al., 2017; Miller, 1997);
2. Company leadership (Alharthy et al., 2017; Dalcher, 2018; Durlak & DuPre, 2008; McManus & Wood-Harper, 2008; Olivier, 2015);
3. Project Leadership (Durlak & DuPre, 2008; McManus & Wood-Harper, 2008);
4. Performance Management (containing the MERIL-DE elements Measure, Evaluate, Report, Improve and Learn) (Alharthy et al., 2017; Chetty, 2010; Fui-Hoon Nah et al., 2001; Olivier, 2015; Pinto, 2004);
5. Risk Management (Alharthy et al., 2017; Durlak & DuPre, 2008; Kniesner et al., 2014; McManus & Wood-Harper, 2008; Olivier, 2015);
6. Alignment (containing the MERIL-DE elements Drive and Engage) (McManus & Wood-Harper, 2008; Olivier, 2015; Sterling, 2003);
7. Expected project outcomes (Alharthy et al., 2017; Chetty, 2010; Fui-Hoon Nah et al., 2001; Olivier, 2015; Pinto, 2004); and
8. Client-consultant engagement (Durlak & DuPre, 2008).

(adapted from Olivier, 2015)

The detailed factors are shown in Appendix 16.

6.6 Conclusion

The study has shown that there are three areas that need attention for mining companies to better implement consultant recommendations and these are management, context, alignment and organisational structure. The success factors identified in the study were classified into these four categories as shown in Table 21 which also shows how the summarised classification relates to the ISF and MERIL-DE models.

Table 21: Summary of success factors

Summarised	ISF	MERIL-DE
Management	Project evaluation Process audits Technical reports Validated/verified solutions Project outcomes Project feasibility Due diligence Management support Manage expectations	Evaluate Drive Report
Context	Organisational functioning Capability Change management	Measure
Alignment	Scope of work/clear objectives (Rumelt, 2017)	Engage

Summarised	ISF	MERIL-DE
	Buy-in (Krishnakumar, 2015) Cross departmental support/collaboration Organisational culture Resource capabilities (Krishnakumar, 2015) Stakeholder endorsement Change readiness (Krishnakumar, 2015) Communication Co-design Regulation Client-consultant synergy (Kaplan et al., 2018)	Learn
Organisational structure	Resources Competence Motivation Time frame (Krishnakumar, 2015) Follow-up Sustainability of change Infrastructure	Improve

The study highlighted the need for mines to adapt change in the mining industry and how regulation plays a part is disrupting the change process, the importance of having internal expertise, the increasing demand for consultants to bring new solutions, not just to confirm what is already known and the power of workers in influencing management decision.

6.6.1 Management

The South African mining industry, home to one of the deepest gold mines, Mponeng Mine in Westonaria (Ptak et al., 2018) Gauteng, has been mining for over 100 years (Neingo & Tholana, 2016), and the management tends to be the old guard who tend to be set in their ways and are loathe to change and adapt new technologies such as mechanisation (Taylor & Mordant, 2015). However, the sentiments from the older professionals in the study group seem to concede to the fact that change is inevitable (Krishnakumar, 2015) and has to be embraced. They accepted the key role consultants play as validators of mineral resource definition and mining feasibility studies, necessitated by the need to supply truthful and accurate information. They have also accepted the role that consultants play in backing-up their internal findings and affording their work more recognition by senior management and increasing the chance of implementation.

The study also highlighted the importance of having technical expertise in the management ranks to avoid uninformed accumulation of unsustainable management fashion fads (Williams, 2004). Usually when the client has their own internal technical expertise, the consultant is there to confirm the diagnosis, back-up findings as well as to give more weight and afford the project greater priority for implementation. In such cases,

when mining companies engage consultants, they have pretty good understanding of what is outstanding on their projects and thus have an idea of what the consultants are going to recommend. When a mining company does not have technical expertise, the research has shown that that is when they get impractical solutions that are difficult or impossible to implement, they tend to get the junior inexperienced consultants from the consulting firm, have limited control of the project outcomes, they suffer more project time over-runs, get less collaboration from employees and the problem at hand is not adequately framed and therefore they don't develop the best solutions with the consultant.

The study also confirmed findings by Nesheim and Hunskaar (2015) that there is less information sharing between consultants and the project team of the client, and it is management's role to facilitate better communication, understanding (Sull et al., 2015) and knowledge sharing to ensure effective solutions are derived from engaging consultants.

However, more and more, the expectations by mining clients is that consultants table totally new, outside the box solutions, unexpected solutions that are bound by the resources available to the client.

6.6.2 Context

South Africa suffers rapidly declining jobs (Baxter, 2015) and inequality (Butler, 2013) causing the state to take a protectionist approach to job creation, allotting significant decision powers to labour unions and regulating mine downsizing procedures (Department of Labour, 2008) limiting the capabilities of mining companies to adapt large scale technologies that can improve their profitability. This research has revealed a perception among the mining professionals that the mining context provides unique operational challenges, confirming findings by Radnor and O'Mahoney (2013) that different contexts impact how projects are implemented.

6.6.3 Organisational structure

The intrinsic structure of mines, particularly those run by large mining companies, have resourcing issues such as influential trade unions which were formed to represent mainly the blue-collar human resource and stand up for their rights in labour disputes and labour negotiations (Plagerson et al. 2019). In mining, they have become so powerful that they have the power to inhibit technological decisions such as mechanisation (Gumede, 2018), they have the power to affect cost management by demanding and most

instances getting unsustainable pay increases considering the South African mining labour is expensive (Gold factsheet, 2018) and the labour bill is often the largest, absorbing about a quarter of mining budgets (Chamber of Mines of South Africa, 2016). Consultation is then key for implementation is key (Fixsen et al., 2009) and involves upskilling the current employees. An interesting resourcing perception highlighted in the study was that the financing decisions are made by non-technical personnel so they may fail to understand the reasons for or the urgency to authorise capitalisation for implementation.

6.6.4 Alignment

The study has revealed an inflexibility in the financing of mining projects, where despite realising and accepting the unpredictability of the mining environment, budgets seem to be inflexible, thus some projects can end up being under-resourced due to poor budgeting combined with difficulty in getting needed additional funding.

Sull et al. (2015) argued that a lot of companies do not suffer from a lack of alignment, but failure to rely on each other and poor inter-departmental coordination which manifests as the silo culture. The study agrees that in the mining industry this is one of the biggest challenges as some recommendations can only be implemented sustainably with cross departmental effort and coordination.

7. Chapter 7: Conclusions

This chapter concludes the findings from the research and assimilates the theoretical and practical finding of this research to summarise what the success factors for the implementation of consultant recommendations are, how these findings will be useful for business and how they further implementation research in the mining and consulting industries.

7.1 Introduction

Implementation, putting plans into action (Krishnakumar, 2015) is important for organisations to put management plans into action, and also to ensure companies are effecting decisions that promote innovations (Obeidat, 2016) and promote the development of mining operations that are efficient, safe, environmentally, operationally and environmentally sustainable. This chapter is divided into four sections which conclude this research. The first section presents the success factors as intended from the outset including a discussion of what the researcher believes the mining and consulting professional should consider for their future engagements. The second

section discusses the theoretical and business implications while the third and fourth sections discuss the research limitations and suggested future research respectively.

7.2 Principal findings

The findings from this research indicated that the key factors for crossing the implementation gap in the South African mining sector are management and employees buy-in and collaboration (Alharthy et al., 2017; Beer and Eisenstat, 2000; Durlak & DuPre, 2008; Sterling, 2003), communication (Alharthy et al., 2017; Dalcher, 2018; Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001; Kakhbod, 2013; Sterling, 2003), regulation and the reputation of the consultant (Ardelean, 2015; Glückler & Armbrüster, 2003), factors around which an eight factor component model was developed (Figure 4) which highlighted implementation success as dependent on organisational structure, company leadership, project leadership, performance management, alignment, expected project outcomes, the client-consultant engagement and risk management.

The research also highlighted that mining professionals, have limited faith in the influence of implementation in driving the competitiveness of operations (Section 5.5.5). A startling discovery considering the professionals are the thought leaders in operations (van Halderen, Kettler-Paddock & Badings, 2013). This highlights the importance of this research, in demonstrating to mining management, leadership and management support and alignment (McManus & Wood-Harper, 2008; Olivier, 2015; Sterling, 2003) are key drivers which should not be overlooked. It also shows how the role of management (McManus & Wood-Harper, 2008; Olivier, 2015; Sterling, 2003) and leadership is appreciated in theory but not in practice, with stakeholder engagement and stakeholder involvement in implementation initiatives focussing on labour, communities, regulators and seldom on company leadership. Despite the implementation research highlighting a need to drive action (Olivier & Schwella, 2018), the mining industry is still focussed on implementation planning and not closing the implementation gap. This research uncovered the necessary tools to do just that by developing the eight-components factor model.

Management, buy-in in order to command a strong management commitment and support for the project (Durlak & DuPre, 2008; Grol & Wensing, 2004). The commitment by management manifests as adequate resource allocation (Alharthy et al., 2017; Bryson & Bromiley, 1993), follow-up and audits as well as having a project champion (Fui-Hoon Nah et al., 2001) within their ranks.

In the client-consultant engagement relationship, management buy-in is also highlighted as a determining factor because trust and cooperation between client and consultant (Vukotić et al, 2017) is paramount. Trust is elevated by the quality of the consultant presented to the client in terms of brand, competence, experience, commitment and outcomes of previous engagements (Durlak & DuPre, 2008). And if trust is deficient, management buy-in is hard to achieve, as well as the support for implementation.

7.3 Implications

The findings from this study point some critical factors which working together, had not been identified in previous research as having the combined effect of impeding implementation in the mining industry. The findings are intended to inspire greater due diligence in carrying out implementation in order to attain collaborative effort from all stakeholders (Alharthy et al., 2017; Chetty, 2010; Hrebiniak, 2006), including the consultants who would have facilitated the identification of the required interventions.

7.3.1 Business implications

The implications for business are specific to the management style that is to be adapted, not just in the mining environment, but in other sectors as well. The business implications are around management buy-in, the management factors identified, as well as the role of management in facilitation and driving change in organisations (Fui-Hoon Nah et al., 2001; McManus & Wood-Harper, 2008), change that allows the organisation to be ready to adapt new methods and technologies and ultimately gain competitive advantage over its peers (Coccia, 2017). Or in the case of mining which is highly susceptible to macro-economic factors, to be able to be agile enough to weather the commodity price fluctuations.

7.3.1.1 Recommendations to mining companies

The study has managed provide more understanding into the factors that are important to mining professionals (Section 5.4.6), and to guide management on key components (Figure 4) for achieving excellence that are beyond the short-term production targets. The study also magnifies the important role played by senior level management (Section 6.2.1.2) as well as external consultants in enabling sustainable mining, compliance with regulation and attaining social licence to operate.

7.3.1.2 Recommendations to consulting companies

The study, in identifying the expected outcomes and perceived roles of external consultants (Section 6.2.1.1), has highlighted important relational factors, as well as key consultant attributes that improve the brand image. It also highlights factors that can help consultants improve the trust relationship they have with their clients and help to generate future business.

7.3.1.3 Implications for business in general

One of the objectives of this research was to demonstrate the adaption of prior implementation model in a different context and this was achieved. The MERIL-DE and ISF models which were developed during research in the medical field, were adapted and were practical for use in the mining industry. This demonstrates the practicality of the adaption of these models in other industry contexts as well to further implementation success in business.

7.3.2 Theoretical implications

The qualitative research presented confirms previous research that highlights the importance of context in implementation research, and the application of the ISF demonstrates how this research can be used to confirm the effectiveness of other frameworks developed in implementation research.

7.4 Limitations of the research

The following section highlights the limitations of this research, which can be taken into account in furthering understanding implementation success in the mining industry.

1. Access to a wider base of industry experts was limited, however, by head count, the number of experts brought on board was satisfactory, however the sample did not cover a broader or more even distribution of professionals within the mining industry. Most of the respondents were from the field of geology;
2. The data collection was time consuming, requiring about 30 minutes to an hour, time, which the respondents could hardly spare. In addition, the period October to December is traditionally very busy in the mining industry and thus the participants were either hurried or interviews had to be postponed to early 2019, narrowing the time to assimilate collated data;
3. The researcher has worked in the consulting industry for over ten years and as a result, has developed perceptions of implementation success, perceptions which could potentially introduce researcher bias. The views of the respondents also

introduced opinion biases. The researcher mitigated the effects by focussing on the experiences of the respondents;

4. Due to a level of patriotism to profession and employers, some of the views of the respondents were quite subjective; and
5. The third sample was only limited to public reports, which biased the findings because recommendations in these publicly available reports are more likely to be implemented in order to demonstrate value for money to stakeholders (Chelliah & Davis, 2011; Srinivasan, 2014).

Despite these limitations, the research resulted in a good guideline that can be successfully adapted for application in other contexts.

7.5 Suggestions for future research

The mining industry presents a complex operating environment in which implementation has to take into account not just technical operational challenges presented by orebody complexities for example, but has to cater for safety, environmental sustainability, labour, social licencing, and mining regulations (Macfarlane, 2018; Robinson, 2016). Research by Lau et al. (2015) confirms that the more complex the context, the more challenging the implementation process. This paper however has identified the key success factors for implementation, however, further research is needed in the following areas:

- Carry out quantitative research to confirm the research findings
- To investigate the effects of the identified factors on the implementation outcome variables.
- To test the South African mining context and challenges
- The carry out a principal component analysis using qualitative methods to narrow down the key factors.
- Investigation on how the identified success factors impact mining operations

7.6 Conclusion

Mining companies use the services of external consultants to provide technical solutions and recommendations for business improvement, however implementing these recommendations has long been a challenge for a lot of mining operations working in the South African mining industry (Baxter, 2016; Simonsen & Perry, 1999; Singh, 2016). Implementation has long since been realised as key for activating business improvement (Darkow, 2015) but due to the fact that it is a practical step which effectively is in direct contact with the external operating environment, it is highly context driven. As a result,

lot of companies, though may be good at strategizing and planning, fail at the implementation stage, the conversion of the plan into action. This research determined that the success factors the implementation of third-party recommendations in the mining industry can be categorised into eight categories which make up the eight-component factors model as shown in Figure 4.

The research met the first main objective of this research by uncovering the role of consultants in driving implementation of their own solutions. The main role of consultants was three-fold namely as advisors in developing solutions to improve operations learning, productivity and sustainability; to support mine cost cutting strategy of lean staffing (Baatartogtokh et al., 2018); and as advisors providing independent and objective expertise (Seifert & Nissen, 2018; Turner, 1982; Vukotić et al., 2017). The research showed that, in implementation, the role of consultants was limited, as the mine project management team was the main driver. It is acknowledged though consultants also get project management assignments, but the internal managers are often still in charge in order to manage costs, however, their main role is as advisors (Collins & Butler, 2019).

The second object of this research was to identify the critical success and failure factors for implementation and to understand the influence of the South African mining context on these. The research has shown that context is key and each operation has different combination of contextual factors which make each a unique working environment. The mining industry itself as a whole also faces a unique combination of macro and micro economic factors (see Section 6.3.2.1) that make it unique as well

The third objective of this research was to develop a structured approach to implementing third-party recommendations and to identify how successful implementation is defined in mining. Both these requirements were met. A eight-component factors model was developed, presenting a structured approach to implementing consultant recommendations in line with the ISF framework (Wandersman, 2008). Successful implementation was defined based on whether the scope requirements were met (Bronnenmayer et al., 2016); whether the intervention took into account the contribution from, and is supported by all the other functions or departments of the business; and the extent to which it effects positive and sustainable change in operations, behaviour and work culture (Emami-Langroodi, 2017).

The findings from this research emerged from the perceptions and experiences of 15 professionals in the roles they have or had while working in the mining industry. An eight-component factors model was developed that highlighted the role of management in implementation as drivers, facilitators and custodians of the mining operation. The eight-

component factors for implementation success are organisational structure, company leadership, project leadership, performance management, alignment, expected project outcomes, the client-consultant engagement and risk management.

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Appendix 1: Consistency matrix

Theme	Research question	Proposition	Literature review	Data collection tool	Research objectives/Analysis	
The role of external consultants	What role do external consultants play in the mining industry?	Companies engage consultants because their resources have limited capabilities to provide the level of service required	Vukotić et al. (2017); Evers & Menkoff (2002); Williams (2004); Samman & Quenniche (2016).	Interview questions	To identify why companies engage the services of external consultants, the areas of the mining business which depend on the services of external consultants and to understand the current and future relevance of external consultants.	
		Recommendations are a key deliverable in consultant engagement.				
Adaption of third-party recommendations	To what extent have third-party recommendations been implemented in the South African mining industry?	Companies fully embrace third-party processes for company improvement.	McLachlin (1999); Nikolova et al. (2015); Nesheim & Hunskaar (2015); Lau et al. (2015); Heide (2002); Fixsen et al. (2009); Radnor & O'Mahoney (2013); Owusu-Manu et al. (2017); Durlak & DuPre (2008); Brandon-Jones (2016); Schaffer (2002).		Interview questions	To identify the factors that hinder or promote implementation in the South African mining context, and the extent to which the programme reach component of implementation is fulfilled in mining projects
		Implementation failure is main cause for some of the challenges faced by the mining industry.				
Effectiveness of implementation	When is implementation considered effective?	Effective implementation manifests as either process improvement, performance improvement or increase in profitability	Bronnenmayer et al. (2016); Durlak & DuPre (2008); Fixsen et al. (2009); Mohammed et al. (2015); Leonardi (2015); Cohen (1999); Lemus-Aguilar & Hidalgo (2015); Durlak (2016); Durlak & DuPre (2008); Krishnakumar (2015).			Interview questions
		Companies which engage external consultants and follow through on their recommendations are more agile, cost effective and are quicker at problem solving.				

Appendix 2: Interview questioning guide

This the interview guide for the questions that were asked during interviews with respondents

Research question	Proposition	Interview question number	Interview question
One	1a	1-1	Why do companies engage the services of external consultants?
		1-2	In a case where you worked with consultants. Was it you who engaged them, or was it another level of management that engaged them? If the former, what are your views on getting external expertise when you are there as the inhouse expert? If the latter, why did you need them when you had in-house expertise?
		1-3	Are external consultants really necessary?
		1-4	What is the role of management?
		1-5	What services offered, expertise or methodologies applied by third-party consultants make them attractive? What are the expected deliverables?
	1b	1-6	Do third-party consultants give practical recommendations/solutions?
		1-7	In your experience, what shortcomings did you find from the results of working with consultants?
		1-8	In your experience, do consultants help with implementation of recommendations?
Two	2a	2-1	In your experience, have you implemented all recommendations put forward by consultants? If not, what were the challenges?
		2-2	To what extent should consultants be held accountable for implementation failure?
		2-3	What is unique about or what are the characteristics of the South African mining industry?
	2b	2-4	What, in your opinion, are some of the challenges in implementation that are specific to the mining industry?
		2-5	What conditions in the mining industry impede or promote implementation?
		2-6	What are the success factors for implementation of consultant recommendations in mining?
		2-7	Are larger companies better at implementation?
Three	3a	3-1	Strategy and implementation-How to you consolidate this relationship?
		3-2	With reference to a project or two, what were the expected outcomes from the implementation of external consultants' recommendations?
		3-3	What is effective implementation? / What constitutes successful implementation?
	3b	3-4	Does management prioritise recommendations from external consultants?
		3-5	Has competitive advantage been gained by implementation?
		3-6	Managers are key in deciding what goes and what doesn't. In your experience, how instrumental was management, as a filter, in implementing (all) recommendations?

Appendix 3: Consent form

CONSENT FORM FOR RESEARCH RESPONDENTS

Name of Researcher(s) <i>(to be completed by the researcher)</i>
Title of study

Please read and complete this form carefully. If you are willing to participate in this study, tick the appropriate box. Sign and date the declaration at the end. If you do not understand anything and would like more information, please ask.

	YES	NO
I have had the research satisfactorily explained to me in verbal and / or written form by the researcher.		
I understand that the research will involve an interview in which a voice recording of the conversation will be used.		
I consent to the audio recording of the interview		
I understand that I may withdraw from this study at any time without having to give an explanation.		
I understand that all information about me will be treated in strict confidence and that I will not be named in any written work arising from this study.		
I understand that any audiotape material of me will be used solely for research purposes and will be destroyed on completion of your research.		
I freely give my consent to participate in this research study		
I wish to be given a copy of this form for my own information		

Signature:

Date:

Appendix 4: Consent statement

CONSENT STATEMENT FOR RESEARCH RESPONDENTS

I am conducting masters research on the effective implementation in the mining industry through the MBA programme at the Gordon Institute of Business Science. The aim of my research is to establish the factors that motivate leadership in mining to implement third-party recommendations. I would appreciate your assistance by availing yourself for an interview to discuss the factors based on your experience. The interview will last about an hour and you can withdraw at any time without penalty. Your participation is voluntary and all data will be reported without identifiers to maintain confidentiality. The benefit of participating will be getting access to the report and the findings from the study over and above the capturing of your views and experience. If you have any concerns, please contact my supervisor or me. Our details are provided below.

Researcher name

Email

Phone

Research Supervisor name

Email

Phone

Signature of participant: _____ Date: _____

Signature of researcher: _____ Date: _____

Appendix 5: Ethics approval

**Gordon
Institute
of Business
Science**
University
of Pretoria

04 October 2018

Mutongoreya Linert

Dear Linert

Please be advised that your application for Ethical Clearance has been approved.

You are therefore allowed to continue collecting your data.

Please note that approval is granted based on the methodology and research instruments provided in the application. If there is any deviation change or addition to the research method or tools, a supplementary application for approval must be obtained

We wish you everything of the best for the rest of the project.

Kind Regards

GIBS MBA Research Ethical Clearance Committee

Appendix 6: List of respondents

Initials	Type	Sample group	Mining division	Interview Venue
MM	Face to face	Client	Director	Noordwyk
RJ	Skype	Client	CMOC Northparkes Mine, Australia	Skype
RB	Skype	Consultant	Director	Skype
LM	Face to face	Client	Lundbeck	Noordwyk
SMM	Face to face	Client	Harmony	Pretoria
LML	Face to face	Client	South32	Pretoria
KM	Face to face	Client	South32	Pretoria
AN	Face to face	Consultant	Director	Midrand
CT	Telephone	Consultant	Director	Skype
YM	Skype	Client	Exxaro	Skype
BV	Face to face	Consultant	ERG	Rosebank
MS	Face to face	Client	Council for Geoscience	Pretoria
SN	Face to face	Consultant	The Mineral Corporation	Sandton
DW	Face to face	Consultant	Director	Killarney
JM	Face to face	Consultant	Strategy and risk	Midrand

Note: to maintain the confidentiality guaranteed to respondents, only their initials are used here for future ease of reference.

Appendix 7: Databases

Company	Web link to public company reports
Anglo American	http://www.angloamericanplatinum.com/investors/annual-reporting/reports-archive/2017.aspx and an example: http://www.angloamericanplatinum.com/~media/Files/A/Anglo-American-Platinum/annual-report-2017/anglo-platinum-ore-reserves-report-2017.pdf http://www.angloamerican.com/~media/Files/A/Anglo-American-PLC-V2/press-release/releases/2017pr/q3-2017production-report.pdf https://www.anglogoldashanti.com/investors/results/ http://www.angloamericankumba.com/investors/annual-reporting/reports-archive/2018.aspx
Bauba platinum	http://www.baubaplatinum.co.za/ One of the reports: http://www.baubaplatinum.co.za/wp-content/themes/baubaplatinum/assets/docs/Bauba-Project-Southern-Cluster-14Apr2010.pdf
Buffalo coal	http://www.buffalocoal.co.za/index.php/aviemore-expansion-project
Firestone energy	http://www.firestoneenergy.com.au/~fireston/im/files/r/ar2014.pdf
Glencore	http://www.glencore.com/investors/reports-results/2017-annual-report
Goldfields	https://www.goldfields.com/quarterly-financial-reports.php
Harmony	https://www.harmony.co.za/invest/annual-reports
Implats	http://implats-reports.co.za/results/annual-results-2018/pdf/booklet.pdf
Kibo mining	http://kibomining.com/investor-relations/annual-reports/ or http://kibomining.com/wp-content/uploads/KIBO-Annual-Report-2017-Final.pdf
Kore potash	http://www.korepotash.com/kore-projects/#reports
Lonmin	https://www.lonmin.com/investors/reports-and-presentations
Merafe resources	http://www.meraferesources.co.za/stake-annual-reports.php#.W55UjqYzblU
Sable metals	http://www.sablemetals.co.za/cpr.html
Northam	http://www.northam.co.za/investors-and-media/publications/announcements/2018
Oakbay Investments	https://www.oakbay.co.za/reports-publications
Orion minerals	https://orionminerals.com.au/investors/financial-reports/
Pan African resources	http://www.panafricanresources.com/wp-content/uploads/Pan-African-Resources-MRMR-report-2017.pdf
RandGold	http://www.randgoldexp.co.za/
Royal Bafokeng platinum	http://www.bafokengplatinum.co.za/integrated-reports.php
Sibanye	https://www.sibanyestillwater.com/investors/documents-circulars
South32	https://www.south32.net/investors-media
Tawana resources	https://tawana.com.au/category/reports/
Tharisa	http://www.tharisa.com/ovr-annual-report.php
Transhex	https://www.transhex.co.za/annual-reports/
Wesizwe	https://www.wesizwe.co.za/investors-annual-reports.php
ZCI Limited	http://www.zci.lu/report.htm

Appendix 8: List of codes used

Codes (A-E)	Codes (F-P)	Codes (P-W)
Acceptability	Exposure	Project leadership
Accountability	Follow-up	Project management
Adaptability	Framework	Project prioritisation
Addresses community needs	Geographically fixed	Realigning roles/responsibilities
Agility	Geological complexity	Reduced risk exposure
Align plan with context	Geotechnical considerations	Demanding mining environment
Alignment	Government	Regulatory compliance
Attitude	Groups affected by the outcomes e.g. investors	Representative
Audience of the report or recommendations	Hands-on management	Resource nationalisation
Audits	Implementation as KPI	Retaining knowledge
Bureaucracy	Improved safety record/performance	Revert to trusted methods
Buy-in	Infrastructure	Risk assessment (and awareness)
CAPEX intensive-ness	Innovation	Risk aversion
Capital and material intensive thus non-agile	Interdepartmental coordination / synergy	Risk exposure
Challenges	Internal skills/training	Risk management
Change management	Job retention	Safety and environmental sustainability
Change readiness	Knowledge sharing	Safety first
Clear deliverables	Knowledge transfer/knowledge sharing	Scalability
Clear objectives	Labour buy-in/inclusion	Scope of work/mandate - audit, diagnosis
Client characteristics	Labour strikes	Self-efficacy
Client-consult relationship	Labour unions	Self-regulation
Co-design/value co-creation	Learning barriers	Shared decision making
Collaboration	Level of interaction	Social licence
Commitment	Low support for site-originated plans	Source of instruction
Commodity prices	Manage expectations	Specialised skills
Communication	Management culture	Staff compliment
Community engagement/participation	Management expectations	Stakeholder endorsement
Company leadership	Management facilitation	Strategy
Competence	Management support	Structural complexity
Competitive advantage	Managing the consultant	Support from top management
Complexity of solution	Mechanisation	Sustainability of intervention/change/new system
Compliance audit	Mining accidents	Synergies
Conforms to organisations mission and values	Mining towns	Talent management
Conservative approach	Mining tradition	Teamwork
Consult characteristics	Motivation	Technical competence
Consultant reputation/brand	National development plan	Technical reports
Contextual appropriateness	New perspective	Tested technologies
Cooperation	New technologies	The role of management
Cost of production	Objectivity	Time-frame

Codes (A-E)	Codes (F-P)	Codes (P-W)
Cost/consultant fee	Opinion	Traditional methods
Cost-cutting	Organisational structure	Training
Cost-effective	Peer review	Translation into real world settings
Cross departmental support/collaboration	Performance management	Trust
Decision confidence	Planning	Unclear/vague strategy
Dedicated team	Policy uncertainty	Underestimating requirements
Deep mines	Pro-activeness	Validated/verified solutions
Deliverables	Problem diagnosis	Vertical communication
Due diligence study	Problem framing	Verification
Effective management team	Process audits	Visible leadership
Efficiency	Process evaluation	Wage increases
Employee engagement	Process optimisation	Within resource and capability limits
Employee involvement	Production pressure	Work culture
Expected outcomes	Professional maturity	Worker learning barriers
Expensive labour	Project champion in senior ranks	Worker mentality
Experience	Project evaluation	Working in silos
Expertise	Project feasibility study	

Appendix 9: Reports analysed

Report	Company	Consultant	Report title	URL
Report 1	Aberdeen International	Odendaal, 2016) Minxcon Consulting	A Technical Report on the Smokey Hills Platinum Mine, Limpopo Province, South Africa, 2016	http://s1.q4cdn.com/369274472/files/doc_downloads/M16-015a_Smokey-Hill_NI_Update_Final-Report.pdf
Report 2	Bauba	(Clay & Taylor, 2010) Venmyn Deloitte	Executive summary short form SAMREC compliant techno economic valuation statement on the southern cluster of the Bauba Mineral platinum properties for Absolute Holdings as at 14 th April 2010	http://www.baubaplatinum.co.za/wp-content/themes/baubaplatinum/assets/docs/Bauba-Project-Southern-Cluster-14Apr2010.pdf
Report 3	Bauba	(Clay, Orford, Dyke, Myburgh & Phahlele, 2014) Venmyn Deloitte	Independent competent persons' report on the Platinum Group Metals assets of Bauba Platinum Limited (Bauba), 2014	https://www.baubaplatinum.co.za/wp-content/uploads/2018/06/Bauba-Platinum-Circular-to-Shareholders-22Aug2014-CPR-Platinum-Project.pdf
Report 4	Bauba	(Clay, Orford, et al., 2014)	Independent competent persons' report on the Moeijelijk Chromite Mineral asset prepared for Bauba Platinum Limited, 2014	https://www.baubaplatinum.co.za/wp-content/uploads/2018/06/Bauba-Platinum-Circular-to-Shareholders-22Aug2014-CPR-Chrome-Moeijelijk-412KS.pdf
Report 5	Bongani Minerals Pty Ltd	(Rozendaal & Theart, 2013) SRK Consulting	Technical review of the Riviera Tungsten Deposit, Western Cape Province, South Africa, 2013	http://batlaminerals.com/wp-content/uploads/pdf/259_Riviera_W_Report_without_appendices_-_posted_to_Batla_website_March_2014.pdf
Report 6	DRDGOLD Limited	Sound Mining	Competent Persons' Report on the West Rand Tailings Retreatment Project for DRDGOLD Limited	http://www.drdgold.com/investors-and-media/circulars/cpr-samrec-wrtrp-26022018.pdf
Report 7	Forbes coal	(Odendaal, Muller, van Heerden & Clemente, 2013) Minxcon	An Independent Qualified Persons' Report on Forbes Coal Dundee Operations in the KwaZulu-Natal Province, South Africa	http://www.buffalocoal.co.za/pdf/Technical%20report_NI43-101.pdf
Report 8	Galaxy Gold	Minxcon	A Technical Report on the Galaxy Gold Mine, Mpumalanga Province, South Africa	http://www.galanegold.com/_resources/technical-report-galaxy.pdf
Report 9	Harmony	(Mandava et al., 2018) SRK Consulting	Competent person's report on Moab Khotsong Mine and selected assets of AngloGold Ashanti Vaal river operation, 2018	https://www.harmony.co.za/assets/investors/reporting/annual-reports/2017/harmony-cpr-report-07122017.pdf

Report 10	Keaton Energy Holdings	(Tefler et al., 2017) Venmyn Deloitte	Independent Competent Persons' Report on the coal assets of Keaton Energy Holdings Limited	http://www.keatonenergy.co.za/downloads/2017/independent-competent-persons-report-2017.pdf
Report 11	Miranda Minerals Holdings Limited	Engelmann, (2018) Minxcon	An Independent Competent Person's Report on the Rozynenbosch Project, Northern Cape Province, South Africa	http://www.unionatlanticminerals.com/downloads/cpr-rozynenbosch-project-12march2018.pdf
Report 12	Sable Metals and Minerals	(Burger, 2015) Minxcon	Complete a compliant Independent Competent Person's Mineral Resource Report with a full mineral asset valuation	https://www.sablemetals.co.za/Extra%20Files/Competent%20Persons'%20Report,%201%20April%2015.pdf
Report 13	Sentula Mining Limited	(Clay, Mazibuko et al., 2014) Venmyn Deloitte	Independent competent persons report on Sentula Mining Limited's Nkomati Anthracite Mine.	https://www.unicorncapital.co.za/wp-content/uploads/2018/03/30-09-2016-September-2016-Independent-competent-persons-report.pdf
Report 14	Mr K. Badenhorst	(Lees, 2017) Geomech consulting	Schurvekop feasibility study rock engineering report	https://www.cabangaconcepts.co.za/wp-content/uploads/2017/08/GEOM10-2017-001-Schurvekop-Feasaibility-Study-Rock-Engineering-Report-....pdf
Report 15	CPS Group	(Lourens & de Jager, 2017) Element Consulting Engineers	Preliminary engineering services report	http://www.knysna.gov.za/wp-content/uploads/2017/08/ANNEXURE-J-EngineeringServices-Report.pdf
Report 16	Letaba Lab	(Coertzen, 2013) Eliakim Development Projects	Geotechnical investigation undertaken on portion 3 of the farm Dorinkoplaas 319-JU.	https://www.sahra.org.za/sahris/sites/default/files/additionaldocs/Complete%20geotechnical%20report.pdf

Appendix 10: Sample three consultants' mandates

Report No.	Mandate
1	"Minxcon (Pty) Limited ("Minxcon") was tasked by Aberdeen International Inc ("Aberdeen" or the "Client") to update the financial model and technical report following the changes in the ZAR/USD exchange rate and commodity prices"
2	The purpose of this report was to provide "an Independent assessment and verification of Bauba's PGE prospective properties on behalf of Absolute Holdings."
3	Venmyn Deloitte was requested to "prepare a Competent Person's Report (CPR) on their material PGM assets in South Africa."
4	The directors of Bauba Platinum requested that Venmyn Deloitte Proprietary Limited (Venmyn Deloitte) prepare a Competent Persons' Report (CPR) on a chromite asset in South Africa" which Bauba Platinum wanted to buy.
5	Bongani mineral was negotiating a deal and "requested SRK Consulting (South Africa) (Pty) Ltd to compile and sign off on a technical review of their Riviera tungsten project"
6	Sound Mining was requested to "prepare a Competent Persons' Report"
7	Minxcon was tasked to "to compile an NI 43-101 technical report for the Dundee mining operations".
8	Minxcon was asked to "compile a compliant National Instrument 43-101 ("NI 43-101") technical report (the "Report") for the Galaxy mineral assets,"
9	SRK was asked to "compile a Competent Person's Report (CPR) on selected assets of AngloGold Ashanti (AGA) at the Vaal River Operations (VROs) for the purpose of a potential transaction."
10	Venmyn Deloitte "conducted a valuation of the coal assets with the aim of identifying the attributable value on an asset-by-asset basis"
11	Minxcon was commissioned to "complete a compliant Independent Competent Person's Mineral Resource Report with a full mineral asset valuation"
12	"Minxcon was tasked to complete an independent competent person's report on the Sable vanadium and iron ore projects.
13	Venmun Deloitte was requested to prepare an updated competent person's report (CPR) for the intended disposal" of a coal asset.
14	Geomech consulting was tasked to compile a geotechnical report for inclusion in a feasibility study document.
15	Element engineers were appointed to render professional civil engineering services for a proposed commercial retail development
16	Letaba Lab was requested to carry out a detailed geotechnical investigation on a farm portion to determine its suitability for future development/construction.

Appendix 11: Table of responses

Question	Sample responses
Why do companies engage the services of external consultants?	Respondent 1: “most of the time you will find within a company there is a lot of....there’s politics sometimes so bringing a third party they are not umm involved in the politics, they don’t know the background of anything they coming in, and they are very objective, they are not going to be biased to pick any sides” ...” and a third party because of the expertise they may have maybe working with our people they might be able to point us to.....to err a different direction or point out certain things that we might have missed as an organisation.”
	Respondent 3: “Now the key aspect about using consultants is the classical one which is that you don’t want to employ people permanently for projects which are short term or patchy””so the prime reason is that fundamental one that you want good expertise but you don’t want to have people full time.”
	Respondent 4: “we needed a broader range of knowledge coming from other areas and other people in the industry not just the consultants that we had so we wanted a broad spectrum of information to draw from”
	Respondent 5: “The manpower on the operation would not have been enough to look into deeper levels of whatever issues we are facing” ...” we would never have inhouse manpower and expertise to do what the consultants were doing.”
	Respondent 6: “it was kind of to put a stamp in in ... put some sort of confidence in some of the work that we had done. So sometimes we had done the work within operations and you want to present it to corporate but you feel like, because it was done by you, there’s a like mmmm could we really use that information but sometimes I mean we used to joke, when I was still in the operations that, you know you do this work, give it to a consultant to write a report, then it becomes something that you can now implement.”
	Respondent 7: “...it was a capacity issue,...and expertise where it was not in our core business but it’s a skill or it’s an issue we need to address but we don’t have the in-house resources to do it.”
	Respondent 8: “it was times where they hit like a stumbling block or a major stumbling block which now affects their financials, especially in the mining, the actual mining of mining deposits bale mine; so you’d find that clients are now mining and now their grades are not doing so well so they need somebody to help them.”...“the other aspect would be maybe a client wants to expand their project, they are already mining but they want to hear an opinion have an to whether it’s a good idea or not”.
	Respondent 12: “it wasn’t like to do administrative work its more the expertise that they had that the company didn’t have at the moment because they had all new graduates. (oh okay) Yah so so er they hired new graduates so that they could train them up, and have their type of ideology going forward to keep up with the company and that’s the reason why we got geological consultants to do err to train our guys”
	Respondent 13: “...sometimes it’s a regulatory requirement, so for a listing um on a stock exchange um or for a... um a transaction between listed entities there may be regulatory requirement to have an independent umm person assess or company assess the project, or sometimes they simply don’t have a choice um other times erm companies are involved in activities which they don’t do on a regular basis, in some other words they have the capacity to run the business on a day to day basis but the requirement for a competent persons report or um some other technical services doesn’t happen regularly enough to warrant having those expertise in in-house full time”...” companies prefer to use an external um consultant to provide them with a review on work that they’ve already done. So the work has been done (uhmm) and an external party is simply asked to um provide a peer review or an opinion on whether there are any fatal flaws in the work or whether or whether an alternative approach might have been helpful, or um or whether there’s a um whether there’s a different way in one..that one might look at a problem”...
	Respondent 14: : I think there is two reasons. One is they have got the impression that consultant more than they do. Erm maybe three aspects the other aspect is they don’t want to employ their own person because the work is for maybe two months three months so they rather see it as a potential cost saving if you like as well. And then the third is for legislation and need to report independently especially in the geological mineral resource estimation field.

Question	Sample responses
<p>In a case where you worked with consultants. Was it you who engaged them, or was it another level of management that engaged them? If the former, what are your views on getting external expertise when you are there as the inhouse expert? If the latter, why did you need them when you had in-house expertise?</p>	<p>Respondent 4 Lin: “this decision was coming from the head office that it was errr mandatory to work with the consultants because it was not just our branch but various other branches that also had to have consultants coming in and joining the teams”</p>
	<p>Respondent 9: Well actually they were not telling they were adding value because after assessing we realised they were adding to what we already have. They were not imposing, they were just adding value, and adding more skill and more knowledge. Like for instance, implementation of let’s say Datamine, they are not taking anyone’s job, they are just showing the tools and leaving</p>
	<p>Respondent 11: Respondent: There is a lot of times that that is the case. You will find that the guy who built the thing, he slept with it, that’s his baby, and he is not in the transformation process, it’s called change management and then they take the laptop and leave with all the information, and you have to go and redo the information on the article leave, and as a human being, no one wants to do all the work and then somebody ...I justify what you’ve been doing it is a one big problem in the geological side of the industry. Its that they hire you as an expert but then everybody questions everything you say. And it’s normally accountants that does that. Business accountants but they don’t understand the technical bits ...but they hired you to explain it to them but then they second-guess you. And it’s a lot of times that causes projects have not gotten off the floor.</p>
	<p>Respondent 5: “Where you use other channels to communicate what you need to make it easier so when you ask how you feel feelings don’t matter anymore” This respondent went on to express sentiments around being happy to have consultants present her findings as long as “in return I get a team who has now the resources and the go-ahead to implement the things that I wanted to implement. So you let it go I just I just need things to work.”</p>
	<p>Respondent 6: “.. we joke about this, that people hire you and still do not believe that you have the expertise to actually do the work The work could’ve been done within the organisation sometimes it could have been done by a team within the of the organisation but somehow selling that idea to management, yes and you know just for them to take it as in like this is an idea we are going to implement sometimes they call in a consultants to just back it up or to disprove it” “...sometimes you know that you need that done so that your idea can be taken...”</p>
	<p>Respondent 7: “It is what it is “</p>
	<p>Respondent 8: “personally I have heard like just on the outside people complaining but for me I’ve never found myself in that situation where I’m working with a group which is like hostile to or not really hostile but feeling that we know more about the project more than you do I know it happens in some of my other ex-colleagues went through the same but personally I never wen, or i never experienced such”</p>
	<p>Respondent 13: “very often you’re brought in to provide recommendations, you’re exactly right, those recommendations have already been identified (uhmm) and um in my experience, when you ..when those recommendations align with what’s been identified internally, rather that resentment, more often than not, you actually get buy-in um because most.. many people that I’ve encountered in the industry see the...see the use of an external consultant as a way to get done, that which they thought should have been done already (Okay) and haven’t been able to motivate it or justify it internally. So people within organisations don’t always have the skills or the time, or maybe the political....err or organisational clout, to get stuff done (uhmmm) and by bringing in somebody in, in who provi.,who doesn’t necessarily echo but at least...if those recommendation align, um (okay) very often they have better a chance of getting what they thought was required in an organisation done with your assistance. It can happen that somebody resents it resents the involvement of a consultant at all but um but I would say many people on the organisations that I’ve worked with identified that its great opportunity um to get stuff done.”</p>

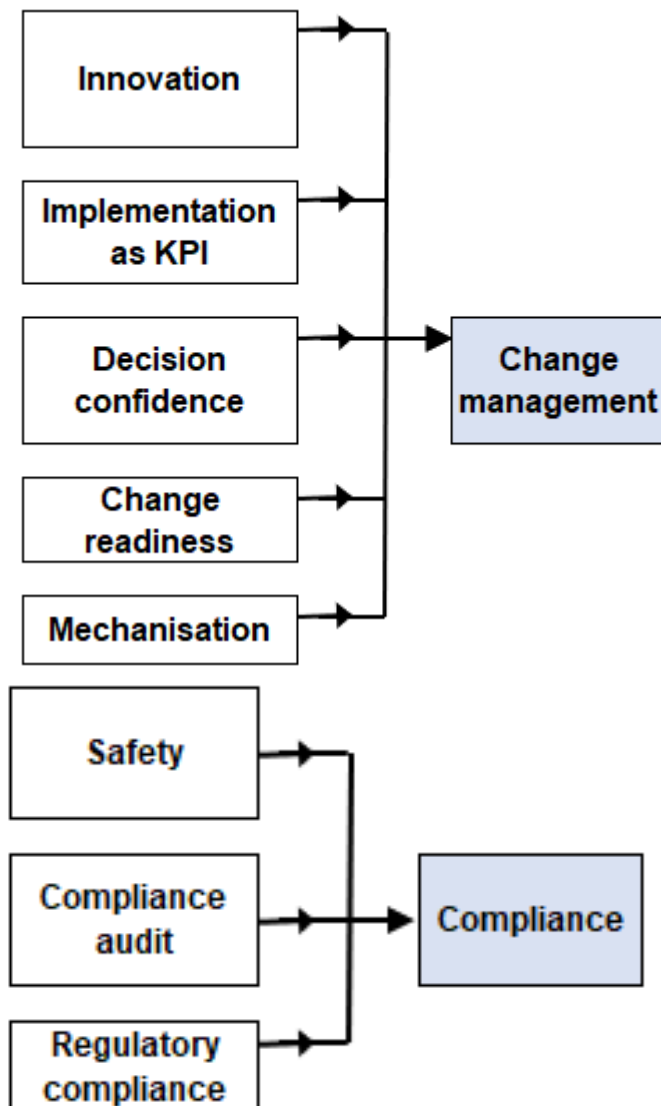
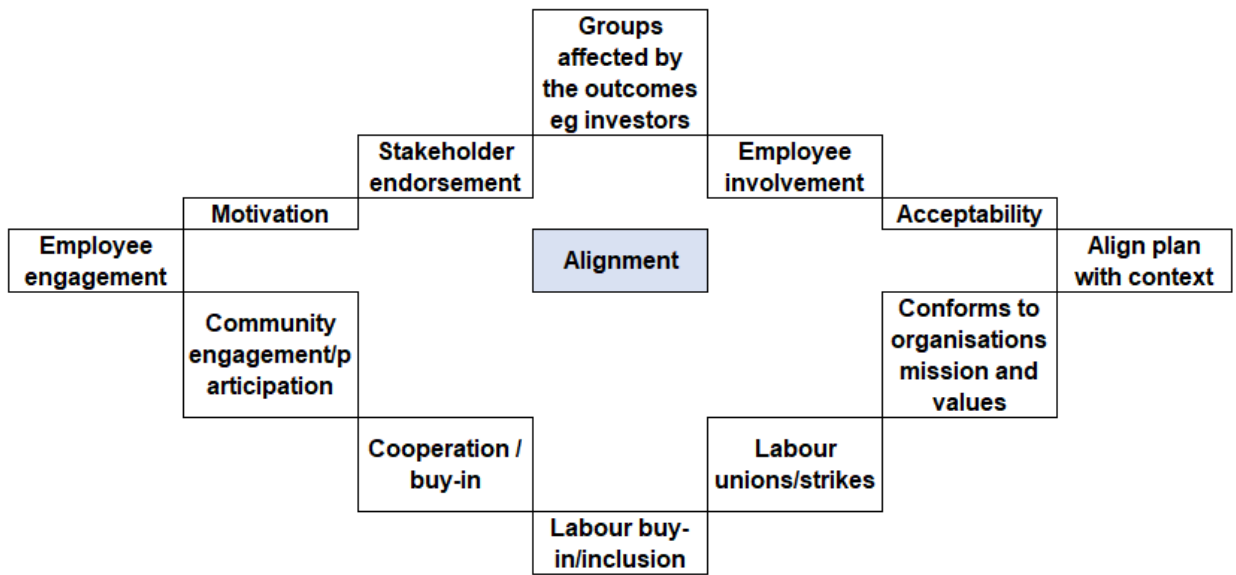
Question	Sample responses
What is the role of management?	<p>Respondent 1: “for me it’s managers they give the direction, they give the strategy (okay) they know the goal of where we want to go (uhmm)so if we bring in consultants we tell them this is where we want to go and they are just following that direction.”</p>
	<p>Respondent 2: “The role of management first is to identify the needs for the consultants. They have to do identify it if there is a gap in terms of skills or new technology that is coming that is needed. So that’s where the manager starts. But once the consultant has been identified and given the job then the role of management, working with his team, is to make sure that the consultant understands what is needed, what are the deliverables, you know it has to be very clear. Because whatever the consultant does, then has got to be in line with the business strategy. They have to come and fit into the organisation. So again, the managers lead that project. Give the consultant as much as information as possible so that they can make informed decisions.”...“You asked before what the role of management is, and that’s the role of manages. To make sure that they give practical solutions that can add value to the business. But I think if you take it from that point of view yes, they give practical solutions.”</p>
	<p>Respondent 3: “Management must at all times be in control and must be able to verify what they’ve been presented with...”</p>
	<p>Respondent 4: “implementation is a something that is left to us as management to ensure that it’s it’s done”...“...and us as management if the recommendation does not meet the conditions, unfortunately we either have to bend, to take just part of the recommendation and adopt to the situation, or we have to drop the recommendation altogether”</p>
	<p>Respondent 9: “The role of management is to provide the budget and also being accountable for the timelines and the results. Because they have measurable results at the end of each project.”</p>
	<p>Respondent 10: “On the client side it was more of a project management role so they basically just checked that we delivered according to the contract and um delivered according to high level KPIs which were eventually on the contract. It was very challenging for them to manage low level or in detail because their technical expertise or knowledge because they really didn’t really know what it was that we were doing, and they had limited capacity um because they were busy with their business as usual as well as sort of project managing us. So in short it making sure that we deliver on the contract that we signed.”</p>
	<p>Respondent 12: “...so your role as management then would be to push me to make sure that I get the job done”</p>
	<p>Respondent 13: “... management needs to filter and strategise and prioritise implemented of..or different projects is because there’s not an infinite budget umm and because making changes in an organisation doesn’t happen in isolation...”...“...I don’t see their role as being about getting more done. Their primary role is making sure that the right thing is being done (yes the right things). That’s why they’re the filter (okay) um and its quite and then its and rightfully so so that changes within organisations get done in by priority, and for a reason and keeping things going in a good strategic direction ...”</p>
	<p>Respondent 14: “The management is for making sure the consultant basically delivers what is expected in the right format and the right, erm its written to what he needs and is positive towards the company. You don’t want a negative report going out and you are in some ways trying to sell like what we have been doing now with a 43-101, you make sure positive aspects go out. So there’s two aspects, so you’re trying to sell the company so you as management have to make sure this comes across in the report and secondly he’s gotta try and be impartial.”</p>
	<p>Respondent 15: So the number one failure of any project and the is the lack of buy-in of management. Management are meant to be spears, are meant to be the tip of the arrow, they are meant to be the drivers of that change. And in every project that we go to, the first thing is to ensure there is management buy-in, and once there is management buy-in, everything else falls into place because they support the project, they support the idea, and don’t become stumbling blocks in the whole process.</p>

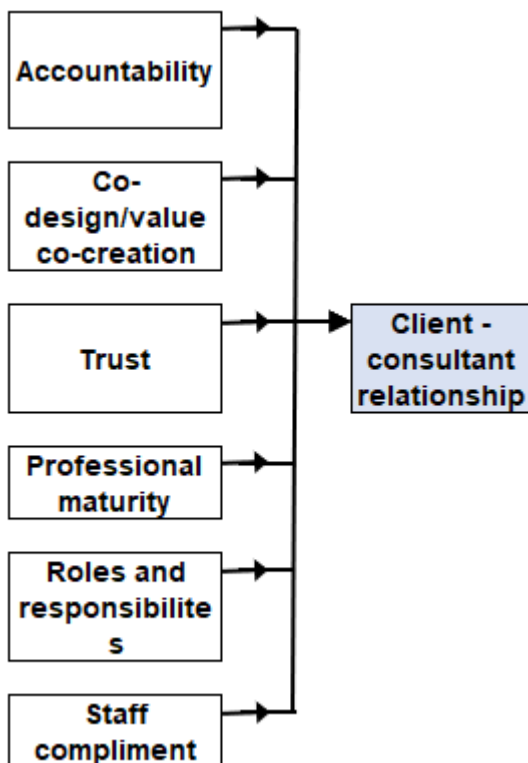
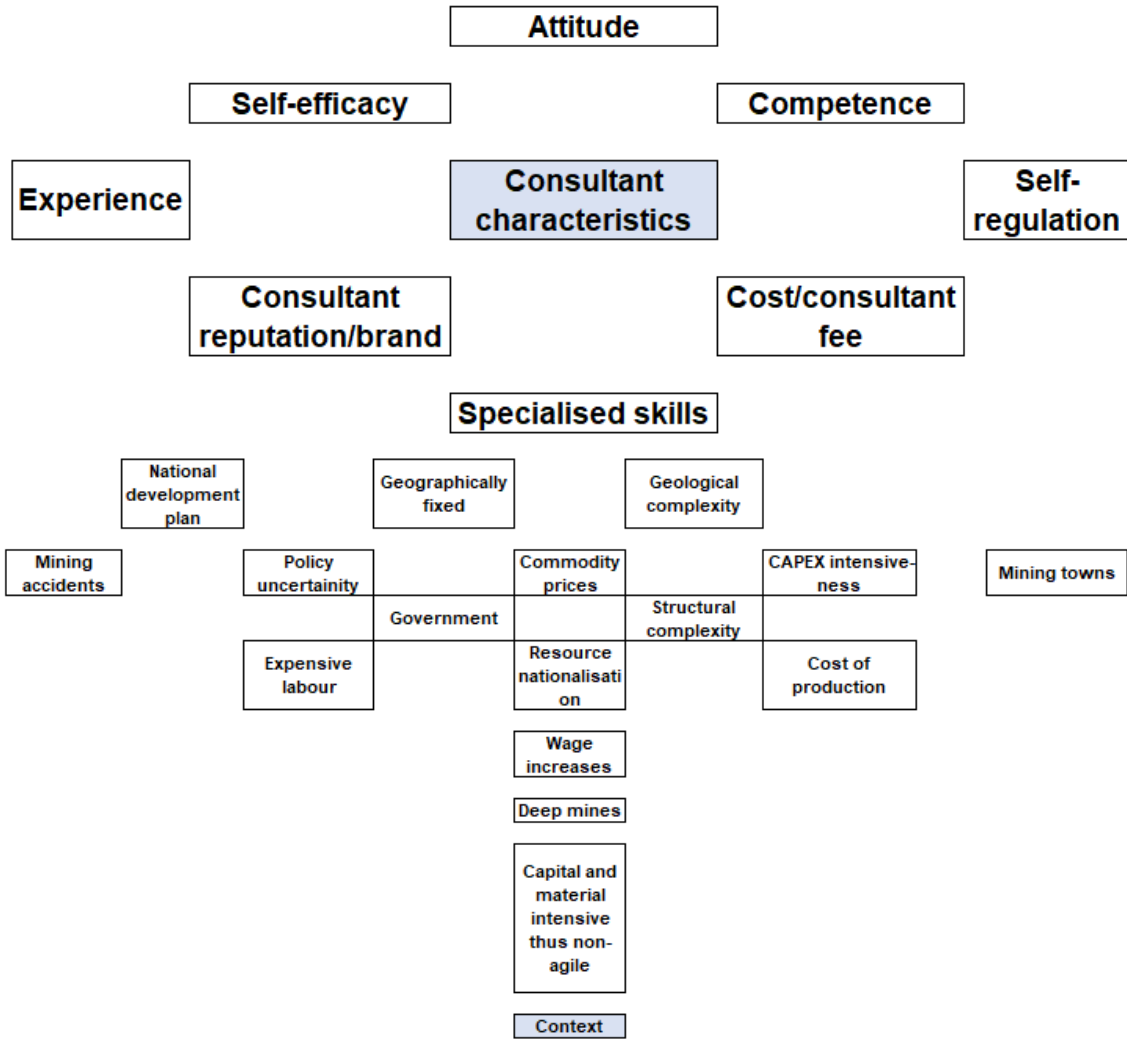
Question	Sample responses
Do third-party consultants give practical recommendations/solutions?	<p>Respondent 1: “I will be very honest sometimes they are not, sometimes they give book (breaths in) book solutions that err when you think about um a certain like sometimes let’s say they give their.. their recommendation it might have worked for some other people , it might not necessarily work for your organisation (ohhh) because each organisation is very unique (uhmm)and if they err if they implement errr if they recommendations are kind of like blanketed in the sense that it worked for these three companies and then they assume that it can work sometimes it doesn’t necessarily work”.</p>
	<p>Respondent 2: Consultants are as good as the people who hired them. So if you don’t manage them, they will give you abstract things that are not going to be helpful at all you know. Unless you are lucky and then the consultants know your business very well. But you can’t blame the consultants. You asked before what the role of management is, and that’s the role of manages. To make sure that they give practical solutions that can add value to the business. But I think if you take it from that point of view yes they give practical solutions. But only as far as you are able to relate to them and make them understand what it is that you want.</p>
	<p>Respondent 4: “they come with theoretical knowledge that you cannot apply er practically” ...“sometimes is not practical for us to go ahead and with every step of their suggestions and recommendations”</p>
	<p>Respondent 10: So not all consultants are the same, so I’ve seen that consultants that work with strategy typically don’t give um practical solution because they don’t go into implementation. But consultants that work purely with implementation tend to give practical solutions because they’ve been on the ground, they’ve been through the change management um and um their KPIs are typically measured then and there, so yah those are definitely practical. So i think it depends on the type of consultant that you’re working with. (Okay) (pause). Because like your top tier consultancies umm there is four of them `i believe they craft strategies and they are not implemented, and then the second tier consultancies which are implementation based, and Ive seen that they tend to sore of deliver f you will.</p>
	<p>Respondent 11: Not always but I think it has a lot to do with (...) The client has some expectations and some idea but he doesn’t communicate it to the consultant. So the consultant has his own idea and he does it that way, and then it doesn’t gel with what the client wants or thought you wanted and then you can get some problems.</p>
	<p>Respondent 12: “Yes, they do”</p>
	<p>Respondent 14: “Yah. The ones that have been in industry for a long time, yes. (Researcher: From the consultants who have been in industry from a long time?) Respondent: Yes. I’m saying now for the guys that have been in industry for maybe ten, yah five, at lease five years plus, then yes. The guys that you say come straight out of varsity um no. But at the same time you use the ones the older consultants to give advice. The principals and the directors of those consulting companies give advice, not the juniors”</p>
	<p>Respondent 15: I think that’s why we have co-design because the co-design allows us first all to design a solution that first of all is practical, meaning that it can be implemented. ... the co-design allows us to say sometimes we know that the ideal situation is to have a tractor, but because we are doing a co-design, we bring the people onto a journey where we say, we are going to design for you to use a plough so that you can then from yourself realise the inefficiencies and the benefits of working and improving going forward. So in practicality is born in the whole approach on how you actually start designing the solution.</p>

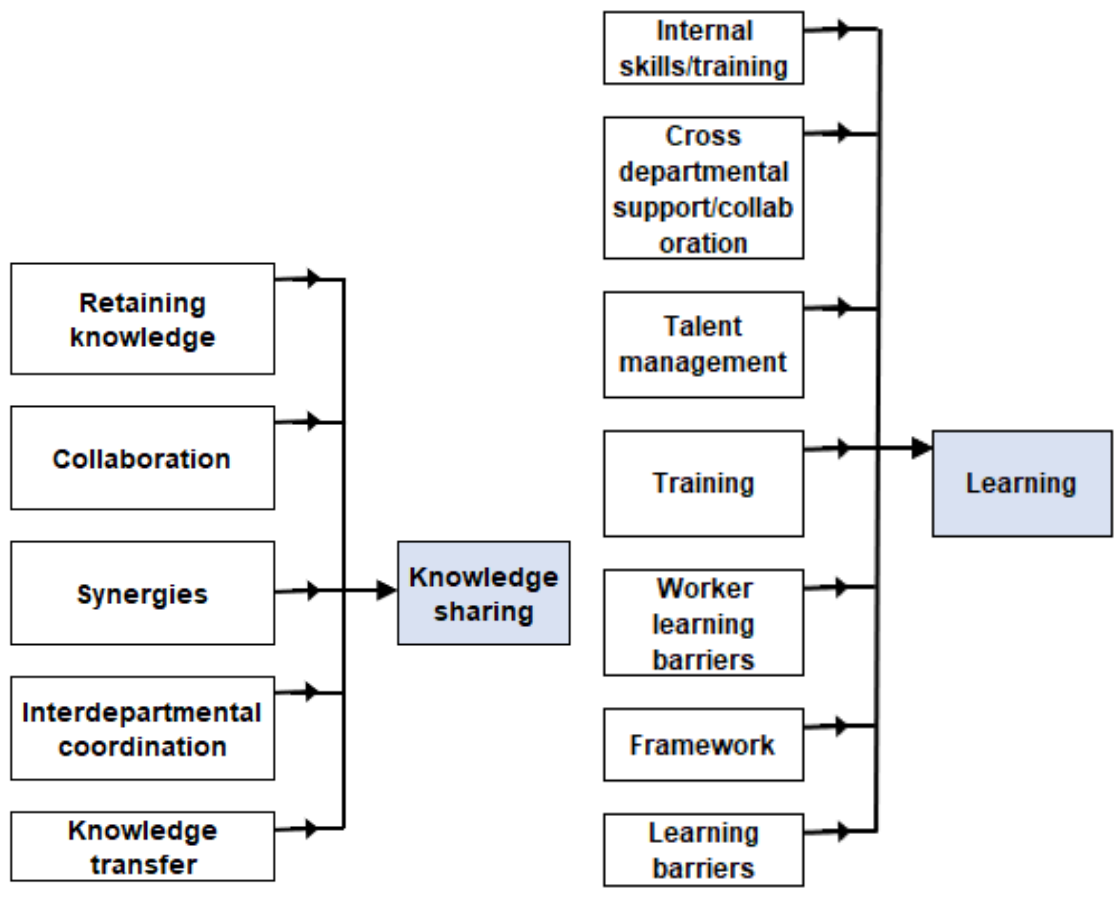
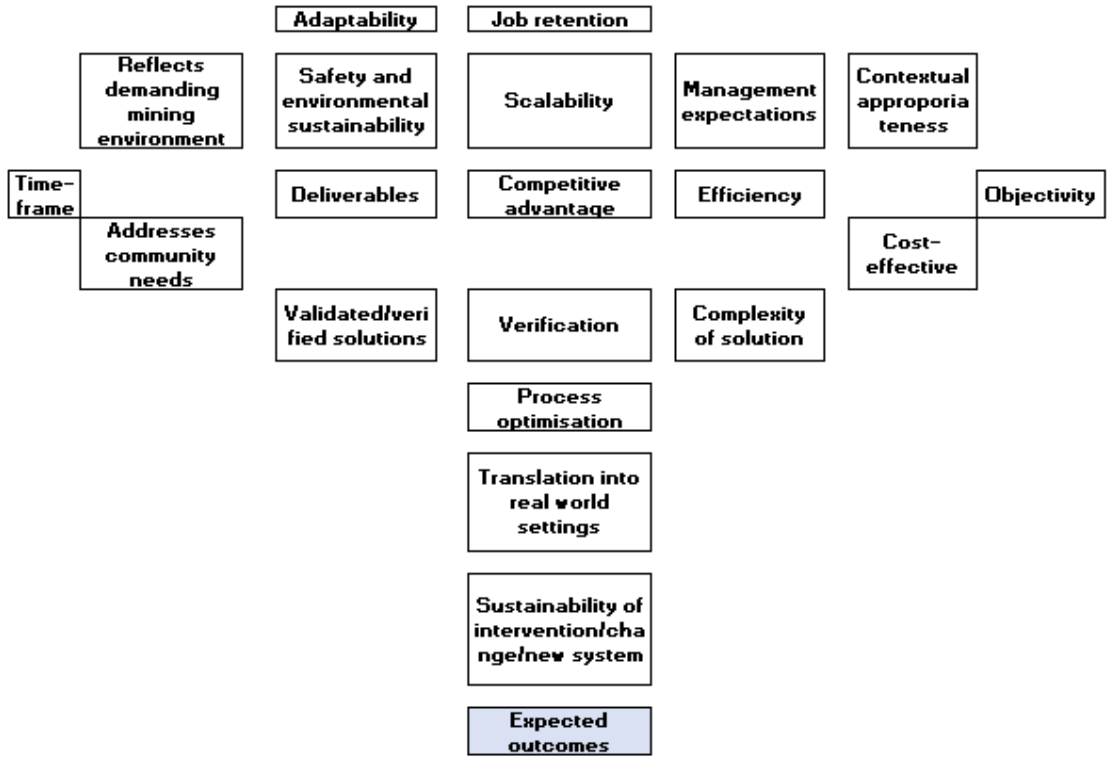
Question	Sample responses
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">What, in your opinion, are some of the challenges in implementation that are specific to the mining industry?</p>	<p>Respondent 2: “Specific to mining? Depending on what it is. Some area can be too complex and the complexity can be under-estimated. Because once you start implementing then you realise that there are so many issues which were not foreseen. I think that’s why when projects get more complicated, some companies prefer to say that we want a person from the consulting company to remain there during the course of that implementation. So yes the complexity can be under-estimated, resources required can be under-estimated so when it comes to implementation you find that there are problems. Skills can be under-estimated, skill sets required to actually carry out the implementation. Those are real challenges that can be faced, and then of course we always talk about change management. How prepared are your people to face that. Because that implementation will come with new technologies, new change of environment. so management has to make sure people are ready for that and they are willing to take that route if its going to be change from what they used to do.</p>
	<p>Respondent 3: “I can’t well I mean there’s not too many constraints... I mean outside of the normal, er you have to be able to raise finance, so you have to have a bankable study at the end of the day. And the work that you have got has got to withstand the due diligence that will be done by financial institutions be it the bank or some other institution, they will bring in their own technical people to assess the work that’s being done.” “other problem is the scaling up from bench test work so you can have metallurgy done at a bench level. But very critical is your pipe line work and how easy it is to scale that up to production.” “The big one is your local community umm but that I know very little of. For instance, in the big mines that we’ve got, it took us a couple of years to sort that out and that was a blow for us because at the end of that 2-year period the company that was funding us got bought out and the company that bought it out just pulled out...”...I know with the Paloma mine, it took them a year to get back, they had an initial water right to access it from a local dam but it took another year to get the local provincial water rights. Your mining law and bureaucracy and your local community issues are huge problems.“</p>
	<p>Respondent 4: “things like hyperinflation and how it affected the pricing of of the commodities, it was issues er of social impacts on the people in the country” “ the issue of land that was still being dealt with then. We have environmental issues that need to be addressed, poverty issues that need to addressed in the county, where you are looking at the people that are working in the mining they are...basic conditions of living not conducive to to to ...er human habitation. Issues like that, where you are looking at social, looking at environmental also looking at the economic the status of the economy, political issues...there were quite a number of issues that the industry was facing at the time that I was in that field.”</p>
	<p>Respondent 7: “with such high unemployment rate. We know that our unions are anti-technology and automation and find some of it is and lack of understanding the benefit it actually brings. But there is also fear of what if this thing now replaces me”</p>
	<p>Respondent 15: “Regulation. So mines are heavily regulated I mean they are the biggest employers in many economies. And you find that the... if a mine says that it’s going to downsize 10% you find that that’s a lot of people a lot of families. And government usually steps in to say look, we don’t want you to ...for example if you go to a mine and you suggest automation as a solution. And that automation is going to downsize that mine to 50% of its capacity. The government will definitely step in and tell you no you’re not doing that. Anyway, so regulation is a challenge to many mines. Yah I think that’s the number one challenge to many mines. The other stuff I think is manageable”</p>

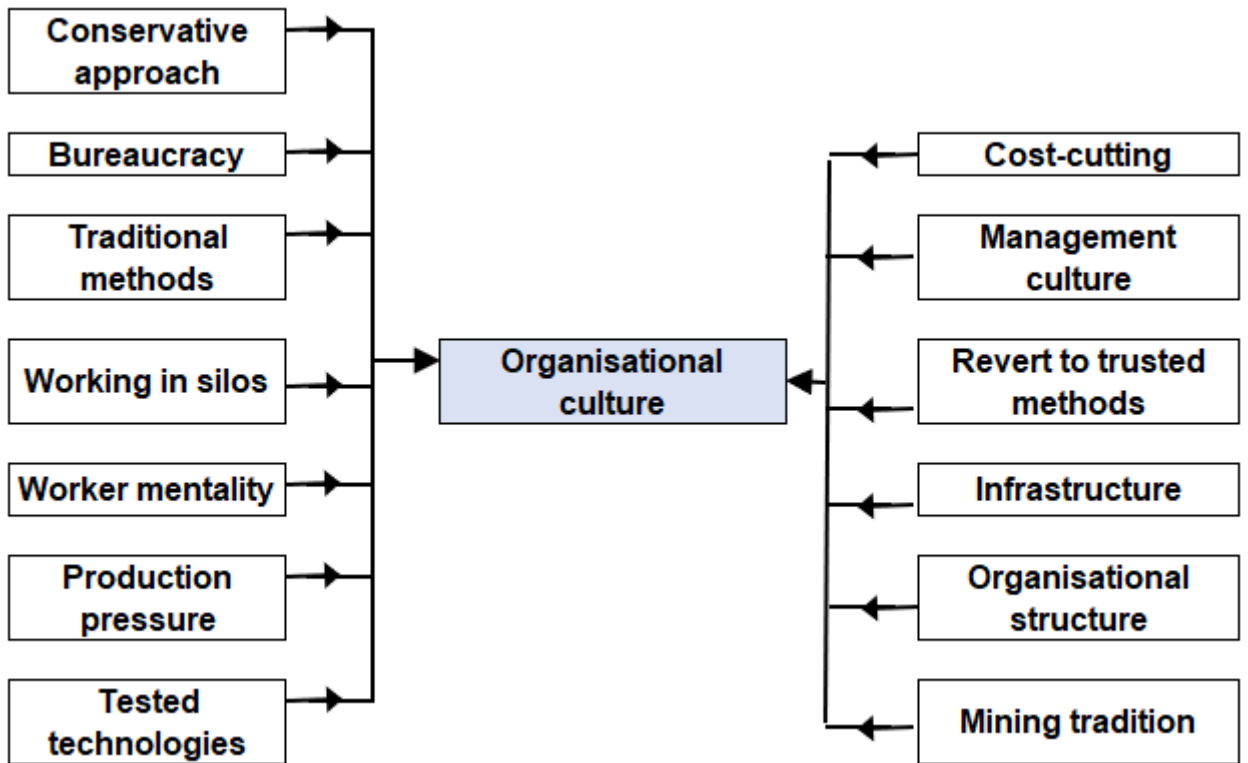
Question	Sample responses
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">What are the success factors for implementation of consultant recommendations (in mining)?</p>	<p>Respondent 1: “.... I need to do my own research I need to know to understand (to be a proactive manager) yes hundred percent I need to be proactive in knowing what’s happening in my own department”</p> <p>“Implementation must be done within the time frame so it should be timed framed (uhmmm) to say it should be done so that it can work cause after a certain period it wont make sense”</p> <p>“... people can see how they can benefit or as an organisation how we can benefit from the implementation”</p> <p>“if everyone is speaking in the same voice (alignment that’s the word) yes hundred percent. So if we are speaking in the same voice even finance will be able to to say you know what we can get funds from team building (lets make it happen) yes let’s make it happen. So I think it’s the human element of it like, people need to feel included there is that inclusion if everyone feels that they are included in this implementation”</p>
	<p>Respondent 4: “it’s a matter of the time span and of course the budget.”</p>
	<p>Respondent 6: “All is based on the follow-through, do people keep on checking or do the people that have asked for the work to be done really believe that there is an issue, and that needs to be solved to make their lives a little bit better</p>
	<p>Respondent 7: “not good at managing change or implementing something different. And hence the issues that she actually highlighted would be where someone doesn’t buy into “why” into the “why”. Firstly, so it’s being implemented but the person never bought into the why in the first place”</p> <p>“perception is going to take a while to change and that’s going to be a process and the local consultants are going to have to prove themselves let me put it like that it’s not going to happen overnight and at the same time It’s a..it’s understand that you need to be given an opportunity to prove yourself.”</p>
	<p>Respondent 10: So I actually I don’t think its primarily dependent on whether the company is big or small. I think its primarily dependent on the relationship that the client has with the consultancy and the easy with which the implementation plan is presented to the client. I think the likelihood for a bigger consulting firm to kind of erm let me use the word infiltrate, a client is easier because they’ve got like really rigorous training programs on how to liaise with the client, to sell the client etc. But I think it’s a combination of things which is like I said the size of the consulting form, the relationship of the client and the consulting firm and also how the solution is presented to the client.</p> <p>“: But we are running with it. So a lot of the major mining companies in the country have put innovation and technological innovation on their CEO’s KPIs. So um I think there is probably only one firm er...mining firm in South Africa that’s gone public that they are doing that (Which)but because I’m in the industry and I know that these companies are doing it and I’ve been in consulting, umm it’s not they are not doing it, they are definitely doing it”</p>
	<p>Respondent 11: “Local is best They understand the the the difference between African and non-African way of doing things.”...“The more years experience, the more types of orebodies you see, the more different commodities (...), the more your experience grows. It is just a time thing really. In the industry you’ll find that most of the people in the positions are young, they’re dynamic and they’re driven but they do not have experience or they don’t always see the bigger picture.”...“Clear and concise recommendations and not a long 50 page recommendations it’s three (chuckles)”...“communication. Communication is not clear (So if we get that right?) Well if we get that right its almost heaven, but we should strive towards it. No I don’t have problems with consultants as I have been one.”</p>

Appendix 12: Coding families









Appendix 13: Adapted ISF synthesis and translation factors

Synthesis (Evaluation)	Translation (Alignment)
Project evaluation Process audits Technical reports Consultant reputation/brand Source of instruction/Support from top management Due diligence study Project feasibility study Financial resources/budget requirement and availability (Krishnakumar, 2015) Infrastructure	Scope of work/mandate (Beer & Eisenstat, 2000; Krishnakumar, 2015) Buy-in (Alharthy et al., 2017; Beer and Eisenstat, 2000; Durlak & DuPre, 2008; Sterling, 2003) Alignment (McManus & Wood-Harper, 2008; Olivier, 2015; Sterling, 2003) Communication (Alharthy et al., 2017; Dalcher, 2018; Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001; McManus & Wood-Harper, 2008; Sterling, 2003) Trust (Expected) outcomes (Alharthy et al., 2017; Bryson & Bromiley, 1993) Stakeholder endorsement (Olivier, 2015) Conforms to organisations mission and values (Durlak & DuPre, 2008) Consultant competence (Durlak & DuPre, 2008) Consultant reputation/brand

Appendix 14: Adapted ISF support component factors

General capacity building factors (Capabilities)	Motivation (Capabilities upgrade)	Change-specific support (Implementation-conducive capabilities)
<p>Internal skills/training (Durlak & DuPre, 2008) Quality assurance Tools Expertise (Bryson & Bromiley, 1993; Hrebiniak, 2006) Effective management team (Beer & Eisenstat, 2000; Dalcher, 2018; Grol & Wensing, 2004) Dedicated team Technical assistance/Consultant engagement Talent management (Alharthy et al., 2017; Grol & Wensing, 2004; Jordaan & Hendricks, 2009)</p>	<p>Risk management (Alharthy et al., 2017; Durlak & DuPre, 2008; McManus & Wood-Harper, 2008; Olivier, 2015) Regulatory/internal systems compliance audits Scope of work/mandate - audit, diagnosis (Beer & Eisenstat, 2000; Krishnakumar, 2015) Knowledge transfer/knowledge sharing (McManus & Wood-Harper, 2008)</p>	<p>Stakeholder involvement/buy-in/unions (Alharthy et al., 2017; Sterling, 2003) Competence (Durlak & DuPre, 2008) Internal skills/training (Durlak & DuPre, 2008) Motivation/proactiveness (Grol & Wensing, 2004; McChesney et al., 2016) Change management (Fui-Hoon Nah et al., 2001; Hrebiniak, 2006; Krishnakumar, 2015; McManus & Wood-Harper, 2008) Sustainability of intervention/change/new system (Krishnakumar, 2015) Commitment (Durlak & DuPre, 2008; Grol & Wensing, 2004)</p>

Appendix 15: Adapted ISF delivery component factors

General capacity	Motivation	Change-specific capacity
<p>Work culture (Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001; Grol & Wensing, 2004)</p> <p>Change readiness (Appelbaum & Steed, 2000; Durlak & DuPre, 2008; Krishnakumar, 2015; Sterling, 2003)</p> <p>Resources (Human, skills, technical expertise, training, capex) (Alharthy et al., 2017; Bryson & Bromiley, 1993; Durlak & DuPre, 2008; Krishnakumar, 2015; McManus & Wood-Harper, 2008; Miller, 1997; Pinto, 2004)</p> <p>Company leadership (Alharthy et al., 2017; Dalcher, 2018; Durlak & DuPre, 2008; McManus & Wood-Harper, 2008; Olivier, 2015)</p> <p>Organisational structure (Alharthy et al., 2017; Miller, 1997)</p> <p>Experience (Miller, 1997)</p> <p>Project management (Alharthy et al., 2017; McManus & Wood-Harper, 2008; Olivier, 2015)</p> <p>Time-frame (Bryson & Bromiley, 1993; Hrebiniak, 2006; Krishnakumar, 2015; Pinto, 2004; Sterling, 2003; Wang & Chen, 2014)</p> <p>Professional maturity/professionalism (Appelbaum & Steed, 2000; Grol & Wensing, 2004)</p>	<p>Fit /compatibility (meeting needs)</p> <p>Complexity of solution (Bryson & Bromiley, 1993; Grol & Wensing, 2004; Wang & Chen, 2014)</p> <p>Practicality of recommendations/adaptability (Durlak & DuPre, 2008)</p> <p>Performance management (Alharthy et al., 2017; Chetty, 2010; Damoah et al., 2015; Fui-Hoon Nah et al., 2001; Olivier, 2015; Pinto, 2004)</p> <p>Visible benefits</p> <p>Project prioritisation (Appelbaum & Steed, 2000; Beer & Eisenstat, 2000; Durlak & DuPre, 2008; Miller, 1997; Sterling, 2003)</p>	<p>Co-design/value co-creation (Appelbaum & Steed, 2000; Durlak & DuPre, 2008; Lemus-Aguilar & Hidalgo, 2015)</p> <p>Development of new platforms</p> <p>Technical competence (McManus & Wood-Harper, 2008; Sterling, 2003)</p> <p>Project champion in senior ranks (Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001; Jordaan & Hendricks 2009)</p> <p>Interdepartmental coordination/synergy (Beer & Eisenstat, 2000; Durlak & DuPre, 2008)</p> <p>Support from top management (Chetty, 2010; Dalcher, 2018; Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001; Miller, 1997; Wang & Chen, 2014)</p>

Appendix 16: Factors in the eight-component factors model (Component one to four)

Organisational structure (Alharthy et al., 2017; Miller, 1997)	Company leadership (Alharthy et al., 2017; Dalcher, 2018; Durlak & DuPre, 2008; McManus & Wood-Harper, 2008; Olivier, 2015)	Project leadership/team (Durlak & DuPre, 2008; McManus & Wood-Harper, 2008)	Performance management (Alharthy et al., 2017; Chetty, 2010; Fui-Hoon Nah et al., 2001; Olivier, 2015; Pinto, 2004)
Work culture (Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001; Grol & Wensing, 2004)	Project champion in senior ranks (Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001; Jordaan & Hendricks, 2009)	Communication (Alharthy et al., 2017; Dalcher, 2018; Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001; McManus & Wood-Harper, 2008; Sterling, 2003)	Process audits
Vertical communication structures/channels (Beer & Eisenstat, 2000; Dalcher, 2018; Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001)	Inadequate technical competence	Effective management team (Beer & Eisenstat, 2000; Dalcher, 2018; Grol & Wensing, 2004)	Technical reporting
Learning barriers	Provision of resources (Human, skills, technical expertise, training, capex) (Alharthy et al., 2017; Bryson & Bromiley, 1993; Durlak & DuPre, 2008; McManus & Wood-Harper, 2008; Miller, 1997; Pinto, 2004)	Dedicated team	Performance tracking (Alharthy et al., 2017; Damoah et al., 2015)
Working in silos (Beer & Eisenstat, 2000)	Provision of dedicated team	Expertise (Bryson & Bromiley, 1993; Hrebiniak, 2006)	Follow-up
Interdepartmental coordination/synergy (Beer & Eisenstat, 2000)	Management support/prioritisation (Dalcher, 2018; Miller, 1997; Sterling, 2003)	Proactive planning (Hrebiniak, 2006; Miller, 1997)	Risk management (McManus & Wood-Harper, 2008; Olivier, 2015)
Change readiness (Appelbaum & Steed, 2000; Durlak & DuPre, 2008; Krishnakumar, 2015; Sterling, 2003)	Technical competence (McManus & Wood-Harper, 2008; Sterling, 2003)	Experience (Miller, 1997)	Implementation as KPI

Organisational structure (Alharthy et al., 2017; Miller, 1997)	Company leadership (Alharthy et al., 2017; Dalcher, 2018; Durlak & DuPre, 2008; McManus & Wood-Harper, 2008; Olivier, 2015)	Project leadership/team (Durlak & DuPre, 2008; McManus & Wood-Harper, 2008)	Performance management (Alharthy et al., 2017; Chetty, 2010; Fui-Hoon Nah et al., 2001; Olivier, 2015; Pinto, 2004)
Project prioritisation (Beer & Eisenstat, 2000; Durlak & DuPre, 2008; Miller, 1997; Sterling, 2003)	Change management (Fui-Hoon Nah et al., 2001; Hrebiniak, 2006; Krishnakumar, 2015; McManus & Wood-Harper, 2008)	Unanticipated market changes (Sterling, 2003)	Shared decision making (Durlak & DuPre, 2008)
Bureaucracy (Damoah et al., 2015)	Hands-on management /reflects demanding mining environment		Internal skills/training (Durlak & DuPre, 2008)
Infrastructure (McManus & Wood-Harper, 2008)	Commitment (Durlak & DuPre, 2008; Grol & Wensing, 2004)		Compliance audit
Risk aversion/management (Alharthy et al., 2017; Durlak & DuPre, 2008)	Realigning roles and responsibilities (Dalcher, 2018; Hrebiniak, 2006)		Process/project evaluation
Talent management (Alharthy et al., 2017; Grol & Wensing, 2004; Jordaan & Hendricks, 2009)	Management culture (Grol & Wensing, 2004)		Process optimisation
Mining projects tend to be expensive due to the safety and training burden, as well as structural infrastructure required	Low support for site-originated plans		Training/talent management (Alharthy et al., 2017; Grol & Wensing, 2004; Jordaan & Hendricks, 2009)
Over 100 years old - Old habits, trusted technology, can't quickly adopt new technologies because of physiology (deep mines, waste handling, geological complexities)			Align plan with context

Appendix 17: Factors in the eight-component factors model (Component five to eight)

Alignment (McManus & Wood-Harper, 2008; Olivier, 2015; Sterling, 2003)	(Expected) outcomes (Alharthy et al., 2017; Bryson & Bromiley, 1993)	Client-consultant engagement (Durlak & DuPre, 2008)	Risk aversion/management (Alharthy et al., 2017; Durlak & DuPre, 2008; McManus & Wood-Harper, 2008; Olivier, 2015)
Support from top management (Chetty, 2010; Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001; Miller, 1997; Wang & Chen, 2014)	Efficiency	Trust relationship	Structural complexity
Project management (Alharthy et al., 2017; McManus & Wood-Harper, 2008; Olivier, 2015)	Improved safety record/performance	Level of interaction (Appelbaum & Steed, 2000)	Geographically fixed
Buy-in (Alharthy et al., 2017; Beer and Eisenstat, 2000; Durlak & DuPre, 2008; Sterling, 2003)	Cost-effective	Communication (Alharthy et al., 2017; Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001)	Scope of work/mandate - audit, diagnosis... (Beer & Eisenstat, 2000; Krishnakumar, 2015)
Financial resources/budget requirement and availability (Alharthy et al., 2017; Bryson & Bromiley, 1993; Krishnakumar, 2015; McManus & Wood-Harper, 2008; Miller, 1997; Pinto, 2004; Sterling, 2003)	Job retention	Synergies (Durlak & DuPre, 2008)	Due diligence study (McManus & Wood-Harper, 2008)
Cross departmental support/collaboration (Beer & Eisenstat, 2000; Durlak & DuPre, 2008)	Reduced risk exposure	Knowledge transfer/knowledge sharing (McManus & Wood-Harper, 2008)	Project feasibility study
Labour buy-in/inclusion (Sterling, 2003)	Practicality of recommendations/adaptability (Durlak & DuPre, 2008)	Shared decision making (Durlak & DuPre, 2008)	Problem framing

Alignment (McManus & Wood-Harper, 2008; Olivier, 2015; Sterling, 2003)	(Expected) outcomes (Alharthy et al., 2017; Bryson & Bromiley, 1993)	Client-consultant engagement (Durlak & DuPre, 2008)	Risk aversion/management (Alharthy et al., 2017; Durlak & DuPre, 2008; McManus & Wood-Harper, 2008; Olivier, 2015)
Intervention to take into account effects on on possible contribution from other departments and resources required in each	Complexity of solution (Bryson & Bromiley, 1993; Grol & Wensing, 2004; Wang & Chen, 2014)	Accountability (Alharthy et al., 2017)	Unclear/vague strategy (Alharthy et al., 2017; Beer & Eisenstat, 2000; Chetty, 2010; Dalcher, 2018; Fui-Hoon Nah et al., 2001; Hrebiniak, 2006)
Social licence	Audience of the report or recommendations	Poor management of consultant (McManus & Wood-Harper, 2008)	Risk assessment
Clear objectives (Alharthy et al., 2017; Bryson & Bromiley, 1993; Durlak & DuPre, 2008; Jordaan & Hendricks, 2009; McChesney et al., 2016; Miller, 1997)	Retaining knowledge (Jordaan & Hendricks, 2009)	Consultant competence (Durlak & DuPre, 2008)	Poor planning (Damoah et al., 2015; Hrebiniak, 2006)
Community engagement/participation (Durlak & DuPre, 2008)	Sustainability of intervention/change/new system (Krishnakumar, 2015)	Professional maturity/professionalism (Appelbaum & Steed, 2000; Grol & Wensing, 2004)	
Regulatory compliance	Regulatory compliance	Consultant reputation/brand	
Stakeholder endorsement (Olivier, 2015)	Safety and environmental sustainability	Consultant with limited practical experience	
Change management (Fui-Hoon Nah et al., 2001; McManus & Wood-Harper, 2008)	Reflect context and harshness of mining environment.	Manage expectations	
Risk assessment (and awareness)	Translation into real world settings	Objectivity (Krishnakumar, 2015)	
Professionalism (Grol & Wensing, 2004)	Objectivity (Krishnakumar, 2015)	Self-efficacy (Durlak & DuPre, 2008)	

Alignment (McManus & Wood-Harper, 2008; Olivier, 2015; Sterling, 2003)	(Expected) outcomes (Alharthy et al., 2017; Bryson & Bromiley, 1993)	Client-consultant engagement (Durlak & DuPre, 2008)	Risk aversion/management (Alharthy et al., 2017; Durlak & DuPre, 2008; McManus & Wood-Harper, 2008; Olivier, 2015)
Professional maturity-realise this is only way to get things done	Tested technologies	Prioritises project/focus (Appelbaum & Steed 2000; Beer & Eisenstat, 2000; Miller, 1997; Sterling, 2003)	
Management support/prioritisation (Dalcher, 2018; Miller, 1997)	Internal skills/training (Durlak & DuPre, 2008)	Cost/consultant fee (Wang & Chen, 2014)	
Co-design/value co-creation (Appelbaum & Steed 2000; Durlak & DuPre, 2008; Lemus-Aguilar & Hidalgo, 2015)	Scalability	Client attitude (Grol & Wensing, 2004; McChesney et al., 2016)	
Visible leadership	Within resource and capability limits (Durlak & DuPre, 2008; Miller, 1997; Pinto, 2004)	Learning barriers (Grol & Wensing, 2004)	
Source of instruction	Reflects demanding mining environment	Follow-up	
Communication (Alharthy et al., 2017; Dalcher, 2018; Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001; Sterling, 2003)	The nature of the intervention/solution (Grol & Wensing, 2004)		
Employee involvement (Alharthy et al., 2017; Sterling, 2003)	Contextual appropriateness (Appelbaum & Steed 2000; Durlak & DuPre, 2008)		
Employee engagement (Alharthy et al., 2017; Chetty, 2010; Hrebiniak, 2006)	Addresses community needs (Durlak & DuPre, 2008)		
Knowledge sharing (Hrebiniak, 2006)	Conforms to organisations mission and values (Durlak & DuPre, 2008)		
Worker mentality, subordinating ownership and cooperation	Clear deliverables (Appelbaum & Steed 2000)		

Alignment (McManus & Wood-Harper, 2008; Olivier, 2015; Sterling, 2003)	(Expected) outcomes (Alharthy et al., 2017; Bryson & Bromiley, 1993)	Client-consultant engagement (Durlak & DuPre, 2008)	Risk aversion/management (Alharthy et al., 2017; Durlak & DuPre, 2008; McManus & Wood-Harper, 2008; Olivier, 2015)
Worker learning barriers (Grol & Wensing, 2004)	Time-frame (Bryson & Bromiley, 1993; Hrebiniak, 2006; Krishnakumar, 2015; Pinto, 2004; Sterling, 2003; Wang & Chen, 2014)		
Project champion in senior ranks (Durlak & DuPre, 2008; Fui-Hoon Nah et al., 2001; Jordaan & Hendricks, 2009)	The groups affected by the outcomes e.g. investors (Bryson & Bromiley, 1993)		
Motivation	Validated/verified solutions		