Sustainability in Project Management
for
Large Engineering Projects in Africa

Scott Brooks
18377816

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ABSTRACT

The purpose of this study was to explore the inclusion of sustainability in project management for large engineering projects in Africa. The sector in which this is explored is mining. This is an explorative, qualitative study with an interpretivist philosophy employed. Data was collected through semi-structured interviews with project managers and project clients. 18 interviews were conducted with participants using an interview guide as an instrument. The findings showed that engagement with local stakeholders is paramount to the inclusion of sustainability and that this holds more importance than environmental considerations for mining projects in Africa. It also revealed the historic, inconsistent expectations around social responsibility between project managers and project clients as a limitation for accountability of social aspects of sustainability. Research limitations were that only large-scale projects were considered for this study and the results may not be directly transferable to smaller projects, the extent to which projects must spend on social endeavours to maximise project was not obtained and the organisational changes required to adjust to these findings need to be explored in more detail. Practical implications are that project management organisations must employ strategies and bring in capabilities to better enable them to attend to social issues.

KEYWORDS

Project management, sustainability, local stakeholder, engagement.

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.

(ORIGINAL SIGNED)	11 November 2019
Signed: Scott Brooks	Date

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CHAPTER 1: PROBLEM DEFINITION AND PURPOSE

1.1 INTRODUCTION

The inclusion of sustainability in project management has gathered significant attention from business and academics and in few contexts is this more pertinent than large engineering projects in the mining sector, specifically in Africa. Whilst economic profit is the main motivator for business ventures in this sector, there has been increasing pressure for social and environmental sustainability to receive the attention it deserves. This pressure has not only been on ethical grounds; it has also been from a risk perspective. Social licence to operate has been deemed the biggest risk to businesses in this industry, (Creamer Media's Mining Weekly, 2019) which emphasises the importance of mining projects to take into account the interests of their social stakeholders. These projects occur in remote areas and organisations are facing increasing pressure from both economic and social stakeholders to improve their relationships with local communities who are impacted by these operations (PWC, 2019).

This study explores the inclusion of social and environmental sustainability in project management of large engineering projects for mines in Africa. This context provides the backdrop on which this topic viewed and explores how this influences the practice of project managers who have been involved in these projects. The research is based on data gathered from interviews with project managers (PMs) and project clients (PCs). Their insights are unpacked to understand the aspects of achieving this in project management and how the profession must respond to the aforementioned pressures.

Despite sustainability being explored on both the social and environmental fronts, the dominant focus from the insight's centres on the social sustainability, and particularly on social stakeholders within the communities that these projects come into contact with. The sections following present the background to the research problem, the aims and the insights gained.

1.2 THE RESEARCH PROBLEM

The topic of sustainability has found prominence in business practice. Organisations are experiencing increasing pressure to walk a moral line in their business practices and become more socially impactful in their corporate journey. In so doing organisations are finding it necessary to measure their performance by more than just financial measures. The triple bottom line (Elkington, 1999) has been a key concept in evaluating the performance of companies in achieving sustainability in their initiatives. This concept is pertinent for large engineering projects as they can significantly influence the areas and communities in which they take place because of their scale. It is particularly relevant in African developing countries, where institutional infrastructure is lacking, and communities rely heavily on this type of investment for social upliftment (Eweje, 2006). It is argued that the private sector is ideally poised to provide this social upliftment in the form of collaborative arrangements (Steven, 2011).

The discipline of project management is deemed to be the cornerstone of industrial practice to achieving these feats (Silvius, 2017). However, the permeation of sustainability into the practice of project management has been limited (Martens & Carvalho, 2017). This appears to stem from a sentiment of short-termism on the part of the project management teams for organisations that practice this (Munns & Bjeirmi, 1996). Whilst large engineering projects can take years to complete, the intended utilisation period of the plant and equipment supplied is far greater. The nature of these projects is such that at the end of the project the plant is handed over to the intended operators, the customer, and the project management team leaves the site for their next project. Bounded heavily by the constrains of time, cost and quality, sustainability and an accompanying long-term outlook are not given due attention.

Often skills within the communities are scarce and local labour is mostly brought on during the project as unskilled labour, with skilled labour being brought in from external resources. This dynamic leads to community unrest (Ndlovu, 2013) as their expectations of employment opportunities are not met and value is seen to be siphoned elsewhere (Conde & Le Billon, 2017). In these environments the project managers' considerations are strained as they must manage the expectations of all stakeholders to the project and balance this with the triple objectives of cost, time and quality (Project Management Institute, 2017). The inclusion of sustainability

initiatives appears a paradox that would compete for these valuable resources at the cost of project success.

The purpose of this research is to explore the relationship between sustainability and project management, and its applicability in the context of large engineering projects in African developing economies. Project management is presented as a set of tools and approaches for use by a project manager (Project Management Institute, 2017) and presents stakeholder management as one of its tenets. However, it is presented in a transaction-like manner and does not speak to sustainability in the efforts of the project manager. Research reveals that the integration of sustainability and project management is still in its infancy (Martens & Carvalho, 2017).

With multinational enterprises (MNE) constantly being exposed to the risks of community unrest from unmet expectations in developing nations (Eweje, 2006) it highlights the need for a more integrative approach to managing project outcomes through collaboration. It also potentially presents an opportunity to explore the creation of shared value (Porter & Kramer, 2011) for all stakeholders. If business can achieve this, it moves the conversation from one of stakeholder risk management to one of mutual long-term benefit. From a business perspective it exposes opportunity to proactively manage project risk, generate community support and benefit from multipliers associated with improved social integration.

The theoretical need for this research is based on the growing focus of sustainability for business and the lack of theoretical application of the tenets of sustainability in the project management theory (Yu, Zhu, Yang, Wang, & Sun, 2018). This gap represents a significant space for development of literature that can be incorporated into practice for project management. This is particularly relevant for mining projects which by their nature create an unsustainable reliance on a non-renewable resource.

The research problem identified is a lack of inclusion of sustainability in project management. The context for this problem is large engineering projects in the mining sector in Africa.

1.3 RESEARCH QUESTION

The overall research question is to understand how sustainability can be included in project management of large-scale projects. This question is asked from the perspective of project managers that are tasked with accommodating the needs of

the multitude of project stakeholders.

1.4 RESEARCH AIMS

To answer the research question the research approaches the problem from multiple angles. The first aim is to understand how the contextual factors of projects in African developing countries influence the agenda on sustainability. The second aim is to understand the drivers that push or pull project managers to include sustainability in practice. The study then identifies the main challenges faced in their efforts to drive its inclusion.

Certain factors within this topic support the inclusion and these are explored to identify what tactics can be leveraged to facilitate this. The process of inclusion is also an important factor in understanding the problem and this is investigated to identify how project managers can achieve ideal outcomes from their inclusion of sustainability. Finally, the research explores the trends that industry faces for the inclusion of sustainability.

1.5 RESEARCH CONTRIBUTION

The contribution of this research is toward project management academic literature. This literature has seen steady growth of new research on sustainability in project management (Marcelino-Sádaba, González-Jaen, & Pérez-Ezcurdia, 2015), however this research does not appear to be prominent in the African context. Stakeholder management finds common ground between these two topics but is also found to be lacking in significant research done for mining projects in Africa (Littau, Jujagiri, & Adlbrecht, 2010). The contribution of this research is to explore these topics from the experience of project managers who have had significant experience in the specified context.

It is expected that this research will illuminate how the African context influences project managers' ability to include sustainable practice in their managerial roles. Stakeholder management has been identified to be an important requirement for project managers to navigate this context and the research explores the organisational change that may be necessary to improve this.

1.6 OVERVIEW OF REPORT

This section presents an overview of the report for the reader to understand the purpose of each chapter, as shown in Figure 1. The next chapter provides insight into the literature on project management, sustainability and stakeholder theory. Chapter three presents the research questions which will guide the focus of the report to address the research problem. Chapter four explains the research methodology and design of the project as well as how the thematic analysis of interviews was carried out. Chapter five contains the results of the interviews according to the themes identified. Chapter six compares the findings from chapter five with the literature reviewed in chapter two, and chapter seven presents the conclusions of the study.

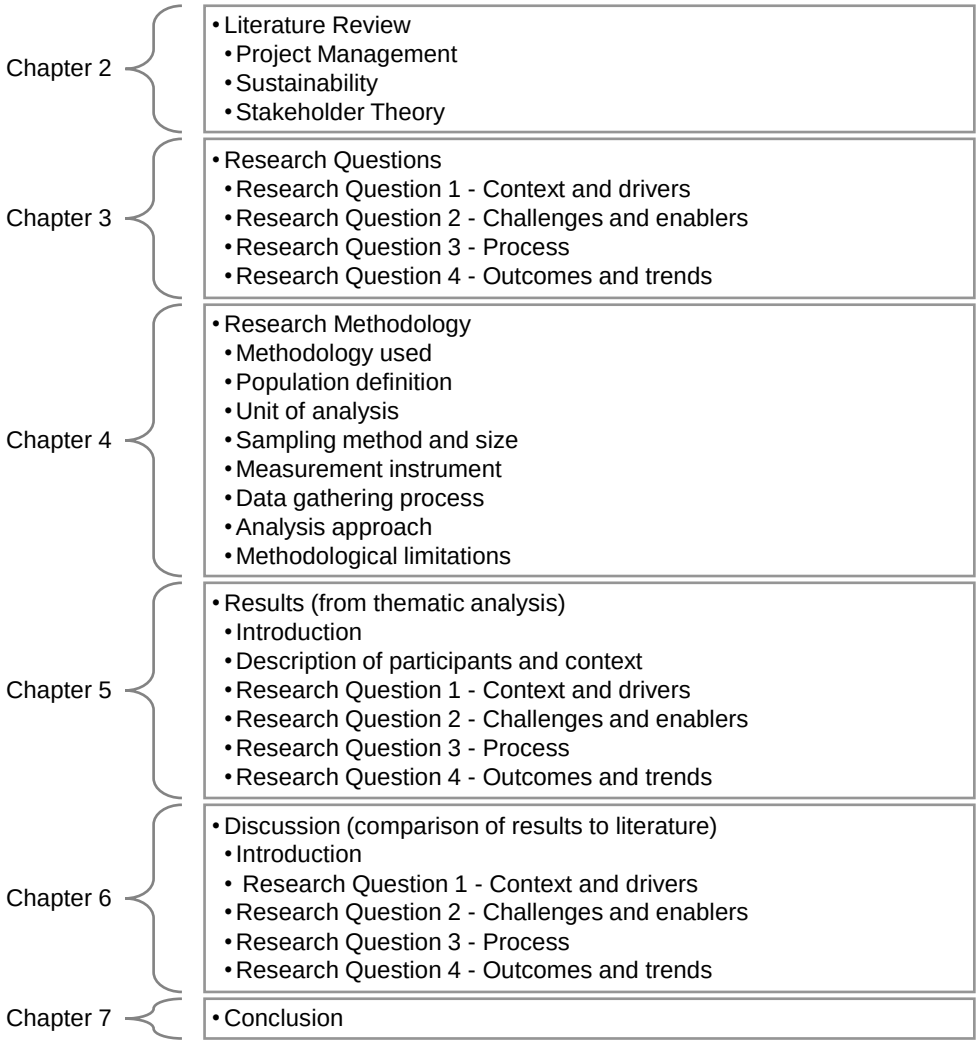

Figure 1: Overview of Report

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter explores the topics of project management and sustainability, and where stakeholder theory plays a role in their intersection. An institution recognised for their compilation of theory on the practice in project management is the Project Management Institute (PMI). The theory on the practice is contained within the Project Management Body of Knowledge (PMBOK) and functions as a guide to professionals in the field. It provides a reference for established norms, preferences and processes associated with managing projects (Project Management Institute, 2017). This body of knowledge is subject to regular update from the Project Management Institute.

The theory provided by this body of knowledge is scant on reference to sustainability as a goal in implementation of projects and this report seeks to explore the incorporation of sustainability factors into the practice of project management. Stakeholder theory has been identified as a means through which this may be explored.

2.2 PROJECT MANAGEMENT

A project's life span is generally broken up into four phases, during which there are notable changes in the level of effort, costs and expertise required. These four phases are as follows (Pinto & Slevin, 2015):

- Phase 1 – Conceptualisation
- Phase 2 – Planning
- Phase 3 – Execution
- Phase 4 – Termination

Definition of these phases is an important consideration in application of tools and factors required in managing the project. For instance, in the conceptualisation phase; goal setting, risk assessments and strategizing are key activities for sensing and determining the appropriate direction to take.

This view of the project life cycle is notably separate from the product life cycle and does not consider the utilisation of the produced plant after the closure of the mine In the case of mining activities this life cycle cannot be ignored as the project

(development) and product lifecycles are interdependent (Marcelino-Sádaba et al., 2015). A more inclusive approach has been to consider the project lifecycle to be viewed as inclusive of the utilisation of the product *and* its eventual closure (Munns & Bjeirmi, 1996), in this case mining and mineral beneficiation infrastructure. To this end we see that organizations are increasingly being held responsible for impacts post completion of the project (Labuschagne & Brent, 2005).

Stakeholder engagement is key feature of project management theory and it is prescribed that project management professionals should identify these by determining the impact of the project on them and in turn their potential impact on the project (Project Management Institute, 2017). This literature encourages project managers to use supporting experts to achieve certain outcomes in the project. Management of stakeholders is prescribed in a manner that bases the interaction with them on their potential impact on the success of the project within its specific timeline. Stakeholders are categorised according to their power and interest/influence over the project outcome (Project Management Institute, 2017). Management of these stakeholders should happen throughout the life of the project and is deemed to end after termination of the project.

2.2.1 Project Success

The formal inclusion of sustainability concepts would likely require the incorporation of additional success criteria. Long-standing definitions of project success include success factors and criterion (Müller & Jugdev, 2012), aptly referred to in literature as Critical Success Factors (CSFs). These factors have evolved over the years from factors that measured the success only in the implementation phase, to more modern definitions that include the project and product life cycle (Müller & Jugdev, 2012).

The Project Management Institute defines project success measures as product delivery, product quality, timelines, budget compliance and degree of customer satisfaction. It allows for the specifics of these factors to be agreed upon by stakeholders. These are incorporated into a project charter that defines what constitutes project success and appropriate criteria for sign-off of the project (Project Management Institute, 2017). Critical Success Factors identified by so-called giants in the field of project management, Pinto and Prescott (1988) are having appropriately identified, defined and/or effected:

- Project mission

- Top management support
- Project schedule/plan
- Client consultation
- Personnel capabilities within the project team
- Technical capabilities
- Client acceptance
- Monitoring and feedback
- Communication
- Troubleshooting

Note: Adapted from Pinto and Prescott (1988), Variations in Critical Success Factors Over the Stages in the Project Life Cycle

The factors that constitute success in these defined areas are heavily contested and rarely agreed upon, and the literature posits that defining these success factors is a subjective exercise and is dependent on the stakeholder that is making the judgement (Davis, 2014). The importance of CSFs also varies according to the different phases of the project – for instance project mission is regarded as highly important at the beginning whereas client acceptance is most important at the end of a project (Pinto & Prescott, 1988). Notably absent from this list is stakeholder engagement and more specifically, sustainability. It appears from the literature that the scope for inclusion of sustainability initiatives is present through appropriate stakeholder engagement. However, these definitions of success still appear to be inward looking and leave room for improvement, especially in the case of large engineering projects in Africa.

More recent literature includes risk management as a means to achieving project success. De Carvalho and Rabechini Junior (2015) describe soft skills as being a capability for project managers to have in order to reduce project risk. Expanding on this, an understanding of the social and environmental terrain by project managers is described as being a factor for project success (Kealey, Protheroe, MacDonald, & Vulpe, 2005). Along this line of thinking Oppong, Chan, & Dansoh (2017) deem that measures of success can include the smooth running of a project without social unrest through appropriate stakeholder engagement.

2.2.2 The Context of Large Engineering Projects

Large engineering projects in the mining sector are generally initiated by a mining

consortium. Once a mineral extraction site has been established through prospecting their business development and project management team will pursue the extraction and beneficiation of the mineral resource through appointment of engineering and project management consultants. In the case of mining projects this generally comes in the form of a project engineering firm that possesses the technical capabilities required to plan and implement the project. These projects typically follow a staged process of pre-feasibility and feasibility studies whereby the project's economic success is ascertained. Investment funding for the project would only be granted upon proving the project's feasibility and feasibility is often subject to the discretion of funders conditions (Labuschagne & Brent, 2005). Once this has been established the process will then move to development where detailed engineering and procurement is carried out. Execution or installation will follow the engineering work, but much of it will happen in parallel due to the need to minimise time to get product to market. Overlapping the execution phase will be a commissioning phase where the installed plant assets will be put into operation, tested and optimised. Once commissioning has been completed the assets are handed over to the client to begin operation (Labuschagne & Brent, 2005).

These projects are executed in remote locations that typically lack infrastructure and have significant effects on the surrounding communities and environment. It is not uncommon for these to be subsistence communities with little to no access to education, medical facilities and formal employment (Eweje, 2006); a consequence of which is that pressure is placed on MNEs to address these social issues. However, that challenge faced in the industrial sectors is a lack of available skills to fulfil their needs for technical capabilities (Hall & Sandelands, 2009). In their encounters with these communities, projects face issues of social unrest which can be caused by myriad of factors such as displacement from their land, marginalisation and lack of participation in project benefits (Conde & Le Billon, 2017). Eweje (2006) argues that companies must be prepared to avoid these issues by addressing the social problems they encounter with these communities.

2.3 SUSTAINABILITY

The definition of sustainability as per the World Commission on Environment and Development (1987) states that sustainability is "meeting the needs of the present without compromising the ability of future generations to meet their own needs." (p.

54). Some literature also refers to this as sustainable development, however these terms are interchangeable in their use and meaning in the context of this report. This is one of many definitions of the concept but it is generally agreed (Labuschagne & Brent, 2005) that sustainability is a term used to refer to the perpetuation of practices that responsibly address economic, social and environmental aspects of human endeavours. This concept inspired the formation of the Sustainable Development Goals (United Nations Development Program, 2015) by world leaders to chart a course to 2030 by which these goals are intend to be achieved. But these goals on a grand scale are idealistic and offer little to business in understanding how to incorporate sustainability into business practice. Which goals should they pursue? How can these goals be translated into something more appropriate for organisations to strive for?

The International Institute for Sustainable Development (1996) answered this by defining sustainable development for business as the adoption of "strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human natural resources that will be needed in the future." (p. 8). The combination of this definition and the aforementioned economic, environmental and social aspects in sustainability has been referred to as the triple bottom line, when spoken of in the business context (Marcelino-Sádaba et al., 2015). Interestingly Foley (2005) states that organisational sustainability would be achieved through maximising the quality of the products they sell whilst catering for their non-customer stakeholders. This seems a departure from looking at sustainability with a view to leaving wealth for future generations to reap, and a move toward better stakeholder engagement. For this reason it may be a more palatable and translatable definition for business practice, but it does not deny that future generations would be non-customer stakeholders and raises the question as to how business should define their stakeholders.

Nonetheless, the topic of sustainability has found increasing support in business initiatives and the triple bottom line of economic, environmental and social performance has become ubiquitous in the literature (Silvius, 2017). Organisations are acclimatising to the need to practice sustainability and are using its concepts more often in the creation of long-term strategies that mitigate their increasing exposure to business risk, which is in part due to global sustainability issues having reached thresholds too significant for businesses to ignore (International Finance

Corporation, 2012). A glaring example of this is the Marikana shootings which occurred on 16th August 2012, where 34 mine workers were shot and killed during protests against low wages and poor living conditions (Ndlovu, 2013). This caused an international outcry and prompted many mining companies to reassess their business risk and stakeholders. A study by Martens and Carvalho (2017) in a Brazilian context seems to agree with the assertion that companies need to pay more attention to appropriate identification of stakeholders, in particular those in local communities.

2.3.1 Sustainability Within Project Management

The issues being faced by businesses are intensifying and becoming more difficult to manage reactively, forcing them to innovate and foster a more proactive approach to managing this risk (Martens & Carvalho, 2017). Large engineering projects have attracted significant attention on this for their ability to influence sustainability issues due to the large investment usually associated with them. As a result social responsibility is regarded as a critical factor for the sustainability of these projects (Zeng, Ma, Lin, Zeng, & Tam, 2015).

2.3.2 The Gap

Labuschagne and Brent (2006) describe that project management does not effectively address sustainable development. The literature is clear that there exists a considerable gap between the ideals of sustainability and current business practice (Garvare & Johansson, 2010). This point is supported by Brones, De Carvalho and De Senzi Zancul (2014) who go further in highlighting the inadequacy of stakeholder engagement practiced by business as a means of addressing sustainability concerns.

2.3.3 Criticism that project management does not talk about sustainability

Implementation of sustainability requires a conduit through which its principles may be practiced and project management seems to be an ideal mechanism to achieve this. However, the intersection of project management and sustainability, and therefore its practice within project management, has limited exposure (Martens & Carvalho, 2017). Literature is still critical of project management not having been identified directly as an instrument through which sustainability should be practiced

(Yu et al., 2018), especially in the context of large engineering projects that have a considerable impact on social and environmental aspects of the areas they target. This raises the question of why the intersection of sustainability in project management for large scale projects has not been as progressive as expected.

2.3.4 Determination of Sustainability

Whilst project management theory as prescribed by the PMI does not present sustainability as a central tenet of the profession, there are a myriad of alternatives for determination of the sustainability of projects. This can come in the form of minimum requirements from legislation, policy from local government, or methodologies that allow organisations to address and measure indicators of their efforts to be sustainable and success thereof (Labuschagne & Brent, 2005). Many of the policies for implementation of sustainability come from governments, standards organisations or agencies that prescribe best practice for organisations to follow.

Ugwu, Kumaraswamy, Wong and Ng (2006) highlight the European Environmental Agency and the World Summit on Sustainable Development held by the UN General Assembly as influencing governments' alignment with sustainability goals and prescribing policy. A recent summit was held in New York in 2015 and gave rise the to 2030 Agenda for Sustainable Development (United Nations, 2015). In their work they classify sustainability key performance indicators (KPIs) for infrastructure projects in order of importance for clients, consultants and contractors according to the domains of environment, health and safety, economy, society, resource utilization and project administration. Whilst this provides some direction on areas of focus for sustainability in projects it is limited to the opinions of economic actors within projects, not considering the views of external stakeholders.

Hacking and Guthrie (2008) speak of the various assessment methods such as the Integrated Assessment, the Sustainability Assessment or SEA, the Extended or Environmental Impact Assessment (EIA), which have taken on different acronyms depending on the country in which they are applied. Their work highlights that there is little agreement regarding the meaning and language used to describe assessment methods, although the EIA has been deemed the most successfully established technique that is supported by legislation in many countries. The content of the assessments as practiced by different countries also varies according to indicators deemed important by varying stakeholders.

Fernández-Sánchez and Rodríguez-López (2010) further highlight the subjectivity in selection of sustainability indicators and models for the construction industry, and the attempt by the International Standards Organisation (ISO) to create homogeneity in application of sustainability through definition of sustainability standards and processes. Their research identifies the need to include stakeholders in establishing sustainability criteria for construction projects and they propose a methodology which involves stakeholders from the outset of identifying sustainability criteria.

Marcelino-Sádaba et al. (2015) present a framework for sustainable project management whereby the three foci of the triple bottom line are applied across the pillars of products, processes and organisations. Through this framework they communicate the importance of the cross section of these criteria being supported by managers with appropriate ethical stances and training. It is interesting to note that whilst these assessment methodologies are presented as tools that project managers can use to introduce sustainable practice into projects, Martens and Carvalho (2017) point out that, from the perspective of project managers in Brazil, sustainability is strongly represented by a sustainable innovation business model, stakeholder management, economic and competitive advantage and environmental policy and resource saving. Whilst the conversation around the assessment of sustainability within project management of large scale projects is dynamic, the assertion by Hacking and Guthrie (2008) that convergence of sustainability assessment methodologies that offer practical use in navigating government policy is lacking, may still hold.

If sustainability is to hold true to its definition then perhaps the determination should be in the outcomes attained through the various methodologies employed. Magis (2010) offers resilience as an indicator on the social side. In this research it is acquired by enabling the social stakeholders to be independent of the project activities. This is a view echoed by Oppong, Chan, and Dansoh (2017) who view social empowerment as a key attribute for project to aspire to within stakeholder management. In this context it appears that a values based approach may be more appropriate when including sustainability into large scale projects (Silvius, 2017).

2.3.5 Sustainability Contextuality

Part of the reason for the lack of sustainability practiced in project management of large-scale projects may lie in the contextuality of sustainability in implementation.

Whilst project management as an instrument is presented as a standard of practice through the PMI and project management institutions, much of the literature pertaining to the implementation of sustainable practice appears to be determined by the context that the project finds itself in. Large engineering projects in mining by nature are extractive of non-renewable resources and finite in life from a project and product lifecycle perspective. A criticism is that there has been little guidance on what a sustainable large engineering project might resemble in terms of the sustainability goals it achieves and those it must choose to ignore (Boswell et al., 2005). It might be argued that all stakeholders should have input in determining which elements of sustainability should be regarded as acceptable measures and to what extent they should be achieved. Equally, stakeholders would need to have agreement on the permissible negative effects of the project on the communities it affects. Ugwu, Kumaraswamy, Wong and Ng (2006) observed that the importance of some sustainability indicators were subject to the social attribution of importance to the varying elements of sustainability and some of this attribution depended on intergenerational priorities. The contextuality also plays out on a national level as the priorities of developing economies in Africa are very different from those elsewhere.

So, whilst the concerns of sustainability are well documented in first world countries, the frameworks applied there may not be as relevant or applicable in the African context (Sowman & Brown, 2006). In Hacking and Guthrie's (2008) research on the array of sustainability assessment methods they agreed with the assertion that sustainability assessment methods that are conceptualised and practiced in first world countries do not necessarily address the contextual needs of developing countries. Due to project managers finding themselves in constantly changing environments there may exist some subjectivity in their selection of sustainability criteria to choose to address (Fernández-Sánchez & Rodríguez-López, 2010). This suggests that sustainability is normative and its application in project managerial roles needs to be based on the project context (Bond, Morrison-Saunders, & Pope, 2012). Contextual factors may include the country, its history, culture, economic conditions, social, and environmental considerations. This seems a dichotomy of sorts in that there are numerous examples of attempts to converge the use of sustainability assessment methods, yet this contextuality points to project managers needing to approach sustainability from the context of the project location and the elements tied to that. Whatever the case, Marcelino-Sádaba et al. (2015) posit that sustainability within projects will not make meaningful progress until the definition of

a sustainable project can be established. Yu et al. (2018) propose a Sustainable Project Planning model for integration of sustainability into engineering projects and acknowledge the need for it to be applied in other contexts to develop its generalisability. It appears that a more standardised approach is needed for sustainability appraisals, but the appraisal methods should be accommodating of the context and be determined on a case-by-case basis.

2.3.6 Barriers to Practice

Choosing the correct methods for sustainability assessment within context signifies the external barriers to implementation, but there do also exist barriers internal to project management that inhibit the practice of sustainability. The argument of the *tried-and-tested* method is one such barrier. Ugwu et al. (2006) refer to this as metaphorical-based-design, whereby projects are designed according to methods that worked in the past. Unfortunately this kind of thinking can inhibit the integration of new sustainability practice into the management of projects by silencing new thinking that might challenge the status-quo. There may be good reason for this reluctance to venture into sustainability practice as Ugwu et al. (2006) point out that there is uncertainty on how sustainability practice should be carried out at the micro-level of projects. It seems understandable then how, with limited consensus on what might constitute sustainable project management, a fall-back option might be to travel the road one knows.

A survey conducted by McKinsey (2011) spoke of other barriers faced by business such as short-termism whereby companies struggle to motivate the long-term value added by sustainability over short-term performance. In this research it is highlighted that companies in extractive industries such as mining found major inhibitors to be a lack of capabilities as well as a lack of incentives to drive sustainability into business practice. Thus if the proposed sustainability practices do not align with company strategy then the efforts to include it often come in the form of green-washing or ad-hoc practice in attending to emergencies (McKinsey, 2011).

This short-termism and lack of inclusion in company strategy could have its roots in the temporary nature of engineering projects which generally only last a few years. By virtue of large engineering projects having start and end dates, any attentiveness to monitoring of sustainability issues quickly fades after completion of the project (Cassar, Conrad, Bell, & Morse, 2013).

Hwang and Ng (2013) supplement the exposure of barriers by focusing on those that would need to be overcome by the project manager in implementing sustainable projects, these are:

- Higher costs
- Technical complexity
- Risk of sustainability integration requiring late changes
- Longer approval times for sustainable aspects
- Knowledge of team on newer more sustainable technology
- Increased onus on project manager to communicate continuously on sustainability practice
- Longer project lead times

Note: Adapted from Hwang and Ng (2013) from Project management knowledge and skills for green construction: Overcoming challenges

It therefore seems paramount that to overcome these challenges, project managers would need to be supported by organisational strategy and policy that aligns with a sustainability agenda (Marcelino-Sádaba et al., 2015).

2.3.7 Drivers of Sustainability

Risk management is regarded by business to be one of the main drivers for pursuing sustainability in large engineering projects. Bond et al. (2012) describe social licence to operate as being a driver that acheives this. Local communities are significantly affected by these projects and investment in the communities is of paramount importance for the relationships with these stakeholders to stay healthy (Eweje, 2006). However, Zeng et al. (2015) point out that these types of projects still trigger severe concerns due to their inadequacy in addressing social issues. This McKinsey (2011) put forward that in extractive industries such as mining, the increased focus on sustainability has more to do with legislation and resource constraints. These factors seem to indicate a favour for practicing sustainability to avoid the adverse short-term economic consequences of not doing so, in what might be referred to as push factors.

However, despite these push factors, the McKinsey (2011) study reported that 76% of CEOs in their study consider sustainability practice to be better for their business performance in the long-term. However this view is tempered by Tan, Ochoa, Langston and Shen (2015) who describe increasing revenue for sustainability

performance up to certain point and decreasing revenues if companies go beyond this. Certain companies in the mining sector have taken heed of sustainability practice and made considerable investments in addressing social aspects through upliftment of the communities they recognise as stakeholders. Newmont Mining Corporation, who has significant mining operations in Ghana, recognised the need for early engagement with local communities that were affected by the mine and a portion of their investment was dedicated toward compensation, building schools, provision of new land, clean water, local clinics and training centres (International Finance Corporation, 2012). However, this was driven by the need to adhere to the IFCs performance standards which are contained in the Equator Principles (The Equator Principles, 2013), which form a risk management framework for the determination of environmental and social risk. The IFC, who funded 21% of the total cost of the investment, argue that the success of a company has a high correlation to its sustainable practice in uplifting the communities in which it operates (International Finance Corporation, 2012). Although this success may still at least in part be tied to reduced risk from the alternative – not practicing sustainability and encountering numerous social, political and reputational challenges along the way (International Finance Corporation, 2012).

Risk management aside, there do appear to be other factors that provide incentives to practice sustainability as opposed to disincentives not to. The IFC (2012) also state that companies stand to improve their bottom line through improved business performance such as reduced cost, improved reputation, better stakeholder relations – though the latter, it could be argued, is still tied to risk management where external stakeholders are concerned. Martens and Carvalho (2016) bring this back to project management and align with this by confirming a slight increase in project success when sustainability methodologies are employed in the various phases of a project. Whilst these are some of the social benefits of improving the bottom line there are environmental benefits too.

PWC (2019) highlight water restrictions from climate change and subsequent droughts as posing large risks to mine operations which are hugely dependent on a steady supply of water – one example provided is that of Barrick Gold who bear a 5% chance of losing USD1 billion per annum due to water shortages at its operations worldwide. Designing operations to be more water efficient through sustainable design can therefore prevent expensive production losses due to operational

downtime.

The above drivers for sustainability have encouraged funders such as the IFC to incorporate conditions for applicants to meet sustainability criteria, in the form of the IFC Performance Standards on Environmental and Social Sustainability, to qualify for funding (International Finance Corporation, 2012). These standards are incorporated into the Equator Principles (2013) which are used by financial institutions worldwide as a guide for allocation of funding, in recognition of their power to influence the effect of large engineering projects on society and the environment. Interestingly these principles are non-prescriptive and instead rely on the applicant to institute and provide verifiable evidence of having complied with the sustainability requirements. These principles call for applicant's projects to be classified according to their potential effects on society and environment, to assess the extent of the effects and propose mitigation strategies and apply the environmental and social standards applicable to the area in which the project takes effect. This appears a critical point as it acknowledges the previously mentioned contextuality of application of sustainability. The Equator Principles (2013) further call for applicants to have in place an Environmental and Social Management System to comply with the applicable standards, engage with stakeholders, provide an avenue for grievances to be made and rely on third parties for review and assessment.

The influence of funders over sustainability practice is likely to encourage companies practicing sustainability to improve their reputation and therefore access to funding. However, whilst reputation was a leading consideration for incorporating sustainability into practice, it is now secondary to improving efficiency and reducing costs (McKinsey, 2011). Nonetheless, Sroufe (2017) finds that companies are experiencing difficulty in responding calls for sustainability appraisal in their commercial ventures, and are needing to adjust their organisational strategy and capabilities be ahead of compliance requirements from their various stakeholders.

2.4 STAKEHOLDER THEORY: A KEY TO SUSTAINABILITY IN PROJECT MANAGEMENT

Freeman (2010), one of the forefathers on the stakeholder theory approach to business, defines the stakeholder as "groups and individuals that can affect, or are affected by, the accomplishment of organisational purpose" (p. 25). Cleland (1985) is recognised for having brought the concept to project management and instead

used *interest* as opposed to *affect* to describe stakeholders to a project. Littau, Jujagiri and Adlbrecht (2010) provide an understanding of how the stakeholder definition has changed over its tenure, but the one definition to endure is that of Freemans which sees the stakeholder in terms of affecting or being affected by. Littau et al. (2010) describe a striking trend in their research which shows the growing popularity of the concept as measured by articles written. The concept grows noticeably in prominence from 2000 to 2009 and the term stakeholder becomes more prominent and explored in project management literature.

Garvare and Johansson (2010) place sustainability within stakeholder theory by suggesting this means meeting the needs and expectations of current and future stakeholders, which would include future generations. By extension this would consider the environment a stakeholder as it serves future generations. This aligns with Hacking and Guthrie (2008) who state the sustainability assessments need to consider the longer term ecological effects that may result from pursuing short term gains. This leads us to sustainability finding intersection with project management, through stakeholder management and the consideration of economic, social and environmental actors as project stakeholders. Accordingly, Marcelino-Sádaba et al. (2015) find that stakeholder management is a vital process required for the inclusion of sustainability in project management.

The PMI (2013) defines stakeholders in the same light as Freeman and agrees with the concept of appropriately identifying stakeholders over the lifecycle of the project and product. References to both internal and external stakeholders within its theory are plentiful and its prescription is for project managers to ensure (Project Management Institute, 2013):

- Identification of stakeholders;
- Planning of stakeholder management;
- Management of stakeholder engagement and
- Control stakeholder engagement

Note: Adapted from (Project Management Institute, 2013), Guide to the Project Management Body of Knowledge

The theory is considered to be a tool for prescribing how to approach stakeholders, though it leaves the identification of social and environmental stakeholders to the project manager. Organisations have realised significant benefits that sustainable social and environmental practice can offer - some of which are further improvement

to other stakeholder relations - which highlights the importance of organisations including sustainable practice as a part of their corporate strategy (International Finance Corporation, 2012) and emphasises the support project managers require to appropriately recognise their project stakeholders. In turn, managerial control is found to be an important requirement for this to happen (Yu et al., 2018).

This is a confirmation of Garvare and Johansson's (2010) research, where they suggest that stakeholders exist, regardless of whether an organisation identifies them as such, by their ability to withdraw support or impose damage. In line with their research the term ‘primary stakeholder’ refers to parties that offer support to a project and ‘secondary stakeholders’ refers to parties that can exert pressure on primary stakeholders to withdraw their support and cause a project to fail (Garvare & Johansson, 2010). Their research therefore highlights the importance of ensuring stakeholders are identified appropriately - not identifying a stakeholder could be detrimental to project success and identifying a stakeholder when not appropriate could result in wasted organisational resource allocation. This ability of stakeholders to influence project failure is a poignant issue in the context of projects when the definition of project success varies significantly between the various primary stakeholders of a project (Davis, 2014), and it raises questions about the level of agreement between project management organisations and mine owners on how they approach sustainability in a coordinated and successful manner. Ugwu et al. (2006) have already proposed that a prerequisite to sustainability within projects is to engage with stakeholders and agree upon indicators for measurement of success. This has made stakeholder management an increasingly important skill for project managers to possess to run projects successfully (Littau et al., 2010).

Martens and Carvalho (2017) highlight in their study of Brazilian project managers that despite the growing literature on stakeholders and management thereof, there still exists a shortcoming when it comes to dealing with issues of social sustainability.

2.5 CONCLUSION

Over the past decade there has been extensive interest and exploration of the intersection between project management and sustainability, but the evidence for inclusion of this in theory and practice is still scant and in need of solidifying. With better understanding of the benefits of sustainability and how to apply it in the project management context, project managers may be better poised to incorporate social

needs and enable the creation of shared value (Martens & Carvalho, 2017).

The literature reveals a litany of definitions for sustainability and how to achieve it but is critical of the restrictions that its vaguesness brings in having targeted application of sustainabilty in context. This need to apply a broad range of sustainability methods in unique contexts is arguably representative of large engineering projects in Africa, specifically the mining sector and Marcelino-Sádaba et al. (2015) highlight the need to understand how sustainability has been approached in unexplored cases.

Despite this recognition of the importance of sustainability it is not specifically considered in major project management theory (Brones et al., 2014). This has highlighted the need for development of literature that helps project managers employ sustainability effectively in the context of project management. This is of particular relevance in social aspects where less progress has been made. It is envisaged that sustainability goals and measures should be defined during project conceptualisation and be integral in establishing the feasibility of the project (Marcelino-Sádaba et al., 2015). But establishment of this brings to light important questions on the degree to which sustainable practice can be employed in the arena of project management in the context of large engineering projects in Africa. Projects are ultimately non-sustainable in nature and are defined by a beginning and an end. With this in mind project managers need to selectively choose which aspects of sustainable initiatives they can employ and stop when the economics of taking on the project no longer make sense (Marcelino-Sádaba et al., 2015)? Despite this uncertainty, the results are positive. In multiple-case study, Mauro Luiz Martens and Carvalho (2016) reveal that where there was an emphasis on sustainability with project management a slight increase in project success is observed.

CHAPTER 3: RESEARCH QUESTIONS

3.1 INTRODUCTION

The research problem is the lack of inclusion of sustainability in project management. The context for this study is large engineering projects in the context of developing countries in Africa. The focus will be specifically within the mining sector, where projects regularly target remote locations with little existing infrastructure. The overall research question is to understand how sustainability can be included in project management of large-scale projects. The individual research questions were informed by this and the literature in the previous chapter, however, some defining themes were used to guide the direction of the questions. These themes were:

- Context
- Drivers
- Challenges
- Enablers
- Process
- Outcomes
- Trends

These themes then formed the basis for the interview guide that was used for the semi structured interviews, which is discussed in chapter four. The research questions formed to answer the overall research question are shown below. It is expected that by answering these questions, the research problem is addressed.

3.2 RESEARCH QUESTION 1

What are the contextual factors influencing the application of sustainability in project management of large engineering projects in Africa?

3.3 RESEARCH QUESTION 2

What are the sustainability challenges and enablers that project managers must be cognisant of for large engineering projects in Africa?

3.4 RESEARCH QUESTION 3

How is sustainability being incorporated into project management of large-scale projects in Africa?

3.5 RESEARCH QUESTION 4

What are the meaningful outcomes for inclusion of sustainability in project management and how is project management of large-scale projects in Africa changing?

A consistency matrix was created to ensure alignment between the research questions, literature review and the interview questions. This is shown in Table 1 below.

Table 1: Consistency Matrix

#	Research Question	Informed Literature	Interview Question
1	What are the contextual factors influencing the application of sustainability in project management of large engineering projects in Africa?	(Bond et al., 2012; De Carvalho & Rabechini Junior, 2015; Eweje, 2006; Labuschagne & Brent, 2006; Mauro L. Martens & Carvalho, 2017; Zeng et al., 2015)	2,3
2	What are the sustainability challenges and enablers that project managers must be cognisant of for large engineering projects in Africa?	(Conde & Le Billon, 2017; Davis, 2014; Eweje, 2006; Hall & Sandelands, 2009; Kealey et al., 2005; Mauro L. Martens & Carvalho, 2017; Project Management Institute, 2017; "Equator Princ.," 2013)	4, 5
3	How is sustainability being incorporated into project management of large-scale projects in Africa?	(Marcelino-Sádaba et al., 2015; Yu et al., 2018)	6
4	What are the meaningful outcomes for inclusion of sustainability in project management and how is project management of large-scale projects in Africa changing?	(Magis, 2010; Oppong et al., 2017; Silvius, 2017; Sroufe, 2017; Tan et al., 2015)	7, 8, 9

CHAPTER 4: RESEARCH METHODOLOGY AND DESIGN

4.1 INTRODUCTION

This section presents the chosen research methodology for the research report and was tailored to answer the research questions. Through answering these research questions, the study aimed to provide insight on the research problem which identifies the lack in intersection of theory between project management and sustainability. The literature on the application of sustainability within project management reveals an area of study still in its infancy. It suggests the application of sustainability practices are reliant on context. The context for this study is large engineering projects in Africa, specifically for the mining sector.

4.2 METHODOLOGY

As the intersection of these two fields is still in the process of being understood, the research took the form of an exploratory, qualitative study underpinned by an interpretivist philosophy.

Saunders and Lewis (2018) illustrate the appropriateness of using an exploratory study when attempting to gain new insights in an unexplored area. This is appropriate due to the contextual dependency of the determination of sustainability (Bond et al., 2012) and its limited scope of integration within project management (Yu et al., 2018), specifically within large engineering projects in an African context. The ontological and epistemological assumptions congruent with exploratory studies are interpretivist in philosophy and are supported by qualitative data gathering (Saunders & Lewis, 2018). This study was therefore an exploratory study in which semi-structured interviews were used as a means of gathering primary data. They consisted of open-ended questions that allowed the problem and its contextual nature and subject to be explored.

Saunders and Lewis (2018) stipulate that a deductive approach to research involves the testing of data collected whilst an inductive approach to research involves moving from observations to development of theory in the field of study. This inductive approach is congruent with the qualitative nature of the study and describes the approach used in formation and categorisation of codes. However, the research, and by extension the interview questions, are informed by the literature and therefore a

required a deductive approach to filter code categories into the research question themes to allow for comparison of the data collected.

This research project intends to explore the adoption and implementation of sustainability in project management for large engineering projects in Africa. The intersection of these two subject areas in this context reveals a gap in the body of literature to which new knowledge can be added. This approach was therefore inductive and aimed to develop the existing knowledge in this field, whilst relying on a deductive approach to allow thematic comparison with the literature. The research was carried our as a monomethod qualitative study in which only semi-structured interviews were used as a primary data gathering instrument.

Research can be conducted cross-sectionally or longitudinally with the former providing a snapshot of the state of the art at the time of the study (Saunders & Lewis, 2018). The intention of this study is to ascertain the current status in a developing field of research. The author recognises that literature on this topic is still very much in its infancy and a longitudinal study would not justifiably add more to the literature given limited timeline. The research shall therefore be cross-sectional.

4.3 POPULATION

The population of this study was project managers (PMs) from engineering consulting and project management houses, and client project managers or project clients (PCs) that have, at the level of analysis, been involved in large engineering projects in Africa, specifically in the mining sector. These two types of actors were chosen for their significance in influence in carrying out project managerial responsibilities. It was the intention that by interviewing the different types of actors in large engineering projects that insights into the intersection of sustainability, within project management in the African context, are obtained at different operational levels.

4.4 UNIT OF ANALYSIS

The unit of analysis was the individual and specifically the experiences of the project managers and client project managers within large engineering projects in Africa in the mining sector.

4.5 SAMPLING METHOD AND SIZE

This study aimed to attain insight from individuals that have experience in the management of large engineering projects in Africa in the mining sector. The chosen population therefore required that judgment be exercised by the author when choosing interviewees for primary data gathering. The author used his professional network to attain access to PMs for initial interviews. Further interviews from PCs were sought from these sample members to attain comparable insights for data triangulation. The sampling method used was therefore non-probabilistic, purposive and snow-ball sampling (Saunders & Lewis, 2018). This strategy was preferable due to certain members within the organisation and customer group having specific knowledge relating to the adoption of sustainability within the field of project management. Sampling participants who have knowledge of the research topic ensured the sample was appropriate and functioned as a verification strategy for exploratory research (Morse, Barrett, Mayan, Olson, & Spiers, 2017). In order to allow for the variation in data gathered and explore the contextual differences of the actors in greater depth, heterogenous sampling was used (Saunders & Lewis, 2018). In pursuing this, interview subjects were limited to those whose insights have been informed by specific large-scale engineering projects in Africa within the mining sector. This selection by observed involvement was intended to strengthen the validity of the data obtained.

The sample size was determined by saturation of data gathered and 18 semi-structured interviews were conducted. This was congruent with analysis done by Guest, Bunce and Johnson (2006) who posit that after analysis of twelve interviews, the appearance of new themes is infrequent.

4.6 MEASUREMENT INSTRUMENT

Due to the nature of the research topic being qualitative, exploratory research, the measurement instrument to be used in this report was semi-structured interviews. Saunders and Lewis (2018) posit that semi-structured interviews should be used when the interviews are conducted through predetermined questions, whose order may change depending on relevance to the interviewee and allow for clarification or probing questions to gain more insight on insights of interest. However, for this study participants were asked all questions in the same order to allow for better comparison of results. Only probing or clarification questions were a deviation from the order of

prepared questions. An interview guide was compiled for this purpose (Appendix A:). Interviews were held with key individuals within the target organisations that were directly involved with or affected by implementation of sustainability in project management.

The interview questions were tailored to be open-ended questions that allowed the participants space to elaborate on topics, concerns and insights that they deemed important (Rubin & Rubin, 2014). To strengthen reliability of results the questions were developed in such a way that they were specific in addressing the research questions but broad enough that they could be asked equally to the different actors identified (PMs and PCs) and allow comparison during analysis. It was important that questions were asked in language that was easily understood by participants (Briggs et al., 1986) and thus the question formulation avoided constructs that could be misunderstood by participants who were not familiar with them.

Validity was ensured by conducting interviews to the point that saturation was reached in interview themes. Saturation was determined by noting the new codes created with analysis of each interview transcript (Myers, 2019). As the interviews progress it was expected that the creation of new codes would diminish to such an extent that little to no new coding categories will result from further interviews (Myers, 2019).

The first question in the interview guide was asked to establish the legitimacy of the participant and their responses being worthy of consideration in analysis and subsequent reporting. It was expected that participants should have had experience in project managerial roles which required of them to have considerations of the social and environmental aspects of managing large engineering projects in the mining sector.

Participants were also probed on project locations and financial values and the significance of their influence on the communities and environment in which they operated. This was used as a qualitative confirmation that indeed their experience was reflective of that of large engineering projects in Africa.

4.7 DATA GATHERING PROCESS

The data gathered is the primary data from the semi-structured interviews on the subject area. Interview questions were subject to ethics approval and as per Myers

(2019) the interviews were conducted by creating a natural environment, encouraging openness and depth through empathy (Patton, 2002). No interviews were conducted prior to obtaining ethics approval from GIBS ethics committee. This approval is shown in Appendix B:.

Saunders and Lewis (2018) emphasise the importance of doing background research on the participants to qualify their knowledge on the topic, developing an interview guide, choosing an appropriate location and using body language to show interest. These are strategies that were employed in preparation for the interviews to allow gathering of richer data. The participants' privacy and involvement in the interview will be protected by way of a consent form (Appendix C:) which stipulates their involvement is voluntary and may be stopped at any time during the interview. The study only gathered data from participants willing to sign the consent form, indicating their understanding of their involvement and their rights. Anonymity of participants was guaranteed through removal of identifiers in records, analysis and reporting of results. Reliability of data was achieved by approaching the interviews as a neutral party to avoid subject and observer biases (Saunders & Lewis, 2018). A pilot interview was conducted to ensure the questions are understandable, assess the length of the interviews and ensure better preparation by the interviewer.

The start of each interview was prefaced with an introduction to the research topic to provide the participant with background and context for the interview. The interview schedule then dictated the flow of questioning. The interviews were a combination of main, clarifying and probing questions. The main questions dictated the framework of the interview and targeted the research topic on a broad level. However, in the interviews it was necessary to gain clarity on insights that participants revealed and or probe further where more depth was required. This was as prescribed by Rubin and Rubin (2012).

Selected participants identified through the author's professional network were approached by email invitation and phone call to set up mutually convenient times to meet. It was the intention that interviews were conducted face-to-face, however, due to the nomadic nature of project management roles in large scale engineering projects, telephone-conferencing was used as a means of interview where necessary. All interviews were recorded and saved without identifiers to the interviewees.

4.8 ANALYSIS APPROACH

Professional services were made use of to transcribe all interviews in preparation for analysis. Interviews were transcribed verbatim to ensure meaning was maintained but unnecessary monosyllabic filler words were removed for ease of reading during analysis. Non-disclosure agreements were attained for transcription and editing services used to ensure that the privacy and anonymity of interview participants was preserved. These can be found in Appendix D and Appendix E, respectively. Once transcribed they were loaded into qualitative analysis software, ATLAS.ti where they were analysed though coding. Due to the study being inductive in nature, there were no predetermined codes and all code creation was derived from the transcripts.

Descriptive coding is a method by which short meaningful labels are assigned to sections of text or quotes from interviews (Saldaña, 2013). During analysis codes were created in this manner. The creation of new codes was logged with analysis of each transcript to record the number of codes created in the process of transcript analysis. This was logged on a bar chart to assess the degree to which saturation was being reached. Codes were reviewed after every third transcript in order to rationalise the codes and remove duplicated meaning (Myers, 2019).

After coding was complete the codes were categorised into 1st order categories as shown in Table 2, which group codes of similar qualities. These categories were then further categorised into 2nd order categories. These 2nd order categories were assigned into themes that gave more abstract meaning to the observations. Thematic analysis is an appropriate technique for analysis of qualitative data by creation. This thematic analysis will form the foundation for further analysis in the report which compares the results in chapter five and then compares these findings to the literature in chapter six.

During analysis cognisance was given to the nature of definition of drivers, challenges and enablers for the inclusion of sustainability in project managerial roles. Due to the nature of the project managers having cost, quality and time implications, some in the responses identified these themes in relation to their management of these criteria. It was therefore necessary to ensure the codes were not skewed by this and drivers, challenges and enablers were reflective only of the inclusion sustainability practice in project managerial roles. For example, where a participant might interpret a lack of legislative enforcement as an enabler in his or her role due to less onerous managerial considerations, this was coded as a challenge for the

inclusion of sustainability in project management.

Table 2: Thematic Analysis

1st Order Codes (Language - inductive)	1st Order Categories (Descriptive - inductive)	2nd Order Categories (Conceptual leap – deductive)	Themes	Research Questions
Individual Codes as reflected in the code book. (Appendix F)	Environment, Governance, Organisational context, Society, Legislation, Organisational drivers, Governance Challenges, Short-term Needs Versus Long-Term Gains, Social Constraints, Understanding Stakeholder Expectations, Communication and Engagement, Governance Enablers, Organisational Strategy, Resource Localisation, Define Expectations, Proactive Governance, Stakeholder Engagement, Competitive Advantage, Local Upliftment, Moral Integrity, Risk Mitigation, Need for Sustainability Skills in Project Management, Organisational Shift, Sustainability Beyond Compliance	Society Governance	Context	1
		Social Licence Economic Conscience	Drivers	
		Social Constraints Navigating Stakeholder Expectations	Challenges	2
		Local Engagement Governance Clarity	Enablers	
		Early Stakeholder Alignment Constant Stakeholder Engagement	Process	3
		Local Upliftment Corporate Conscience and Performance	Outcome	4
		Sustainability Beyond Compliance Organisational Shift	Trends/Future	

4.9 METHODOLOGICAL LIMITATIONS

The project managers in the data sample were from a single company and there may be a risk of homogeneity of results due to standards, procedures and culture being unique in their influence. This could restrict transferability of the results to organisations with differing structures, culture and geopolitical influences.

The thematic filtering process cut out certain themes and outliers for the purpose of producing a concise report. This could lead to less dominant themes not being reported on despite their significance.

The skills of the interviewer could contribute to a methodological limitation. The skills of the interviewer improved over the course of the interviews which meant that more material was likely obtained in later interviews.

CHAPTER 5: RESULTS

5.1 INTRODUCTION

This chapter presents the results of the interviews conducted with PMs and CMs on the inclusion of sustainability in project management of large engineering projects in Africa. The first section provides an overall understanding of the interviewees and the background experience they offer as a sample. The sections following have been informed by the categories that emerged from the codes and allocated under the respective themes for the question that they address.

5.2 DESCRIPTION OF PARTICIPANTS AND CONTEXT

The study participants were chosen based on their experience in project managerial roles for large engineering projects in Africa within the mining sector. A total of 18 semi-structured interviews were carried out with PMs and PCs, both in person and over teleconference. In order to verify the legitimacy of the participants they were asked the first question on the interview guide to establish their experience in project managerial roles for large engineering projects. For this question if detail was scant the participants were probed to estimate the project value or the significance of their effect on social and environmental aspects, as well as the country in which they had managed projects.

The first question of the interview queried the role and experience of participants. In one of the interviews conducted it was revealed that, despite the participant's extended technical experience in projects, the participant’s insights were not appropriate for use in the study. This was due to a lack in experience in a project managerial role that involved significant consideration of social and environmental stakeholders outside of the organisation. On this basis the participant was not deemed to have met the qualifying criteria and the results of the interview were discarded. The number of valid participants was therefore reduced to 17. These were made up of eleven Project Manager (PM) and six Project Client (PC) interviews and have been represented in Table 3.

In the interest of maintaining anonymity of the participants they have been assigned pseudonyms for reference within this report. The participants were chosen for their exposure to large engineering projects in Africa within the mining sector. Through

questioning their roles and experience in the first question it was established that the sample group represented exposure to a multitude of African developing countries which included specific large mining project experience in Botswana, Democratic Republic of Congo (DRC), Ghana, Guinea, Mali, Mozambique, Sierra Leone, South Africa, Tanzania, Zambia and Zimbabwe. Specific locations and ascription to PMs and PCs have been alluded to in general to restrict identifiers and preserve anonymity. This is due to the infrequency of large engineering projects and the large attention that they draw in the public domain, which are factors that could potentially aid in participant identification. Allusion to specific PM and PC country experience occurs only where it reveals an insight of value to the report and sufficiently protects the identities of the participants.

Although project largeness was judged on the qualitative assessment of its ability to significantly affect social and environmental stakeholders, the project values ranged from US$80m up to US$1.8bn in the case of projects outside of South Africa, with the majority falling within the range of US$300-800m. Within South Africa the project values were quoted in Rand and fell within the range of ZAR650m and ZAR4.2bn. It is important to note that these values are not quoted in real time and reflect project values in which the participants have been involved in from 2000 to present.

Table 3: Participant Details

Interview Number	Participant Pseudonym	Layer	Exposure
1	PM01	Project Manager	Participants have had experience in project managerial roles for mining projects in: Botswana, Democratic Republic of Congo (DRC), Ghana, Guinea, Mali, Mozambique, Sierra Leone, South Africa, Tanzania, Zambia, and Zimbabwe
2	PM02	Project Manager	
3	PM03	Project Manager	
4	PM04	Project Manager	
5	PM05	Project Manager	
6	PM06	Project Manager	
7	PM07	Project Manager	
8	PM08	Project Manager	
9	PC01	Project Client	
10	PC02	Project Client	
11	PM09	Project Manager	
12	PM10	Project Manager	
13	PC03	Project Client	
14	PM11	Project Manager	
15	PC04	Project Client	
16	PC05	Project Client	
17	PC06	Project Client	

The interviews were conducted in the same manner for both PM and PC participants and they were treated as a single sample group with respect to coding of transcripts.

However, the differences in their responses were captured in frequency and the nature of the topics that the respective groups emphasised. The creation of new codes was recorded with each interview to track the level of data saturation. This has been shown in Figure 2. The full list of codes produced is shown in 0.

The author's professional network was leveraged to gain access to PM participants who then recommended PCs for participation. This order of interviewing resulted in PCs being interviewed in the latter half of the interview process and is reflected in the graph by a notable increase in new codes where participant PC01's insights were recorded.

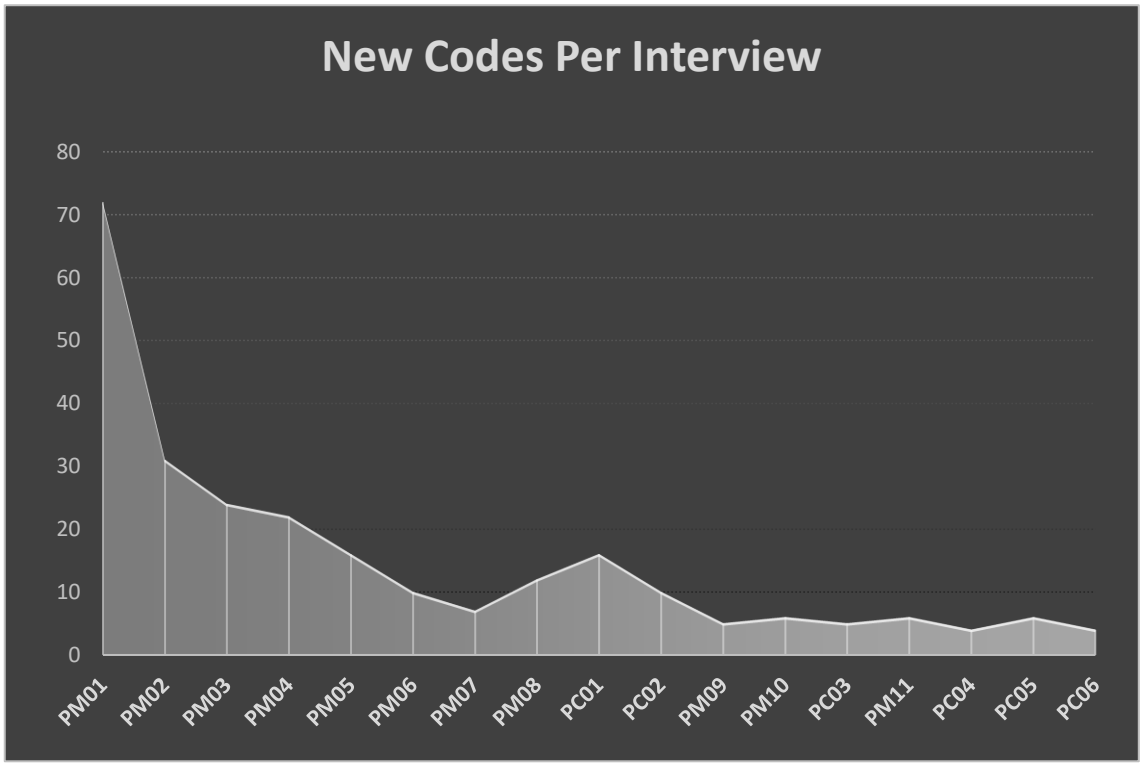

Figure 2: New Codes Per Interview

Despite all participants being treated as a single sample group saturation was pursued from the different actors and saturation can be recognised in the individual graphs reflecting new codes for PMs and PCs in Appendix G: and Appendix H: respectively. The responses of the different actors are compared with one another in the results.

The interviews and analysis thereof revealed a prevalence of certain topics from both participant groups by way of the frequency of appearance. Frequency of appearance was only counted once per participant even if the topic revealed itself multiple times

within an interview. The frequency of appearance was noted for understanding the narrative and constructing a preference for the focus of the report within the respective research questions. Table 4 provides an insight into the most frequently occurring codes in the thematic analysis and the significance of these shall be explored further in the following sections.

Table 4: Most Frequent Codes

Code	PM	PC	TOTAL
Driver for sustainability is local community	9	4	13
Process: Sustainability expectations must be defined upfront	8	5	13
Challenge: Client deemed to have more sustainability drive ownership	10	2	12
Challenge: Local skills/capabilities difficult to source	8	3	11
Outcome: Project provide skills upliftment	8	3	11
Challenge: Attaining stakeholder equity	7	2	9
Challenge: Understanding sustainability expectations through reactive experience	7	2	9
Driver: Social licence to operate required	5	4	9
Outcome: Local business growth	6	3	9
Outcome: Post project employment of locals	7	2	9
Trend: Shift of social responsibility onto PM	7	2	9
Challenge: Business with junior miners' sustainability risk	5	3	8
Challenge: Sustainability cost/time	5	3	8
Enabler: Blue chip companies better at sustainability compliance	5	3	8
Enabler: Early stakeholder engagement positive for PM	5	3	8
Enabler: Nurture local business creation	5	3	8
Enabler: Use of social experts/consultants	5	3	8
Outcome: Sustainability success measure is lack of industrial action/stoppage	6	2	8
Context: Project site rural/informal with poverty and unemployment	5	2	7
Enabler: Projects dedicated environmental specialist	5	2	7
Process: Constant community engagement on expectations	5	2	7
Challenge/need for PMs on sustainability is to understand expectations	4	2	6
Challenge: Corruption harms governance	3	3	6
Challenge: Training for local labour	5	1	6
Context: Prior experience in technical vocation	4	2	6
Driver for environmental sustainability is legislation	4	2	6
Enabler for PM is client engagement with locals	6	0	6
Enabler: Communication forums	3	3	6
Enabler: Environmental requirements well defined	5	1	6
Enabler: Local partnerships beneficial	4	2	6
Outcome: Community upliftment	2	4	6
Process: Identify solvable social needs	2	4	6
Process: Need to engage with politicians/chiefs/leaders	3	3	6

To present relevant results, the categories within the research question themes have been selected according to predominance of discussion on sustainability and the report avoids discussions that would naturally be covered in project management

literature and offer little to the knowledge base.

5.3 RESEARCH QUESTION 1

What are the contextual factors influencing the application of sustainability in project management of large engineering projects in Africa?

The application of sustainability is seen to be contextual and acceptance of its inclusion in business practice is understood to be dependent on the context in which it is applied. This question explores the context of projects in Africa within the mining sector and how sustainability practice within project management is influenced through drivers within this context.

The question reveals that society and governance are significant contextual factors that influence how sustainability is included in project management. The prominent drivers for this are appropriately found to be social licence and economic conscience of PMs and PCs. An overview of the themes is shown in Figure 3.

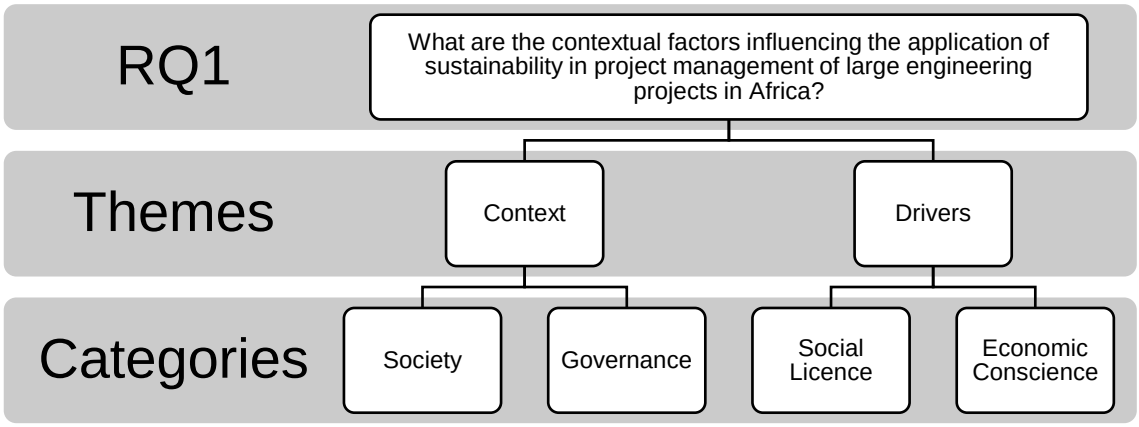

Figure 3: Overview of Results for RQ 1

5.3.1 Context

This section identifies society and governance from an organisational and legislative perspective as leading themes for discussion.

5.3.1.1 Society

Large engineering projects in the mining sector target areas that are mineral rich and thus the project location is not a variable that project managers have control over. This factor in the African context means that projects frequently target rural areas.

Numerous participants expressed this context in their responses.

> *PM02: "When we got involved in '16, we could only get there with a helicopter. Very, very rural. A lot of the people that worked there has never seen things like electricity, I mean it's that rural."*

Despite the remoteness of the locations the projects frequently come into contact with small communities and villages the likes of whom have not had contact with industrial development on such a large scale.

> *PC03: "Yes, okay. If we go back with Tanzania, the context there was a mine in a remote location, but close to two established villages, plus Tanzania has a very dispersed population, very rural, so inevitably there were people around."*

The ramification of this was that neighbouring communities tend to be vulnerable and poverty stricken, with high unemployment figures and a dire lack of local infrastructure. Access to basic needs such as clean water, health services and electricity have not been met by local government and communities are subject to a harsh existence.

> *PC06: "I remember one of the little villages… when I started up there, they had a clinic, and it was really in the bush. The clinic, the pregnant ladies would go to the clinic. In order to have a baby they'd have to bring their 50 litres of water with them. I mean it was crazy. There was no water in this place."*

> *PM11: "the life expectancy in that community was between 22 and 24 years of age"*

> *PM10: "it's extremely high, it's in the 80s, before the mines actually started there, unemployment. There was no work, no nothing"*

In many instances the projects are exposed to corrupt elements and conflict which complicate the ability of projects to navigate the social terrain.

> *PC01: "our ore body was an active object of control by up to 18 armed groups, or corrupt elements…at one point, and it financed a lot of conflict"*

This context meant that the projects would gather a large amount of local attention

and enormous expectations are placed on the project to navigate and solve social needs.

> *PC04: "if you look at the amount of unemployment and poverty in the areas that we operate in, the need and the expectation is so vast, it's so big, that as a mining company we've got limited resources and even though we can do a lot, there's just no way that we can meet the expectation."*

The prevalence of these social needs is such that social sustainability gathers a far larger focus from local stakeholders than does environmental sustainability.

> *PC04: "But in the African context, the demand side is more on the social side of it, compared to the environmental, there's a lot more pressure from communities to have opportunities, business opportunities"*

> *PM08: "Environmentally, I would say that we conform to first-world ideas in our designs, but that is not always the impact that you see in local areas where they don't necessarily have a very big drive or awareness or concern for environmental impacts of the project itself."*

This focus on the social needs of local stakeholders holds weight when the voice of local stakeholders in the form of communities is observed to hold more sway than political ones.

> *PM10: "…with the community…they carry more weight than law, in that instance. So, that's quite a challenge."*

> *PC03: "…if the community is very much in favour of something then politicians are far less likely to get in the way, because politicians will do what gets them votes, and if the community supports something then the politicians will tend to support what the community want"*

The needs of local communities in terms of basic human rights and security are significant and due to their voice holding large sway they have a significant influence in the allocation of resources to attend to sustainability within projects. These insights reflect the views of both PMs and PCs on the contextual issues faced and how they elevate consideration of social sustainability from the perspective of local stakeholders above that of environment sustainability.

5.3.1.2 Governance

Congruent with the theme of contextuality previously it is apparent that the project location determines how stringent the requirements are for the inclusion of sustainability in project management. The legislative standards to which projects must comply are dependent on the country in which the project takes place, which sets the expectations for minimum compliance.

> *PM01: "…each mine needs to go through a process, depending on what country it is to do an environmental impact study to actually obtain either the mining license or licenses from the EPA"*

Most notably, the results revealed that legislative requirements within South Africa were far more stringent than those of other African countries.

> *PM08: "…legislatively, South Africa is far more difficult, can I say, or stringent than the rest of Africa is"*

An interesting deviation from the previous section – which states that local communities are more focused on basic social needs – is that the focus on environmental sustainability from local communities in South Africa is more pronounced than it is elsewhere.

> *PC04: "What we have seen is that the environmental [focus], especially from a social aspect, is a lot more prevalent or topical, in my experience at least, here in South Africa, compared to our experience that we picked up in Zambia"*

This appears to be the result of greater awareness with regard to protection of the environment, as expressed by PM01, whose experience has been informed by project management in Ghana and suggests that the phenomenon is not limited to South Africa.

> *PM01: "…a lot bigger social awareness from the people in the country. I think you would find it the same way in South Africa"*

This is perceived by both PMs and PC as they both note the increasing environmental pressure and associated dedication required from them within project design, implementation and the product lifecycle to the extent that they perform beyond compliance.

PM01: "There's a lot more focus on the environment"

PC02: "…now environmental is more important… I think it's beyond a compliance thing right now. I think it's a right to play."

A large component of compliance is on the sustainable practice surrounding water usage and handling. However, this focus appears to have attracted the appropriate attention due to its necessity for the economic operation of the mines and mineral processing plants and the clear expectations from legislation surrounding this.

PM01: "…that is legislated, this law that tells you that's what you have to keep it to. And what happens is when you actually do environmental impact study, that study will show the guys the footprint of a mine, where you take water from… it actually shows exactly how you influence the water resources of a country and the natural resources… That needs to normally be approved by the EPA and then only you will get your mining license to start mining."

PC06: "So from an environmental point, first thing to do is to use all the water that you use over and over again. So we would put in good cleaning plants… we've got to be careful, where the legislation comes in, that's an easy one, whatever water falls on your ground, you've got to keep contained"

The ability of the mines and processing plants to comply with environmental legislation is heavily influenced by the planning and design work carried out under the PMs project responsibilities. This is something that comes easily to PMs and they're far more comfortable with, as they come from technical vocations and are supported by technical skills generally associated with ensuring governance of environmental aspects within a project.

PM02: "We typically employ the environmental guys"

PC01: "…environment is more built into the genes of project design people... I think tailings dams and all the pollution aspects, noise, dust, and so on, are built into the genes of mining."

Whilst PMs found addressing environmental requirements came more naturally there appears to be a historic understanding that environmental and social sustainability was the responsibility of the PCs and the PMs only needed to conform to their

requirements.

> *PM07: "…it was a bit of a change from my previous projects where a lot of that social interaction was not so direct, was more left to the client to manage."*
>
> *PM04: "…we were very blinkered, so we only ever built the concentrator. So you could put a fence around it and you did what you needed to do, and you had environmental and social responsibilities, but you weren't driving the bus, you were just conforming. But, by the time I started to build [projects]... that fence line had moved. We were doing a lot more, and it moved off the property."*

This was not a sentiment shared by the PC participants and whilst this may have been an acceptable stance on the environmental side where compliance came easy for PMs, it left a lot to be desired on the social front. The insights above reflect the acknowledgement from PMs that expectations surrounding their attention to social sustainability are changing. This brings challenge in capabilities for governance by PMs from technical vocations, who now need to remove the blinkers and earnestly take on the social agenda in their project management activities. This lack in experience is further exposed by a critical point, highlighted by both PMs and PCs, that Project Management theory does not appropriately address sustainability practice and prepare practitioners for the expectations now bestowed upon them.

> *PM10: "…if you must take it back to project management, there's no way that you really can deal with that. You do your stakeholder management and all of that, but you can't go and tick it in one of those boxes… the intention of stakeholder management, for my view, within project management isn't set up to actually deal with this."*
>
> *PC05: "PMBOK talks about stakeholder engagement. It doesn't talk about the softer side of things. So a lot of nuance changes are coming to the industry, in terms of people just becoming more socially responsible, and building in terms of sustainability elements within the execution of projects.*

This provides an understanding of the governance context that exists with the project management of large-scale projects in the mining sector. PMs have historically viewed the responsibility of sustainability as falling within the realm of the PC. PCs

on the other hand have not shared this view. PMs are able to keep up with the increasing requirements for the inclusion of environmental sustainability due to their technical affinity and it being in their area of expertise. However, their understanding of project management literature has not appropriately equipped them to handle the increasing social pressures their projects are exposing them to. This reveals a gap in ability versus expectations that will grow if PMs aren't able to attend to the growing social awareness of sustainability responsibilities, a phenomenon that would likely see countries with less mature mining sectors following suit.

5.3.2 Drivers

Contextual factors significant to the inclusion of sustainability in project management of large-scale projects are the drivers that push or pull the agenda. This section discusses the drivers that influence PMs and PCs to integrate sustainability into project management.

5.3.2.1 Social Licence

The most significant driver of sustainability into project management, as measured by frequency of mention from PMs and PCs in data analysis, was influence from local communities in the project location. It was apparent that their ability to cause project delays through disrupting implementation activities is significant and has become a significant driver for addressing sustainability in project management.

> *PM10: "…if you don't include this you know, and you make the people around you unhappy, you will lose time because they will block you from doing your work. And losing time means cost. It takes me so much longer to finish off the project. One can do the sums. I think that's the biggest driver."*

The nature of these large engineering projects is such that the cost of stoppage from community unrest is higher than the perceived cost of social investment that would satisfy expectations and prevent such.

> *PC04: "…if we don't have the community onboard… and we operate in a way that doesn't include them, and there was an element of disruption… just the cost of that disruption, in terms of impact opportunity cost on our current operations is… worth more than the cost of uplifting and developing of people of the communities and the money that we spend on social projects."*

Social sustainability expectations have been legislated through social labour plans which are intended to guide PCs in particular on expectations regarding their inclusion of local community. Local communities are active in policing the PCs, whose scope this normally falls under, on meeting their obligations.

> *PC02: "…the community will police you… on their social labor plan."*

However, as revealed earlier the voice of the community holds more weight than political voices and it appears that PMs and PCs would be unwise to only use legislative obligations to guide their actions. Even if these have been met, the voice of the community stakeholders is one that can still exert influence over the project. There appears to be a recognition of this from governance stakeholders as it is seen that if PMs are able to keep their community stakeholders happy then governance stakeholders require less management. PM04 highlights this in stating that by addressing expectations at the community level, they attract less attention from national stakeholders and in turn government.

> *PM04: "…we could ease the pressure from a ... community perspective, by defusing that, your local perspective goes away. Local being now national according to government, and because now community and local have gone away, now government goes away. So they're happy."*

This sentiment is echoed by PM02 who reveals that even in the absence of legislative stakeholders the need to attain support from communities is still paramount.

> *PM02: "in the Congo there's no legislation that you've got to do anything. There it's driven by ... I suppose where we were it was quite important to engage with the local community to get their buy-in, because of the history of the rebels in the region and burning down the camp."*

Both PMs and PCs refer to this local community support as social licence to operate and it is revered as an absolute necessity to have before any project commences.

> *PM05: "Any new mine, the clients especially, and us, we need to deal with the… social license to operate."*

> *PC04: "…it's important that you've got that social license to operate, and you've got a content and happy environment, because ultimately they're*

your stakeholders and partners, and you can not live and operate on an island."

The quote above from PC04 indicates that the social licence to operate is being understood from more than just a risk avoidance perspective and communicates an understanding of having this as a social responsibility. This more altruistic theme is echoed by PM10 and PC06 who imply that ideal of a social licence to operate has been incorporated into a moral philosophy.

PM10: "…I think as we progress over years, I think it's also that responsibility."

PC06: "…you've got to try and people must get up in the morning and have a job, and go to the mine and work, and not sit there and watch people driving in and out to work. That's what causes the animosity and the strikes"

It is concluded in this section that local communities are influenced by the presence of large engineering projects and in turn have a powerful influence on the projects to the extent that they are able to dictate its success or failure. PMs and PCs as a necessity must ensure that they have social licence to operate from their local community stakeholders. This social licence has been overwhelmingly recognised as the strongest driver for sustainability from both actors in the sample group. Whilst this driver appears to be based in project risk management, the lexicon used indicates that this is being increasingly driven by moral principles.

5.3.2.2 Economic Conscience

One of the significant drivers for the inclusion of sustainability in project management highlighted by both PMs and PCs was the high cost of social unrest from local stakeholders. This unrest can originate from local stakeholders internal and external to the project payroll and affects project duration as well as the operation of the mines post project.

PM01: "If you don't get it right you will burn, the project will burn, you will sit with HR and IR issues coming out of your ears and your project will cost the client three times more because you will have strikes and you will have a riot."

The PM focus on the issue is limited to the project lifecycle. However, the PC

responses tend to interpret the issue from a different perspective. They view the potential for the problem to span into the product lifecycle and severely affect the long-term profitability of the mine as emphasised by PC06.

> *PC06: "one of the problems with those mines in that area has been local protests, where they've actually shut down the mines. Obviously you can't afford to do that. You can't afford not to run for five days. You maybe work 25 days of the month, and five days to make your money. If you don't run those five days, you don't make the money. Eventually you're going to close the mine down.*

Seemingly related to this problem, PC respondents highlight that project funders' expectations are a significant driver for sustainability into project management. These expectations impose pressure on project managers to ensure that social and environmental sustainability is planned into the projects before project funding is granted.

> *PM08: "…we have clients that seek funding from abroad. They're not local clients, they get money from Europe or they get money from Aus or wherever they fund their projects from, Canada. And those funders want to see social and environmental impact assessments, they want to know they you're doing things in a safe manner, they want to know that you've consulted, they want to know that local communities are taken care of."*

This pressure from funders primarily affects the PCs, and a large proponent of this influence is from funding institutions that comply with the Equator Principles, which function as a risk management framework for lending conditions. These principles are generally deemed by PCs to be more onerous than local legislative compliance and require considerable effort to incorporate into project management planning and design, as relayed by PC02.

> *PC02: "…it's basically setting a minimum standard now. It's quite an elevated minimum, and if you can't show that you comply to the equator principles, you're going to find it really hard to raise funding on, European and… American financial institutions like IFC and IMF and Sofgen and the bigger world bank and those guys… it's something that you've got to sit down and work really, really hard on."*

This drive for project sustainability from funders first influences PCs who approach these financial institutions for international funding. The conditions of funding according to the Equator Principles then find their way into contractual conditions for PMs. These contractual conditions also include legislation for the country on social and environmental compliance, for which PCs are held accountable. A significant driver for PMs is, therefore, the contractual conditions set out by the PCs that originate from these. This driver was a predominant view amount among PMs, with the implication being that they view PCs as the owners of sustainability initiatives.

> *PM08: "…clients will drive the social and environmental items to ensure that you don't leave them with a legacy that becomes a problem for them.*
>
> *PM11: "…that is issued to us by the client and we follow those standards that get given to us."*

Both PMs and PCs confirmed that responsible incorporation, despite the cost of doing so, was positive for company reputation. The PMs tended to view reputation as a driver along economic lines, from the perspective that it provided an advantage for continued business with PCs.

> *PM06: "…if you manage this correctly, it will contribute to a good reputation that will be in our favour when we tender for work with the same client."*

In contrast, the PC view on reputation being a driver was motivated more by aversion to risk, and embodiment of corporate citizenship as expressed by PC02.

> *PC02: "it's an investment, absolutely an investment. It's like I said, it's the right to play. It has to be there. It relieves pressure, it makes you a good citizen, it protects you from a reputational risk point of view."*

Expanding on the PMs motivation of competitive advantage being a driver, there was a high emphasis on the ability of PM capabilities on the social front being a competitive advantage. PM06 relays this by identifying the ability to make use of local labour being a differentiator that allows PMs to meet PC obligations to funders and legislation.

> *PM06: "Those project houses can get this right, that can identify local based resources and can train them up and identify the training needs and train them up- will be the winners at the end of the day. Those who ignore it and*

those who don't pay enough attention to it will stand to lose projects in the future."

It is apparent that both PMs and PCs consider the successful sustainability as a whole a competitive advantage through meeting the preferences of their respective stakeholders both economic and otherwise. An interesting observation from PC02's response is that funding institutions with large wealth are those that subscribe to sustainability principles and focus on the triple bottom line in their investments.

PC02: "…you have a topic that you can discuss with confidence during anything like roadshows. Reporting back to the board and reporting to investors, reporting to shareholders, reporting to authorities. You have a step up on anybody else that does not do what you do. It attracts good investors, it attracts shareholders with conscience. And as the world would have it, the investors with real money are the guys with all the boxes ticked that's been in triple bottom line reporting for years and years and years."

Despite the economic drivers that appear to be prevalent for both PMs and PCs, both actors also indicate that conscience is a driver for the inclusion of sustainability practice into project management of large engineering projects.

PM02: "…without a third party governing. We had environmental consultants. We did all the good things. We complied with all the rules and guidelines that we would on a South African mine, simply due toe, I suppose good governance. Not through any authority levels. We didn't do it because we had to. They did it because they believed it's the right thing."

PC03: "Well I think the two are hand in hand. It is risk management for sure … if you don't take a long-term view of your business and the community and the environment in which you work, then you may have a very short-term outcome… So it is for me… it's a risk issue and a philosophical one as well."

The responses highlighted that inclusion of sustainability practices are driven primarily by risk management and the prevention of social unrest from local stakeholders due to the ability for this to terminate projects. However, the participants highlight the understanding that there are economic advantages to be had beyond risk management by subscribing to sustainability principles. This is due to the access

it provides to future projects and funding thereof. Though not explicitly stipulated, legislation was a key driver mentioned by participants. Despite being mentioned as a significant driver, conscience as a driver was less prevalent than the aforementioned ones and was more prevalent from PCs who were deemed to be the drivers of sustainability efforts by PMs.

5.3.3 Summary of Results for Research Question 1

The context of large engineering projects in Africa emphasised the vulnerability of local communities in terms of the lack of basic services and infrastructure they have. The consequence of this exogenous factor is that a significant pressure is placed on PMs and PCs to resolve these social needs. Despite their vulnerability, it is evident that the voice of these local communities is powerful and can potentially cripple projects if not heeded, even if PMs and PC have complied with the local legislative requirements. This powerful voice coupled with the dire social needs results in much of the efforts of PMs and PCs being directed toward the social elements pertaining to these stakeholders.

There is, however, an indication of an increasing focus on environmental sustainability from local communities, specifically in South Africa and Ghana, that are more environmentally aware. One may possibly draw from this that exposure, awareness and perhaps having already had more dire social needs met is a factor that has shifted their gaze to include holding PCs and PMs accountable for environmental aspects of sustainability.

With regard to governance within the project management arena, environmental sustainability practice appears to receive appropriate attention due to the technical ability to attend to it naturally residing with PMs, and their ability to factor these considerations. Despite PM abilities on this front, it is evident from the governance of these projects that PMs have had a historical view that the responsibility for sustainability resides with the PCs. This view is especially pertinent for social sustainability with which PM teams have less experience. In relaying the dynamics of this insight it was evident from PMs that they are becoming more exposed to social sustainability aspects of project management through necessity.

5.4 RESEARCH QUESTION 2

What are the sustainability challenges and enablers that project managers must be

cognisant of for large engineering projects in Africa?

This question aims to unpack the endogenous and exogenous barriers to implementation that PMs and PCs face in their inclusion of sustainability in project management for large scale projects in their context. It also aims to unpack the factors for support of this and how these can be leveraged by these actors. An overview of the themes is shown in Figure 4.

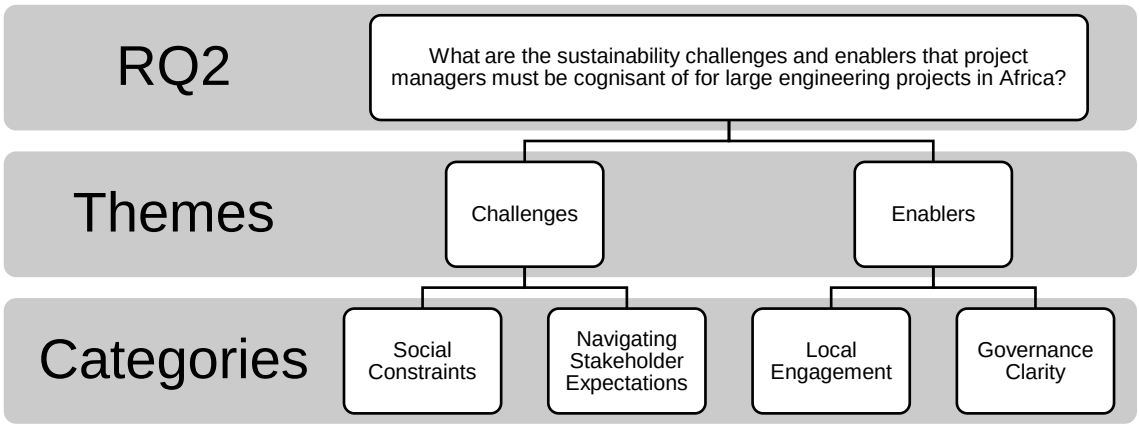

Figure 4: Overview of Results for RQ 2

5.4.1 Challenges

This section identifies social constraints and the navigation of stakeholder expectations as key challenges for the inclusion of sustainability in project management by PMs and PCs.

5.4.1.1 Social Constraints

One of the significant constraints mentioned by both PCs and PMs is the prior and neighbouring occupation of project sites by artisanal miners. This is exposed as risk to sustainability from an environmental perspective due to it being uncontrolled with poor standards of practice, as referred to by PM11.

> *PM11: "…it's quite often that our environmental standards are significantly higher than what you see in the surrounding community. So if you take Ghana… and the DRC, they do this artisanal mining where they just mine in the river, out the river everywhere and they just make a big mess where we've got - what happens to the run-off? our roads? And we put silt traps in and ensure that you don't put that silt into the river where, quite often, those guys don't have any of that."*

The ungoverned nature of this also poses significant social safety issues. This is apparent in terms of those carrying out these activities without appropriate safety standards and those exposed to the environmental damage of the natural ecosystems on which they rely to live. The poor practice of illegal mining activity was highlighted by PC03, with the emphasis that this activity tends to be accompanied by corruption and a lack of capacity by authorities to control it.

> *PC03: "Yeah, but then there is true corruption as well, and people are allowed to do things that are illegal because they bribe their way to be overlooked… we call it artisanal mining. Nine times out of 10 I'm talking about illegal mining. These aren't properly licensed artisanal mines. These are people who are coming on to a mining license, or a tenement that they have no right to be on, and then the willingness of the authorities to actually apply the law to protect the assets that belong to other people. That type of thing is challenging… with the artisanal miners who don't care what they do to the environment. They have no control over them whatsoever."*

Another challenge posed by this is the social constraint of relocation of local stakeholders which may include illegal miners. Despite the relocation of illegal miners not falling within the responsibility of PMs and PCs, it was acknowledged that in the long term this would be a more sustainable solution to help address the issue. However, there are large costs attached to doing do which are restrictive, as put forward by PC01.

> *PC01: "We cannot afford to resettle those artisanal miners"*

Relocation of local stakeholders typically involves the provision of housing and land title to a suitable location off the mine premises. The enormity of this cost is apparent when the potential numbers of legitimate local stakeholders are considered, as stated by PM11.

> *PM11: "…relocating communities that are within the mine area. They call that RAP Projects, quite often, Relocation Action Plan… we assisted them [the PCs] with their RAP. They moved, I think 12,000 to 14,000 people out of their mining rights area"*

Once the project has established control over the property, both PMs and PCs face large pressure to employ large proportions of their workforce from local stakeholders.

This pressure comes from both legislation and the local community, and PMs in turn feel this pressure from PCs. The challenge in doing this, as relayed by both PMs and PCs, is the ubiquitous lack in suitable skills within these communities for employment on large engineering projects.

> *PM03: "…it's a law that you have to use a certain minimum percentage of local labour. With that it does bring its own challenges, and one of the challenges is that most of those people are unskilled."*

> *PC03: "What so often happens with projects is that people talk about the upside of a mining project, about particularly bringing jobs for the local community, but not every job can be done by people who don't have any skills at all."*

A predominant view from PMs was that this pressure from local communities presented a challenge as it had the propensity to escalate if they felt their expectations were being side-lined. This escalation then often manifested in social unrest, sometimes leading to intimidation and violence by local stakeholders.

> *PM04: "So it becomes a lot of heated conversations, a lot of aggressive talk, petrol bombs at the ready. That type of stuff and trying to defuse these situations the whole time is quite tricky."*

A nuance to this challenge was that project managers needed to drive the right level of inclusion and transparency of project decisions for the local community, as expressed by PM08.

> *PM08: "and if you don't drive than inclusion of having people know what you're doing and why you're doing it, then your work is physically going to come to a grinding halt very quickly, and often in a violent manner"*

In trying to drive the inclusion of local stakeholders into the project the most significant challenge raised by both PMs and PCs is attaining stakeholder equity. Both actors highlighted the challenge of the significant number of stakeholders and their associated social needs, and the limited capacity of the project to attend to them. This was relayed by PM10 and PC04 below and highlights the challenge of ensuring inclusion across a vast number of local stakeholders.

PM10: "It's still difficult. They've got different tribes with different sizes, so you can't employ all of the people. So you constantly have issues with roads being blocked and so on. People will have the attitude of, "If I don't work, nobody else will work." Sort of that arrangement, which impacts in time of a project severely…"

PC04: "we could not accommodate all the people, just the sheer the numbers that was involved, we couldn't incorporate all of them. And that remains a challenge… it's difficult to find a sustainable solution for all of them."

With project employment being a means through which local inclusion is driven, a significant challenge raised by PMs was the provision of training for unskilled labour to ensure their value to the workforce. This placed an additional burden on PMs by way of project onboarding weighed against project time constraints.

PM05: "Then, we would take them on, because it was relatively low skills, but you still at to re-issue P-P-E, you still have to induct them, you still have to give them basic training for what they're got to do. It just became a lot of work for the onboarding guys."

This was revealed to be especially challenging where the extent PM obligations to hire local labour were not defined from project inception. This presented an unexpected cost burden for external contractors, who were expected to work with local labour to expected safety standards.

PM03: "Who would pay for the training, which was obviously something that the contractor, he would say, "Well, we haven't priced for that." You know. "We've just priced lean and mean, with the minimal amount of skilled labour, and now you want us to hire more local labour on site, who is unskilled. So, therefore, to get them, not to the same level, because that would take a long time, but to get them to a level where they could work safely is going to cost you money."

The correlation of safety risks and incidents to the utilisation of local labour was stressed by PMs, as most injuries occurred with local employees due to their inexperience in navigating the hazards of project construction.

> *PM10: "We had a lot of injuries where most of our injuries… [have] been local labour that get injured. And it's just the guys are not used to major construction works"*

This point is indicative of the quality of training provided. It raises the question of how reasonable it is to expect previously unskilled employees to become safe workers within the time constraints of project deadlines. It also raises the question of how safety of employees should be managed with this constraint to prevent such injuries.

PM participants also flagged the challenge of unskilled labour negatively affecting their ability to meet PC quality and cost expectations.

> *PM05: "…we ended up with issues of poor quality and the clients made us 100% responsible for all of the issues coming out of that. We wouldn't normally employ them, because when you price, you price for the right calibre that you know you can use and put your price in. So, there's a challenge; how do you price your project correctly that allows for some of the challenges that happen during schedule, when the owners are generally looking at lowest-cost tenders."*

Within the challenge of taking on local employees PMs raise the language and culture dynamics as barriers for driving safe practice and productivity into project implementation.

> *PM08: "we drive… to do our work safely, and always with zero harm. But when you get into a social environment where the language differ, the culture differs, the level of understanding is completely different, it becomes very difficult… So, specifically in Guinea for example. Getting to understand the social interaction with local community was a key driver to eventually try and drive a safe behavioural system. To be blunt, I don't think we made very many inroads into that on that project"*

An interesting criticism from the PCs is that some cultural limitations rested with the PMs in that they limited their reliance to stakeholders which they could speak their language as relayed by PC01.

> *PC01: Cultural and just the communication it doesn't help when no offense, but the expatriate comes in they become totally relying on a few people, a few Congolese in the company or outside the company who speak English*

These views are illustrative of the significant social challenges faced by PMs and PCs in their inclusion of social sustainability into project management. PMs have primarily identified a lack of appropriate skills as a challenge for the inclusion of local stakeholders as employees for the project. This has ramifications for safety, quality and time aspects of project deliverables. Other related challenges included illegal mining and relocation costs.

Both actors identified that attaining stakeholder equity was a challenge due to the social needs far outweighing what the projects are able to solve, with the potential result being sometimes aggressive social unrest. A criticism from PCs on management of this is the tendency of PMs to be over reliant on local stakeholders with cultural similarities, which has the propensity to exacerbate feelings of exclusion.

5.4.1.2 Navigating Stakeholder Expectations

The significant cost and time implications of the inclusion of sustainability for both environmental and social aspects in project management was frequently mentioned by both PMs and PCs.

> *PM09: "I think it's money. It's all money because environmental sustainability cost you more in the short-term and people don't think long-term. It takes time. So I want the mine, you know, in three years, but it'll take me six years now to get through all this legislation, you know, and approval. So it's definitely money that makes it difficult and the same of social"*
>
> *PC01: "…depending on your interpretation, they can cost a lot of money and take a lot of effort."*

In communicating this constraint it was apparent that being able to better understand expectations would aid in being able to accommodate them. However, a key concern raised primarily by PMs was that expectations around social sustainability lack definition, as expressed by PM04.

> *PM04: "Socially, it has been, and will be for many years, an absolute free for all. It's just open to interpretation. I think that is the essence of it is that it's open. I also believe that it's the reason why... investors are not investing in South Africa, and it's basically… policy uncertainties… and the guys just don't know how to deal with it."*

This was not a prevalent view from PCs but there was acknowledgement that PMs

struggle to gain clarity on social expectations as expressed by PC01, which suggests that this is a limitation on the part of PMs but not necessarily from PCs.

> *PC01: "…environment is more built into the genes of project design people… those are issues that to a great extent, people know how to quantify and know how to assess. The social is a little harder for people to get their arms around"*

This difference in view appears to have its origins in the types of skills that are found within PM teams and PC teams. It appears from the responses that PCs are better equipped to understand social expectations in terms of skills and experience.

Both actors highlighted political agenda as a challenge to sustainability due to the propensity of political actors to employ self-serving agendas to maintain popularity. These agendas were described as assistive of local interests due to their desire to maintain voter support. However, the short-termism of these political agendas meant that politicians were unwilling to enforce policy that supported the long-term survival of the project.

> *PC03: "…the only reasons I can think of why they wouldn't enforce the law was… political. They see it as a vote loser… people in authority are political appointees, so they're doing what it takes to remain popular."*

Whilst there was moderate mention of this issue it was acknowledged that this issue is not limited to the African context.

Identifying stakeholders influenced by and with influence projects was a challenge raised mainly by PCs. This appeared to stem from the dynamic of PCs having the first encounter with local communities. The results revealed their meeting of large local populaces with big social needs and having difficulty in deciding how to allocate resources to the most important stakeholders.

> *PC01: "That's a very challenging issue because the world is infinite in all kinds of needs, everyone's poor and struggling. So, you're targeting of the social catchment area or zone that you're going to focus on, needs to take account of wherever there's a community impacted by the project, but also where there's a community that can influence positively or negatively the success of the project."*

PC04: "…our preference is to address the doorstep communities, that's really communities that's in very close proximity to the mining operation… then you work geographically and move out… but because of the sheer number of people, there are people also that don't have opportunities. And those guys feel left out, and they want to knock on the door and also get a chance to participate."

This combination of the overwhelming number of stakeholders and their needs often presented unprecedented expectations of both PMs and PCs. This, coupled with a lack in social attention from the project actors, often meant that they came to understand expectations through reactive experience.

PM07: "…our senses for social awareness are not always in place… over time and over experience, you learn the hard way that you need to be a bit more skilled in that field and it helps a lot to be more aware of how you interact with the local community people, how you interact with and how you make provisions for setting up your own team to cater for those needs."

PC05: "…a huge amount of school fees paid over time. Once somebody has signed agreement… you just assume things would happen according to the agreement, and you both go ahead and according to your project schedule you'll deliver… [but there's] a social and a softer element, which actually has a lot more at play than just doing things that you think people agree to… being kind of from a Western background, you just assume that people think like you do, which they don't."

A result of this reactive experience was late changes to the project scope which are costly for the PM to implement as expressed by PM03.

PM03: "…we now discovered that this bloody footprint of the plant was 200 meters inside the village. And we had to do changes to civils. We had to do changes to earthworks. We had to do changes to structural steel and… we were heavy into fabrication and construction… when somebody said we've got to stop."

The challenge of late changes to the sustainability expectations and therefore project scope appear to have been aggravated by inadequate attention to resolving local stakeholder expectations by the both PMs and PCs.

This was particularly pertinent for PMs in their interactions with junior mining companies, which were strongly criticised by PMs as the mining companies take shortcuts on sustainability to cut costs on projects. This apathetic attitude had the potential to cause large problems later on for PMs if they left the drive for sustainability to the PC to manage.

> *PM01: "I've been in multiple meetings with younger mining companies which start-up companies where they don't want to take on that responsibility because they see it as too much money to actually really comply."*

This highlighted the need for both PMs and PCs to ensure that they understood expectations and improved stakeholder communication in order to prevent problems further down the line.

> *PM01: "You cannot ignore that and you need to engage with them to understand how they perceive a project, what do they think they're going to get out of a project and what do they want to do in terms of employment. Because again, you'd be employing, like I said, up to 2,000 people on a project, so therefore, they've got a big say on who and how you employ people. So you have to engage on that level."*

> *PC05: "I'd say the biggest challenge would be, people that are suitably, socially, and environmentally aware. I don't think there's any textbook that would be followed. There's a couple of items that could be highlighted in terms of, these are portfolios previously experienced, and there's a couple of things that you need to focus on, understand, and review."*

However, one of the most frequently noted challenges for the inclusion of sustainability in project management of large-scale projects was the perception by PMs that the responsibility for sustainability issues rested with the PC. The nature of project approvals meant that obligations generally originated with the PC. As a result PMs have historically deemed PCs to have more sustainability drive ownership. In relaying the handling of sustainability issues to a PM colleague, PM04 recounted this historical sentiment.

> *PM04: "… he'd say to me, "But why're you getting involved in the social and environmental ..." It was those two, "Why're you getting involved in this? This is the client's problem," and there was a conversation that I had with him"*

This assumption of the responsibility of sustainability falling within the PCs domain was something echoed by many other participants as a matter of assumption, as highlighted by PM07's response.

> *PM07: "I think arguably one could say that's not really our responsibility because we're not going to be there longer than the project's lifetime itself."*

PCs were critical of this assumption and recounted it as a large expectation gap between what PCs needed from PMs and what the PMs felt was their contractual obligation. PC01 illustrated this in his criticism of PCs and PMs not having a shared vision on the matter.

> *PC01: "…the EPCM role versus the project owner, the client role is a challenge, because it's easy for… people to be assuming, "Well, the other guy's handling this."… That's why communication and having a shared vision of what the social environmental issues are, even if the EPCM contractor isn't directly involved in this or that aspect of it. That's an issue that can be a challenge…. I think the EPCM partner can sometimes relax, thinking that they just need to worry about what's in their contract."*

This section highlights the challenge of cost implications from late changes to sustainability expectations on the social front. This arose from a lack of appropriate navigation of stakeholder expectations. This poor navigation highlighted the need for PMs to be better positioned through skill and involvement to address these upfront. However, there was a notable restriction inhibiting this from occurring; PMs have tended to take direction from PCs on sustainability initiatives that are to be employed. This has mainly been influenced by the PCs budget and choosing of initiatives. The result has been a tendency for PMs to view sustainability efforts on the social side as being the client's responsibility. Despite the budgetary constraints and social access limitations that may restrict PMs, PC participants were critical of the PMs' assumption of responsibility and the corresponding gap in expectation of who will define and incorporate social stakeholder expectations.

5.4.2 Enablers

This theme identified local engagement and governance clarity as dominant enablers for sustainability. These are expanded on below.

5.4.2.1 Local Engagement

With projects taking PMs and PCs into new and unknown locales, both PMs and PCs emphasised the use of partnerships with local knowledge to navigate terrain. By leveraging these relationships both parties were better able to understand the local expectations on sustainability, particularly on the social front.

> *PM03: "we were very reliant on [COMPANY]… and we learnt a lot from them… [and] from a social point of view, they definitely helped the projects that we were involved in from day one. Because they were used to it. We weren't used to all those social things we had to be aware of and implement"*

> *PC04: "We're quite fortunate on this project that our partner is [COMPANY], and they've got a multitude of projects that they do on other job sites in South Africa as well, so they also bring a lot of experience and prior learnings to the table, which we benefit from."*

To ease the establishment of the project, PMs highlighted that early PC engagement with local communities at project conception stages is great enabler for managing local expectations and preventing challenges further down the line.

> *PM02: "…[our client] learned a lot from them, I suppose. And from the beginning they got the community involved. The initial road that we cleared and started building. The bridges that they built were all done by hand. They didn't use any equipment or any contractors. They employed 400 people to literally build a road through the jungle. They bought a lot of goodwill by engaging with the community on a large scale."*

> *PM08: "…our clients, in general, have actually taken a lot of effort in aligning social strategies, in aligning local communities to what it is we're doing, why we're doing it, how we're going to go about it, what impact it's going to have on them. And to a large extent, we have been absconded from challenges from the social perspective from that front… I would also say that local communities have become more approachable, and with the right footwork done by the clients"*

Early stakeholder engagement from the perspective of the PCs is positioned more along the lines of enabling social sustainability in the long term and has the appearance of being more altruistic in nature.

PC03: "…by involving the local community in understanding the project from the inception stage then you stand a far better chance of it not posing a problem for the community down the track."

PC06: "…sitting down with the municipality, understanding what are your plans for the next 10 years? Where do you want to build a suburb? And mixed development, rich, poor, everybody. What do you want to do? Where do you want to build schools? If you don't make those allowances in the pre-feas and the feasibility, when you come to execution everybody's going to be so pissed off and say, "But we've got no money for this. We haven't thought of this." That to me is so important. In the process do it right in the beginning, understand it. You know, you almost need to say, "I'm going to sign on Joe Bloggs, his job is going to be community investment, speaking to the community, getting legal assistance, getting guidance." And all those things. It almost runs as a part of your pre-feas and feasibility. That's the only way that you're going to do it successful, is to do it upfront."

When comparing the PMs and PCs insights on stakeholder engagement there is a contrast in the sense of why this is deemed an enabler. The PMs appear to view this as an enabler because it allows a project to run without delays from social unrest, whereas the PCs view it as an enabler due to its ability to ensure long term social sustainability. It seems this difference in interpretation may lie in the short-term project performance focus of the PMs versus the long-term lifecycle focus of the PCs.

Despite this difference both actors agree that an enabler in maintaining this engagement with local stakeholders is the creation of communication forums. PM02 describes this and also acknowledges the importance of the softer aspect of communities having a sense of ownership over the project outcome.

PM02: "…you go and ask the community leaders. You use that forum as a tool. You communicate with them. You get them engaged with what we're doing and that also gives them a bit of pride and a sense of belonging."

PC04 ratifies this concept and emphasises the importance of ensuring community understanding to close any expectation gaps.

PC04: "you've got to run a system where you've got constant local engagement with the local communities. Through the forums that you've set

up, where you give constant feedback to them so that they understand where you are in the process"

In trying to drive inclusion of local communities both PMs and PCs said that the vetting of local capabilities assisted in maximising the project work that could be allocated to them. By establishing this PMs and PCs were able to match the capabilities to suitable work packages and distribute accordingly.

PM04: "…we invited business owners. So SMMEs… to basically give us their company profiles. There were 1000s of company profiles that came in. Those were then sorted, and from there we had a look at our procurement operating plan, and we said, "Okay, what procurement has to be done and what can be sourced from the community?".

PC04: "…what we did, for instance, on this project is, we identify all the procurement activities, we then issue an expression of interest, which we advertise within the local community broadly, and then the companies and individuals have got an opportunity to send their company details or prospectus, expressing an interest in that particular procurement package. We then… make sure that that inquiry also goes to those people that have expressed the interest in that particular package. So that's the way we give everybody an opportunity to participate economically in the project, as much as possible"

Locally based human resource services were identified as a key enabler for this process and ensuring PMs could keep attention on this whilst still managing other project demands.

As part of this process both actors agreed that the most important enabler from local engagement was to nurture local business creation. This was done through supporting existing local businesses, as mentioned by PM06, chosen through the vetting process.

PM06: "They can manufacture any structural steel or plate wood required for mining industry, they offer very decent- in fact, top-notch service. By employing them, all- you can say %100 of the staff complement are all Northern Cape based people, people who has been born and bred there. By

supporting them, I support local community with jobs. Also, the social impacts on this project are huge."

This could also be achieved by creating opportunities for business that could serve the needs of the project and be sustainable after project completion.

PC06: "We bought brick-making machines out of South Africa. So we would send five of these machines up, and we would get them with the local municipality, we would provide the power and the water, et cetera, with the intention is that they would not only make bricks for the mine, but they would make bricks to either be sold locally, and we would give them the skills. So those were some of the things we did there."

Large contractors were identified as a mechanism through which this could be achieved, by including in their conditions of award that they partner with local businesses and assist them in establishing themselves.

PM04: "There was a fencing contractor who we felt needed to be given an opportunity… the fencing contract as a whole was about a R14 million contract… we got one of the known and trusted fencing contractors that I'd used in the past, and what we did is, we split the contract. So we awarded R10 million to him, and we awarded R4 million to the local community guy… He had challenges, from a corporate perspective. Cash flows always a problem, banking, invoicing, planning, scheduling, all of that. So what I did, is I awarded the R10 million contract to the major contractor on condition that he looked after the smaller guy and taught him how to run a business, and that was successful.

In summary, this section emphasises the importance of local engagement and the activities that support this. Partnerships with local actors are identified as useful means of understanding the social context. Early engagement with local stakeholders was seen to be critical for PMs and PCs to ensure inclusion in the project and ensure alignment on outcomes. A valuable means by which this could be achieved is through the establishment of communication forums with local representatives. An enabler for maximising local inclusion was the vetting of the local skills base and using locally based human resource staff to manage this. Lastly, contractor partnerships with local entrepreneurs/small businesses were recognised to be a means through which a lack in local capabilities could be overcome.

5.4.2.2 Governance Clarity

Both PMs and PCs indicated that an understanding of requirements from project teams was a key ingredient of being able to ensure sustainability was integrated into project management of large-scale projects.

> *PM05: "I think the biggest enabler is our education, really. Over time everyone has become far more aware of all of this lot. Years ago, people didn't worry about it. There was no knowledge about it. There's a far more formalized environment, for want of a better word, where we are generally aware of our requirements"*
>
> *PC05: You need to make sure that from an understanding and acceptance perspective, all of those things are pointed to whatever you consider. And that links into both your stakeholders, plus your sustainability elements in terms of minimizing impact to the environment."*

Key to this understanding of obligations is legislative clarity on social and environmental compliance. Environmental legislation was recognised to have clarity which greatly aided in meeting obligations.

> *PM04: "The two are very different. One, defined. Environmentally defined, you know where to go look. If you have a question, you go read. Socially, very gray. Interpretation leaves stuff out. You ask for recommendations, you get 10 different answers"*
>
> *PC03: "…the authorities in most countries are actually fairly good I think in terms of requiring an environmental impact assessment to be done, an environmental management plan to be put in place."*

As expressed by PM04, social legislation was seen to have been lacking in this regard historically. However, some PMs did note that clarity on social legislation had improved and was better at enabling their attendance to social sustainability.

To aid in gaining clarity on social and environmental obligations it was noted that the use of social and environmental experts within project teams was an enabler. This was particularly pertinent for PMs whose skills do not generally lend well to social engagement.

PM07: "…an industrial relationship officer, it's got an enormous effect as a channel of communication between us of providing that link between us as the executing party on site and the local community"

PC02: "…social labour plans are handled well. These, these normally HRD manager and there a communal responsibility or community person that looks after that"

Clarity in governance was a theme that extended beyond legislative compliance and into PM and PC organisations. PMs noted the blue-chip PCs were generally better at driving sustainability in their projects than junior miners. Given the dynamic of PMs taking direction on these issues from PCs, blue-chip companies were regarded as enablers for PM sustainability efforts.

PM01: "If you're doing a job for a blue chip company they will make sure that they comply with all the rules and the regulations and they drive it quite strongly. Like the Newmont or Anglo or BHP Billiton. They really do drive it hard"

Organisational strategy on governance of sustainability from the PC is therefore an important enabler for its integration into large scale projects as expressed by PC03.

PC03: "it has to be internal in the sense that the company sets the tone, and I think, yeah, most EPCM contractors would be happy to fit in with the culture and the expectations of the client. I don't think that's an issue, but if the client isn't doing it itself, then it's going to be hard for the EPCM contractor to try and impose that. Having said that, for the contractors that have that awareness it would be a very strong selling point."

Nonetheless, PC03 does highlight the importance of the PM having a firm understanding of how to integrate sustainability into projects.

In summary this section illustrates that having a clear understanding of sustainability requirements was key to enabling inclusion into project management. This understanding was aided by clear legislation and the use of experts - specifically social experts. PMs also highlighted that blue-chip companies were an enabler for sustainability due to their tendency to have defined standards for the inclusion of sustainability in their projects.

5.4.3 Summary of Results for Research Question 2

The participants described social constraints and navigation of stakeholder expectations as dominant challenges for their inclusion of sustainability in project management. The enablers they emphasised were local engagement with communities and clarity in governance.

Within the challenges identified, a lack of local skills created a trade-off between project deliverables on safety, quality and time and maximising employment of locals. Encounters with illegal miners and relocations costs were also noted to be prohibitive. In engaging with local communities, achieving stakeholder equity was a challenge that could result in social unrest and PCs indicated a desire for PMs to be better engaged with these communities. This exposed the difficulties faced by PMs in navigating social engagement and the subsequent gap in expectations. This gap was seen to the result PMs taking direction on what is to be included in their sustainability efforts from PCs but being subject to their budgetary constraints.

Participants identified enablers as local engagement through established forums, partnerships with local actors and vetting of local skills to maximise work allocated to these stakeholders. Clarity on governance from a legislative and PC standpoint were recognised to be key to defining the extent of the aforementioned activities. Participants also described the use of experts, specifically on the social side, as aids in navigating this.

5.5 RESEARCH QUESTION 3

How is sustainability being incorporated into project management of large-scale projects in Africa?

This research question queries the processes that PMs and PCs must employ to integrate sustainability into the project management of large-scale projects. It identifies early stakeholder alignment and constant stakeholder engagement as key requirements in the process of including sustainability into project management. An overview of the themes is shown in Figure 5.

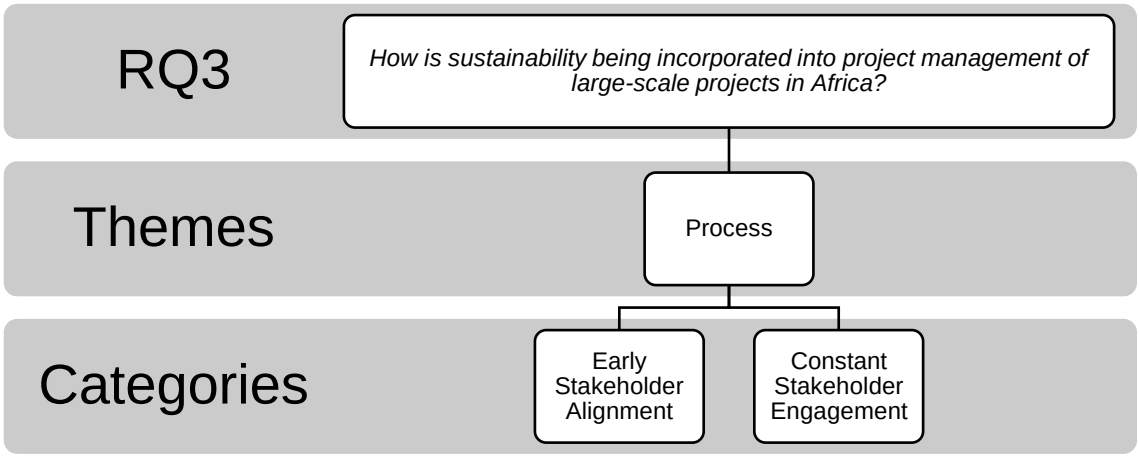

Figure 5: Overview of Results for RQ 3

5.5.1 Process

The thematic analysis revealed that early definition of stakeholder expectations was key in ensuring that sustainability can be planned into project activities. It also highlighted the need for constant stakeholder engagement to maintain this alignment.

5.5.1.1 Early Stakeholder Alignment

Both PCs and PMs stressed the need for sustainability expectations to be defined during early project conception stages to ensure that they could be planned and designed into the project implementation.

> *PM05: "…do sufficient pre-planning, up early; our intent is always to use the local communities as far as possible; see how we can uplift the communities, or provide them with some benefits from the projects that we do. From a process perspective, all of that needs to be brought into consideration in the study phases; that's when the funding is done for the projects."*

> *PC06: "…it's part of your pre-feasibility and feasibility study. You cannot come to execution and think you can incorporate this. You've got to make the allowances right from day one. I mean it's frightening when you see how much money you actually have to allocate."*

To achieve this early alignment a number of critical factors were identified for the project actors to include. The first of which was from PCs who highlighted the need for political engagement and for PMs to be involved in this.

PC01: "…we need project operators and consulting companies [to] be more focused on the political situation that affects the social and environmental situation… the extent to which a social environmental issue will affect negatively or positively a project has really, the primary aspect is the political context."

A large emphasis was placed by both PMs and PCs to identify social stakeholders that are influenced by and can influence the project, and to ensure their concerns are represented in project discussions.

PM04: "…community trumps everyone, so understand community. So how many communities are you dealing with? How many chiefs are you dealing with?"

PC03: "…it's involvement of all the stakeholders, and what's key here is that the stakeholder mapping, to make sure that every single potential stakeholder or person affected, people affected is identified, and then getting them properly represented and involved so that there is that understanding about the project. That's the key, because it's all about managing expectations"

With an understanding of the stakeholders, PCs should then establish their budget for social spend and commitments, which PMs can then accommodate and allocate accordingly.

PM04: "…especially for junior clients, we need to firstly understand how big is the pot of money that's going to be made available for social spend"

PC04: "…there's certain goals or drivers that you need to set yourself upfront, to say 100% of unskilled labor will come from doorstep communities or local communities. 70% skilled labor must come from an area... so I think it's important upfront to set yourself goals like that, and then put a target in terms of the overall spend, that you bring things on, and keep working with local communities."

Another emphasis was that once these stakeholders are identified, PMs and PCs must identify solvable social needs with these local stakeholders so that they can be planned into project deliverables.

PM04: "…understand how you can distribute that money. So can you employ the guys? Can you give them procurement opportunity on the mine, and if the answer's no, do you need to go and find projects in their communities to obviously uplift those communities… once you understand money, communities, and what should be and can be done, then you can program it, you can put it in your schedule, you can measure it, you can employ people to do whatever needs to be done there"

PC04: "You've got to look at what social projects and opportunities there are, then you've got to say, okay well, where can I spend my money where it's got the biggest impact. So it's really about having effective communication, and then also to make sure that you spend your money in the most appropriate places."

This process of identification of solvable social needs must be done through engagement and alignment with local communities so that expectations are managed and social spend is not squandered.

PMs should then engage with the various contractors on sustainability expectations, such as local employment requirements and business creation, so this can in turn be planned into their activities.

PM07: "Again a huge obligation to transfer that understanding to our own contractors and making sure that they implement it correctly as well. I think that's, for me, the process."

PMs highlighted that the establishment of project-wide conditions of employment was a key component to future stakeholder alignment and equity.

PM01: "…we physically actually contracted in how people need to be employed. We've contracted in minimum wages, we had a project wide agreement on all the contractors, what's the minimum wage, how much leave does people get, so everyone gets treated fairly. I think that's a very important thing you have to do."

In summary this section emphasised the need for sustainability expectations to be defined early so to ensure alignment between PMs and PCs. It was identified that in doing this PMs should engage at a political level and then identify local stakeholders and solvable social needs. Expectations of local employment and engagement

should be communicated through to contractors and it was deemed helpful to establish project-wide conditions of employment to better manage problems of inequity among local employees.

5.5.1.2 Constant Stakeholder Engagement

Both project actors emphasised the importance of continuous engagement with the local communities through established forums to manage expectations gaps that grow over the course of the project.

> *PM11: "So when they say we're going to give jobs to the local community the local community thinks every single person in the local community is going to get a job, not just one third of them. So that often creates a bit of a problem and that... expectation gap, so I think, in terms of projects, the biggest thing around social is to make sure that that gets communicated very well and continuously"*

> *PC04: "…you've got to run a system where you've got constant local engagement with the local communities. Through the forums that you've set up, where you get constant feedback to them so that they understand where you are in the process."*

Part of this engagement is the communication and enforcement of strict guidelines as to how social spend will be directed to prevent it from being squandered.

> *PM04: "when the one community leader… or chief says, "My community hall needs to be extended. It needs to be upgraded and made good", then we'd send an engineer. I had an engineer that only worked on these projects, on the outside projects, and we'd go there and say, "Okay, look, you need to spend R2 million here to get this done. We agree. We'll spend it." The chief would say, "But give me the money. I'll do it."… we were very strict. We said, "No, we don't [do that]... What we're going to do is we're going to execute the projects for you using people, locals in your community."*

> *PC06: "don't give them money. I mean they're going to maybe squander it, or not know how to use it correctly, rather do something for them on the social side. That's really what we've been doing"*

A key mention in this process is that PMs and PCs should maintain transparency

with local stakeholders so that it advertises that the efforts of the project are in the public interest and keeps all representative accountable to their constituents.

In summary continuous local engagement to maintain alignment of expectations should be done. During this engagement, transparency should be upheld and social spend should strictly be allocated to projects without donation of money to local stakeholders.

5.5.2 Summary of Results for Research Question 3

The participants described early stakeholder alignment and constant local engagement as critical parts of the process for the inclusion of sustainability in project management of large-scale projects. Alignment at an early stage between PCs, PMs, local politicians and local communities was described as paramount to ensuring the appropriate inclusion of sustainability in project planning and allow better management of stakeholder equity.

In summary this section emphasised the need for sustainability expectations to be defined early so to ensure alignment between PMs and PCs. It was identified that in doing this PMs should engage at a political level and then identify local stakeholders and solvable social needs. Expectations of local employment and engagement should be communicated through to contractors and it was deemed helpful to establish project wide conditions of employment to better manage problems of inequity among local employees. This alignment required constant engagement and ethical and transparent governance.

5.6 RESEARCH QUESTION 4

What are the meaningful outcomes for inclusion of sustainability in project management and how is project management of large-scale projects in Africa changing?

This question is aimed at understanding how businesses need to respond in order to integrate sustainability into project management of large-scale projects. The results revealed that ideal outcomes of this would be local upliftment which gave rise to corporate conscience and long-term performance. Participants speculated that projects would find increasing needs to ensure sustainability on social and environmental fronts beyond compliance. Achieving this would require a change in

organisational strategy and inclusion of sustainability in project management. An overview of the themes is shown in Figure 6.

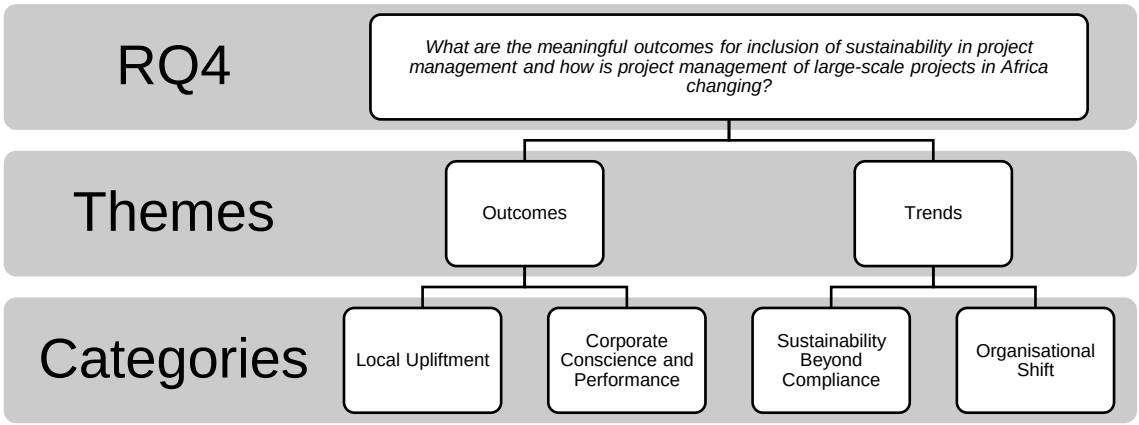

Figure 6: Overview of Results for RQ 4

5.6.1 Outcomes

The participants were asked to identify meaningful outcomes from the inclusion of sustainability in project management of large-scale projects. The themes identified were upliftment of local communities by way of infrastructure, meaningful skills and local business growth. Attributes that improved project performance were also identified as meaningful outcomes indicating an economic benefit of the inclusion of sustainability in project management.

5.6.1.1 Local Upliftment

In identifying meaningful outcomes from the inclusion of sustainability into project management, PMs emphasised skills upliftment.

> *PM04: "…you want to be able to show up-skill... and we had so many examples, if that person has arrived as a cleaner and has left as a clerk. If a guy has arrived as a semi-skilled labor and left as an artisan, perhaps, or he's come in as a general worker and left as a supervisor. I think that's a fantastic outcome."*

This was not emphasised as strongly by PCs and appears to be from the difference in their respective focuses. PMs are largely project-focused whereas the PM focus spans the product lifecycle. This perhaps indicates that skills upliftment may not be an appropriate measure as skills gained during a project do not necessarily translate to employment after it.

Some PMs identified maximised local employment during the project as a positive outcome for social sustainability. PMs also mentioned the employment transfer of locals from the project to the mine operations as a positive outcome. However, these were not prevalent views from PCs.

Both PMs and PCs identified post project employment of locals outside of the mining environment as a positive outcome for project sustainability as highlighted by PM09.

> *PM09: "I want 5,000 jobs in the community, which is non-mining related. When my mine go, these guys can still have jobs. So people must not create the mine to create jobs on a mine, [we] need to create jobs in a community."*

PC03 also highlights this as an important outcome, however, there is an emphasis on developing appropriate skills to enable this to happen.

> *PC03: "…we had a couple of scholarship programs in schools and so on to actually get people and sponsor them through university, that type of thing, so we were trying to develop the skill base on a local level… these are portable skills, so people can take them when the mine has closed up as well.*

Local business growth is emphasised by both PMs and PCs as being an important sustainable outcome for projects as highlighted by PM07 and PC04. Which supports PC03's emphasis on portable skills that can be used outside of the mining environment.

> *PM07: "…more positive [outcomes] are with just sustainable businesses created through the project itself being created. Creating working opportunities for others in the areas and identifying real growth in the local entities that you develop there."*
>
> *PC04: "…if you can have meaningful skills transfers, during that project we skill up the people and create sustainable businesses that can continue to deliver service in the area."*

This appeared to be a preference with PCs who identified that the prominence of local business in the area created a symbiotic relationship that allowed the PC to rely on local services.

Local infrastructure improvement was identified by both PMs and PCs as a positive

outcome for project sustainability. It was identified that though infrastructure improvements, conditions for local business growth would be aided.

> *PM09: "…to do that you must put money in infrastructure and I want people to do business."*

The infrastructure improvements identified were by way of clean water supply, electricity and education facilities.

> *PM02: "…if you provide them with drinking water that, let's just say clears up the wife and the family's day significantly because now she doesn't have to spend three hours trying to get clean water for the family. Now she can go and pick it up at a central spot. That made a big impact in their lives."*

> *PM05: "In terms of power; if you can move power around during the time that it's not really required, into local communities, that's obviously a good start there. I think there're good outcomes."*

> *PM07: "…setting up a training center for helping people from the local community that's currently been through schooling but struggling to get to the point where they are employable. That could be anything from math classes to computer literacy stuff that they need to upskill them, just to get to a point where they become more marketable in an open labor market."*

A significant point of the respondents indicated the more desirable outcomes were in areas that did not depend on the project or the mine, both of which have finite lives.

To summarise this section, participants agreed that local upliftment was a meaningful outcome for the inclusion of sustainability in their projects. This was represented by imparting appropriate skills to locals which would initially maximise employment during the project, but more significantly allow them to use those skills elsewhere and lessen their dependence on the project and the mine. Participants also identified local business growth as a meaningful outcome through nurturing their creation and sustenance. Finally, infrastructure improvement was seen to be a key outcome that would support growth of local economy.

5.6.1.2 Corporate Conscience and Performance

Many of the meaningful outcomes identified were in aid of improved project

performance. The most significant of these was a lack of industrial action/project stoppage, particularly from social unrest, through community support.

> *PM01: "A project I guess would be socially successful in mind first if you were able to stay clear of any industrial action. Because that basically tells you that the workforce were happy and you kept the local community happy in terms of how you acted with them during the project."*

> *PC01: "Well, on one level, have we had any sort of social environmental incidents that has threatened the construction and operation of the project? To date we've had no, we've had none."*

Key to achieving this was community engagement. Especially in areas of conflict where local stakeholder support was identified as a necessity for the project for its ability to prevent exposure to conflict.

> *PM02: "…you don't build a mine in a war torn region that doesn't have any, I suppose governing law, by not engaging with the community. And the rebels operate in that region quite successfully because of the inaccessibility… You can't fight that fight. It's impossible to police so how do you operate in a region like that? You involve the community. You get on their good side… You get them involved in what you're doing. You get buy-in and you share the wealth. "Now all of a sudden these foreigners have arrived and now we all got jobs and we all have food and we've now, for the first time, getting a bit of an education"."*

This support translated into other meaningful outcomes such a happy and productive workforce.

> *PM02: "The outcome is you've got a happy workforce. You've got a productive labor force."*

Whilst most actors acknowledged that the environment it invariably damaged in some way through the creation of the mines, they identified that environmental compliance and mitigation of damage and potential harm to local communities was a meaningful outcome for the inclusion of sustainability practice. To a large extent, this is achieved through sound design practices.

PM05: "…comply with the environmental requirements, to make sure the environmental impact is reduced"

PC01: "…successfully mitigated the risks are social environmental risks"

By reducing exposure to the adverse consequences of not having appropriately integrated sustainability into project management, both actors identified the positive outcome of this was an avoidance of bad publicity. This was recognised to provide a competitive advantage by both PMs and PCs.

PM09: "…a differentiator for it to give us a competitive advantage"

PC03: "I see all of these things actually as huge opportunities, because if you get this right it's a massive competitive advantage"

PMs and PCs highlighted that having a clear conscience of having carried out their activities in a responsible manner, was a meaningful outcome.

PM11: "…feeling good about what you're doing is part of what we do… about a wholistic view of what you've put in the middle of the DRC and being proud about it, and really thinking that this client isn't just raping the environment and abusing the local community, they're actually uplifting them and they're doing some of the right things. Makes you feel good about it."

PC06: "…you've actually got to hand on heart, be able to walk away and say, "I did my best, and I've left something behind for everybody."

The value of conscience is noted to be more than an internalised attribute and potentially provides value in engaging with stakeholders. PC03 recounted this in recollection of an engagement with a government stakeholder regarding the restriction of illegal mining activity on a project site.

PC03: "I'm talking about illegal mining… These are people who are coming on to a mining license, or a tenement that they have no right to be on… So you go to the Minister and you talk it through, he understands it, and he'll make sure that the right decisions get made. But the one point that he made to me was that he actually didn't worry about us as an operator, because he knew that we had a conscience. The problem he had was with the artisanal miners who don't care what they do to the environment."

In summary, the participants identified a lack of project delays from social unrest as a significant measure of the success. The spin-off of this was a more content and productive workforce. On the environmental side they pointed to a mitigation of environmental risks which prevented exposure to bad publicity. A measure of these outcomes was improved organisational performance. A personal and organisational outcome for the participants was having a clear conscience of having achieved these outcomes.

5.6.2 Trends

Participants were asked to identify the change they were experiencing in the project management field with the intention that trends for future practice could be identified. This was explored to understand what approaches might be necessary for the inclusion of sustainability in large scale mining projects in Africa.

5.6.2.1 Sustainability Beyond Compliance

A predominant view from PCs is that legislation will become increasingly more stringent and this will be accompanied by an increase in sustainability consciousness from communities. PC02 supports this in the following statement:

> *PC02: "I think we would see more one more and definitely significant increases in pressure from legislators… My theory is that it will probably be movements within communities. I think surrounding communities will smarten up in terms of these things and they will start policing environmental aspects as much as they police social labor plans*

Additionally, it was clear that responsible investing is an increasing trend, as funders try to avoid sustainability risks. The implication is that economic stakeholders will impose sterner conditions that ensure sustainability beyond compliance.

> *PC02: "…significant increases in pressure from… investors, shareholders, boards for compliance and well, performance beyond compliance becomes absolutely nonnegotiable."*

The response from industry is thus perceived to be requirement for a far more proactive approach to the inclusion of sustainability practice in project management. This means historical compliance to minimum standards will be abandoned in favour of meeting the higher expectations of local and economic stakeholders.

> *PC04: "…with the realization now that this is something that we can not ascribe to the minimum criteria set out in the law, we've got to go beyond, because the expectation is much larger. There's a lot more proactive measures that are coming in from the mining companies to be able to improve on what we've done previously."*

A consequence of this is understood to be much earlier and thorough stakeholder engagement from PCs and PMs in particular to establish their social licence to operate.

> *PM09: "…you have to be involved much more upfront to think about the procurement strategy. How do I arrive from the beginning, study phase, procurement, you have to consider the impact of the environment and social and not leave it [until] after. Project management needs to start focusing on those things"*

In summary, this section identified that legislators and funders would have more stringent requirements for the inclusion of sustainability in large-scale mining projects. In order to stay ahead of these pressures project managers will have to ensure that they go beyond compliance in their efforts. This will require from them a more proactive approach to inclusion of sustainability through earlier engagement and definition of strategy.

5.6.2.2 Organisational Shift

PMs have traditionally been comfortable with ensuring environmental sustainability is integrated into their practice, as prescribed by PCs. The social aspects have been left to the PC to deal with. However, a significant trend identified by PMs has been the shift of social responsibility onto them through contractual obligations, by the PCs.

> *PM05: "…the owners, who realize that the issues are there, are making it the contractor's problem… Even the blue-chip companies. They pass the risk on. They make it very clear what the requirements are but they don't accept any of the issues that go with it. They make it the contractor's problem to properly manage them and make sure they're not late."*

Projects will therefore need to have a large emphasis on localisation and social engagement. PM07 indicated that this would have ramifications for equipment design

to ensure its ease of installation by unskilled employees.

PM10 criticised the insufficient reference and indicated that project management literature would need to explicitly include sustainability as part of its doctrine due to its growing importance.

> *PM10: "…you want to create a pillar just for that within project management. You don't want to generalize it across the management areas. It's something you must take cognizance of, and you must plan and put it within all the other stuff that's critical within project management."*

The implication of this increased focus is that projects would likely need to change their structure to include sustainability specialists as part of the core team that work alongside PMs. The purpose of these specialists would be to steer the social agenda within the project in a more proactive manner.

> *PM05: "The first thing I think is that we're going to end up changing our structure. So, we typically will have a single project manager, quite technically sorted... If we wanted to be bigger influencers in there as part of the project, which is the way I see it will go, then we will change our structures so that we'll have a technical team and we'll have… a sustainability team, that might look more after special projects for the guys and understanding how they come in."*

Also mentioned and worth noting was the potential for more companies to start reframing their organisational mission. This reframing would be to view the projects and the mines as a means to creating social upliftment.

> *PM09: "So there's mining companies now that say they're not in the business of mining, they in the business of uplifting communities… So if you can focus everything to uplift communities, then you know, to do that I need to build a mine."*

In summary of this section, PMs would see a shift in the allocation of social responsibility to their contracts. This would bring with it, emphasis on integration of local stakeholders into the project. Achieving this would likely result in a change in design considerations to allow for project implementation to be achieved by unskilled workers. Projects would also need to bring on social experts as part of the project team to ensure this was managed as a key deliverable for the project. These changes

would need to be supported by changes in organisational strategy around the inclusion of sustainability in project delivery.

5.6.3 Summary of Results for Research Question 4

Participants identified meaningful outcomes of the inclusion of sustainability in project management as local upliftment, conscience and corporate performance. They described future trends of the inclusion of sustainability in project management as projects going beyond compliance to minimum sustainability requirements and an associated shift in organisational strategy to accommodate this.

Ideal local upliftment was described to be in forms that allowed the community to have sustainable improvement without reliance on the project or the mine. Infrastructure improvements, portable skills and business growth were identified as dominant outcomes of having achieved this. From an organisational perspective, participants noted a lack of social unrest as a measure, which allowed improved productivity and project success from a time and cost perspective. Participants also described a clear conscience as a meaningful personal and corporate outcome.

Sustainability beyond compliance was a trend identified by participants as a result of organisations reacting to stay ahead of imposed pressure from stakeholders. It was described that PMs would see increasing contractual responsibility for social engagement which would trigger change in organisational strategy. This strategy would be defined around sustainability interests and likely require sustainability experts to be included in project teams.

5.7 CONCLUSION OF RESULTS

The results revealed a distinct focus from participants on appropriate engagement with local communities that were influenced by the projects. Due the dire social needs faced by these stakeholders from the lack of institutional infrastructure, they look to the projects for fulfilment of them. They were noted to be powerful stakeholders that could significantly affect project outcomes through social unrest. This attention coupled with their power over project outcomes meant that they were a dominant focus from the participants. Many of the responses were therefore centred around understanding and dealing with the engagement of these stakeholders.

Form a governance perspective, this engagement has been made more difficult by a historic lack in clarity in legislation on social sustainability, especially for PMs who typically lack the capabilities to navigate this dimension. With pressure mounting for PMs to take on more contractual responsibility for the social dimension of their sustainability efforts, it has exposed the relationship between PMs and PCs as a limiting factor.

This relationship has typically been defined by PMs taking instruction from PCs in what is to be allowed for, from an environmental design perspective, by virtue of the legislative and investor pressure imposed on them, as well as their budget constraints. The nature of this relationship has meant that sustainability efforts were deemed to be owned by the PC. The tendency for PMs to be centred on technical vocations meant that they easily accommodated environmental sustainability, but willingly absolved themselves of dealing with social sustainability, for which they have historically lacked the skills. The increased pressure from PCs for PMs to accommodate the social needs of local stakeholders has been an uncomfortable adjustment from a capability and risk perspective. This adjustment is also constrained by the ability of the PM to dictate their own sustainability criteria on the PC.

Environmental sustainability was mentioned by both participants, but to a much lesser extent than social sustainability. The lesser attention on this was influenced by better clarity in legislation surrounding environmental compliance and competent technical capacity for this to be designed into the project. This dimension is therefore not carried forward with great emphasis into the findings in chapter 6. Environmental legislation was also noted to be a ubiquitous topic that influenced the inclusion of sustainability into project management, but has only been included in discussion where it influenced the inclusion of social sustainability.

The participants identified that the distinct needs for social sustainability could be accommodated through an approach that lessened dependence on the project and the mines. They also identified that organisations would need to adjust their strategies and tactics to incorporate the need for this as a key project deliverable, and move beyond merely complying.

CHAPTER 6: DISCUSSION OF RESULTS

6.1 INTRODUCTION

The previous chapter presented the results of the interviews according to the research questions. These results were presented as categories under the themes identified for each of the questions. The research was conducted to explore the inclusion of sustainability in project management of large-scale projects in Africa, specifically within the mining sector. Despite the research being on both environmental and social sustainability, a large focus of these results appeared to on social sustainability and its prominence as a topic of importance.

This chapter presents a discussion of the results analysis in chapter five and compares them with the literature in chapter 2. The discussion follows the themed format as it is presented in chapter five. The results shall be presented in academic style inspired by Hart (2018), which prescribes a style of academic argument that shall follow a sequence of:

- Provision of evidence;
- Reasoning through comparative analysis;
- Reasoning through interpretation and
- Concluding

Note: Adapted from (Hart, 2018), Doing a Literature Review: Releasing the Research Imagination

Each theme will make use of this style in paragraph form within each of the themes to better enable the reader to follow the academic argument.

6.2 RESEARCH QUESTION 1

What are the contextual factors influencing the application of sustainability in project management of large engineering projects in Africa?

This question explored the context of projects in Africa within the mining sector and how sustainability practice within project management is influenced through drivers within this context.

Society and governance of project actors were found to be key contextual factors in the results. The results found correlation with mention of these in literature, however,

the emphasis of the relative importance of the contextual factors differed and is offered as a conceptual finding.

6.2.1 Context

This theme aimed to identify the contextual factors that were most influential in the inclusion of sustainability in project management of large-scale mining projects in Africa. The results from participants indicated a context that was heavily influenced by social considerations, particularly with regard to the local stakeholders of projects. Results also showed that governance played an influential role in the inclusion of sustainability.

The rural nature of these projects and the dire social needs of their local stakeholders meant that projects faced significant pressures to help resolve them. However, despite the vulnerability of these stakeholders, their power as and influence could be hugely impactful on the project. The sustainability efforts by project managers are heavily influenced by them resulting in significant attention being drawn to social sustainability. However, a minority of local stakeholders with a higher awareness of environmental effects of mining were increasingly policing projects on this front.

Comparatively, in their study of Braziallian project management companies, Martens and Carvalho (2017) identify environmental, economic, stakeholder management and business model as key factors for consideration in the project management context. These are provided in order of significance. Their grouping places relationships with local community within that of stakeholder management. The appearance of this indicates a similarity in findings. However, this does reveal some deviation from the results of this study in that the social context was deemed more pertinent than environmental. On a more granular level Martens and Carvalho (2017) indicate that relationships with society and management of human rights have higher significance than relationships with local community. Comparatively this study might place management of human rights and relationships with local community as of higher importance than that of relationships with society. This statement correlates with prior research from Eweje (2006), who states that the importance of community development in developing economies is higher than it is elsewhere.

From a governance perspective, the results showed that environmental aspects of sustainability were catered for satisfactorily due to the organisational skills of PMs. PMs have not historically catered for social sustainability. Regardless of these

abilities, PMs viewed the PCs as being responsible for sustainability efforts on both a social and environmental front. This appeared to stem from a historic contractual understanding of project responsibilities. PCs, however did not share this view which indicated a significant gap in their expectation versus expected responsibility and ability of PMs and their teams.

Martens and Carvalho (2017) highlight management of relationships with customers, and participation and involvement of stakeholders as key contextual factors for sustainability within project management. These could be construed as a similarity between the research and the literature, speaking to the identified gap between PM acceptance and capabilities for social responsibility and PC expectations. The results for social from both highlight the importance of the social aspect of sustainability which aligns with Labuschagne and Brent (2006) who identify it as a pillar of weakness in sustainability efforts.

The research therefore finds similarities between the results and the literature. However, the results differ in that they exhibit the social and governance as more important in the African context and this is put forward cautiously as a conceptual finding.

In conclusion, project managers for large-scale projects in the African context would be wise to prioritise social and governance factors. In so doing, their considerations for the inclusion of sustainability in project management for these projects might stand to be improved.

6.2.2 Drivers

The results emphasise that the importance of establishing social licence to operate is the strongest driver for the inclusion of sustainability in project management of large-scale projects. This social licence is regarded as an intangible positive relationship between the project players and the local stakeholders. It grants the project credibility to proceed on the grounds that local stakeholders support the intentions of the project and the influence it will have over the communities. This was accentuated as the most powerful driver due to the influence that local stakeholders have on the project outcome. The results also cited economic conscience as a key driver of sustainability into project management. In the context of these results, economic conscience was comprised primarily of social risk avoidance by project players, conditions for funding and conscience.

Academic literature on drivers highlighted the importance of ensuring social concerns are addressed within projects. Bond et al., (2012) allude to social licence to operate as being driven strongly by proponent forms within South Africa. This correlates with the findings of this research. More broadly, research by Zeng et al. (2015) for major infrastructure projects in China, have reported the criticality of social responsibility as a factor for inclusion in engineering projects. This was highlighted for its importance in avoiding costly social issues and which also aligns with the findings herein regarding social licence to operate.

With regard to economic conscience, De Carvalho and Rabechini Junior (2015) find a significant correlation between project success and risk management practice through the use of soft skills. This agrees with the findings from the results which describe risk reduction being driven by funders having responsible investment strategies and the conscience of project players.

The results therefore correspond with the findings in the literature, which shows that social licence and economic conscience are key drivers to the inclusion of sustainability in project management. It can be concluded that these findings are valid and reflect the important drivers for project managers to include sustainability in project management of large-scale projects in Africa.

6.2.3 Summary of the Discussion for Research Question 1

The results revealed a social context that exposed project managers in Africa to an expectation from local stakeholder to solve social needs and this was mirrored in the literature. It also found that the social context in Africa was the most significant factor for project managers to consider in their inclusion of sustainability in project management. This factor was identified in the literature (Martens & Carvalho, 2017), but was not rated as highly as the result for this study appear to indicate. This difference in prioritisation in the African context is offered cautiously as a finding.

With regard to governance, the results identified a lack of attention to social sustainability from project managers as a contextual factor that affected the ability to deliver on social aspects of sustainability. The literature agreed with this finding and identified the weak focus on social aspects of sustainability as a limitation (Labuschagne & Brent, 2006). Despite this lack in attention to the social side, the results corroborated the findings in the literature which agreed that social licence to operate was a critical factor for inclusion in project management in large engineering

projects (Zeng et al., 2015). Soft skills were found to be an important capability that to achieve this social licence and therefore reduce project sustainability risk.

6.3 RESEARCH QUESTION 2

What are the sustainability challenges and enablers that project managers must be cognisant of for large engineering projects in Africa?

This question explored the endogenous and exogenous barriers to implementation that project managers face in their inclusion of sustainability in project management for large scale projects in their context. It also explored the factors for support of this and how these can be leveraged by these actors.

6.3.1 Challenges

The results exposed that participants considered a lack of appropriate skills, illegal mining, relocation costs and achieving stakeholder equity as key challenges to the inclusion of sustainability in project management. They also revealed the challenge of PMs not being better skilled and positioned within the project lifecycle to address local stakeholder expectations. This appeared to arise from a finding that PMs expected the PCs to be responsible for sustainability initiatives on the social side. PCs, however did not support this view, indicating a difference in expectations. These findings again emphasised the significance of social sustainability as a dominant topic of concern.

The literature in many instances points toward the social constraints faced by the construction industry due to the lack in skills availability for large construction projects in Africa (Hall & Sandelands, 2009; Windapo, 2016). This confirms the findings of skill deficiencies being a significant challenge for project managers trying to localise construction services. The other social constraints experienced by mining projects is well covered by Conde and Le Billon (2017), who identify artisanal or illegal mining displacement, sentiments of marginalisation, community displacement, and community driven participation as significant reasons for their social unrest.

In considering the challenge of PMs' focus on and contribution to social sustainability efforts, the literature reveals that perceptions of project success factors differ between stakeholders. Davis (2014) reveals that PMs and PCs differ in their attribution of the identification of project objectives being a factor for success.

Agreement on the responsibility of social initiatives within projects may be one such project objective that may contribute to project success. However, the literature reviewed does not appear to specifically identify the dynamic of social sustainability responsibility expectations between PMs and PCs not being met. It did not highlight the challenge to the PCs in incorporating social sustainability elements into the project, while balancing organisational constraints, budget limitations, and conventional contractual relationships between the two actors.

In conclusion, these findings show that the literature agrees with social constraints having been identified as a key challenge for the inclusion of sustainability in project management of large-scale projects. It also recognises the difference in attribution by the project actors of project success factors. It does not recognise that the expectation between PMs and PCs of incorporation and delivery of social responsibility appears poorly delineated, with actors having different perceptions of project drivers. This last point is therefore offered as a conceptual finding in the research.

6.3.2 Enablers

The results show that local engagement and clarity in governance are identified as key enablers for the inclusion of sustainability in project management of large-scale projects. For local engagement participants mentioned the use of local partnerships with entities to establish an understanding of the local context. This was to be accompanied by early engagement with local stakeholders and the establishment of forums through which regular engagement could take place to ensure stakeholder alignment. The vetting of local skills was a key enabler for ensuring allocation of work to local stakeholders could be maximised through allocation of appropriate contracts to stimulate local business. Clarity in understanding of expectations from both legislation and PCs was also highlighted as a key enabler of the inclusion of social sustainability in project management.

The project management literature clearly identifies the need for project managers to plan for stakeholder engagement and identifies partnerships and use of specialists as a means of achieving this (Project Management Institute, 2017). The emphasis on engagement with local stakeholders is enshrined within the Equator Principles (2013), to which many project funders subscribe. Eweje (2006) has confirmed that MNEs operating in Africa must, as a matter of necessity, invest in local communities

through upliftment initiatives. This must be done in order to nurture a cordial and constructive relationship free from costly confrontation. Martens and Carvalho, (2017) verify this with their findings that relationships with local stakeholders are a key factor for the inclusion of sustainability in project management. Clarity of understanding of social sustainability expectations may be more appropriately categorised by project success factors. Kealey, Protheroe, MacDonald and Vulpe (2005) explain that clarity on governance, roles and responsibilities are one such success factor.

Enablers revealed here a largely linked to normal project management practice prescribed by project management institutions. This highlights that in this case project management theory prescribes the useful enablers through which sustainability can be included in project management.

The results from the research therefore agree with the findings in literature. Local engagement and clarity in understanding of expectations are key enablers for the successful inclusion of sustainability in project management.

6.3.3 Summary of the Discussion for Research Question 2

The social constraints were identified in both results and literature to be a challenge for project managers to address sustainability issues. The paradoxical relationship between PMs and PCs was seen to be a limitation in overcoming these constraints. The budgetary and contractual constraints coupled with access limitations imposed by PCs onto PMs appear to contradict their need for PMs to take on more social responsibility. The nuance of this was not found in the literature reviewed and is offered cautiously as a conceptual finding.

With regard to enablers the research found agreement with the literature that local engagement was important for the inclusion of sustainability in project management. This gave support for the finding that understanding of expectations was another important factor. The results agreed with what was found in the literature.

6.4 RESEARCH QUESTION 3

How is sustainability being incorporated into project management of large-scale projects in Africa?

This research question queried the processes that must be employed to integrate

sustainability into the project management of large-scale projects. It identified early stakeholder alignment and constant stakeholder engagement as key requirements in the process of including sustainability into project management.

6.4.1 Process

The results indicated that early and constant engagement with political and local stakeholders was a key aspect of the process to include sustainability in project management. There was high emphasis placed on the importance of engagement with local stakeholders and the use of established forums to achieve this. These forums should be used to ascertain solvable social needs which can be included in project planning and design stages. External contractors should in turn be engaged on the established sustainability expectations that require their participation, such as taking on local employees and partnering with local businesses. The results affirmed the value of transparency in local engagement, appropriate allocation of social spend and the establishment of project conditions of employment to help manage equity of stakeholders.

Findings from the literature from Marcelino-Sádaba et al. (2015) on sustainable project processes point to stakeholder management being a key process. They find its importance is key to agreement on the meaning of sustainability which corresponds with the results identifying solvable social needs. Their research identifies the inclusion of sustainability as a process that spans across multiple stakeholders and that inclusion of them, at appropriate times, allows a wholistic understanding of its aims. This correlates with results that emphasise the importance of early engagement of local and political stakeholders and the communication of the expectations to project contractors. Yu et al. (2018) identify managerial control as an important feature for the inclusion of sustainability in project management. They identify this as actions that are taken to ensure consistency with the strategy on sustainability. In a broad manner this encapsulates the activity required to ensure transparency, appropriate allocation of social spend and standardised conditions of employment.

The results are therefore represented in the literature. They agree that stakeholder engagement and managerial control are important aspects for the inclusion of sustainability in project management.

6.4.2 Summary of the Discussion for Research Question 3

The findings showed that early and consistent stakeholder engagement and managerial control are important factors for the process of inclusion of sustainability in project management. The results correlated with what was found in the literature.

6.5 RESEARCH QUESTION 4

What are the meaningful outcomes for inclusion of sustainability in project management and how is project management of large-scale projects in Africa changing?

This question explored how the success of sustainability initiatives in project management manifests. It also attempted to identify what the future may hold for its inclusion.

6.5.1 Outcomes

The results exhibited that participants viewed local upliftment, corporate conscience and performance as meaningful outcomes for the inclusion of sustainability in project management. Meaningful upliftment was seen to come in the form of infrastructure improvements that allowed local stakeholders to be less reliant on the mine in the long term. Portable skills and local business growth were seen to ideal manifestations of this. Economic measures would be a lack in project delays from social unrest and mitigation of environmental harm. These were viewed to provide competitive advantage for project managers who were able to complete projects with a clear conscience.

Literature on the success of social sustainability points to the significance of community resilience. Magis (2010) identifies this as a measure of a community's ability to sustain itself and recover from changes in their environment or ecosystem. This finds parallels with the meaningful outcomes from the results. The results suggest that participants find meaning in enabling the community to better itself outside of the project environment or the mine. This is so that they can continue to do so when the project ends and when the mine closes. Accordingly community resilience may be an appropriate term to define their view. Some research views these outcomes in terms of performance objectives of successful stakeholder management. Along similar lines, Oppong, Chan, and Dansoh (2017) view

stakeholder empowerment, relational benefits and human capital building as key indicators of this, which correlates with the results. Clear conscience as an outcome finds similarity to the values-based approach to sustainability. Silvius (2017) highlights the values-based approach as a defining characteristic of sustainability in its shaping of project management.

Oppong et al. (2017) also find that undisturbed progress, conflict mitigation, image protection and cost performance are indicators for stakeholder management performance. These appear to correlate with the economic outcomes identified from the results. However, Tan, Ochoa, Langston and Shen (2015) find for international construction that business performance increases with lower levels of sustainability performance, but shows negative returns at higher levels of sustainability performance.

This indicates that the inclusion of sustainability in project management for large engineering projects in Africa may lie at lower levels of sustainability performance. An implication of this, which is supported by the results, is that project management practice for large scale projects in Africa may stand to show better economic performance with increased focus on social aspects.

6.5.2 Trends

The results showed that dominant trends for the inclusion of sustainability in project management for large-scale projects were toward sustainability beyond compliance and an accompanying shift from organisations. This shift would appear in the form of changes in design considerations, the entrenching of social experts within the project team and a change in organisational strategy to support sustainability in its mission.

Literature on the integration of sustainability within organisations is similar to the results obtained. Sroufe (2017) finds that organisations are battling to respond to and comply with the increasing pressures of incorporating sustainability into business practice. This work revealed that compliance alone was not an appropriate response to the incorporation of sustainability and that organisations needed to reconfigure themselves to align with the sustainability agenda. This literature bears resemblance to the results found in that project managers would need to go beyond mere sustainability compliance in their projects. It also reflects the finding that organisations need to align their strategy to support this. Sroufe (2017) also supports

that one of the means of achieving this is through the use of sustainability professionals within teams.

The results therefore align with the findings in the literature and confirm the insights on trends that are a consequence of the sustainability agenda. Project managers will need to pursue sustainability beyond compliance and a key factor in achieving this will be the use of sustainability professionals in the form of social experts within project teams.

6.5.3 Summary of the Discussion for Research Question 4

The findings identified meaningful outcomes for the inclusion of sustainability in project management were social upliftment through measures that result in resilience of local communities (Magis, 2010) and their lessened reliance on the project and mine. Economic outcomes of this were improved project performance and which was supported by a values based approach to the inclusion of sustainability in project management (Silvius, 2017). To achieve this it has been found that organisations will need to adjust their strategies to include social sustainability as a key performance objective. This would require the inclusion of sustainability professionals within project teams to drive these objectives. Results for this correlated with content found in the literature.

6.6 CONCLUSION OF FINDINGS

The conclusions are presented in the context of inclusion of sustainability in project management for large scale engineering projects in Africa. The industrial context is within the mining sector. The findings of the study identified correlation of the results on drivers, enablers, process outcomes and trends for the future. Two conceptual findings have been cautiously put forward as contribution to the literature. These conceptual findings were within the themes of context and challenges. These results are summarised in Table 5 below.

Table 5: Conclusion of Findings

Research Questions	Themes	Findings	Results and literature
1	Context	Society and governance found to be important contextual factors.	Cautious conceptual finding for project management literature is that project context in African countries makes social sustainability more critical than other factors.
	Drivers	Social licence, project performance and conscience found to be key drivers	Correlated.
2	Challenges	Social Constraints and navigation of stakeholder expectations are key challenges	Nuanced conceptual finding of project client and project manager relational paradox. Project client expectations for project managers to take on social responsibility is constrained by conventional contractual relationship where project manager has authority limitations on implementation.
	Enablers	Local engagement and governance clarity are key enablers	Correlated.
3	Process	Early stakeholder alignment and constant stakeholder engagement are vital for inclusion of sustainability	Correlated.
4	Outcome	Local upliftment and resulting corporate performance and conscience through better are valuable outcomes from inclusion of sustainability	Correlated.
	Trends/Future	Sustainability beyond compliance and adjustment of organisational strategy to include sustainability stance are trends for sustainability in project management	Correlated.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1 INTRODUCTION

This study set out to explore the inclusion of sustainability in project management for large scale engineering projects in Africa. As described in Chapter 1 the intersection of these is of interest to both academics and business. The mining sector was chosen as the industry of analysis and the participants were selected according to their experience in this sector. The participants included in the study were project managers from engineering project management backgrounds and project clients who were the owners of the mines. Whilst these participants were considered part of the same sample group and were asked the same questions, the difference in their respective focuses was seen to be of value. As such their responses were compared throughout the research to gain insight into difference in views.

The insights drawn centred strongly on engagement with local stakeholders and how their interests influence the inclusion of sustainability in project management. These insights were, for the most part, corroborated within the literature, however, there were some nuanced findings offered as contributions to the literature on project management.

This chapter presents the conclusions of the research and their contribution to the academic literature. Insights are drawn from this to provide recommendations for managers in practice. Limitations of the study are highlighted and provide a basis for the recommendation of further research.

7.2 PRINCIPAL CONCLUSIONS

Guided by the research problem described in chapter one, the research has provided insight in an exploratory manner to understanding the problem as experienced by project managers. The research has described a dominant focus on stakeholder engagement, specifically with regard to a project's local stakeholders. It is concluded that the inclusion of sustainability in project management practice in this context should keep local stakeholder engagement at the forefront of project managers' considerations.

The social needs of local stakeholders in Africa create a context where projects are pressurised to help resolve these, and the research has exposed that commensurate

attention from project managers is necessary for sustainability (Eweje, 2006; Labuschagne & Brent, 2006; Martens & Carvalho, 2017). This study deviates slightly from the reviewed literature in that it emphasises the importance of the social dimension as a contextual factor for projects in Africa, above that of environmental sustainability. Accordingly project managers are driven to ensure they have social licence to operate from these stakeholders (Bond et al., 2012; Zeng et al., 2015). By ensuring this through a values-based approach they stand to improve their project performance through lessened social unrest.

Attendance to social licence brings with it challenges as social and organisational factors make it difficult to navigate stakeholder expectations (Conde & Le Billon, 2017; Davis, 2014; Hall & Sandelands, 2009). Challenges such as lack of skills, illegal mining and attaining stakeholder equity are difficulties faced by project managers. A prominent organisational challenge exposed is the paradox that lies within the relationship between the project manager and the project client. Project clients' expectations for project managers to take on social responsibility is constrained by their conventional contractual relationship. Due to the project clients' obligations dictating the choice on sustainability inclusion, project managers have authority limitations over implementation of social sustainability. These limitations come in the form of early engagement restrictions and budgetary constraints. Nonetheless, this expectation from the project client has emphasised the need for project managers to develop capabilities in social engagement which they have previously typically lacked.

The results find that early political and local engagement should be managed effectively in order to identify solvable social needs as a means to sustainability and project success (Eweje, 2006; Kealey et al., 2005; Marcelino-Sádaba et al., 2015; Martens & Carvalho, 2017; Project Management Institute, 2017; Yu et al., 2018). This engagement should then occur consistently throughout the project. An economic advantage of this is risk reduction by preventing social unrest from local communities. For these actors, this aids project success through the meeting of PC time and cost constraints. This perception by PMs may appear self-serving of economic stakeholders. However, the success of projects from lack of social unrest would be a factor that encourages further investment in projects that can mimic this, and subsequently further local upliftment. Therefore it becomes evident that community engagement strategies are a scalable concept that can be employed by

project managers to the benefit of both economic and local stakeholders.

The ideal outcomes that would measure the effectiveness of the inclusion of this would be social upliftment. This upliftment is ideally in forms that improve the lives of local communities and allow them to become less dependent on the project and the mine over time (Magis, 2010; Oppong et al., 2017). To achieve this, project management companies must consider organisational strategies that bolster their social engagement capabilities so that they move toward sustainability beyond compliance (Sroufe, 2017).

7.3 RESEARCH CONTRIBUTION

The discussion chapter identified areas where the findings were different form the literature. These are presented cautiously as contributions to the project management literature below:

- The first contribution of this report to project management literature is that the social context should be the most significant focus of project management in its management of stakeholders, to support the inclusion of sustainability.
- The second contribution is that the paradoxical relationship between project managers and project clients, with regard to the inclusion of sustainability in management of projects, is a nuanced limitation. Sustainability requires an integrated approach that does not stop at the boundaries of organisations. Despite project clients' desires for project managers to take more ownership of social sustainability, the extent of inclusion is ultimately defined by the project client and their obligations to others, and project managers imposing sustainability standards on their clients unlikely to gain capital support.

7.4 RECOMMENDATIONS FOR MANAGERS IN PRACTICE

The recommendation for project managers is to foster an integrated approach to sustainability. This should begin with project management organisations adopting a focus on sustainability in their organisational standards. Companies that lack the skills of social experts should support this by bringing these capabilities into the project team environment. In so doing they are able to better integrate social expectations into their project planning in early stages and entrench stakeholder engagement. This would allow tactful handling and smooth transition of social

engagement from the project managers to the project client at the end of the project.

Despite the difficulties that may be faced in trying to impose these standards on unwilling project clients, having an organisational strategy that takes a stance on sustainability issues will likely attract business from blue-chip clients and collaborators that consider this valuable. It will also help guide smaller clients in strategies that better avoid project risk and prevent exposure to projects that terminate due to social unrest. Ideally, project clients need to foster this by bringing project managers into the social interactions with local and political stakeholders earlier so that a wholistic view of the sustainability goals can be carried through the project.

7.5 LIMITATIONS OF THE RESEARCH

During the course of the study certain limitations presented due to the chosen scope and design of the study. These limitations were as follows:

- The study only considered large-scale projects. This could imply a limitation on transferability of findings to smaller projects which do not benefit from the economies of scale that come with size.
- Whilst the inclusion of sustainability is seen to provide economic advantages, the extent to which projects should go to maximise could not be quantified within this study.
- Organisational change to respond to the need for sustainability within projects was concluded from the findings. Recommendations for the inclusion of sustainability specialists in the project team was described to be a necessary factor in achieving this. However, the questions in the interview guide prevented further enquiry on how this would be successfully implemented from the perspective of organisational strategy and structure.

7.6 RECOMMENDATIONS FOR FURTHER RESEARCH

The findings from this research showed opportunities of interest that were not able to be explored in this report. These have been noted as recommendations for further research below:

- The study revealed consistently that blue-chip or mature mining companies have a propensity for better sustainability performance than junior mining companies.

Junior mining companies are seen to be lean in their focus and spend on sustainability due to the significant costs involved and constraints on their access to capital. This raises the question of how economically feasible it is for junior mining companies to implement proportionally equivalent efforts toward sustainability in their project focus and presents an opportunity for further research.

- The costs of the inclusion of sustainability were described as being prohibitive in many cases but the research suggests project managers should consider it a small investment to prevent large project risk from social unrest. Tan et al. (2015) find that with increased performance in sustainability for companies in the construction sector, they may see increasing returns initially but find that these start to drop with further expenditure. However, their research shows that despite the decreasing returns, they start to see increasing revenue growth. A recommendation for further research is to investigate this relationship for mining projects in Africa. This may allow better understanding of the economic benefit of sustainability and empower project managers to make more informed decisions.
- The research identified that organisations should adjust their strategies to align with a focus toward sustainability and recommendations were made for sustainability specialists to be included as part of the project team. A recommendation for further research is to understand how company structure, project structures and performance measures should be arranged to nurture this focus.
- Some of the project managers interviewed described the highly subjective and contextual nature of each mining project, and the corresponding need for a tailored social engagement response. However, they also highlighted the lack of the structured and formal inclusion of social sustainability within project management teachings. This is currently limited to the inclusion of “stakeholder engagement”, but does not necessarily accommodate the level of time, energy and investment required to entrench social sustainability and drive success factors, such as long-term social upliftment. Therefore, it is recommended that further research be conducted into how the inclusion of social sustainability milestones and actions could be formalised and built into recognised project management structures, such as PMBOK (Project Management Institute, 2017).

7.7 CONCLUSIONS

This study explored the inclusion of sustainability in large-scale engineering projects in Africa. The industry of analysis was the mining sector. The participants chosen to explore this topic were project managers from engineering backgrounds as well as project clients, who had experience in this context. Semi-structured interviews were conducted with eleven project managers and six project clients. Though these interviews valuable insights were obtained on the challenges faced for this inclusion in their projects. Social sustainability was a dominant theme of the findings and this exposed the need for project managers to prioritise local stakeholder engagement.

It was found that through appropriate inclusion of sustainability in project management there are economic gains to be had. It also revealed opportunities for improvement by way of better integration of sustainability practice into project management planning and implementation. Organisational re-structuring to improve stakeholder engagement between local stakeholders and project clients were shown to be areas where such improvement could be made.

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APPENDIX A: INTERVIEW GUIDE

Introduction

The topic of sustainability is one that expects practitioners in business to consider social and environmental sustainability as well as economic sustainability in their search for economic gain. The concept of sustainability is seen by many to be contextual and its inclusion in project management roles for large engineering projects within Africa is one such area that has attracted attention of business and academics. The purpose of this interview is to explore the individual experiences of individuals in project managerial roles that pertain to the inclusion of sustainability when managing large engineering projects in Africa.

This shall be a semi-structured interview of approximately one-hour duration.

Protocol for Semi-Structured Interviews

Question Number	Question Theme	Question Asked
1	Opening / context	What has your role and experience been in large scale projects?
2	Context	Can you tell me about the social and environmental situations and issues in the projects you've been involved in?
3	Drivers	In your experience what drives the inclusion of social and environmental issues into project management of large-scale projects?
4	Challenges	In your experience, what are the challenges of incorporating social and environmental issues into project management in large scale projects?
5	Enablers	In your experience, what are the factors that facilitate the inclusion of social and environmental issues into project management of large-scale projects?

Question Number	Question Theme	Question Asked
6	Process	In your experience how would you go about including social and environmental issues into project management of large-scale projects?
7	Outcome	In your experience what would be meaningful outcomes of social and environmental inclusion in project management of large-scale projects?
8	Outcome	In your experience how can you recognise/identify when these meaningful outcomes have been achieved?
9	Closing	From your experience, how do you anticipate that project management for large scale projects will change with respect to social and environmental issues?
*	Clarification	Please could you clarify what you mean by that?
*	Probing	Please can you tell me more about that?

* Asked at any point during the interview.

APPENDIX B: ETHICAL CLEARANCE LETTER

Gordon Institute of Business Science
University of Pretoria

21 August 2019

Brooks Scott

Dear Scott

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

Gordon Institute of Business Science
Reg. No. 04/00816/06
26 Melville Road, Illovo, Johannesburg
PO Box 78693, Sandton, 2146, South Africa
telephone (+27) 11 771 4000
fax (+27) 11 771 4127
website gibs.co.za
University of Pretoria

APPENDIX C: CONSENT FORM

I am currently a student at the University of Pretoria's Gordon Institute of Business Science and completing my research in partial fulfilment of an MBA.

I am conducting research on the inclusion of sustainability in project management and am trying to find out more about this intersection for large engineering projects in Africa. Our interview is expected to last about an hour and will help us understand how sustainability is being incorporated into the project management profession these large projects in the setting of developing economies.

Your participation is voluntary, and you can withdraw at any time without penalty. All data will be reported and stored without identifiers and will therefore be completely anonymous. If you have any concerns, please contact my supervisor or me. Our details are provided below.

Researcher Name:	Scott Brooks
Email:	18377816@mygibs.co.za
Tel:	+27844767975
Supervisor Name:	Dr. Jill Bogie
Email:	BogieJ@gibs.co.za
Tel:	

Participants Name: _____

Participants Signature: _____

Date: _____

Researcher Signature: _____

Date: _____

APPENDIX D: NON-DISCLOSURE AGREEMENTS FOR TRANSCRIBERS

Rev.com
222 Kearny St, Fl 8, San Francisco, CA 94108
+1 (415) 801-0500 | sales@rev.com | www.rev.com

CLIENT NON-DISCLOSURE AGREEMENT

This CLIENT NON-DISCLOSURE AGREEMENT, effective as of the date last set forth below (this "Agreement"), between the undersigned actual or potential client ("Client") and **Rev.com, Inc.** ("Rev.com") is made to confirm the understanding and agreement of the parties hereto with respect to certain proprietary information being provided to Rev.com for the purpose of performing translation, transcription and other document related services (the "Rev.com Services"). In consideration for the mutual agreements contained herein and the other provisions of this Agreement, the parties hereto agree as follows:

1. Scope of Confidential Information

1.1. "Confidential Information" means, subject to the exceptions set forth in Section 1.2 hereof, any documents or other text supplied by Client to Rev.com for the purpose of performing the Rev.com Services.

1.2. Confidential Information does not include information that: (i) was available to Rev.com prior to disclosure of such information by Client and free of any confidentiality obligation in favor of Client known to Rev.com at the time of disclosure; (ii) is made available to Rev.com from a third party not known by Rev.com at the time of such availability to be subject to a confidentiality obligation in favor of Client; (iii) is made available to third parties by Client without restriction on the disclosure of such information; (iv) is or becomes available to the public other than as a result of disclosure by Rev.com prohibited by this Agreement; or (v) is developed independently by Rev.com or Rev.com's directors, officers, members, partners, employees, consultants, contractors, agents, representatives or affiliated entities (collectively, "Associated Persons").

2. Use and Disclosure of Confidential Information

2.1. Rev.com will keep secret and will not disclose to anyone any of the Confidential Information, other than furnishing the Confidential Information to Associated Persons; provided that such Associated Persons are bound by agreements respecting confidential information. Rev.com will not use any of the Confidential Information for any purpose other than performing the Rev.com Services on Client's behalf. Rev.com will use reasonable care and adequate measures to protect the security of the Confidential Information and to attempt to prevent any Confidential Information from being disclosed or otherwise made available to unauthorized persons or used in violation of the foregoing.

2.2. Notwithstanding anything to the contrary herein, Rev.com is free to make, and this Agreement does not restrict, disclosure of any Confidential Information in a judicial, legislative or administrative investigation or proceeding or to a government or other regulatory agency; provided that, if permitted by law, Rev.com provides to Client prior notice of the intended disclosure and permits Client to intervene therein to protect its interests in the Confidential Information, and cooperate and assist Client in seeking to obtain such protection.

3. Certain Rights and Limitations

3.1. All Confidential Information will remain the property of Client.

3.2. This Agreement imposes no obligations on either party to purchase, sell, license, transfer or otherwise transact in any products, services or technology.

4. Termination

4.1. Upon Client's written request, Rev.com agrees to use good faith efforts to return promptly to Client any Confidential Information that is in writing and in the possession of Rev.com and to certify the return or destruction of all Confidential Information; provided that Rev.com may retain a summary description of Confidential Information for archival purposes.

4.2. The rights and obligations of the parties hereto contained in Sections 2 (Use and Disclosure of Confidential Information) (subject to Section 2.1), 3 (Certain Rights and Limitations), 4 (Termination), and 5 (Miscellaneous) will survive the return of any tangible embodiments of Confidential Information and any termination of this Agreement.

5. Miscellaneous

5.1. Client and Rev.com are independent contractors and will so represent themselves in all regards. Nothing in this Agreement will be construed to make either party the agent or legal representative

of the other or to make the parties partners or joint venturers, and neither party may bind the other in any way. This Agreement will be governed by and construed in accordance with the laws of the State of California governing such agreements, without regard to conflicts-of-law principles. The sole and exclusive jurisdiction and venue for any litigation arising out of this Agreement shall be an appropriate federal or state court located in the State of California, and the parties agree not to raise, and waive, any objections or defenses based upon venue or forum non conveniens. This Agreement (together with any agreement for the Rev.com Services) contains the complete and exclusive agreement of the parties with respect to the subject matter hereof and supersedes all prior agreements and understandings with respect thereto, whether written or oral, express or implied. If any provision of this Agreement is held invalid, illegal or unenforceable by a court of competent jurisdiction, such will not affect any other provision of this Agreement, which will remain in full force and effect. No amendment or alteration of the terms of this Agreement will be effective unless made in writing and executed by both parties hereto. A failure or delay in exercising any right in respect to this Agreement will not be presumed to operate as a waiver, and a single or partial exercise of any right will not be presumed to preclude any subsequent or further exercise of that right or the exercise of any other right. Any modification or waiver of any provision of this Agreement will not be effective unless made in writing. Any such waiver will be effective only in the specific instance and for the purpose given.

6.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed below by their duly authorized signatories.

CLIENT	**REV.COM, INC.**
By:	By:
Name:	Name: David Abrameto
Title:	Title: CFO
Date:	Date:
Address for notices to Client:	Address for notices to Rev.com, Inc.:
	222 Kearny St., STE 800
	San Francisco, CA 94108

Gordon Institute
of Business Science
University of Pretoria

CONFIDENTIALLY AND NON-DISCLOSURE AGREEMENT

It is a condition of engagement that students shall aid in preserving all confidential information, ideas and plans; any confidential information or any information in respect of any data gathered in respect of their research work. The parties under this agreement agree to the following:

1. The parties of this agreement shall use its best endeavors to keep any information confidential which it has acquired or may acquire pursuant to the research initiative. For the purposes of this clause, confidential information excludes information which:

1.1 is publicly available or becomes publicly available through no act or default of any Party;

1.2 was in the possession of a Party prior to its disclosure otherwise than as a result of a breach by any party of any obligation of confidentiality to which it is subject;

1.3 is disclosed to the student by a person which did not acquire the information under an obligation of confidentiality; and

1.4 is independently acquired by a student and as a result of work carried out by a person to whom no disclosure of such information has been made;

2. No party shall use or disclose confidential information except with the prior written consent of GIBS or in accordance with an order of a court of competent jurisdiction or in order to comply with any law or governmental regulations by which any Party concerned is bound or as may be lawfully requested in writing by any governmental authority.

3. The party undertakes to permanently delete any electronic copies of confidential information received and destroy any confidential printed documentation or similar material in their possession promptly once they are no longer required on completion of the contracted service by the student.

4. On completion of the contracted service by the student, the party is to confirm to the student that they are not in possession of any confidential information.

Gordon Institute
of Business Science
University of Pretoria

Signed at SANDTON on this 5TH day of NOVEMBER 2019.

On behalf of:

SCOTT BROOKS

Name: SIMONE BRYSON Signature:

duly authorised and warranting such authority

Witness:

APPENDIX E: NON-DISCLOSURE AGREEMENT FOR EDITOR

Gordon Institute
of Business Science
University of Pretoria

CONFIDENTIALLY AND NON-DISCLOSURE AGREEMENT

It is a condition of engagement that students shall aid in preserving all confidential information, ideas and plans; any confidential information or any information in respect of any data gathered in respect of their research work. The parties under this agreement agree to the following:

1. The parties of this agreement shall use its best endeavours to keep any information confidential which it has acquired or may acquire pursuant to the research initiative. For the purposes of this clause, confidential information excludes information which:

1.1 is publicly available or becomes publicly available through no act or default of any Party;

1.2 was in the possession of a Party prior to its disclosure otherwise than as a result of a breach by any party of any obligation of confidentiality to which it is subject;

1.3 is disclosed to the student by a person which did not acquire the information under an obligation of confidentiality; and

1.4 is independently acquired by a student and as a result of work carried out by a person to whom no disclosure of such information has been made;

2. No party shall use or disclose confidential information except with the prior written consent of GIBS or in accordance with an order of a court of competent jurisdiction or in order to comply with any law or governmental regulations by which any Party concerned is bound or as may be lawfully requested in writing by any governmental authority.

3. The party undertakes to permanently delete any electronic copies of confidential information received and destroy any confidential printed documentation or similar material in their possession promptly once they are no longer required on completion of the contracted service by the student.

4. On completion of the contracted service by the student, the party is to confirm to the student that they are not in possession of any confidential information.

1 of 2

Gordon Institute
of Business Science
University of Pretoria

Signed at LONDON, UK on this 08 day of NOVEMBER 20 19.

On behalf of:

SCOTT BROOKS

Name: TIFFANY MOORE Signature:

duly authorised and warranting such authority

Witness:

APPENDIX F: CODE BOOK

Codes	PM	PC	TOTAL
Challenge/need for PMs on sustainability is to understand expectations	4	2	6
Challenge: Attaining stakeholder equity	7	2	9
Challenge: Business with junior miners' sustainability risk	5	3	8
Challenge: Change in legislation and interpretation thereof	3	0	3
Challenge: Client deemed to have more sustainability drive ownership	10	2	12
Challenge: Client not volunteering information	1	0	1
Challenge: Client prioritisation of environmental sustainability	1	1	2
Challenge: Contractors expected to hire locals	5	0	5
Challenge: Corruption harms governance	3	3	6
Challenge: Developing sustainability skills in technical vocations	0	1	1
Challenge: Disputes with communities can terminate projects	1	0	1
Challenge: Driving safety of employees	4	0	4
Challenge: Getting funding for sustainability costs	1	0	1
Challenge: Government capacity to enforce sustainability lacking	2	2	4
Challenge: Identify stakeholder influenced by or that can influence project	1	2	3
Challenge: Identifying local stakeholder's representatives	2	1	3
Challenge: Intimidation/violence by local stakeholders	5	0	5
Challenge: Language/cultural dynamics	2	1	3
Challenge: Late additions to sustainability expectations costly	4	1	5
Challenge: Lessening local long-term dependency on project	0	2	2
Challenge: Local middlemen costly	1	0	1
Challenge: Local skills/capabilities difficult to source	8	3	11
Challenge: Logistics a major project concern	1	0	1
Challenge: Long term environmental sustainability difficult to define	1	0	1
Challenge: Managing client project cost/time expectations	2	0	2
Challenge: Miscommunication between stakeholders	1	0	1
Challenge: Multitude of government stakeholders	1	0	1
Challenge: Non-equator bank sustainability performance not strict	0	1	1
Challenge: PM attaining work permits for expats	2	0	2
Challenge: PMs need to bring in specialist contractors	2	2	4
Challenge: Political agenda	2	2	4
Challenge: Pollution overflows	1	0	1
Challenge: Preference for local vs standardization and design compliance	1	0	1

Codes	PM	PC	TOTAL
Challenge: Process to recruit the right skill is onerous	1	0	1
Challenge: Project conflict with local population	4	1	5
Challenge: Project employment limited duration	2	0	2
Challenge: Project risk is immigration compliance	1	0	1
Challenge: Project sites occupied by artisanal/illegal miners	2	3	5
Challenge: Project vs operation skill mismatch	1	0	1
Challenge: Provision for environmental rehabilitation	0	2	2
Challenge: Relocation/habitation of stakeholders	1	3	4
Challenge: Separation between local and national stakeholders	3	0	3
Challenge: Short term costs vs long term gains	1	2	3
Challenge: Social spend a grudge purchase	1	0	1
Challenge: Social spend squandered	2	2	4
Challenge: Social sustainability a low priority	1	0	1
Challenge: Social sustainability lacks definition	4	1	5
Challenge: Staying abreast of community expectations	1	2	3
Challenge: Sustainability cost/time	5	3	8
Challenge: Sustainability expectations differ by project/country	4	0	4
Challenge: Technology drives unemployment	2	0	2
Challenge: Training for local labour	5	1	6
Challenge: Understanding environmental expectations	0	1	1
Challenge: Understanding sustainability expectations through reactive experience	7	2	9
Challenge: Unskilled labour affects quality/time	3	1	4
Challenge: Wealth creation exacerbates competitive conflict	0	1	1
Context: Approval constraints	4	0	4
Context: Area sensitivity/context determines drivers	1	1	2
Context: Avoidance of imposed performance obligations	0	2	2
Context: Blue chip mine owner	1	0	1
Context: Brownfields/optimisation project work	1	0	1
Context: Community ignorance to long-term environmental sustainability	1	0	1
Context: Community voice overrules others	1	2	3
Context: Compliance to avoid risk a recent maturity	1	0	1
Context: DRC legislation unclear	1	0	1
Context: Efforts to improve productivity/reduce downtime	1	0	1
Context: Engineering skills well regarded	1	0	1
Context: Environmental impact during construction small	1	0	1
Context: Environmental sustainability not strict outside South Africa	1	0	1

Codes	PM	PC	TOTAL
Context: Environmental sustainability strict in South Africa	2	1	3
Context: Experience in Botswana	1	0	1
Context: Experience in DRC	3	3	6
Context: Experience in Ghana	4	1	5
Context: Experience in Guinea	2	0	2
Context: Experience in Mali	0	1	1
Context: Experience in Mozambique	1	0	1
Context: Experience in Sierra Leon	1	0	1
Context: Experience in South Africa	9	4	13
Context: Experience in Tanzania	0	2	2
Context: Experience in Zambia	1	1	2
Context: Experience in Zimbabwe	3	2	5
Context: Family reliance on job holders	1	0	1
Context: Geotechnical complexity affects feasibility	0	1	1
Context: High payback on optimization work	1	0	1
Context: Illegal mining a big culprit in environmental harm	1	0	1
Context: Increase in focus on environmental issues	1	1	2
Context: Lack of local infrastructure	3	1	4
Context: Lack of local legislation	1	1	2
Context: Legislation is clear in Ghana	2	0	2
Context: Less governance increases sustainability responsibility of project orgs	0	1	1
Context: Local communities very resilient	1	0	1
Context: Local communities vulnerable	2	1	3
Context: Local engagement easier without established unions	1	0	1
Context: Local focus on short-term sustainability	1	0	1
Context: Long term sustainability responsibility resides with client	1	1	2
Context: Low environmental legislative focus	1	0	1
Context: Mine owner historically deemed responsible for sustainability efforts	3	0	3
Context: Mine rights application process specific to country	1	0	1
Context: Nationals have more skills and easier to bring in	1	0	1
Context: Platinum processing plant	1	0	1
Context: PM Legitimacy	7	6	13
Context: PM/Client project vs product lifecycle focus	0	1	1
Context: PMs drive environmental agenda	2	1	3
Context: Prior Experience in social vocation	0	1	1
Context: Prior experience in technical vocation	4	2	6
Context: Prior inclination toward sustainability	0	1	1

Codes	PM	PC	TOTAL
Context: Project in conflict area	1	1	2
Context: Project JVs to ensure skills	1	0	1
Context: Project management theory insufficient	1	1	2
Context: Project site rural/informal with poverty and unemployment	5	2	7
Context: Project sponsors	1	0	1
Context: Projects gather large attention	1	2	3
Context: Sensitive locations	1	0	1
Context: Social bigger focus in South Africa	0	1	1
Context: Social concerns in Africa contentious	4	0	4
Context: Social stakeholder considerations vast	1	2	3
Context: Social sustainability a larger focus than environmental	2	2	4
Context: South African communities more vocal on sustainability than other African nations	0	1	1
Context: Sustainability a low priority historically	4	2	6
Context: Water a focus of environmental sustainability	3	2	5
Driver for environmental sustainability is conscience/responsibility	2	2	4
Driver for environmental sustainability is legislation	4	2	6
Driver for PM sustainability is social awareness	3	0	3
Driver for social sustainability is legislation	3	2	5
Driver for sustainability is local community	9	4	13
Driver: BEE Spend	1	0	1
Driver: Black Economic Empowerment	1	0	1
Driver: Client sustainability expectations/needs	5	0	5
Driver: Environmental activism	2	0	2
Driver: Environmental legislation strict	1	1	2
Driver: Equator bank sustainability performance onerous	1	2	3
Driver: Funders expectations	2	2	4
Driver: Large cost of labour/social unrest	4	1	5
Driver: Organisational standards	0	2	2
Driver: Reducing cost	1	0	1
Driver: Reputation is a driver for sustainability	3	1	4
Driver: Ripple events	1	1	2
Driver: Social capability a competitive advantage	2	1	3
Driver: Social driven by conscience/responsibility	1	1	2
Driver: Social licence to operate required	5	4	9
Driver: Water optimization improves production	1	0	1
Drivers for PM sustainability is legislation	3	1	4
Enabler for PM is client engagement with locals	6	0	6
Enabler: Better educated labour	1	0	1

Codes	PM	PC	TOTAL
Enabler: Blue chip companies better at sustainability compliance	5	3	8
Enabler: Clarity in social legislation	1	1	2
Enabler: Communication forums	3	3	6
Enabler: Contractor partnerships with local businesses	0	1	1
Enabler: Early stakeholder engagement positive for PM	5	3	8
Enabler: Environmental compliance easy	3	1	4
Enabler: Environmental requirements well defined	5	1	6
Enabler: Establishment of local office provides employment	1	0	1
Enabler: Giving locals a fair chance at employment	2	1	3
Enabler: Government speeding up application processes	1	0	1
Enabler: Healthy PM/client relationship	1	1	2
Enabler: IFC benchmark standards	0	2	2
Enabler: Legislation on sustainability has become clearer	1	0	1
Enabler: Legislation	0	1	1
Enabler: Local capability reliance improves over long-term	2	2	4
Enabler: Local governments ensuring provision of local employment	1	0	1
Enabler: Local labour eager to learn	1	0	1
Enabler: Local partnerships beneficial	4	2	6
Enabler: Locally based HR	4	0	4
Enabler: Nurture local business creation	5	3	8
Enabler: Organisational strategy on sustainability	1	4	5
Enabler: PM social sustainability benefits client long term	0	2	2
Enabler: Political engagement	1	1	2
Enabler: Project wide basic conditions of employment good for stakeholder expectations	3	0	3
Enabler: Projects dedicated environmental specialist	5	2	7
Enabler: Skills available to address environmental sustainability	2	3	5
Enabler: Social spend from project budget	4	0	4
Enabler: Technology	4	0	4
Enabler: Train for non-project related vocations	0	1	1
Enabler: Transparency	0	1	1
Enabler: Understanding of sustainability requirements	3	3	6
Enabler: Use of social experts/consultants	5	3	8
Enabler: Vetting of local capabilities/skills	3	1	4
Environmental legislation examples	1	0	1
External companies brought in to do EIAs	1	0	1
Outcome: Access to electricity	2	0	2
Outcome: Attracting corporate citizenship	0	1	1

Codes	PM	PC	TOTAL
Outcome: Avoidance of bad publicity	0	1	1
Outcome: Clean water supply is a measure	3	1	4
Outcome: Clear conscience of responsibility	2	1	3
Outcome: Community upliftment	2	4	6
Outcome: Competitive advantage	1	3	4
Outcome: Conflict avoidance through local engagement	2	1	3
Outcome: Environmental sustainability is through mitigation of damage	4	1	5
Outcome: Environmental sustainability success through compliance with latest regulations	2	2	4
Outcome: Environmental sustainability through EIA compliance	2	0	2
Outcome: Happy workforce meaningful	2	1	3
Outcome: Increase in local disposable income	1	0	1
Outcome: Increased schooling/education	2	1	3
Outcome: Increased transportation access	1	0	1
Outcome: Local business growth	6	3	9
Outcome: Local infrastructure improvement	5	1	6
Outcome: Meeting predefined goals	0	1	1
Outcome: Meeting project time/cost schedule	1	0	1
Outcome: Mine area provide environment sanctuary	1	0	1
Outcome: Post project employment of locals	7	2	9
Outcome: Proactive sustainability	2	0	2
Outcome: Productive workforce is meaningful	1	0	1
Outcome: Project provide skills upliftment	8	3	11
Outcome: Project providing local employment	5	0	5
Outcome: Provision of decent meals is meaningful	1	0	1
Outcome: Reliance on renewables	1	0	1
Outcome: Safety of employees	3	0	3
Outcome: Social sustainability measure is amount of training	1	0	1
Outcome: Social sustainability success measure is compliance with legislation	1	0	1
Outcome: Spreading work spreads profits and lowers risk	0	1	1
Outcome: Stakeholder support	1	4	5
Outcome: Successful sustainability audits	1	1	2
Outcome: Sustainability success measure is lack of industrial action/stoppage	6	2	8
Outcome: Sustainability awareness	0	1	1
Process: Account for lessons learned	1	1	2
Process: Client communication	1	0	1

Codes	PM	PC	TOTAL
Process: Constant community engagement on expectations	5	2	7
Process: Define internal standards	0	1	1
Process: Define sustainability accountability	0	1	1
Process: Develop trusted relationships/networks	0	1	1
Process: Engage with contractors on sustainability expectations	2	0	2
Process: Environmental impact study needed for mining licences	2	0	2
Process: Environmental management plans needed	1	1	2
Process: Environmental sustainability achieved through design	5	1	6
Process: Establish and commit budget for social spend	1	2	3
Process: Identify social stakeholders	2	1	3
Process: Identify solvable social needs	2	4	6
Process: Monitor and direct social spend without giving money	1	1	2
Process: Monitor and record environmental effects	1	0	1
Process: Need to engage with politicians/chiefs/leaders	3	3	6
Process: PMs must engage with political/government entities	2	1	3
Process: Project feasibility needs due time and attention	1	0	1
Process: Public participation hearings	1	0	1
Process: Reliance on client sustainability input for feasibility studies	2	0	2
Process: Self-imposed audits	1	2	3
Process: Social sustainability achieved through design	2	0	2
Process: Stakeholder engagement best driven by senior management	1	1	2
Process: Sustainability expectations must be defined upfront	8	5	13
Process: Systems for long term compliance	1	2	3
Process: Track PESTLE	0	1	1
Trend: A more proactive approach to sustainability	3	2	5
Trend: Corporate conscience of sustainability responsibility required from PMs	3	1	4
Trend: Design for sustainability	1	0	1
Trend: Earlier and onerous stakeholder engagement for licence to operate	1	1	2
Trend: Economic stakeholders want sustainability beyond compliance	0	1	1
Trend: Increase in sustainability consciousness	1	5	6
Trend: Investor scrutiny on sustainability	1	0	1
Trend: Legislation becoming more stringent	1	2	3
Trend: Need for fast and accurate reactions to expectations gaps	0	1	1
Trend: PMs will need to be skilled in sustainability	2	1	3

Codes	PM	PC	TOTAL
Trend: Projects will have higher focus on social engagement	2	0	2
Trend: Projects will need to hire more locals	2	0	2
Trend: Projects will require sustainability specialists alongside PMs	1	3	4
Trend: Reframing organisational mission for sustainability	2	1	3
Trend: Shift of social responsibility onto PM	7	2	9

APPENDIX G: NEW CODES PER INTERVIEW FOR PROJECT MANAGERS

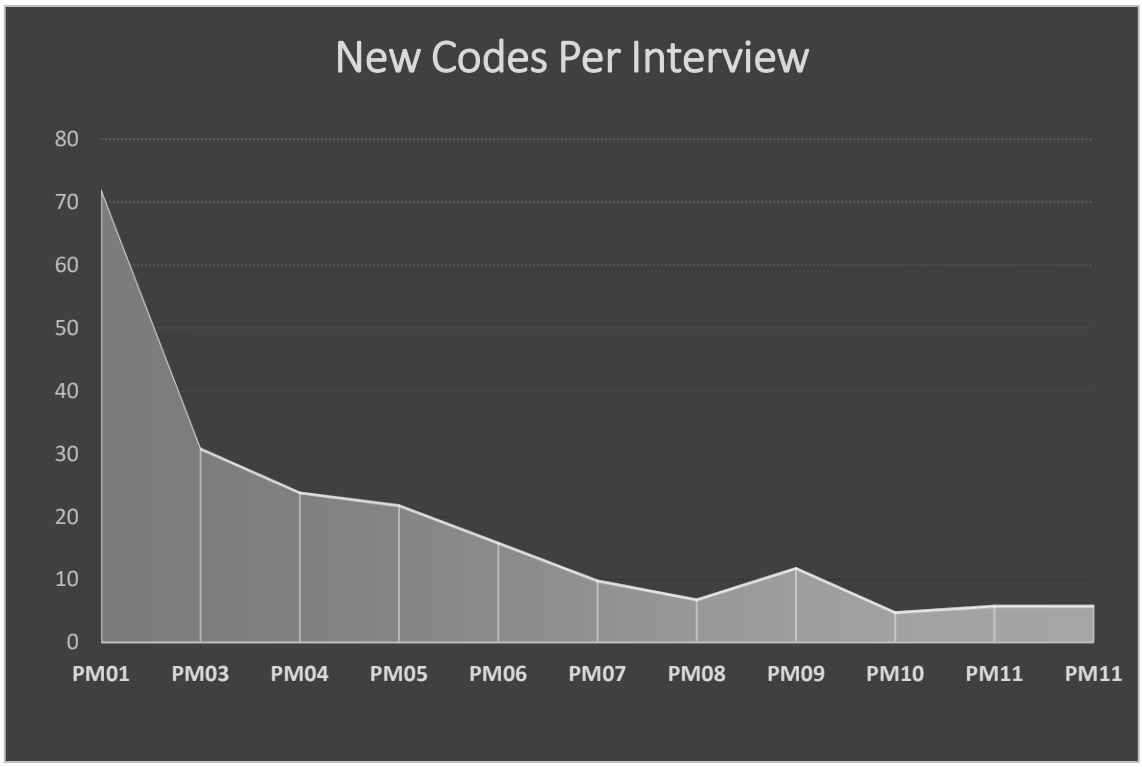

Figure 7: New Codes Per Interview for Project Managers

APPENDIX H: NEW CODES PER INTERVIEW FOR PROJECT CLIENTS

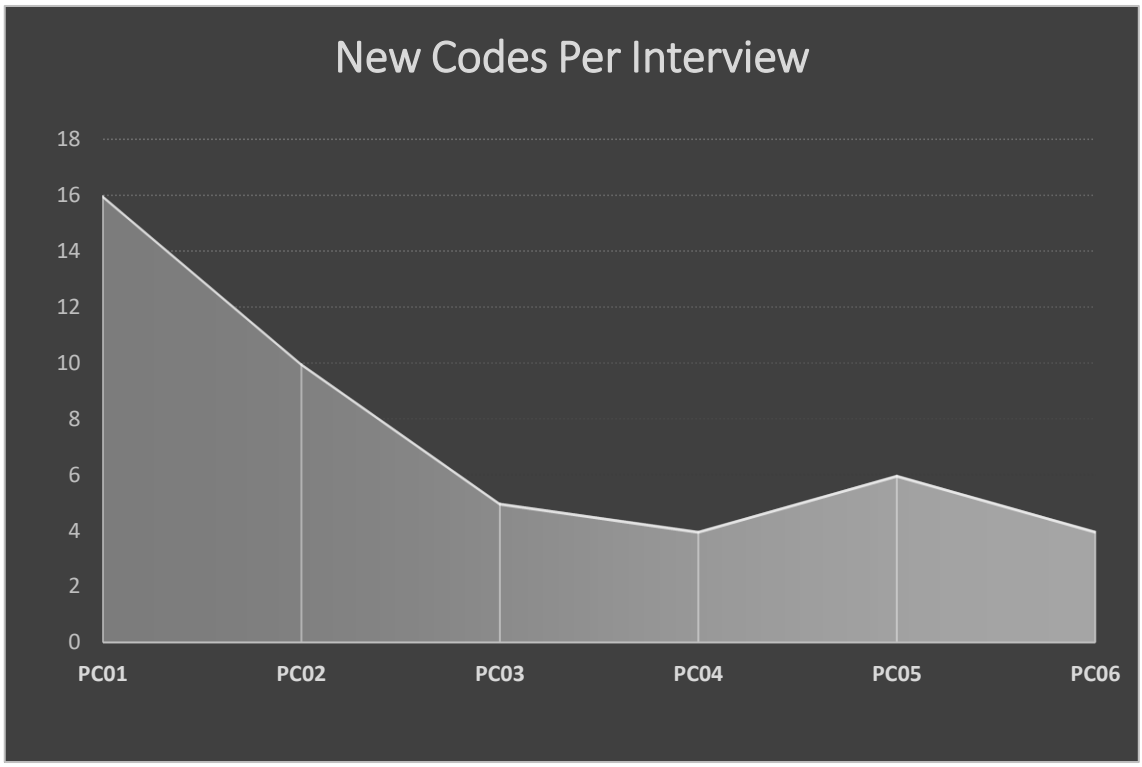

Figure 8: New Codes Per Interview for Project Clients