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CONFERENCE PAPER

## Exploring the Effects of Centralised Procurement on Projects in South African Matrix Mining Organizations

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### Abstract

**Synopsis:** The increasing use of centralized procurement in South African mining organizations has led to the need to understand the effect that this procurement governance model has on project procurement performance in matrix organizations. The purpose of this study is:

- a) to understand the challenges experienced in projects in South African matrix mining organizations using centralized procurement;
- b) to explore how the aforementioned challenges impact project performance in terms of time, cost, quality and client satisfaction.

**Relevance for practice education:** The study has identified knowledge gaps in centralized procurement literature especially in the context of the South African mining industry, which encourages further research in this field.

**Research design:** This paper presents the findings of a qualitative study, where 13 semi-structured interviews were conducted with project managers, procurement officials and suppliers of 5 different mining organizations in South Africa.

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**Main findings:** The study found that centralized procurement in a matrix mining organization is not perceived by the research participants to significantly influence procurement or project performance. The perception of the interviewees is that there are mainly positive effects in adopting centralized procurement in matrix mining organizations.

**Research implications:** The study highlights the relevance of centralized procurement in the mining industry in South Africa and denotes areas of improvement within the industry which could improve project procurement as well capital expenditure.

## Keywords

**Centralised procurement, Matrix organization, Mining, South Africa**

## Introduction

Time is a very precious commodity in projects, as it is generally linked to the cost performance of the project (Mahmoud-Jouini, Midler, & Garel, 2004). History and research has shown that most projects suffer from project schedule delays, budget overruns, poor quality and countless contractual claims, which are influenced by the risky and uncertain nature of projects, variation in project deliverables and excessive phase overlaps, amongst others (Dvir, T, & Shenhar, 2003; Yeo & Ning, 2006). Therefore much can still be done in terms of studying project challenges/failures and how these situations can be avoided (Glass, 1999). An area that requires further research is project procurement management. In Padalkar and Gopinath's (2016) most recent paper which summarises thematic trends and future opportunities in six decades of project management research, it is stated that the procurement management knowledge area has only been minimally represented. Furthermore, one of de Araújo, Alencar and de Miranda Mota's (2017) findings (following their structured literature review of project procurement management) is that future procurement research must consider new perspectives, such as client/supplier relations, due to the importance of having partnerships with suppliers that meet organizational needs. For these reasons, this study explores the procurement governance model for projects executed in matrix mining organizations in South Africa. The procurement governance model used in a project to a large extent determines the nature of the client/supplier relationship and imposes certain project procurement advantages and challenges (Blomberg, 2006; McBeath, 2011).

South Africa's mining community makes a significant contribution to the gross domestic product (GDP) of the country and is one of its primary employment sectors (Chamber of Mines of South Africa, 2013; Gunter, 2009; M. I. Walker & Minnitt, 2006). In 2012, the total expenditure of the South African mining industry was ZAR 497.1 billion<sup>1</sup>, 33% of this was spent on operating and procurement costs. Furthermore, a sum of ZAR 59 billion was dedicated to capital expenditure in order to ensure growth and sustainable production (Chamber of Mines of South Africa, 2013). The mining industry in South Africa is valued at ZAR 650 billion (Gunter, 2009).

The mining community invests substantial capital into the economy, through procuring projects and this investment needs to be carefully managed. Therefore procurement management is one of the key areas where project costs and delays can be reduced, as less time

<sup>1</sup> The rate of exchange for the South African Rand (ZAR) on the 10th of November 2017 is 1 US\$ Dollar = R 14.33 [XE currency, 2017]

spent on procurement results in less time-related costs for each procurement process, reduced risks, less uncertainties and improved coordination between construction and project managers (Humphreys, McIvor, & McAleer, 2000; D. H. T. Walker & Rowlinson, 2008).

In this study Sparrius's (2016) definition of procurement is used which states that "procurement is the process of creating, performing and completing a contract which is mutually beneficial to all parties, with the intent to cement a long-term relationship between the parties." Procurement is a very important function for suppliers and clients to build sustainable and mutually beneficial relationships and to ensure that the acquisition of engineering and construction materials and professional services is done in a cost-effective manner (Sparrius, 2016). In the mining industry procurement is facilitated through a procurement governance model. This model determines the framework for client/supplier interaction as it governs the way in which the need for goods or services are determined, the identification of suppliers, bid solicitation and awarding and managing contracts. The procurement governance model sets the basis for cooperation between the client and suppliers and is essential to manage costs, and increase the quality of the deliverables (Sparrius, 2016).

A mining organization can adopt a centralized, decentralized or mixed method procurement governance model. Decentralised procurement is a model which delegates procurement decision making to the different operations of the organization, thus localizing procurement activities. In contrast, centralized procurement concentrates decision making to a central point such as the headquarters of the organization and all procurement activities are handled there. Mixed methods is a combination of centralized and decentralized procurement (Blomberg, 2006; McCue & Pitzer, 2000).

The procurement governance model is undertaken within an overall organizational structure, which for most mining companies is either functional or matrix (D. H. T. Walker & Rowlinson, 2008). The two basic organizational structures are the functional structure and the pure project structure. The matrix structure is a combination of the two basic structures (du Plessis, 2014; Steyn et al., 2016). Matrix organizations try to combine the strengths of functional structures (such as the development of key competencies, continuity at project closure and the availability of resources to all projects) and pure project structures (focus on project objectives and on the project client, flexibility, speed and team spirit). This study will only focus on the matrix organizational structure which is discussed in more detail in the next section.

Successful execution of project procurement in a matrix structure with a centralized procurement governance model is quite a challenge (McBeath, 2011). In many such instances, the organization has a project management office which delivers projects, working alongside other functional departments, this has its own set of advantages and disadvantages. Project managers find the matrix organizational structure immensely bureaucratic especially when the project is complex and there are many uncertainties (Geraldi, 2008). Therefore it is very likely that this is also the case when working in a matrix organization with a centralized procurement governance model.

There is a host of literature on centralized procurement governance models in several industries in both the public and private sector (Aritua, Smith, & Bower, 2011; Murray, Rentell, & Geere, 2008; Pemsel & Wiewiora, 2013; Saharidis, 2011; Singh, 2007). However, research regarding this topic in the mining industry is limited. Moreover, very little research exists regarding the procurement governance model and organisational structure within which a project must be done and its influence on project procurement performance (i.e., time, cost,

quality and client satisfaction) (Financial Review Business Intelligence, 2012; McBeath, 2011; D. H. T. Walker & Rowlinson, 2008). Therefore, this paper aims to investigate procurement processes, considering the following research questions:

1. What are the effects of a centralized procurement governance model on a matrix mining organization in South Africa?
2. How do the identified effects impact on project performance in terms of time, cost, quality and customer satisfaction?

The unit of analysis is mining organizations in South Africa.

This paper summarises the work and results of an inductive, qualitative study, consisting of semi-structured interviews, which were transcribed and analyzed by means of pattern matching, and interpreted. The next section of this paper reviews the research on the centralized procurement governance model and matrix organizational structure; then the research methodology is described. A discussion of the study findings follows, including the practical and theoretical implications thereof. Finally, the study is concluded with recommendations for further research.

## Literature Review

### CENTRALISED PROCUREMENT GOVERNANCE MODEL

Centralised procurement has been studied in some detail in various countries (e.g., Brazil, the European Union and Uganda) and industries (e.g., ICT, defense and government) (Agaba, E. and Shipman, 2007; Cox, 2002; Sorte, 2013). However, literature regarding centralized procurement in mining organizations is sparse.

Centralised procurement is one of the methods preferred by mining companies such as Anglo American. (McBeath, 2011). Anglo American is a leading global mining company with assets in the South African mining industry. In 2015 the company expended ZAR 12.6 billion<sup>2</sup> on procurement (Govender, 2015). Generally, organizations tend to gravitate towards centralized procurement, as it allows them to leverage their economies of scale, obtain buying power, control decision making, streamline processes and enforce governance (Blomberg, 2006; Vagstad, 2000; M. I. Walker & Minnitt, 2006; Yeo & Ning, 2006).

Centralised procurement is also associated with sacrificing the budget holder's autonomy, the individual in charge of delivering the project has little power to use their budget as they see fit (Murray et al., 2008). There is evidence that suggests that this could negatively impact on projects delivery and could result in greater cost expenditure (Eriksson & Westerberg, 2011). This system is also hierarchic as the approval of contracts is done by the central procuring review body, and the release of purchase orders is done by procuring officials who are centrally located at the headquarters, this can introduce inefficiencies in the procurement process, which could increase project costs (Singh, 2007).

Centralised procurement requires the procurement officials to elicit information from project managers, or delegate decision making as they have little knowledge of the mine and local suppliers' capabilities (Vagstad, 2000). This is because most South African mines are situated in remote locations, while procurement for these mines is in most instances done at the head office. The distance between the procurement officials and the mine can cause project

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<sup>2</sup> . The rate of exchange for the South African Rand [ZAR] on the 10th of November 2017 is 1 US\$ Dollar = R 14.33 [XE currency, 2017]

managers and operational staff to have unrealistic expectations and often delays purchasing activities. This may place the procurement official under pressure to skip certain steps, thus neglecting the procurement policies (Financial Review Business Intelligence, 2012; Wittig, 1999). According to the Financial Review Business Intelligence (2012), procurement officials often lack adequate skills, training, and resources to seek the correct vendor for the tender, to conduct work at the level required by the project manager, and they have difficulty with maintaining long-term supplier relationships (Micheli, Cagno, & Di Giulio, 2009; Pesämaa, Eriksson, & Hair, 2009; Singh, 2007; Tysseland, 2008; Wardani, Messner, & Horman, 2006).

The shortcomings of centralised procurement need to be addressed as improved procurement has many benefits for an organisation, such as purchasing the correct equipment the first time which reduces quality costs, drives standardisation (everyone is buying similar products) and the organisation is able to gather market intelligence, thus obtaining the best technology at the best prices, all of these benefits are of monetary consequence (Blomberg, 2006).

### **MATRIX MINING ORGANIZATIONS**

Organisational structures are said to be vital for organizational performance, specifically procurement, as well as for accomplishing the project mission (Pettijohn & Qaio, 2000; D. H. T. Walker & Rowlinson, 2008). A mine's organizational structure should be designed to promote efficient project procurement and should not be an obstacle to complete the project objectives. Mining industries cannot use a pure projects structure, as their core business is selling ore not projects, nor can they rely on a purely functional structure, because they need projects to improve and sustain the business. They resort to a matrix organization which is far more integrative and agile (Steyn et al., 2016).

When a matrix structure is implemented well, the organisation should be working as a team, focused on the strategy, fully integrated across projects and functions, thus making resource sharing easier, and therefore information transfer will be efficient, and there will be sufficient skills development (du Plessis, 2014; Steyn et al., 2016). The matrix structure is beneficial for mining organizations as it is agile and can adapt to change. However, the matrix structure can present its own challenges. Project managers struggle with slow decision making in matrix organizations as a result of the conflicting objects of the different functional managers. Project delivery may also be slower due to resource over-allocation and multi-tasking caused by resources being assigned to multiple projects or operational tasks (Steyn et al., 2016).

Organisational structures have been discussed in the context of its characteristic composition (Ahmady & Mehrpour, Maryam Nikooravesh, 2016), its influence on communication (Král & Králová, 2016) and strategy implementation (Hyväri, 2016), amongst others. However, literature to substantiate the influence of matrix organizational structures on procurement is very limited. This study will specifically explore the effect of a matrix mining organization on centralized project procurement.

### **CENTRALISED PROCUREMENT IN A MATRIX MINING ORGANIZATION**

The current situation in the South African mining industry is that mineral deposits are limited and are getting harder to access. Increasing pressure is being put on mining companies to mine more responsibly, and with changing economic conditions, mining can become expensive and unsustainable. The strategic objectives of the mining companies are normally aligned with

these changing circumstances, and capital budgets are allocated to operations, which carry out projects to meet these objectives (Govender, 2015). The projects are executed on-site by the project managers while procurement is done by the purchasing department at head office (Humphreys et al., 2000; McBeath, 2011; Saharidis, 2011). Supplier selection and contracts are negotiated centrally, and contractual terms are valid for all business units. Specialist procurement officials negotiate high-value contracts to increase bargaining power which encourages the standardization of products (D. H. T. Walker & Rowlinson, 2008). According to Murray et al. (2008), “centralized procurement operates on the basis of a specialized unit being in place through which procurement strategy is developed and implemented, and all tactical and operational procurement is channeled.” Centralized procurement is used by executives to maintain control over important decisions, and is used as a tool to maximize efficiency and maintain company integrity (Gianakis & Wang, 2000).

According to Blomberg (2006), “Anglo-American recently decided to move from a decentralized procurement governance model to a centralized procurement governance model.” With the old procurement model, each operation had its own procurement staff compliment. However, they realized, that they had common suppliers in areas such as petroleum, oils and greases, explosives, yellow equipment, tires, temporary labor, and other services. This meant that they could consolidate spending across operations by creating four groups.

This restructuring improved their ability to leverage economies of scale, and they were able to identify cost-saving initiatives by merging their spending in each category which resulted in optimized operations and lower prices through global sourcing. However, the disadvantages of centralized procurement were that project managers did not have any control over the sourcing for their project, long lead times on items, inflexibility and little to no relationship between the project manager and the supplier(s).

The performance of project procurement in a matrix organization can only be measured according to the Key Performance Indicators of the entire project; therefore procurement should be delivered on time, within the correct specifications, within budget and must meet the customers’ expectations (Sparrus, 2016). It is proposed that these four performance measures may be influenced by the ten challenges associated with centralized procurement as identified from the literature. Table 1 provides a summary of these challenges and their effect on centralized procurement in matrix organizations.

## Conceptual Model and Research Propositions

A conceptual model is proposed in Figure 1 which focuses on matrix organizations in the South African mining sector. Specifically, centralized procurement governance and how this effects project procurement performance, measured in terms of time, cost, quality and client satisfaction.

Effective and efficient project procurement is vital in the mining industry and needs to be done in the smartest manner possible to ensure that the organization is sustainable. The following propositions are put forward in this study based on the literature summarised in Table 1.

**P1-1: A HIGH NUMBER OF MISALIGNED KEY PERFORMANCE INDICATORS BETWEEN PROJECT MANAGERS AND PROCUREMENT OFFICIALS WHEN USING CENTRALIZED PROCUREMENT IN MATRIX ORGANIZATIONS CAUSES CONFLICT AND PUTS PRESSURE ON THE PROCUREMENT OFFICIAL.**

According to Aritua et al. (2011), the procurement department and project office generally have misaligned key performance indicators. An example is the procurement official's maintenance of the company's bidders list by removing inactive suppliers. However, this exercise could impact the project manager's ability to obtain competitive rates during the tender process as shorter bidders lists could lead to collusion among bidders. The misaligned key performance indicators may also result in the project managers having unrealistic deadlines, which clash with the procurement official's procurement protocol, thus placing undue pressure and creating conflict between the two parties.

**P1-2: LOW SUPPLIER INVOLVEMENT IN PROJECT SCOPING LEADS TO POOR SCOPE OF WORKS AND REWORK.**

Market intelligence gathering is a crucial activity in project procurement. However, the client (project manager) and supplier often do not interact until the execution phase. This can lead to multiple risks, depending on the project phase at that time (Edler et al., 2003). Normally the policies and systems in centralized procurement do not allow the project manager to go into the market prior to the execution phase, as this can lead to corruption (Blomberg, 2006; Pettijohn & Qaio, 2000; Wardani et al., 2006). Moreover, poor market intelligence, can result in poor scope of works, rework and time wastage.

**P1-3: THE FURTHER (DISTANCE) THE PROCUREMENT OFFICIAL IS FROM THE MINE (OPERATIONS), THE LESS HIS UNDERSTANDING OF SITE NEEDS.**

Mining operations staff are best informed about their local conditions, and best positioned to choose a local supplier (Wittig, 1999; Yeo & Ning, 2006; Yeqing, 2003). It is recommended that procurement officials be located closer to the operations so that they can be aware of operational needs (Blomberg, 2006; Yeqing, 2003). This means that the distance between where the procurement takes place and where the project takes place leads to a lack of understanding of site needs and delays in procurement and price variations.

**P1-4: FEEDBACK BETWEEN THE SUPPLIER AND CLIENT WILL BUILD MUTUAL TRUST AND ENSURE REPEAT BUSINESS FOR THE SUPPLIER.**

The procurement official plays an important role in developing the relationship with the supplier. In some cases, the procurement official does not have a relationship with the suppliers, which is disadvantageous for ensuring quality and for relational functions such as negotiating contracts (McBeath, 2011; Sparrius, 2016). Failing to develop this relationship with the supplier can lead to poor delivery from suppliers and poor trust between the parties which affects the supplier's ability to improve and obtain repeat business (Wittig, 1999; Yeo & Ning, 2006).

**P1-5: FLEXIBILITY IN PROCUREMENT GOVERNANCE LEADS TO FASTER EMERGENCY RESOLUTION.**

Projects are uncertain, and poor risk identification often leads to project managers pushing the procurement officials to expedite procurement (Haseeb, Bibi, & Rabbani, 2011; Love,

Gunasekaran, & Li, 1998). Unfortunately, there's no flexibility with centralized procurement, as there are many rules and regulations in place which inhibit expediting emergency work, as and when required by the project manager (Gerald, 2008; McCue & Pitzer, 2000).

**P1-6: THE GREATER THE NUMBER OF CHANGES IN ROLES AND RESPONSIBILITIES IN THE CENTRALIZED PROCUREMENT OFFICE IN A YEAR, THE SLOWER THE PROCUREMENT PROCESS TURNAROUND TIME.**

The procurement officials in a centralized procurement governance organization do not have a standard role or responsibility assigned to them, they get distributed according to the workload, or need, and this has an effect on efficiency because they may not be competent for the job (Financial Review Business Intelligence, 2012). This also impacts on performance because they move from one role to another, which means that they do not get time to learn and become efficient in their work. These role changes can result in multitasking and student syndrome, meaning that they cannot focus on a task; therefore activities get delayed, and as a result, project performance may begin to decline (Nicholas & Steyn, 2012; Steyn et al., 2016).

**P1-7: PROCUREMENT OFFICIALS WITH LIMITED KNOWLEDGE AND SKILLS IN THE PROCUREMENT OFFICE LEAD TO SLOWER PROCUREMENT PROCESS TURNAROUND TIME.**

Great emphasis is placed on the training of procurement officials to be better equipped to do their jobs (Blomberg, 2006; Humphreys et al., 2000; McBeath, 2011; Yeqing, 2003). Financial Review Business Intelligence (2012) and Wittig (1999), states that the procurement official often lacks adequate training and resources to conduct the work at the level required by the project manager. Sometimes the low skill level affects their ability to seek the correct supplier for the tender.

**P1-8: THE MORE PEOPLE THE PROCUREMENT OFFICIAL REPORTS TO THE SLOWER THE PROCUREMENT PROCESS TURNAROUND TIME.**

A challenge of matrix organizations is multiple boss syndrome. The project management office co-exists with other functions, and the project manager allocates work to individuals in other departments (Steyn et al., 2016). The official procurement reports to the procurement manager and the procurement manager have conflicting business requirements from the project manager, and this leaves the project managers operating in a space of minimal authority over the procurement officials (Steyn et al., 2016). In most cases, the functional managers' legitimate power, wins the war for resources. In this case, the project manager needs to use interpersonal skills to overcome this challenge and get the procurement official to assist them with adequate urgency (du Plessis, 2014).

**P1-9: THE SLOWER THE TURNOVER OF APPROVALS IN MATRIX ORGANIZATIONS, THE SLOWER THE PROCUREMENT PROCESS TURNAROUND TIME.**

Functional managers are focused on how to do the job, they are specialists in what they do and normally operate in silo's, which can prevent the sharing of resources (Steyn et al., 2016). The different managers are not aligned with their work execution strategies, and this can result in slower decision making. In some cases, the delivery of projects procurement may be slower due to resource multitasking, as the procurement official is allocated tasks simultaneously, in multiple projects (Steyn et al., 2016).

## **P1-10: GOOD RELATIONSHIPS BETWEEN PROCUREMENT OFFICIALS AND PROJECT MANAGERS, LEADS TO BETTER PROCUREMENT SERVICE DELIVERY.**

The matrix structure is heavily reliant on interpersonal relationships (du Plessis, 2014). The project manager normally has to make commitments regarding the project without any positional power (especially legitimate power) due to the hierarchy in matrix organizations. This situation forces the project manager to rely on personal power to get the job done. If there is no relationship between the project manager and procurement official, the project manager will not be able to influence the procurement official to assist in accomplishing the project goals. This would mean that the procurement process would be late, over budget and sub-standard leading to an unsatisfied client.

## **Research Methodology**

This section describes the research methods. A realism perspective was adopted, using an inductive interview-based qualitative study, which is presented in this paper. The research will seek to describe the cases in their real-world context, attempt to explain why some conditions exist and to propose research questions or procedures to be used in the subsequent research study (Yin, 2014).

The unit of study is the South African mining industry. According to the Chamber of Mines of South Africa (2013), there are eighty-seven mining companies affiliated with them in South Africa. These include open cast and, underground mining operations. The study investigated companies which have mines in South Africa. However, these companies could be foreign owned. As the respondents from the selected mining companies are spread across South Africa, telephonic interviews were done. To have a well-rounded view of the research problem, practitioners responsible for the procurement in a project, the project manager and the project suppliers for each of the study mining organizations, were approached to participate in the study.

## **Development of data collection instrument**

Semi-structured telephonic interviews were chosen as the data collection instrument. The interview questions were derived from literature and tested in a small pilot study. The first set of questions ask the interviewee to describe their designation or role in the organization, responsibilities, how often their role had changed, if they received training and the key performance indicators for their role. The second set of questions revolved around the procurement governance model used in their organization, the reason for the model and some exploratory questions regarding pros and cons of the model. Thirdly, information is requested about how market intelligence is gathered and how procurement emergencies are handled. The next questions are about their company's organizational structure, reporting structures, and the interpersonal relationships which exist between themselves and their suppliers and colleagues. Finally, if the interviewees state that they are project managers they are asked about the procurement performance in their project(s) in terms of schedule, budget, quality and client satisfaction.

## **Sampling and data collection**

Gunter (2009), states that five cases and ten interviews are sufficient, while Baškarada (2014) states that anything less than fifteen is insufficient for qualitative research. A sample of five

mining companies in iron ore, diamond, copper and manganese mining, as well as their suppliers were invited to take part in the study. Purposive sampling was used to identify fifteen participants that were then approached to participate in the study, thirteen responded positively. To collect a variety of data and get integral information, the interviewees consisted of procurement officials, project managers or suppliers from various mining organizations in South Africa. The sample group was also not restricted to people from organizations with a specific procurement governance model or organizational structure. The interviews were conducted in a semi-structured manner with open-ended questions; these questions were adjusted depending on the person's role (Project manager, procurement official or supplier). Transcriptions were made immediately after the interviews and sent back to the interviewees for validation (Flick, 2009). The sample demographics of the interviewees is provided in Table 2.

## Data analysis method

Case-study design is appropriate when the context of the research must be clearly understood. Case-study design is considered a pragmatic approach that permits employment of multiple methods and data sources to attain a rich understanding of the phenomenon under investigation. The findings from such multiple methods can be reconciled in case-study analysis, specifically through a pattern-matching technique (Almutairi, Gardner, & McCarthy, 2014).

After the interviews had been transcribed and checked by the interviewee pre-set and open coding was used to study the text. Pattern matching was used as the method of analysis in this study. This method compares the predicted patterns and/or effects with the ones that have been theoretically observed, and the identification of any variances or gaps (Baškarada, 2014; Yin, 2014). This study tested the necessary conditions by assessing whether outcome  $y$  is present when condition  $x$  exists. A number of conditions or categories were derived from literature. By counting the number of interviewees who mention the outcome  $y$  (codes/ expected effects) when condition  $x$  (challenge in centralized procurement) is present, or by counting the number of times the outcome is stated, it will be determined whether outcome  $y$  is related to condition  $x$ .

The proposition is disconfirmed if there is no evidence of predicted effects when a certain challenge is present. Greater differences in rival patterns/effects make the pattern matching easier, and disconfirming conclusions/results are more convincing (Baškarada, 2014). This means that when using pattern matching, confirmations of counterintuitive predictions will be more convincing than confirmations of logical predictions.

## Analysis and Results

This section is divided into two parts, the first is an assessment of project procurement duration and the second investigates the ten propositions which are put forward herein. 13 interviews were held out of the 15 who were invited to participate, and this is a response rate of 86.7%. Walker and Selfe in Human and Steyn (2013) states that a minimum response rate of 70% is required for qualitative research. Response rates are graded from 8% as being 'unacceptable' to 100% as being 'excellent'; therefore the response rate for this study was recorded as acceptable (Human & Steyn, 2013). A count summary for the codes associated with each of the ten challenges/propositions is provided in Table 3.

## Procurement duration

The interviewees had similar views regarding the duration of the procurement process. The data revealed an average procurement process cycle of 3.8 months with the outliers considered. However, this figure decreased to 1.7 months when the outlier responses were excluded. No duration guidelines could be found for procurement process turnaround times in the mining industry; however, according to USAID Deliver Project (2013), the procurement process should generally take between 1 and two months. The centralized procurement interviewees had an average procurement process duration of 2 months, and the decentralized procurement interviewees had one month. Both are within the recommended time frame. It should be noted that there is a perception from centralized procurement interviewees that they perceive the procurement turnaround time to be much longer.

## Discussion of proposition results

### **P1-1: A HIGH NUMBER OF MISALIGNED KEY PERFORMANCE INDICATORS BETWEEN PROJECT MANAGERS AND PROCUREMENT OFFICIALS WHEN USING CENTRALIZED PROCUREMENT IN MATRIX ORGANIZATIONS CAUSES CONFLICT AND PUTS PRESSURE ON THE PROCUREMENT OFFICIAL.**

The codes used to investigate the first proposition were *conflict*, *pressure on procurement official*, *less competition and collusion among bidders* which together were mentioned four times. The code 'collusion among bidders' arose during transcription as it is a practice that is quite common in the South African procurement landscape. Time and budget were the key performance indicator's that were mentioned the most in centralized procurement, and this was common for both procurement officials and project managers. There was not enough evidence to support the pattern that a high number of misaligned key performance indicators between project managers and procurement officials when using the centralized governance model in the matrix organization results in conflict and pressure on the procurement official.

### **P1-2: LOW SUPPLIER INVOLVEMENT IN PROJECT SCOPING LEADS TO POOR SCOPE OF WORKS AND REWORK.**

The codes for this proposition were, *poor scope of work*, *rework and time wastage*, which were mentioned a total of ten times. Although all suppliers had to some extent been involved in the scoping of the project, they mentioned that it was not often done in the mining industry. Four of the suppliers also mentioned that the scope of works received, lacked detail and led to poor tender outcomes such as receiving few, no bids or incorrect bids. A few of the interviewee's pointed out that being involved in the scoping earlier on greatly improves the results of the tenders as the person adjudicating is able to adjudicate on similar work, and the prices are normally similar. In cases where the suppliers were not involved earlier in the project, the suppliers ended up with insufficient designs, poor scope of works, rework, and price variations. Based on the data analyzed it is evident that low supplier involvement in scoping leads to poor scope of works and rework.

### **P1-3: THE FURTHER (DISTANCE) THE PROCUREMENT OFFICIAL IS FROM THE OPERATIONS, THE LESS HIS UNDERSTANDING OF SITE NEEDS.**

*Site requirements*, *delays in procurement*, *knowledge of local suppliers*, *incompetent suppliers* and *price variations* were the codes used to identify this procurement challenge/proposition. In

total, the codes were mentioned ten times. Most interviewees mentioned that the procurement department was in the city or at their headquarters and that the procurement official did not understand the mine's requirements and the implications of remote locations in terms of quoting. There was also a need for the procurement official to understand operational requirements, as this affects the tender process. For those with decentralized procurement, they reported a better understanding of site requirements as a benefit of a decentralized model. These interviewees also reported that the reason for adopting a decentralized procurement governance model was because of different site requirements. Therefore the further (distance) the procurement official is from the operations, the lower the understanding of site needs.

**P1-4: FEEDBACK BETWEEN THE SUPPLIER AND CLIENT WILL BUILD MUTUAL TRUST AND ENSURE REPEAT BUSINESS FOR THE SUPPLIER.**

The challenge/proposition regarding feedback between client and supplier had the following codes, *poor communication with suppliers, issues with payments, affects negotiating, lack of repeat business, and poor delivery from suppliers*, which were mentioned a total of twenty-four times. However, eleven of the thirteen interviewees mentioned either having a progress meeting or closure meeting where feedback was given to the supplier, and two of them mentioned that this was used as criteria for repeat business. One of these interviewees used centralized procurement and the other decentralized procurement. Good communication between the supplier and project manager ensured that the supplier received feedback and obtained an opportunity to improve. Based on the responses feedback between the supplier and client builds mutual trust and ensures repeat business for the supplier.

**P1-5: FLEXIBILITY IN PROCUREMENT GOVERNANCE LEADS TO FASTER EMERGENCY RESOLUTION.**

This proposition had the following codes: *pressure on procurement official to skip steps, slow resolution, and delays*, which were mentioned fourteen times in total. The results show that emergency resolution in both centralized and decentralized procurement can take 2.5 weeks. According to the USAID Deliver Project (2013), procurement emergencies should be treated within a week. Most interviewees stated that procurement could be expedited in cases of emergencies in their organizations. Therefore, the flexibility or strict policies of the organization's procurement model did not affect emergency resolution.

**P1-6: THE GREATER THE NUMBER OF CHANGES IN ROLES AND RESPONSIBILITIES IN THE CENTRALIZED PROCUREMENT OFFICE IN A YEAR, THE SLOWER THE PROCUREMENT PROCESS TURNAROUND TIME.**

This category had the following codes, *approval, slow, change of role, dealing with different procurement personnel*, which was mentioned 15 times in total. Four out of the five suppliers felt that they dealt with different individuals during the procurement process or for procurement matters during the project. Fifty percent of the centralized procurement officials had changed roles in the past year. This was reported as having an impact on the procurement turnaround time. It was found that the greater the number of changes in roles and responsibilities in the centralized procurement office in a year, the slower procurement process turnaround time.

### **P1-7: PROCUREMENT OFFICIALS WITH LIMITED KNOWLEDGE AND SKILLS IN THE PROCUREMENT OFFICE LEAD TO SLOWER PROCUREMENT PROCESS TURNAROUND TIME.**

The challenge/proposition of training and skills development had the following codes: *slow procurement process, trained, skilled, underwent training, none technical*, which were mentioned a total of twelve times. All the suppliers reported dealing with procurement officials who were proficient in handling contracts and the tender process, however, some did mention that they struggled with clarification questions as the procurement official was not technically knowledgeable. The procurement officials were well trained therefore their lack of training did not affect procurement process turnaround times. As none of the interviewees had dealt with incompetent procurement officials, there is no evidence to support the proposition that the presence of procurement officials with limited knowledge and skills in the procurement office leads to slower procurement process turnaround time.

### **P1-8: THE MORE PEOPLE THE PROCUREMENT OFFICIAL REPORTS TO THE SLOWER PROCUREMENT PROCESS TURNAROUND TIME.**

The codes for this proposition/challenge was: *slow procurement process, procurement official reporting to project manager and procurement manager, too many approvals*. In total, the codes were mentioned 11 times. There were cases where the procurement official has to report to the procurement and project manager. However in none of these cases was procurement found to be slower than the standard two months. Therefore reporting to multiple people is not perceived to impact the procurement process turnaround time.

### **P1-9: THE SLOWER THE TURNOVER OF APPROVALS IN MATRIX ORGANIZATIONS, THE SLOWER THE PROCUREMENT PROCESS TURNAROUND TIME.**

This challenge/proposition had the following codes, *too many approvals, slow procurement process, slow decision making* which was mentioned a total of fourteen times. The suppliers mentioned that multiple approvals were required for invoice payments which meant that suppliers received late payments and the creation of purchase orders is delayed which affects project commencement. Therefore the slower the turnover of approvals in matrix organizations, the slower the procurement process turnaround time.

### **P1-10: GOOD RELATIONSHIPS BETWEEN PROCUREMENT OFFICIALS AND PROJECT MANAGERS, LEADS TO BETTER PROCUREMENT SERVICE DELIVERY.**

The codes for this proposition were as follows: *relationships, communication between the project manager and the procurement officials and conflict*, which were mentioned thirty-two times in total. The project managers mentioned that their good working relations, as well as the respectful interactions with suppliers, had resulted in efficient procurement delivery. This relationship often helps them to expedite procurement processes. Some mentioned that there are conflicts which arise however these are healthy conflicts and make the procurement official perform better. Therefore good relationships between procurement officials and project managers lead to better procurement service delivery.

## **1.1 DISCUSSION OF PROJECT PROCUREMENT PERFORMANCE RESULTS**

Three of the suppliers had projects which were late, and four of the five suppliers were involved with projects that were over budget. One of the centralized procurement project managers

had a late project which was over budget, and the other project was just over budget. On the other hand, the rest of the project managers were involved with projects that were performing satisfactory and were adhering to scope. Centralised procurement alone cannot cause delays within the projects. However, as shown earlier the procurement governance structure can influence the project space in many other ways which could result in delays and costlier projects.

## Conclusions and Recommendations

In this qualitative study, 13 practitioners representing five different mining organizations in South Africa were interviewed. The purpose of the study was to explore the effects of centralized procurement on projects in South African matrix mining organizations. Data was gathered through telephonic semi-structured interviews. An inductive approach was used to analyze the interview data in order to answer the research questions:

1. What are the effects of a centralized procurement governance model on a matrix mining organization in South Africa?
2. How do the identified effects impact on project performance in terms of time, cost, quality and customer satisfaction?

Contrary to the literature survey conducted, the results from the study showed various positive effects associated with projects in organizations using centralized procurement. Procurement in this environment is still completed within the recommended two months. Procurement staff were found to be well qualified and experienced within the organizations with centralized procurement. The findings show that the project managers and procurement officials are aligned in terms of important performance indicators. The project manager is also able to expedite the centralized procurement process in cases of emergencies. The procurement official and project manager are able to keep records of the suppliers' performance which is used to determine repeat business.

The disadvantages of centralized procurement are that the procurement official is normally based at the organization's headquarters (in the city), while the project is undertaken on the mine, which may be in a remote location. There is perceived to be a lack of market intelligence gathering for scoping purposes on the part of the procurement official, which is crucial for obtaining the right suppliers, avoiding rework and subsequent price variations. This distance between head office and site impacts the procurement official's participation in solicitation and project meetings, and they generally don't understand the scope of works and site requirements. The distance reduces the frequency and quality of communication between the project manager and the procurement official. Moreover, the fact that the two parties are not co-located is also detrimental to their working relationship; therefore, there is often conflict between them. However, this conflict is perceived to be beneficial as it tends to expedite the procurement process.

Some of the specific effects of centralized procurement in a matrix mining organization are:

- Slow decision making in terms of turnover of approvals which slows procurement.
- Low supplier involvement in scoping the projects as the procurement officials are allocated to multiple projects and based at head office.
- The procurement officials have a poor understanding of site requirements/needs as they are allocated to multiple projects and based at head office.
- Little to no relationship between procurement staff and suppliers which reduces trust and supplier performance and the possibility of repeat business.

- Changes to the roles and responsibilities of procurement officials are perceived to increase the procurement process turnaround time.

It was found that centralized procurement in matrix mining organizations does not affect the turnaround time for emergency procurement. The fact that procurement officials in such organizations report to multiple bosses is not perceived to influence project procurement turnaround time significantly. The study found that centralized procurement in a matrix mining organization is not perceived to influence procurement or project performance significantly.

Some of the disadvantages of centralized procurement in matrix mining organizations could be addressed by mines encouraging and supporting frequent interaction between the project manager and procurement official as well as between the procurement official and suppliers. This would facilitate communication, assistance with procurement processes, as well as decision making. They should also investigate the use of engineer, procure, construct and manage (EPCM) contracting strategies, which may improve scoping and reduce rework and price variations.

The theoretical implications of the study are that it provides insight into the effect of centralized procurement on projects in South African matrix mining organizations, which to date has not been explored in the literature.

A limitation of the study was that the data analyzed did not include company records of previous project cost and schedule indexes to substantiate details regarding project procurement duration and time taken to resolve procurement emergencies. All the information gathered was based on the interviewee's perception and some of the procurement performance information could contain bias based on the interviewee's role in the study. It is recommended that a quantitative study be done which includes secondary data such as company records to assess how many projects in a portfolio tend to experience delays during procurement and determine the extent of the delays.

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## Tables and Figures

Table 1 A summary of the challenges and effects of centralized procurement in matrix organizations.<sup>3</sup>

Summary of challenges and effects of centralised procurement in matrix organisations		
Challenges	Effects	Reference
P1-1. Misaligned Key performance indicators between procurement official and project manager, which can lead to reduction in vendor lists. Governance being put over quick delivery of procurement services.	Less competition, collusion among bidders, pressure on procurement official, conflict between PO and PM	(Aritua, 2011; Blomberg, 2006) (Walker & Minnitt, 2006; Singh, 200
P1-2. Low interactions between the project manager and the contractor prior to implementation, due to policies which can result in low market intelligence gathering and poor tender documents.	Poor scope of works, reworks, time wastage	(Blomberg, 2006; Pettijohn & Qaio, 2000; Wardani, 2004).
P1-3. Procurement offices are often far away from the operations which leads to poor communication between project managers and procurement officials.	Lack of understanding of site needs, delays in procurement, low knowledge of local suppliers, incompetent contractors, price variations	(Yeqing, 2003; Blomberg, 2006), (McBeath, 2011; Vagstad, 2000). Hanlin & Kaplan (2011)
P1-4. Lack of feedback loop between contractor and client which can affect supplier relationships.	Poor communication with suppliers, issues with payments, affects negotiating, lack of repeat business, poor delivery from suppliers	(McBeath 2011; Sparrius 2013), (Mahmoud-Jouini, et al., 2004), (Ye Ning, 2006; Wittig, 1999)
P1-5. Strict policies don't allow for flexibility in order to treat emergencies.	Pressure on procurement official, slow resolution, delays	(Wittig, 1999)
P1-6. Having multiple roles and responsibilities in short periods, or constantly changing roles.	Multitasking, slower procurement turnaround time	(Steyn, et al.,2013) .
P1-7. Training and skills development obtaining training for your roles, showing knowledge of role.	Slower procurement turnaround time	(Humphreys, et al., 2000; Blomberg, 2006; McBeath, 2011; Yeqing, 200
P1-8. Multiple boss syndrome- reporting to the project manager and procurement manager at the same time. Each has their different requirements.	PO reported to PM and Procurement manager, multitasking, slower turnaround time	(Steyn, et al.,2013) .
P1-9. Decision making - Slow to make decisions due to governance framework and meetings which need to be held.	Too many approvals, slow procurement process, slow decision making	(Steyn, et al.,2013) .
P1-10. Interpersonal relationships, Good relationships between the procurement and project personnel assisting with communication.	Poor relationships (related to distance), infrequent communication (struggle to get ahold of the procurement personnel),	(du Plessis, 2014)

<sup>3</sup> Acronyms: PO refers to the Procurement official and PM refers to the Project Manager

Table 2 Sample demographics

<b>Gender</b>	5 females
	8 males
<b>Role</b>	5 project managers
	3 procurement officials
	5 suppliers
<b>Project management experience</b>	3-5 years
<b>Time period supplier has been working with mine</b>	7-15 years
<b>Centralised procurement in organization</b>	9 interviewees
<b>Decentralised procurement in organization</b>	4 interviewees
<b>Matrix structure in organization</b>	10 interviewees
<b>Functional structure in organization</b>	3 interviewees

Table 3 Summary of challenges and effects of centralized procurement in matrix organizations

Categories	Codes	Times mentioned by interviewees
<b>P1-1. Misaligned key performance indicators between procurement official and project manager, which can lead to a reduction in vendor lists. Governance being prioritized over quick delivery of procurement services.</b>	Conflict, pressure on procurement official, less competition, collusion among bidders	4
<b>P1-2. Low interaction between the project manager and the supplier prior to implementation, due to policies which can result in low market intelligence gathering and poor tender documents.</b>	Poor scope of work, rework, time wastage	10
<b>P1-3. Procurement offices are often far from the operations which lead to poor communication between project managers and procurement officials.</b>	Site requirements, delays in procurement, knowledge of local suppliers, incompetent suppliers, price variations	10
<b>P1-4. Lack of feedback loop between supplier and client which can affect supplier relationships.</b>	Communication with suppliers, issues with payments, negotiating, repeat business, delivery from suppliers, turnkey	24

Table 3 continued

<b>P1-5. Strict policies do not allow for flexibility in order to treat emergencies.</b>	Pressure on procurement official, slow resolution, strict policy, compliance with governance	14
<b>P1-6. Having multiple roles and responsibilities in short periods, or constantly changing roles slows down the procurement process turnaround time.</b>	Approval, slow, change of role, dealing with different procurement personnel	15
<b>P1-7. Training and skills development obtaining training for your roles, showing knowledge of role.</b>	Slow procurement process, trained, skilled, underwent training, none technical	12
<b>P1-8. Multiple boss syndrome-reporting to the project manager and procurement manager at the same time.</b>	Slow procurement process, procurement official reports to project manager and procurement manager, too many approvals	11
<b>P1-9. Decision making - Slow to make decisions due to governance framework and meetings which need to be held.</b>	Slow approvals, slow procurement process, slow decision making	14
<b>P1-10. Interpersonal relationships, Good relationships between the procurement and project personnel assisting with communication.</b>	Relationships, communication, conflict	32

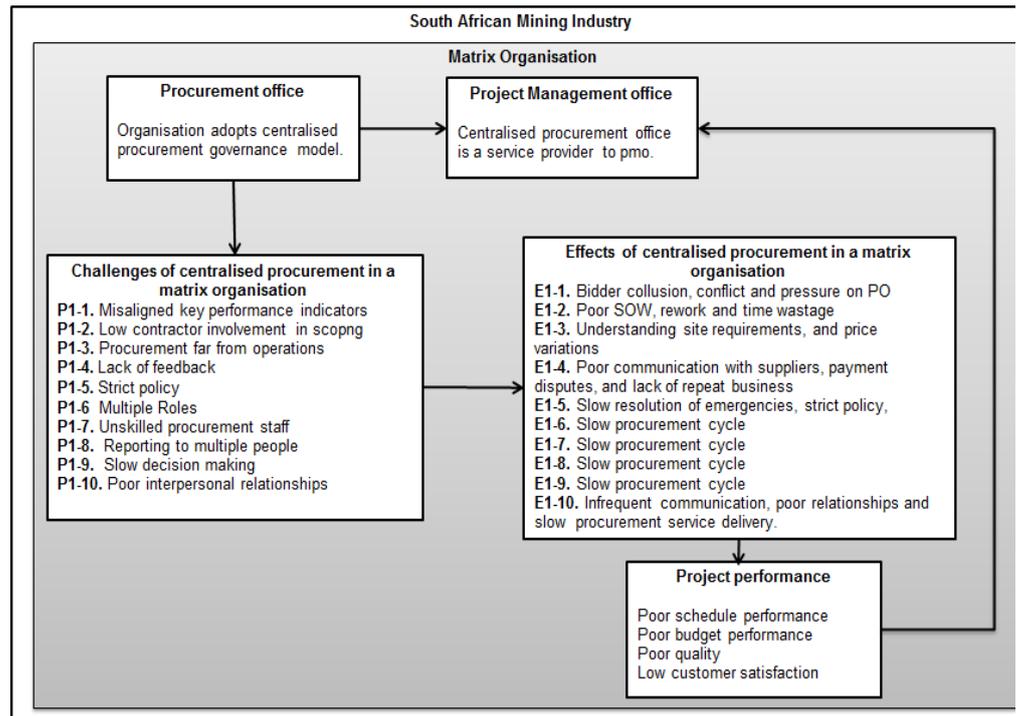


Figure 1 Conceptual framework