ECONOMIC VALUE ADDED AND MARKET VALUE ADDED; CAN IT BE ACHIEVED BY IMPROVING ORGANISATIONAL CAPABILITY AT DEBSWANA DIAMOND COMPANY?

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ABSTRACT

The main objective of any organisation or business is to create wealth for its shareholders, and Debswana Diamond Company (Debswana) is not an exception. When revenue is more than the cost of doing business and the cost of capital, the business will create wealth for the shareholders. Therefore, wealth for shareholders can be defined as the present value of future returns expected from the equity invested. Maximising shareholders' wealth is important for all profit seeking organisations, regardless of the size of operations. The principle of increasing or maximising wealth is that, the objective of all the organisational activities should be about maximising value. It requires organisational management to have the ability to increase sales, earnings and free cash flow, which will possibly increase returns on funds invested in the business, while mitigating any associated risk of loss. Measuring an organisational value is important for organisations as measuring value takes into account the interests of all stakeholders and not only shareholders. Stakeholders include shareholders, governments, citizens and anyone with interest to the organisation.

Economic Value Added (EVA) is the internal measure of an organisational performance. It is the difference between the current total market value of an organisation and the capital contributed by investors. It is a measure that is mostly associated with creation of wealth for shareholders over time. EVA can be increased through the actions and decisions of managers at the right time. Managers can make decisions and changes that create value using different continuous improvement methodologies. Organisations that use EVA as their financial performance measure focus on operational efficiency, which ensures that assets are closely managed. There are three tactics that can be used by organisations to increase EVA, either earn more profit without using more capital, by using less capital, and invest capital in high return projects.

Market Value Added (MVA) is another measure that can be used to measure shareholders value. It is the difference between the organisational total market value and the capital invested. It measures wealth and assesses the level of value that has been accumulated over a period of time by an organisation and is typically used for companies that are larger and publicly traded.

EVA and MVA are considered critical principles when evaluating an organisational performance with regard to measuring shareholders returns. They are financial performance indicators that can be used to measure the financial results and be correlated to the shareholders' value creation. These two performance indicators measure the true economic performance of an organisation. They are also vital to strategy formulations for the creation of shareholders' wealth by an organisation. Both the EVA and MVA are indicators of, and influenced by the capital invested; therefore any change in the capital invested influences the two indicators.

There is therefore a need to develop Organisational Capability, especially when operating in a rapidly changing and highly turbulent environment like the mining industry. This can allow flexibility in decision making and agility to adapt to the international markets.

This study is aiming at showing the importance of improving Organisational Capability by using the business improvement methodologies like the lean management. The 20 keys to organisational improvement is one of the tools that can be used for lean management approach. This study analysed the impact of implementation of the 20 keys to organisational improvement at one of Debswana's operation (Orapa Letlhakane and Damtshaa mines). Debswana has shown benefits in improving its Organisational Capability through the 20 Keys to Workplace Improvement, even though done at operational level. There were costs saved, improved efficiency and improved safety performance. Some of the benefits included improved morale of the teams, improvement of team works and accountability and ownership by employees.

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TABLE OF ABBREVIATIONS

Abbreviation	Definition
EVA	Economic Value Add
MVA	Market Value Added
MBA	Mini Business Area
VMB	Visual Management Board
GDP	Gross Domestic Product
Debswana	Debswana Diamond Company
OLDM	Orapa, Letlhakane and Damtshaa Mines
JW	Jwaneng Mine
DEA	Department of Environmental Affairs
ROIC	Return On Invested Capital
MRM	Mineral Resources Management
HPO	High Performing Organisation
KPI	Key Performance Indicator
SGA	Small Group Activities
VBM	Value Based Management
TQM	Total Quality Management
EPS	Earnings Per Share
CFROI	Cash Flow Return On Investment
NPM	Net Profit Margin
OPM	Operating Profit Margin
ROI	Return On Investment
RONW	Return On Net Worth
NOPAT	Net Operating Profit After Tax
WACC	Weighted Average Cost of debt and equity Capital
TOC	Theory of Constraints
QCDSM	Quality, Cost performance, Delivery, Safety/health/environmental performance, and employee Morale
5S	Sort, Set in order, Shine, Standardize and Sustain
LTI	Lost Time Injury
RWI	Restricted Work Injury
MTI	Medical Treatment Injury
LTIFR	Lost Time Injury Frequency Rate
CIFR	Classified Injury Frequency Rate
TRIFR	Total Recordable Injury Frequency Rate
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
EBIT	Earnings Before Interest and Taxes

GLOSSARY

GLOSSARY OF TERMS	
Kimberlite	An igneous rock type, which sometimes contains diamonds
Ore	A naturally occurring solid material from which a metal or valuable mineral can be extracted profitably
Mineral Reserve	The economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.
Diamond Resource	A concentration or occurrence of diamonds of economic interest in or on the Earth's crust in such form, quantity (volume/tonnage), grade and value that there are reasonable prospects for eventual economic extraction.
Stockpile	A pile or storage location for bulk materials, forming part of the bulk material handling process
Dilution	Low or zero grade (waste) material that is mined during the course of mining operations and thereby forms part of the Mineral Reserve
Recoveries\yields	All mineral processing activities are subject to losses of the desired mineral, which may occur at all stages of processing. A plant has a recovery which is the mass of product recovered for final disposal, divided by the mass contained in the ROM (Run-Of-Mine) ore fed into the plant, expressed as a percentage.
Concentrate	The product produced by processing ore. The raw ore is usually ground finely in various comminution operations and waste is removed, thus concentrating the mineral component
Grade	The concentration of valuable mineral(s) in the ore
Organisational Capability	An organisation's capacity to deploy its assets, tangible or intangible, to perform a task or activity to improve its performance. These are unique combination of skills, processes, technologies, and human abilities, attitude, behaviour that will assist organisations in gaining competitive advantage against competitors and in turn increasing its value
Blood diamonds	Also referred to as **conflict diamond**, any **diamond** that is mined in areas controlled by forces opposed to the legitimate, internationally recognized government of a country and that is sold to fund military action against that government, and where human rights are violated

Tobin's Q-ratio	The ratio between a physical asset's market value and its replacement value. It is a means of estimating whether a given business or market is overvalued or undervalued
Mine-to-plan	The process of mining the resources according to the defined mining plans. **Mine Planning** is the process of optimizing the exploitation of mineral reserves for maximum added value aligned with the strategic goals and objectives of the business enterprise.
Run-Of-Mine	Ore that comes from a mine before any processing activities are done

CHAPTER 1: INTRODUCTION

1.1. Project Background

1.1.1. Botswana Economy and Mining Industry

‘Botswana has historically enjoyed strong and stable economic growth since independence, with sizable fiscal buffers and prudent policies playing a key role in shielding the economy’, (World Bank, 2020). Figure 1 shows the Gross Domestic Product (GDP) growth over the years. The real GDP growth has averaged 5% since 1960s as per the Republic of Botswana statistics, (Statistics Botswana, 2020). The GDP in 2019 currently estimated at $18.34 billion (World Bank, 2020).

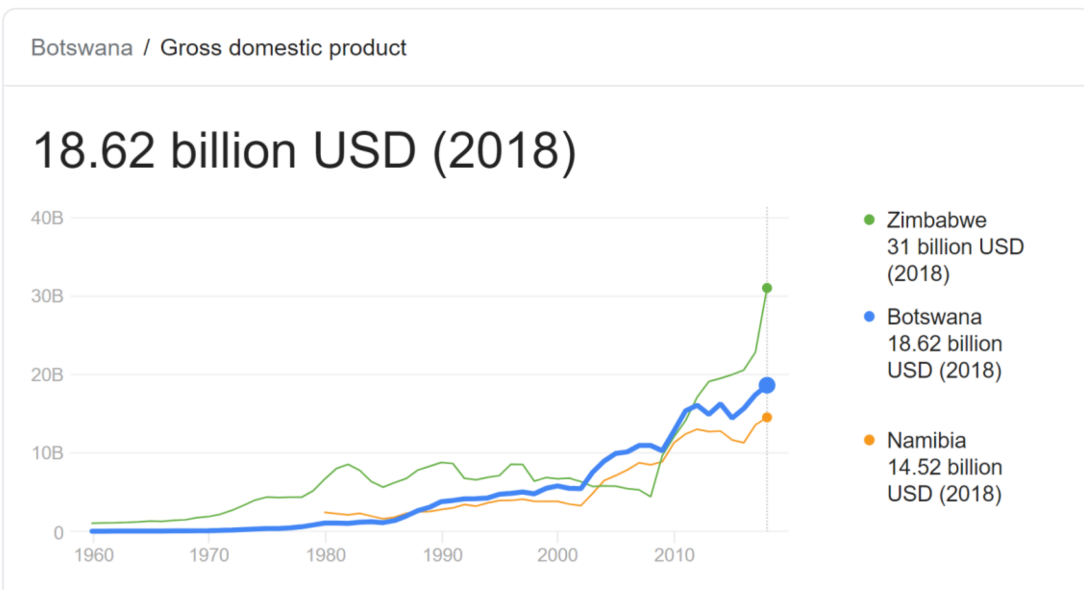


Figure 1: Botswana GDP growth since independence (Source: World Bank)

Botswana’s mining sector plays a fundamental role in the economy of the Republic. Botswana has few mineral resources, including coal, base metals (copper and nickel), diamonds, soda ash, salt, cobalt and uranium. The mining sector contributes about one third of GDP (Figures 2 & 3) and about three quarters of export earnings (Figure 4), and nearly half of government revenue. Diamond mining is a major contributor to the mining sector in Botswana, contributing nearly two thirds alone to principal exports (Figure 4). Botswana uses its resource wealth for socio-economic development while maintaining its political-economic stability by adhering to democracy and free-market principles.

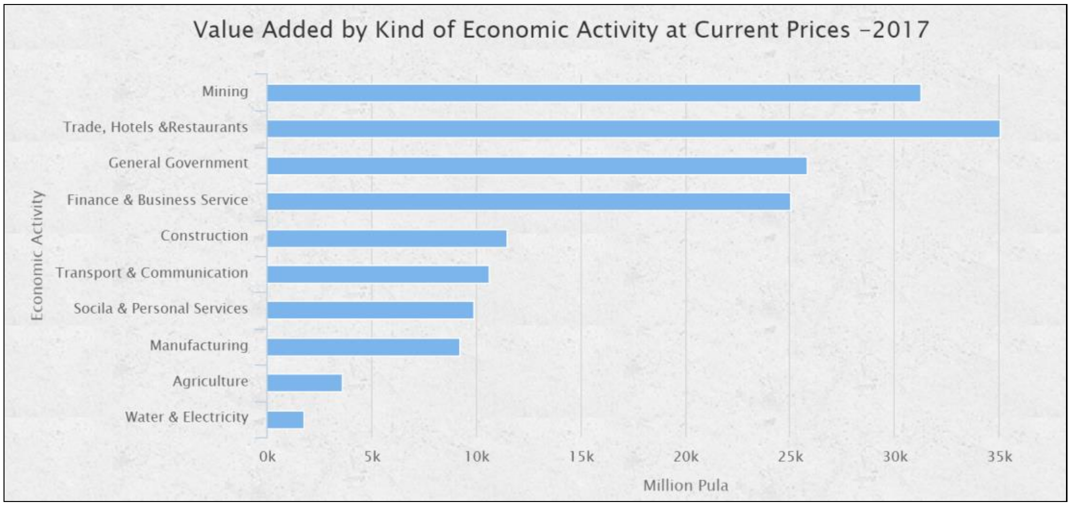


Figure 2: GDP value added by economic activity in 2017*(Statistics Botswana, 2019)*

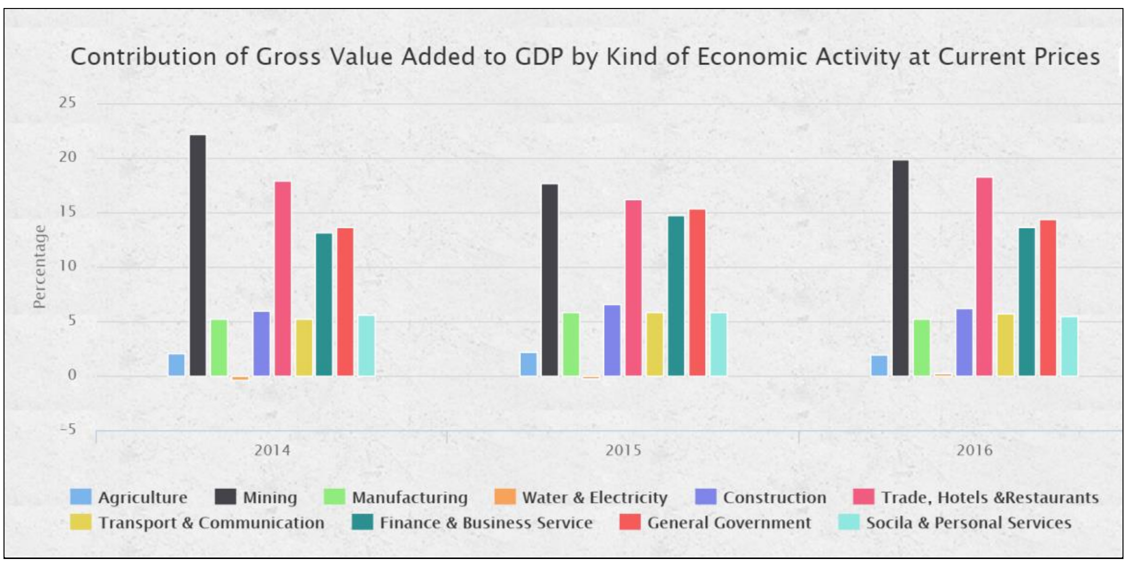


Figure 3: Mining contribution to the GDP over 3 years (2014 - 2016) *(Statistics Botswana, 2019)*

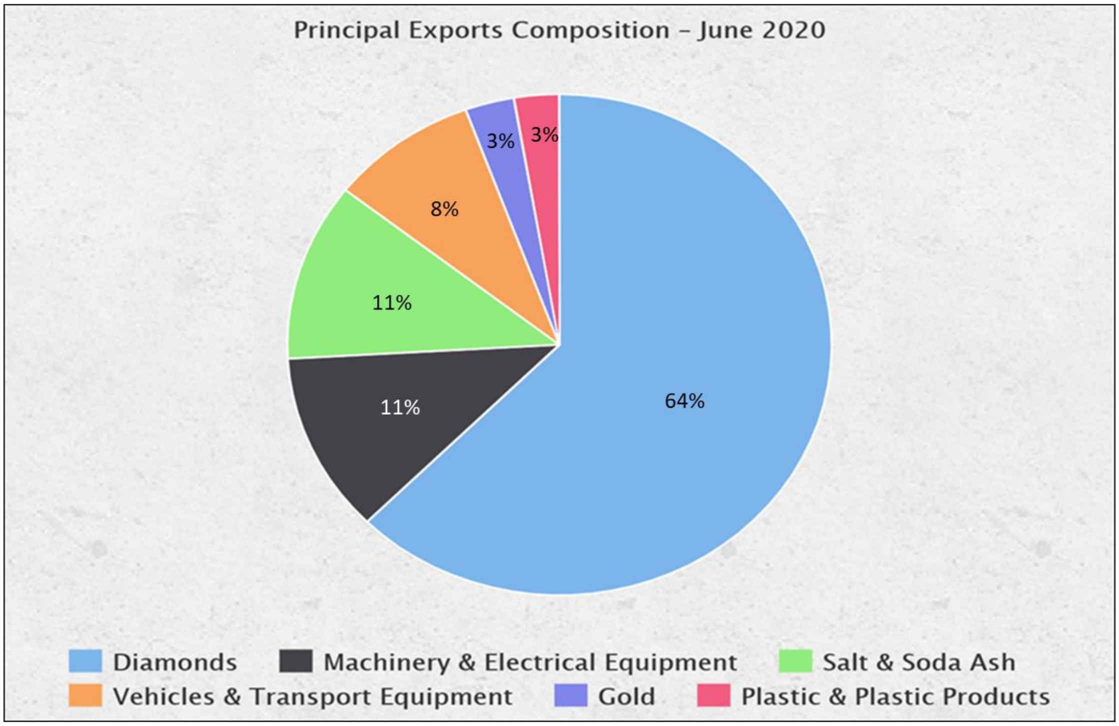


Figure 4: Botswana principal exports in 2020 *(Statistics Botswana, 2020)*

Good management of the mineral reserves and resources is therefore very crucial for sustainable development and economic growth of the country. However, the country's high reliance (as shown in Figure 4 above) on the mining sector pose a risk to its sustainable development and economic growth. There have since been improvements towards diversifying the economy through agriculture and tourism. The Department of Environmental Affairs (DEA) has created mineral accounts, where the physical trends in mineral resource stocks changes and major monetary change trends are quantified so that the country can benefit from the mineral extraction.

1.1.2. Debswana Diamond Company

Debswana is a major diamond mining company in Botswana, with four diamond mine operations, including Orapa, Letlhakane and Damtshaa mines (OLDM) and Jwaneng (JW) mine. All of these operations have relatively large kimberlite pipes. Debswana is part of the De Beers Group of Companies, and is owned in equal shares by the Government of the

Republic of Botswana (GRP) and the De Beers Group of Companies (which is in turn 85% owned by Anglo American and 15% by the GRP) (Figure 5).

De Beers Group of Companies operates in an international market and community. The international or global community can be described as free trade of goods or services across national boundaries, everywhere in the globe regardless of where management is located. An organisation operating in an international market needs to be efficient and eliminate waste to maximise value. The international markets provide both opportunities in terms of wider markets and make the organisation vulnerable to challenges. Recession in foreign markets can have a negative impact on an organisation. The adoption or relaxation of protectionist policies by foreign nations can have either a positive or a negative impact to an organisation respectively.

Debswana is one of the leading diamond producers by volume of rough diamonds (Figure 5), and both value as demonstrated by Figure 6. It is also the major contributor of Botswana's economy, 'contributing significantly to the GDP, foreign exchange earnings and government revenue' (Debswana, 2019).

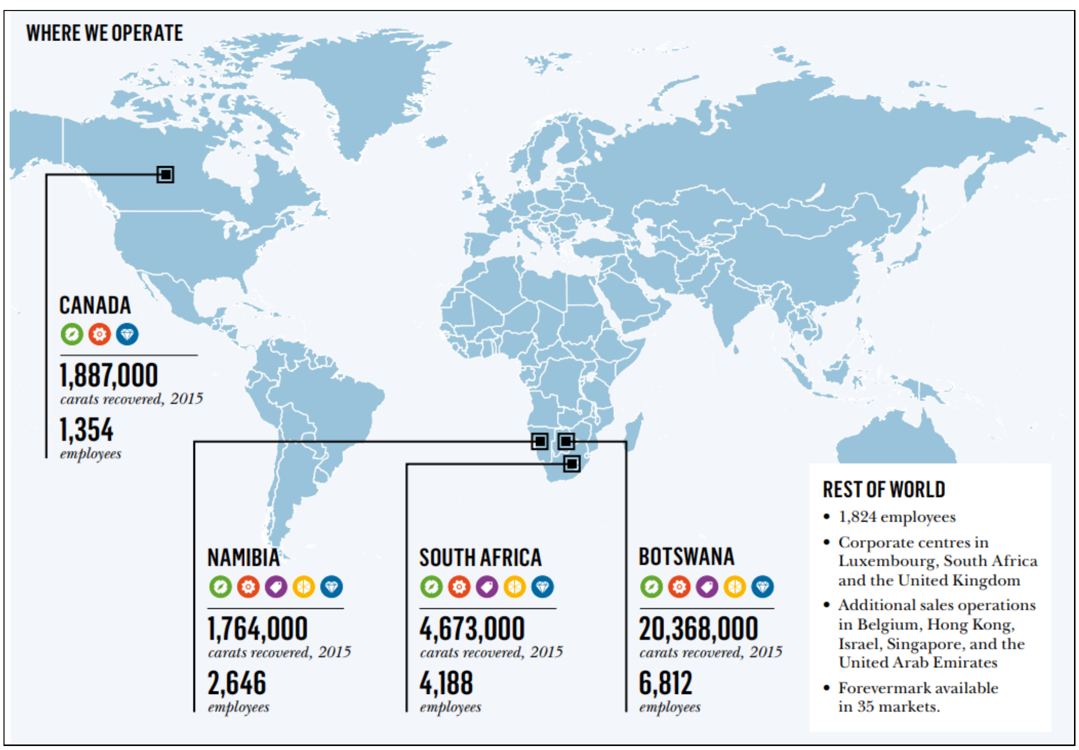


Figure 5: The DeBeers Group of Companies operations (DeBeers Group, 2015)

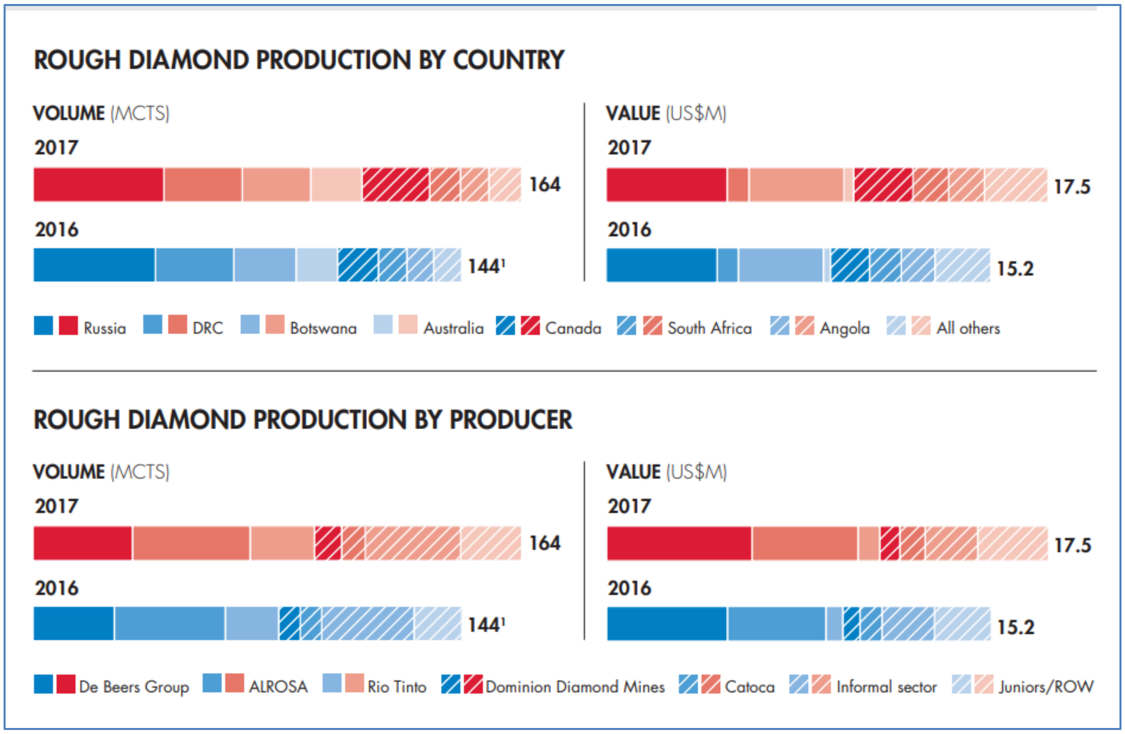


Figure 6: Rough diamond production for the year 2016 & 2017, (DeBeers Group, 2018)

Maximising Debswana's value-add does not only affect its shareholders (De Beers Group of Companies and the RBG), but also Botswana citizens at large. It is therefore in the best interest of all shareholders and the citizens that the management of the mineral resources by the company is done with due diligence to maximise shareholders' value and competitive advantage in the diamond industry. 'Exploiting a unique value proposition, consolidating market share or identifying opportunities to improve project economics are ways in which companies can enhance or consolidate their competitive advantage' (Ernst & Young, 2015).

1.1.2.1. Mineral Resources Management Department

Mining organisations like many other organisations are normally structured and have well-defined departments. Debswana has eight departments, and these are; Engineering, Safety and Sustainability (SSD), Human Resources, Finance, Ore Processing, Mining, Support Services and Mineral Resources Management (MRM). The departments are managed through a hierarchical network. The MRM department is responsible for:

- Accurate geoscience information of the orebody (revenue generating asset of a mine);
- Plans to determine how the orebody can be exploited to the maximum advantage; and
- Control on the exploitation and utilisation of the orebody.

Debswana MRM department's mission is to deliver stakeholder's expectations through safe, sustainable and optimal exploitation, evaluation, planning and exploration of the natural resources. The mining industry in general is challenged by increasing operational and closure costs, deep mining (getting harder to exploit minerals – deep underground mining and large open pits) and the ability to effectively manage the return on reserve.

MRM departments in a mining environment assist organisations to use less capital to exploit the minerals through optimisation of mining plans. It addresses the physical and non-physical characteristics of the resource to minimise variability within the mining value chain. The MRM department focuses on optimising processes and key focus areas that have impact on an organisational business performance including and not limited to:

1. Managing loss in product
   - during ore handling at various stages through the value chain (from the blasting ore to the product stockpiles)
   - due to ineffective plant processing (leading to low recoveries or yields)
2. Waste dilution which will degrade the ore product and decrease the sales values, (higher dilution against lower product concentrate grades and the associated product sales price difference between the two options); and
3. Product quality control. Not developing options associated with stable and predictable product grades in context with customer specifications

1.1.2.2. Debswana Diamond 2018 Strategy

Driving operational effectiveness is one of the key organisational area that is being used to survive the macro and micro environmental factors affecting the diamond industry (Debswana, 2016). There was a 2018 HPO (High Performing Organisation) "Always Ahead" strategy that was launched in 2014 by Debswana to assist the organisation to deliver value to the stakeholders. The strategy (Figure 7) is focused on the principle of always being ahead and ensuring maximising shareholders' value, by focusing on five pillars;

1. Revenue Improvement (delivering higher value);
2. Cost Performance (doing more with less);
3. Organisational Capability (improving the way we work);
4. Sustainability (maintaining our social licence to operate); and
5. Capital Projects.

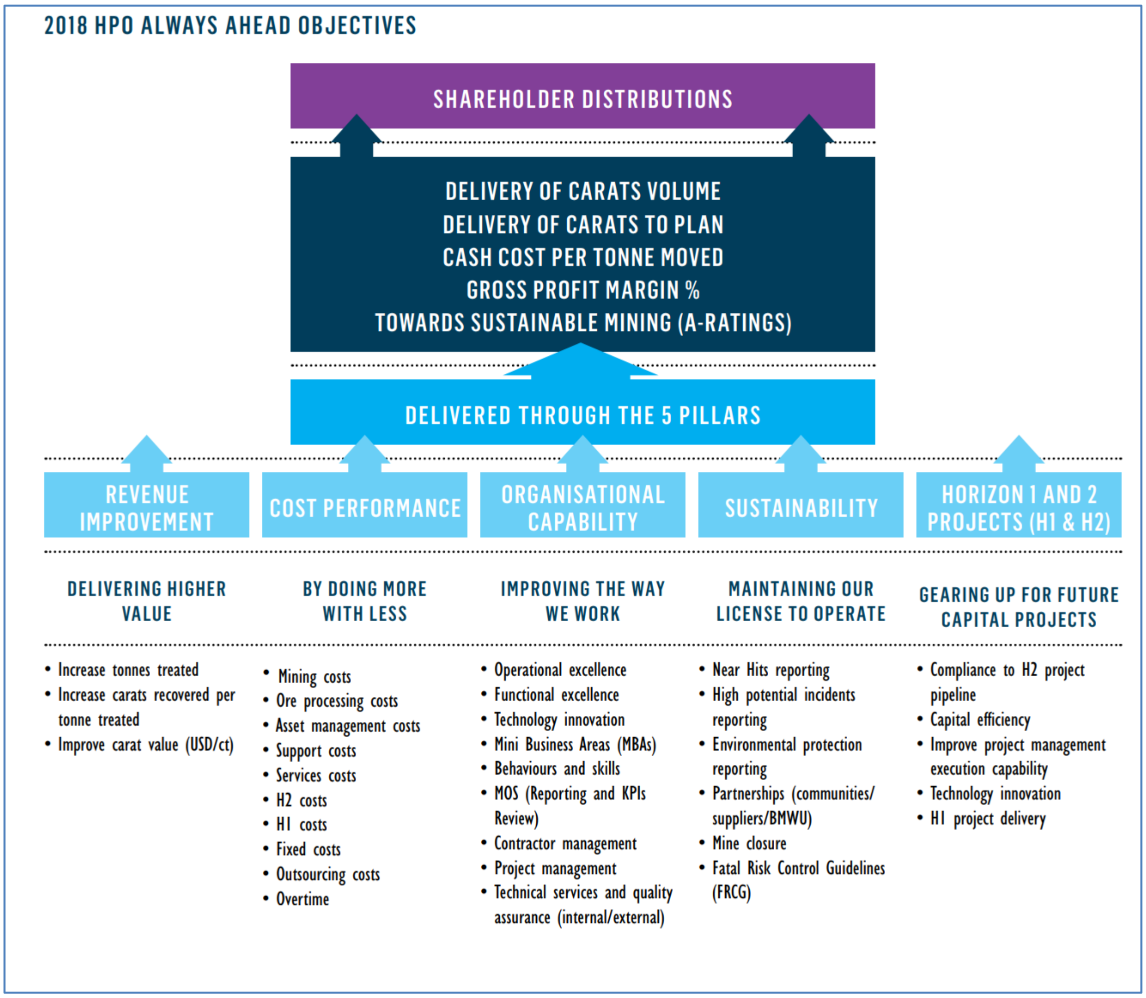


Figure 7: Debswana strategy (Debswana, 2016)

The organisation created initiatives focusing on improving or achieving the strategic set pillars. The Organisational Capability improvement pillar had initiatives that were implemented in order to improve operational effectiveness. One of the initiatives implemented within the OLDM was the lean management concept, using the 20-Keys to workplace improvement

(Figure 8), and the specific initiative was called the ‘Mini Business Area’ (MBA). The programme was implemented as a vehicle to drive performance improvement, with employees focusing more on Key Performance Indicators (KPIs) within their respective workplaces.

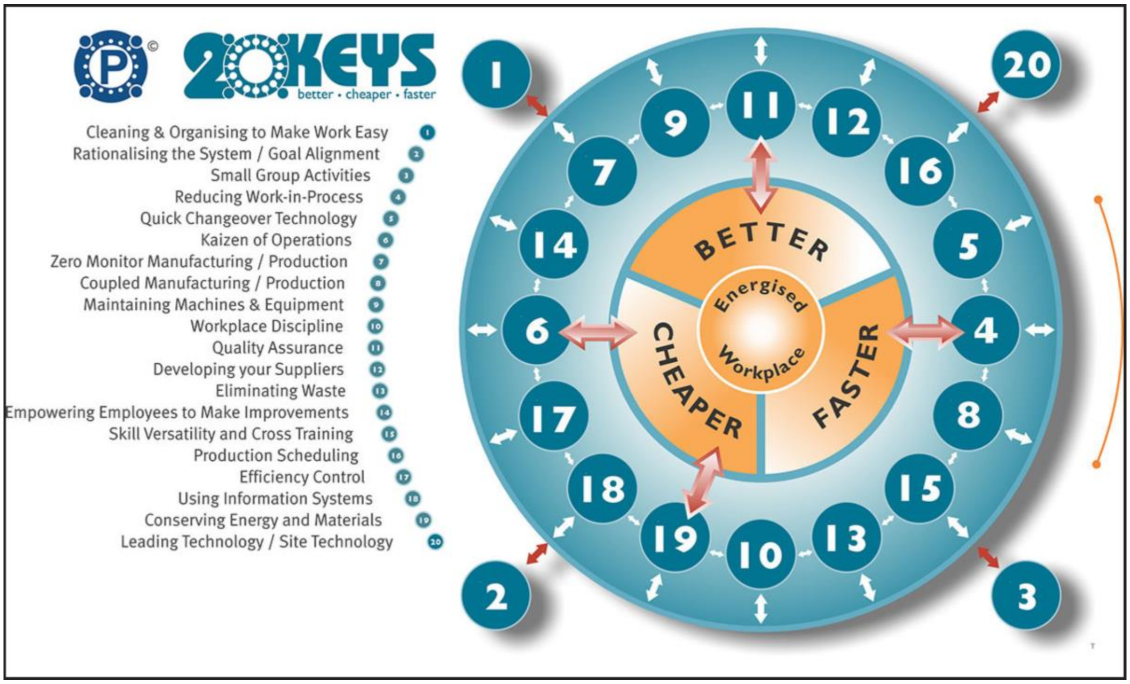


Figure 8: 20-Keys to workplace improvement (Organisation Development International, 2019)

Three Keys out of 20 were implemented to drive performance improvements within the Debswana organisation (Figure 8). The implemented Keys are; Key 2 (goal alignment), Key 13 (waste elimination) and Key 3 (small group activities (SGA)). The three keys were identified to be of high impact value without need for additional human resources and have potential to positively influence a culture of a value-based mind-set. The goal alignment cascades the organisational strategic objectives to the shop floor, through the mini-business concept. The mini-business concept identifies any small working group as a mini-business area (MBA) with customers and suppliers and monitors the performance of the identified key performance indicators at source. ‘Performance measurement is essential for the effective working of an organisation as it monitors the weaknesses at the earliest onset and warns the managers to take the corrective action as soon as possible' (Gupta, 2011).

Waste elimination key was done through the 5S concept (Sort, Set in order, Shine, Standardise, Sustain), which focuses on identifying and eliminating waste in work areas, and sustaining the improvement. Small group activities methodology was used to improve problem-solving skills and techniques at any working level for informed decision-making

1.1.3. Challenges Facing the Mining Industry

Mining operations are capital intensive. Substantial capital is invested in mining projects, and the shareholders' value or wealth is realised after an extended period. The mining industry is also subjected to the volatility of the markets, commodity prices, political risks, and increase in social issues (the social license to operate). Where capital is available, macro and micro-environments force companies to be more effective in capital allocation for survival.

Economy of scale has worked for Debswana for a very long time (since 1969), considering the size of the Orapa AK1 pit (which is the largest kimberlite deposit in Botswana and the world's largest diamond mine by area) and the Jwaneng pit (regarded as the "richest" diamond mine in the world in terms of value). The economy of scale has the potential to hide the inefficiencies that can influence negatively on maximising value from these assets. 'Long-term shareholder wealth is equally important for all profit-seeking organisations, regardless of their size' (Geyser & Liebenberg, 2003).

According to Mitchell (2018), volatility in the markets has eased off in a number of commodities, and currently, it is about how organisations can stay ahead of the competition by gaining competitive advantage and being at the lower end of the cost curve. Cash optimisation and competitive shareholder returns have been in the top 10 business risks from 2016 to 2018 within the mining industry as shown in Figure 9, (Ernst & Young, 2018).

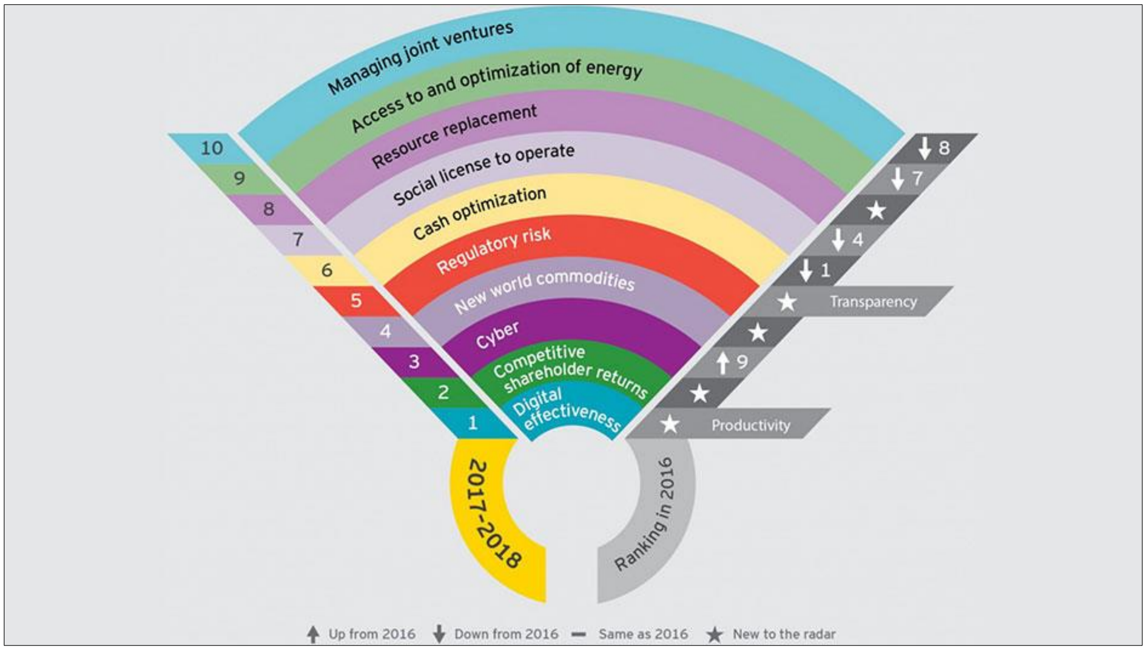


Figure 9: 2018 Top 10 risks facing the mining industry (Ernst & Young, 2018)

1.2. Economic Value Added (EVA), Market Value Added (MVA) and Improving Organisational Capability

The mining industry operates in a volatile, uncertain, complex, and ambiguous (VUCA) environment, which requires agility from an organisation. Mining organisations are therefore challenged to sustain and improve profitability. There are many drivers influencing the VUCA environment, and some of these are globalisation, international financial crises, volatility of interest rates, foreign exchange rates and increased competition in the markets and competition for capital. These drivers can influence an organisational performance and efficiency. The leadership is therefore challenged to come up with strategies that can increase competitiveness through performance and create value.

Financial performance indicators such as EVA and MVA can be used to measure the financial results and be correlated to the shareholders' value creation. EVA can be used to formulate strategies and manage financial performance, which enables companies to create returns greater than the cost of capital. It can also be used to measure the internal financial performance of an organisation and help companies to monitor their financial positions and improve on timeous investment decisions. EVA gives insight on the difference of the company's after-tax profit from operation's cost of all capital used to produce profits. MVA is one of the values and wealth-based management systems that can be used to measure the value added by the organisation in order to generate value and wealth to its shareholders. It measures the external financial performance of an organisation. MVA demonstrates the net difference of an organisation's' market value and the cost of invested capital. Wealth to shareholders is generated when the total market value is greater than the amount of capital invested. Both EVA and MVA add value to investment decisions for mining projects. "In a market economy, a company's ability to create value for its shareholders and the amount of value it creates are the chief measures by which it is judged" (Koller, et al., 2010).

1.3. Research Objectives

1. The objective of this research is to determine how Organisational Capability, through the 20-Keys to workplace improvement, can improve the EVA, MVA and shareholders' value for Debswana, by analysing organisational performance as evidence.
2. Identify Key value drivers that can positively influence or increase shareholders' value (influence on the EVA and MVA), and also key value drivers that can improve Organisational Capability and the effectiveness of the MRM Departmental will be identified.

1.3.1. Key Questions to be Addressed

There are key questions that have to be addressed by this research, and these are;

1. Can the 20-Keys to workplace improvement be used to improve Organisational Capability and achieve superior returns for shareholders, hence improving the EVA and MVA?
2. How can Organisational Capability improvement positively influence EVA and MVA of an organisation;
3. Which value drivers can improve EVA and MVA for the Debswana through the 20-

Keys to workplace improvement initiative; and

4. How can the MRM department use the 20-Keys to workplace improvement to improve departmental capability and increase shareholders' value?

1.3.2. Research Scope of Works

1. Analysis of the 2014 – 2018 strategy of the organisation, the results from the initiatives that have been implemented by Debswana as part of the strategy. The initiative of interest for this report is the 20-Keys to workplace improvement implemented in 2016 at Orapa operations.
2. Review the five (2014 – 2018) years' financial performance of the organisation using the annual reports of the company available in the public domain.

CHAPTER 2: LITERATURE REVIEW

2.1. Value

Value can be expressed differently based on a specific purpose. Some examples of value include fair market value, liquidation value, market value, fair value, intrinsic value, investment value. Value is created when an organisation generates revenues more than economic costs used to generate these revenues. According to Geyser & Liebenberg (2003), three components of an organisation's value are:

1. The organisation's capacity to generate higher cash flows (hence higher value) from existing assets without a negative impact on the growth prospects and the risk profile;
2. Its willingness to re-invest and create future growth; and
3. An organisation's cost of capital that is lower than the invested capital's rate of return.

Value is created when invested capital's rate of return exceeds the cost of capital of an organisation. "Value creation plans must always be grounded in realistic assessments of product market opportunities and the competitive environment", (Koller, et al., 2005). An organisation has to increase revenue growth and decrease the cost of capital in order to maximise value created. The relationship between the Return on Invested Capital (ROIC) and value is elaborated in Figure 10.

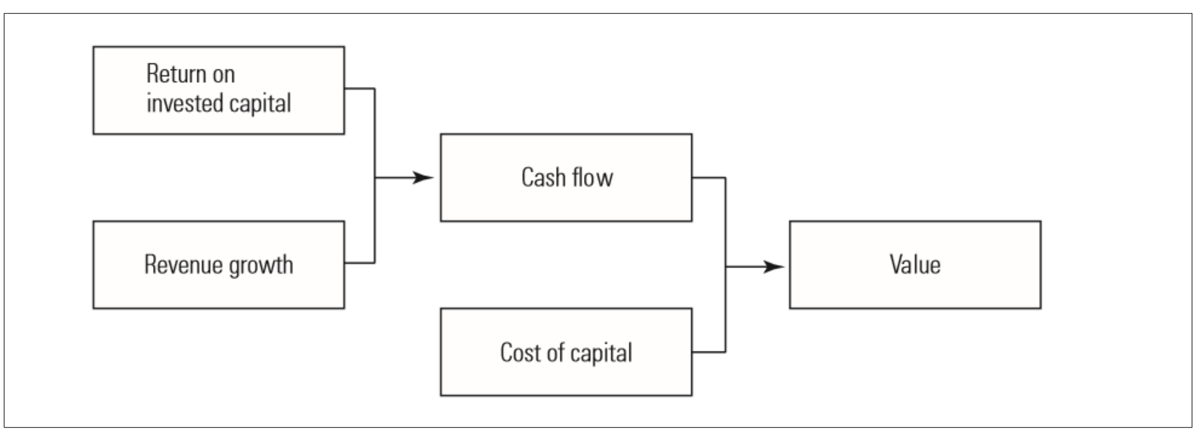


Figure 10: Relationship between ROIC and value (Koller, et al., 2010)

In today's business environment, a Value Based Management (VBM) framework can be used to improve value creation of an organisation. When implementing a VBM approach, it is important to understand why and how the implementation would be done. The VBM is based on changing the organisational culture and therefore value mind-set that embraces value maximisation is the ultimate financial objective (increasing shareholders' wealth) of an organisation. When creating value through a VBM approach, goals and targets should be set. There are two types of goals to the VBM approaches; goals that are financially related and goals that are non-financially related. Goals that are set in terms of the discounted cash flow value are the direct measure of value creation (Koller, 2018). Non-financial goals are concerned with the customer's satisfaction, employee's satisfaction (e.g. morale, motivation) and innovation.

Identifying value drivers is also very important with the VBM approach. Value drivers should be understood as they influence or create organisational value. These are variables such as costs, customer satisfaction and capital expenditures.

2.2. Maximising Value

An organisation's main objective is to create real economic value for their shareholders. Value is driven by the rate of ROIC and organisational growth. Organisations therefore can create more value by increasing revenue and deploy more capital at favourable rates of returns quickly. Shareholders are interested in the value added by their organisations and therefore organisational management are under increasing pressure to regularly demonstrate how shareholders' value can be created. Organisational management has to measure and manage shareholder value due to globalisation of capital markets, emerging opportunities with higher yields and corporate governance, which demands accountability. "Managers who focus on shareholder value creates healthier companies, which in turn provide spill over benefits, such as stronger economies, higher living standards, and more employment opportunities"(Koller, et al., 2005).

Organisations need a well-defined competitive strategy in order to sustain high returns on invested capital and growth. “This is how competitive advantage, the core concept of business strategy, links to the guiding principle of value creation”, (Koller, et al., 2010). ‘‘The value creation is a complex process that implies correct decisions, common responsibility (managers and shareholders) and actions towards an efficient and profitable activity’’ (Sichigea & Vasilescu, 2015). Organisations therefore should develop key value drivers, which are performance variables that are used to create value and their performance can be influenced by the organisation.

Value can be maximised when an organisation is focusing on all stakeholders, through the following:

1. Improving revenue growth (through happy customers, and in the diamond industry, ‘blood diamonds’ do not support sales);
2. Reducing costs;
3. Optimising investment decisions (through the SGA, problems that can reduce efficiency and production are solved as and when they occur and it also gives the opportunity to make decisions that can reduce costs as soon as required);
4. Improving employee productivity; and
5. Reducing regulatory and legal interventions (managing safety performance).

“To compete successfully in an increasingly competitive global market, a company has to know the costs of its entire economic chain and work with other members of the chain to manage costs and maximize yield. (Watson, 2002)

2.3. Performance Measurement

Gupta (2011, p. 3) defines performance measurement as evaluating how well organisations are managed and the value they deliver for customers and other stakeholders. How much value a company creates is dictated by the revenue growth, the ROIC and its ability to sustain the performance over a period of time. Therefore, revenue growth is an important driver of long-term shareholder returns and needs to be measured and monitored closely. An organisation creates value when it invests capital at returns that are more than the cost of capital. It is important to increase revenue growth in order to increase the ROIC for an organisation to create value. The ROIC is the ration that measures an organisational profitability and the efficiency in which the capital is used. In order to evaluate an organisation's value creation, the financial theories have two categories of performance techniques or approaches that can be used: the traditional and modern approaches. Traditional techniques are the accounting approaches, based on earnings and the modern techniques are the economic (stock exchange) approaches. The traditional techniques do not correlate with value creation as they measure the realised benefits while modern approaches can be correlated to the value created. Modern approaches have influence on the leading key value drivers. Value can be generated for all stakeholders and not only shareholders. ''In a successful total quality organisation, performance will be measured by the improvements seen by the customer as well as by the results delivered to other stakeholders, such as the shareholders'' (Gupta, 2011). Improving organisational performance for all stakeholders results in happy customers (increasing revenue), motivates employees to perform better and efficiently as well as sustaining the social licence to operate, hence giving and organisational an opportunity to operate for a long period of time.

Maximising wealth and other non-financial factors like customer satisfaction, innovation, employee morale and many others are considered by the modern techniques. An organisational performance management system should be aligned with organisational strategies and should be conveyed to the rest of the employees. Some of the reasons why management approaches for improving organisational performance fail is the misalignment of performance targets with the value creation objective and targets that are not clear. The strategic direction of an organisation together with its mission, vision and values should be cascaded to external stakeholders and employees (Gupta, 2011). This provides the employees with focus on their contribution to the success of the organisation and expectations from shareholders.

2.4. Value-Based Management (VBM)

VBM is considered the 'fastest and hottest ticket' to shareholder's wealth and "It is a complete financial management and incentive compensation system that guides decision making at every level and includes techniques like EVA, ROIC and MVA" (Sayed & Sayed, 2015). It is a management control system that measures, promotes and supports the creation of net worth of an organisation. It aligns an organisation's management processes and its strategic objectives with key drivers of value. Organisations that use the VMB approach needs to:

1. Develop strategies that aim at maximising value;
2. Translate the strategy into short and long-term performance targets (KPIs or key value drivers);
3. Develop an action plan and budget to ensure achievement of the KPIs; and,
4. Develop a performance measurement tool and an incentive system for monitoring.

There have been many VBM approaches used by organisations to improve organisational performance, and 'a successful program is about introducing fundamental changes in the company's culture' (Ameels, et al., 2002). Some of these approaches include, but not limited to:

- the Total Quality Management (TQM);
- lean organisations, employee empowerment;
- the kaizen improvement models (for example; Kanban approach, zero defects; effectiveness and networking); and
- other continuous improvement initiatives.

For these approaches to produce a high return on investments or benefits, the performance targets should be clear and properly aligned with the ultimate organisational objectives of creating value. An organisation has to find a combination of growth and return on invested capital that can be useful to it, with consideration of the environmental challenges and opportunities within their industry. VBM 'provides a precise and unambiguous metric value upon which an entire organisation can be built' (Koller, 2018). Organisations that use shareholder value analysis to manage their business, are mostly practising VBM. It is therefore a framework used to make key business decisions that adds economic value.

'Value is created only when companies invest capital at returns that exceed the cost of that capital' (Koller, 2018). The VBM approach should be clearly and properly executed by aligning the organisational objectives, management processes and everyday operational decision-making on the key drivers of value. The VBM approach recognises that value-adding decisions should be done at all levels of an organisation. VBM focuses on achieving maximum value on a continuing basis, with high impact that is often realised in improved organisational economic performance, therefore, “if implemented well, it brings tremendous benefit” (Koller, 2018).

There is a wide range of measures that can be used to determine the value of organisations or if an organisation has achieved its overall objective of creating value. Value-based performance can be measured using EVA, Earnings Per Share (EPS), Cash Flow Return on Investment (CFROI) or Tobin’s Q-ratio. ‘Incorporating indicators such as EVA and MVA, the VBM can represent a framework for value enhancement that guides the decision process, and be an efficient instrument for financial planning, monitoring, and controlling’ (Sichigea & Vasilescu, 2015).
EVA measures an organisation’s economic success over a specific period while MVA measures wealth; it assesses the level of value that an organisation has accumulated over time. This means that with these two indicators, while being monitored closely, can assist an organisation to maximise value creation by making key financial decisions.

2.5. Economic Value Added (EVA)

There are few traditional measures of corporate performance and these measures include but are not limited to; Net Profit Margin (NPM), Operating Profit Margin (OPM), Return on Investment (ROI), Return on Net Worth (RONW), Earning Per Share (EPS). The commonly used measure is the ROI, which can be defined as the percentage ratio of the net profits against the net costs. “EVA is advocated as a measure of corporate performance that focuses on the clear surplus in contrast to the traditionally used profit-based indicators”, (Rakshit, 2006). Earnings returns that are greater than the cost of capital increases an organisational value. EVA is the internal measure of an organisational performance and is the difference between the current total market value of an organisation and the capital contributed by investors. It is also typically used for organisations that are large and publicly traded. EVA has also been described as ‘an effective measure of the quality of managerial decisions as well as a reliable indicator of an enterprise’s value growth in future’, (Geyser & Liebenberg, 2003) There are two basic principles of the EVA that can be used by managers into their decision-making. These principles are based on an organisations’ primary financial objective being to maximise shareholders’ wealth and that an organisation’s value is dependent on the extent to which investors expect future profits to differ from the cost of capital.

“EVA is an integrated framework for financial management and incentive compensation that transforms a company’s culture and its performance”, (Stern Value Management, 2015). EVA can be used to measure the wealth a company creates (or losses) in a year. It also gives insight on the difference in the company’s after-tax profit from the operation’s cost of all capital used to produce profits. The cost of capital includes the cost of debt and equity. According to the Stern Value Management Consulting website (Stern Value Management, 2015), EVA can bring huge performance improvement.

EVA as a measure of economic profit can be calculated as the difference between the Net Operating Profit After Tax (NOPAT) and the opportunity cost of the invested capital. The opportunity cost is determined by multiplying the Weighted Average Cost of debt and equity Capital (WACC) and the amount of capital employed.

Equation 1: EVA = NOPAT – WACC * Capital Employed.

or

Equation 2: EVA = Capital Invested *(Return on Invested Capital – WACC)

WACC is the average of the cost of financing (capital), which is weighted by its proportionate use in a given situation. ROIC is the ration that measures an organisational profitability and the efficiency in which capital is used. NOPAT is defined as the net operating profit of an organisation after tax for all investors (shareholders and debt holders). Positive EVA shows that the organisational cost of capital is less than the return on capital generated, therefore it is generating value from the invested capital. EVA can be used to measure organisational performance over a given period of time. ‘EVA represents value generating power of an organisation’, (Rakshit, 2006). It takes in account the opportunity cost of alternate investments.

Three factors that influence the EVA are:

1. Adjusted earnings before interest after tax;
2. WACC; and
3. Capital Employed.

This means that any change to one of these factors will positively or negatively change the EVA. According to Rakshit (2006), improving the operating efficiency of the organisation can help retain the same amount of NOPAT by possible reduction of existing capital, and continuous increase of the existing NOPAT with the existing amount of capital. The WACC can be lowered by optimising the capital structure through the optimum debt-to-equity mix. Although in large companies, the debt-to-equity is generally high, the lower the ratio is, better it is for the WACC.

‘EVA is used by companies as a performance indicator and also as a basis for executive compensation’, (Rakshit, 2006). The surplus should be derived by deducting the cost of capital from profit before interest but after tax. EVA can be used as a measure of value and a measure of performance. EVA as a measure of value is determined by the expectation of shareholders concerning future profits while as a performance measure, it is focused on the capability of the organisation to create shareholder value. A continued increase in EVA will increase the market value of an organisation. EVA helps companies to concentrate on improving the net cash return on invested capital. When organisational decisions are aligned with the shareholders’ interest, its efforts will be reflected by a higher stock price, positively influencing the MVA. EVA can be used by managers for informed investment decisions, to identify improvement opportunities with the organisation and also consider both long-term and short-term benefits for the company (Roztocki & Needy, 1998).

2.5.1. Challenges With the EVA Approach

There are challenges to using the EVA approach. The right financial factors and adjustments have to be considered when the technique is used and if not used, it is difficult to get a clear idea of the value created to reflect on organisational unique identity. Using a few financial factors results in a distorted reflection of an organisation, while too many factors introduce process risks that will complicate using the EVA technique. However, the EVA has been praised for its simplicity.

2.6. Market Value Added (MVA)

"MVA is the difference between the current market value of a firm and the capital contributed by investors", (Sayed & Sayed, 2015). The MVA demonstrates the net difference of an organisation's market value and the cost of invested capital.

Equation 3: MVA = Company's Total Market Value – Capital Invested

Shareholder value is created when the total market value is greater than capital invested. Therefore, a positive MVA indicates that an organisation has added value while a negative MVA reflects a destroyed organisational value. MVA is an external indicator, which provides the highest satisfaction to the shareholders and it is the reliable measure of a management's long-term success. "MVA is the best internal performance indicator as it assesses the market effectiveness with which companies' managers have used the scare resources under their control", (Sayed & Sayed, 2015). It is therefore very crucial and important to analyse and identify the internal value drivers that relate to the MVA. It has, however, been noted to be easily calculated for private-owned and non-profit organisations, because shares of those organisations cannot be traded.

MVA is not a performance metric like EVA, rather it is a wealth metric, measuring the level of value a company has accumulated over time, (Shil, 2009).

2.7. Strategic Management

The fundamental question in the field of strategic management is how firms achieve and sustain competitive advantage (Teece et al., 1997). Strategic management is the application of strategic thinking of leading an organisation while in a comprehensive view; strategy can be defined as the long-term direction of an organisation. It is used to determine the mission, vision, values, goals, objectives, roles and responsibilities and timelines of an organisation. Strategic planning is a disciplined effort to produce fundamental decisions and actions that shape and guide what an organisation is, what it does, and why it does it, with a focus on the future. Strategic planning can be used as a strategic management tool to align organisations' strategies with the rapidly changing environmental needs. Ugboro *et al* (2011, p. 89) in their paper define strategic planning as the process by which organisations determine and establish long-term directions and formulate and implement strategies to accomplish long-term objectives while taking into account relevant internal and external environmental variables.

Developing a strategy is important as it helps the organisation to be prepared for the ever-changing environments and the uncertain future. The strategy model has three main branches namely; the strategic position, the strategic choices and the strategic implementation. The strategic position looks at the impact the external environment has on the organisational strategic capability (resources and competencies), the objectives and the culture of the organisation. The strategic choice is more about the strategic options in terms of the direction for the organisation and the methods that can be explored and the strategic implementation or strategy in action is the strategies identified and how they can be implemented.

An important component of the strategic position is to evaluate the strategic capability of an organisation. Strategic capability can be defined as the ability of a firm or an organisation to identify its strengths, weaknesses, threats, and opportunities and, be able to formulate strategies, and implement them in order to survive and succeed in a competitive business environment. The type of strategic capability of an organisation at a specific time is determined by the legitimising factors, threats and opportunities in the future business environment, (Johannesson, 2010). These factors establish the purpose and criteria of success of an organisation.

2.7.1. Strategic Capability

The term "capabilities" is used to imply different things looking at the context that is being used for at the time. ‘‘Capabilities are characterised as the skills or expertise of employees, or as intangible resources such as reputation or culture that seem to be quite specific or individual’’ (Tuan & Yoshi, 2010). It is important to understand the Organisational Capability as it can influence and support organisational strategies, and can also be able to invest directly to the capabilities that can have positive business performance and acquire sustainable competitive advantage. For organisations to stay competitive in a volatile environment, they have to develop organisational capabilities that can enable them to deal with organisational problems. There is a need to develop employee capability, especially when operating in a rapidly changing and highly turbulent environment like the mining industry. This can allow flexibility in decision-making and agility to adapt to the change.

‘A basic assumption of the capability view is that companies have ways of doing things and dealing with organisational problems that show strong elements of continuity’ (Dosi, et al., 2003). Organisational capabilities enable organisations to effectively resolve different types of organisational problems. Key organisational problems that organisations deal with can be categorised as exploitation and exploration. Exploration type organisational key problems addressed are associated with developing and experimenting new possibilities or opportunities. Exploitation type organisational key problems maximises what already exists, that is, finding new and effective ways to deploy the existing resources. The exploration way of dealing with problems help developing strategies and knowledge while the exploitation produces high performance, which are what the managers operating in the current highly dynamic environment need. It is important for organisations to use their resources effectively to be able to have a competitive edge.

2.7.2. Organisational Capability

The concept of organisational capabilities takes organisational change as a continuous and open-ended process of organisational development. Organisational capabilities have been defined as ‘an organisation’s capacity to deploy its assets, tangible or intangible, to perform a task or activity to improve its performance' (TICHA, 2010) and plays a crucial role to organisational performance, hence affecting the economic success of an organisation. Organisations operating in an international market have to develop organisational capabilities to stay competitive as they are a source of competitive advantage. There are different definitions of Organisational Capability and some are presented in Table 1. From the definitions, there are different categories that can be identified that affect organisational capabilities.

Table 1: Some of the Organisational Capability definitions, (Wang & Zeng, 2017)

Categories	Description of organizational capability	Reference
Knowledge	Knowledge integration	(Grant, 1996a)
Knowledge	Multilayered knowledge corresponding to different types of organizational capabilities	(Kusunoki, Nonaka, & Nagata, 1998)
Skill	A firm's dynamic capability to use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match and even create market change	(Eisenhardt & Martin, 2000)
Skill	The ability to perform a coordinated set of tasks, utilizing organizational resources	(Helfat & Peteraf, 2003)
Skill	Dynamic capabilities to integrate, build, and reconfigure internal and external resources/competencies to address, and possibly shape, rapidly changing business environments	(Teece, 2012)
Routine	A high-level routine (or collection of routines)	(Nelson & Winter, 2009)
HR manangement	The ability to manage people to gain a competitive advantage	(Dave Ulrich & Lake, 1990)
Knowledge and skill	The capabilities founded on the knowledge and skills of individuals	(Loasby, 2006)
Management	Dynamic managerial capabilities resided in managerial cognition	(Eggers & Kaplan, 2013)
Emotion	Emotional capability to acknowledge, recognize, monitor, discriminate and attend to its members' emotions, and manifested in the organization's norms and routines related	(Huy, 1999)

The global environment is complex and there are always new and different challenges that organisations have to deal with. Organisational capabilities have also been divided into five dimensions (Schienstock, 2009), which organisations use to deal with emerging problems in order to be competitive and survive the markets. These broad categories are:

1. Selective or strategic capabilities: These capabilities enable organisations to be

ready for any change in the environment and to hold on in a globalising economy;
2. Organisational or integrative capabilities: They enable organisations to deal with problems that results from combining organisational efficiency and flexibility successfully;
3. Technical or functional capabilities: These capabilities enable organisations to perform and increase output;
4. Understanding characteristics of markets and demand capabilities, which enable organisations to trade for profits and invade new markets; and
5. Ability to learn, absorb, transform and reflect on acquired information and experiences, integrating and cutting through all these (Schienstock, 2009).

2.8. Business Improvement Methodologies

There are at least three basic business improvement methodologies, and these are:

1. Six Sigma;
2. Lean Thinking/Management; and
3. Theory of Constraints (TOC).

Table 2 shows the comparisons of the improvement methodologies.

Table 2: Business improvement approaches, (Nave, 2002)

Program	Six Sigma	Lean thinking	Theory of constraints
Theory	Reduce variation	Remove waste	Manage constraints
Application guidelines	1. Define. 2. Measure. 3. Analyze. 4. Improve. 5. Control.	1. Identify value. 2. Identify value stream. 3. Flow. 4. Pull. 5. Perfection.	1. Identify constraint. 2. Exploit constraint. 3. Subordinate processes. 4. Elevate constraint. 5. Repeat cycle.
Focus	Problem focused	Flow focused	System constraints
Assumptions	A problem exists. Figures and numbers are valued. System output improves if variation in all processes is reduced.	Waste removal will improve business performance. Many small improvements are better than systems analysis.	Emphasis on speed and volume. Uses existing systems. Process interdependence.
Primary effect	Uniform process output	Reduced flow time	Fast throughput
Secondary effects	Less waste. Fast throughput. Less inventory. Fluctuation—performance measures for managers. Improved quality.	Less variation. Uniform output. Less inventory. New accounting system. Flow—performance measure for managers. Improved quality.	Less inventory/waste. Throughput cost accounting. Throughput—performance measurement system. Improved quality.
Criticisms	System interaction not considered. Processes improved independently.	Statistical or system analysis not valued.	Minimal worker input. Data analysis not valued.

2.8.1. Six Sigma

The Six Sigma approach focuses on the reduction of variability of activities or elements in the problem to solve problems in the process and business. The approach uses a rigid and structured methodology to investigate the process. The investigating methodology has five steps of improvement outlined below:

1. Define the process by identifying customers, problems that exist, key characteristics of the process that are important to the customer and existing outputs conditions;
2. Measure the process by categorising characteristics identified, collecting data and

verifying measuring systems;

3. Analysis of data collected, identifying the most important root causes of problems and defects;
4. Improve the process by developing solutions to the identified problems; and
5. Monitor the process to ensure that there will be no unexpected change to the process.

The process also improves quality. During investigation of the process, some activities are re-evaluated. This gives an opportunity to re-define some activities and/or discontinue some activities. There is also reduction of opportunities and mistakes.

2.8.2. Lean Thinking/Management

In the current business environment, Lean Management has gained the attention and is regarded as core business principles. Lean Management is also referred to as lean manufacturing or the Toyota production system. Lean Management focuses on elimination of waste and improving process flow. Waste in a process can be defined as the steps or actions that do not add any value in the process (non-value adding), and the product can be produced without having them in the system.

The critical steps or principles of improvement in Lean Management are:

1. Identifying features that create value. This involves determining features or activities that create value in the process, based on either an internal or external customer's perspective or subsequent process. 'Value is expressed in terms of how the specific product meets the customer's needs, at a specific price, at a specific time' (Nave, 2002);
2. Identifying sequence of activities (the value stream) once all the value-adding activities have been identified;
3. Improving activities flow. There should be an uninterrupted movement of activities through the process to deliver the product or service to the customer;
4. Customers pull product or service through the process without delay once all the waste is removed and a flow of activities has been established; and

5. Working towards perfecting the process through monitoring to ensure constant removal of non-value adding activities and improvement of the flow is maintained to meet the customer's needs.

The Lean Management process has other advantages. The process outputs are improved quality of the product or service. Production time is also improved, there is less over-production and the process flow is optimised. 'Transitioning to flow thinking causes vast changes in how people perceive their roles in the organisation and their relationships to the product' (Nave, 2002), leading to improved employee morale or organisational culture.

2.8.2.1. 20-Keys to Workplace Improvement

The 20 keys to workplace improvement methodology is a business improvement tool that can be used to increase organisational efficiency. It is a new improvement approach that has been introduced by Professor Iwao Kobayashi., based on the Toyota Production System. The Toyota Production System is the original continuous improvement approach, which aims at eliminating waste and improving efficiency in the Toyota manufacturing system. The 20 Key Areas (Figure 10) aim at assisting organisations to archive their performance by improving cycle times (increases efficiency), quality of product or service and lowering costs. There is a relation between the results achieved through the different keys. 'The 20 Keys approach offers a way to look at the strength of organisations and to systemically improve it, one step at a time by focusing on 20 different but interrelated aspects' (Petranolo, 1997). The methodology provides a continuous improvement approach that is integrated to achieve organisational strategic goals, in all areas of the business. Organisations can improve their organisational efficiency by improving their processes, with the goal of lowering productivity costs. The 20 Keys enables organisational strategies goals achievement and can be used to improve efficiency of the entire organisation.

'The keys are an agglomerate of different tools and techniques which are already well known in the world, but they are incorporated into a common system of evaluation, visual reporting, monitoring of results, and work organisation' (Dabić, Orac, Tugrul, 2016: 4).

There are four key pillars to this approach, which are keys 1, 2, 3 and 20.

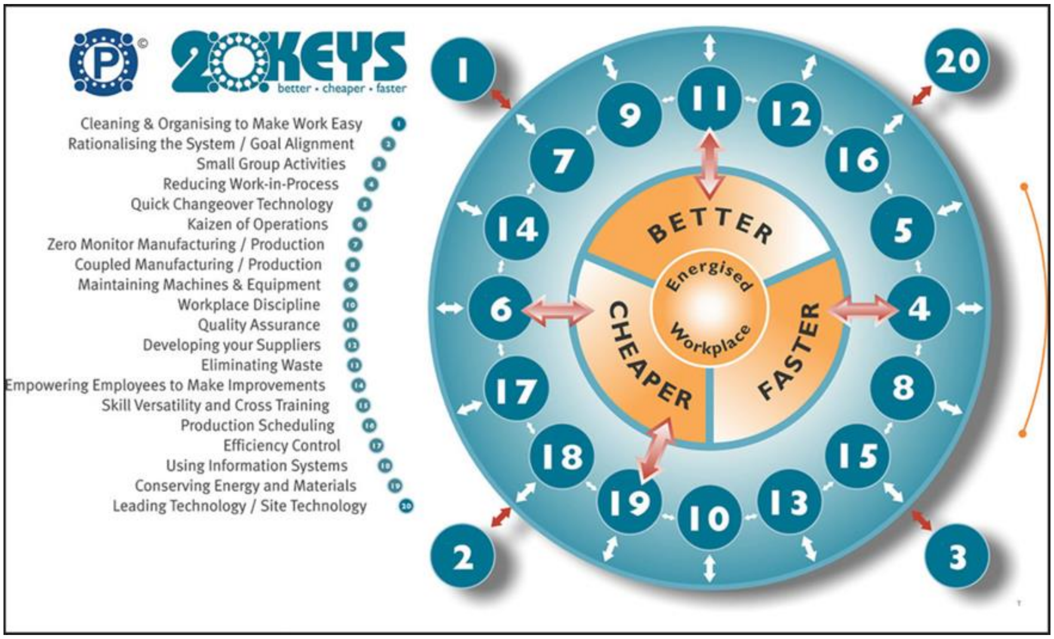


Figure 11: 20 Keys to workplace improvement (Organisation Development International, 2019)

The objectives of the 20 Keys approach are to assist organisations with:

1. Cascading their strategic objectives in an effective manner to the rest of the organisation;
2. Improving organisational learning capacity;
3. Elimination of all types of waste;
4. Improving employee morale through motivation in order to strive for continuous improvement and maintain the performance; and
5. Increasing competitive edge, profitably and long-term perspective.

The 20 Keys approach edges managers to analyse the degree that their organisations can respond to change, and can be used to indicate an organisational strength, (Organisation Development International, 2019). To be able to measure this strength, there should be specific items that should be improved and how the improvement will be measured. This approach has identified and defined 20 characteristics that an organisation needs to stay flexible and adaptive to the changing environments. ‘‘The 20 Keys system provides such a systemic approach by bringing together (and evaluating) the world's workplace improvement methods into one package and integrating these separate methods into a closely interrelated whole with synergistic effects’’ (Petranolo, 1997) . It also encourages synergies within different business units and successful and sustainable improvements within an organisation. The 20 Keys approach can be used as an introduction to the Lean Management in an organisation.

Every tool (key) of this methodology can be used to contribute to the fundamental organisational objective, which is profit. ‘Main benefits of implementing 20 keys methodology are enhancing competitiveness, market share, customer satisfaction and profitability (Kobayashi, 1995; Petrarolo, 1997; Dabić, Orac, Tugrul, 2016)’

Advantages of the 20 Keys to Workplace Improvement

Some of the identified benefits of the approach can be summarised as: elimination of unnecessary actions (waste); directs and manages organisational quality, delivery times and costs outputs, increases productivity, quality enhancement, and cost reduction, increases flexibility and adaptability to market changes, increased customer and supplier’s satisfaction, focus on continuous improvements and innovation and ultimately it leads to increased profits.

Different types of waste in Lean Management are:

1. Transportation: Although this activity is required, it does not add value to the product being produced. Transportation can be waste when there are unnecessary movements in the system.
2. Inventory: This can be defined by having excess stock, any raw material that is not being used at the moment (in the case of mining, having a huge stockpile of minerals), spares or parts that are not being used.
3. Motion: This waste refers to the excessive movement of people or equipment to perform tasks.
4. Waiting: This can be the result of production delays, waiting period for either material or equipment to perform tasks.

5. Over-production: When production is more than what is required or producing more volume than the demand.
6. Over-processing: This can be described as excess processing, multiple handling, producing more specifications than required by the customer.
7. Defects: This type of waste is concerned about re-works, re-doing a process more than once or producing defective parts. In a mining environment, it can relate to defective maintenance or mining a wrong mining block.
8. Unused knowledge: Not utilising the talent that is in the organisation. These can result in combination of the above wastes manifested.

2.8.3. Theory of Constraints (TOC)

The TOC approach focuses on the system improvement. A series of interdependent processes defines a system. The constraint is the weak link in a chain of interdependent processes working together for a common goal, which limits the performance of the entire chain. Steps towards the TOC improvement process are:

1. Identifying the constraints using various methods;
2. Exploiting the constraint to maximise its capacity without high expenses. This results in an improved process;
3. Pacing the speed of other processes to the speed of the constraint for the benefit of the entire system;
4. Elevating the constraint if the entire system is producing un-satisfactory performance, which means the constraint, needs further improvements; and
5. The processes are repeated, once the identified constraint is managed, another part of the system will then become a new constraint.

These improvement approaches have positive effects on the production time of the system. There is also reduction of waste in the flow. ‘When the constraint is improved, then the variation is reduced, and the quality is improved’ (Nave, 2002). The approach does not need one to have knowledge of the data analysis or understanding of the system. Only a few people with the decision-making power are needed to make changes.

2.8.4. Limitations and Constraints of Business Improvement Methodologies

Business improvement methodologies have a number of fundamental shortcomings in the mining environment, making them less effective. ‘‘A major stumbling block in the application of these methodologies in mining is its handling of variable raw material quality’’ (Claassen & Laurens, 2016). In the manufacturing system, poor quality material is rejected as part of the quality management system, but in the mining system, all raw materials within the reserve boundaries are processed. The variability of raw material quality and mining production rates results in mining operations constraints. These can have a huge impact on performance.

The business improvement approaches were developed for the manufacturing industry, which is different to the mining industry. The mining industry has unique features like variable geology (mineralogical, structural and geometrical), mine planning factors (e.g. equipment to be used, which needs to be changed from time to time as result of production schedules and new mine developments), processing plants (which can be dictated by the raw material change). The variability of the raw material can lead to under-performance of an organisation.

‘Complex mining operations employing mechanistic structures however find it increasingly challenging to sustain and improve performance’ (Claassen & Laurens, 2016).

According to Claassen & Laurens (2016), some of the factors that can impact on the performance of a mining organisation are shared in Table 3 below.

Table 3: Factors that contribute towards poor performance in a complex mining organisation

Factor	Impact
1. **Organisations are broken up into its different parts/departments**	1. The focus is on the performance of the department instead of the performance of the system as a whole, i.e. flow and product payability throughout the system 2. Different functional entities (compared to one entity) could take longer to adapt to change
2. **Equal attention is given to all parts/departments in the organisation**	1. Organisations are staffed to perform optimally in all departments. This create bulky, expensive organisations and potentially distracts people from their work/goal of the company 2. Goals of different departments can be in conflict with one another, e.g. cost saving goals of a supply chain department can hamper production goals, e.g. if parts ordered are not of the required quality or take too long to be delivered 3. Improvement initiatives do not focus on the CCR and therefore in the best case waste money and in the worst case destabilise operations when capacities are balanced (i.e. when it is successful) 4. Cost saving exercises typically put the CCR under more pressure and the output of the system as a whole decreases 5. There is a focus on standardisation/best practices that could result in the implementation of practices/equipment/spares not fit for use in the environment where it is used (increase cost and lowers production) 6. An efficiency focus on equipment and activities across the organisation waste money at best and hampers the performance of the CCR at worst
3. **Hierarchical structures are used to manage mechanistic organisations**	The decision-making and implementation processes take very long and do not support flexibility and adaptability

There is also limited research in the business improvement methodologies associated with the economic and market value adds for organisations to date. ''There is general agreement that Organisational Capability represents a key concept in analysing a company's performance, little empirical research has been conducted in this field'', (Schienstock, 2009).

CHAPTER 3: RESEARCH METHODOLOGY

The interest of this research was to analyse how Organisational Capability can positively influence the shareholders' value through the 2018 High Preforming Organisation strategy that was launched in 2014 by Debswana. Below are the steps were followed:

3.1. Availing the Reports

The 20 Keys to workplace improvement implemented in 2016 at Debswana's OLDM is the focus area of this research. The report from the strategy initiative was used to review the results. The reports used were availed from the Debswana website, The De Beers Group and the Anglo American websites. The Government of Botswana also has reports on the performance of the companies, accessible through the Botswana Statistics website which would be availed for assessment.

3.2. Review the Reports

There was review of the Debswana strategy initiatives that were meant to improve Organisational Capability. The review will include the impacts that the initiatives have on the organisational performance. Reviews of the financial reports available would be conducted.

The literature review was used to discuss the financial performance indicators that can influence the shareholders' value. The financial indicators of interest were the EVA, MVA and how the VBM framework can be used to positively influence the shareholder's value.

3.3. Analyse the Data\Results Quantified

The data from the initiatives implemented by Debswana strategy was analysed by going through the report and data, and the results were plotted against time. The internal performance of the company with respect to the 20-Keys to workplace improvement was also analysed through the graphical plots. Key value drivers to improve the financial performance of the organisation and the MRM department were also reviewed and identified.

3.4. Discuss the Analyses and Conclude

To be able to link the strategy results with the financial performance of the organisation, the public reports of the company from the public domain were reviewed and compared with the results from the MBA strategy initiative. This was done to identify if there is a correlation between the financial performance (operating costs and financial statistics for at least 5 years).

CHAPTER 4: DATA\RESULTS ANALYSIS AND DISCUSSIONS

4.1. Introduction: 20 Keys to Workplace Improvement at Debswana Orapa, Letlhakane and Damtshaa Mines (OLDM)

Debswana has been aligning and cascading its objectives, measures and targets from the top management down to Section managerial level, leaving the levels below to the Line Manager with no structured or defined framework to use for cascading the information. In addition, managers were responsible for the performance and improvement of their work areas. Under this traditional way, the responsibility for the business results rested with some of the employees who in most cases do not have the line of sight for metrics that directly affect the bottom-line. The 20 Keys to Workplace Improvement addressed this challenge by empowering all employees to be responsible for the performance and improvements in their work areas. This leaves the manager accountable and responsible for coaching and mentoring to support his direct reports to improve Quality, Cost performance, Delivery, Safety/Health/Environmental performance, and Employee Morale (QCDSM). The initiative also made the organisational strategy everyone's responsibility.

Across OLDM operations, there has been many non-value adding work activities compared to value-adding work activities across the value chain. Efficiencies were not clearly witnessed and processes were not fully optimised. This environment is to some extent wasteful, inflexible and has a lot of variability. Debswana implemented the 20 Keys to Workplace Improvement (MBA *Lean*) initiative at the Orapa, Letlhakane and Damtshaa Mines (OLDM) in 2017 as part of the 2018 High Performing Organisation (HPO) strategy.

The MBA *Lean* initiative was used to drive continuous improvement as part of the Organisational Capability improvement within the operation. It has implemented three keys with the plan to implement other keys at a later stage. The organisation has implemented only three Key 2, 3 and Key 13 across the entire value chain as the start of the initiative. The three keys were identified to be of high impact value without need for additional human resources and can positively influence a culture of a value-based mind-set. The initiative's mandate was to maximize value addition across all departments. In so doing, assist the organization to continuously do more with less and thereby become more profitable. It was also to ensure that teams achieve positive mind-sets and behaviors to 'Seek', 'Assess' and 'Act' in a manner that ensures accuracy and efficiency to achieve team targets.

Waste Elimination – Key 13: The objective for this Key was to create a safe and efficient workplace using the 5S (Sort, Set in Order, Shine, Standardise and Sustain) methodology. This methodology focused on improving safety performance (housekeeping, near hits reporting and closure) through a systematic process. Key 13 focused on eliminating all types of Lean waste, hence improving workflow, minimize costs and increase productivity. The focus areas for waste elimination were workshops, laydown areas and storerooms, while other departments used the process to streamline their processes.

Goal Alignment – Key 2: The focus for this key is to align objectives from senior leadership to the shop floor level throughout the entire operation. This is done through the Mini Business Areas, where Visual Management Boards (VMB) is used to monitor objectives performance through the KPI's. Different sections within the organisational departments were identified as mini-businesses with customers and suppliers. The mini-business then identified their KPIs that are monitored daily, performance reviewed, corrective decisions made, and actions implemented. VMB's visually displays who has to do the job, what has to be done, by when, where it will happen, why it has to be done and how an area (mini-business) is performing at a glance. Visual Management Board is about communicating, informing, and motivating the team to make the present day better than the previous one.

Problem Solving Teams (Small Group Activity - SGA) – Key 3: Small Group Activity (SGA) is a method for problem solving, which uses small teams to analyze a problem and eliminate the root cause. It provides a systematic approach and techniques to use to solve problems in a small team, assembled like a task force. It is also defined as a multi-disciplinary group, formed to solve a specific problem that can lead to an improved performance. This key assists teams to identify the root causes to the non-performing KPIs.

Summary of the expected benefits from the MBA initiative:

Expected benefits from implementing the initiative was to drive substantial improvements in Safety, Productivity and Cost Performance whilst motivating and empowering teams.

The following benefits were also expected at the time of implementation.

1. Improved operational performance: Teams will achieve more by improving the way work is planned and executed;
2. Improved quality: Teams would understand what their customer wants and needs and design the processes that meet their expectations and requirements;
3. Eliminate waste: Removing activities that consume time, resources, or space but do not add value to the product or services;
4. Reduce time: Eliminating waste and lowering costs by reducing the time it takes to finish an activity from start to finish; and
5. Reduce total costs: This was expected to be achieved by producing what is required, procuring only what is needed and releasing frozen capital in excess inventories to reduce total cost.

4.1.1. Analysis of the Results

From the KPIs used across the organisation, only a few were used to illustrate the performance of the initiative in this report. This includes, the cost of geyser maintenance, valve consumption and jet sump pipes, the queueing time for the mining equipment and the safety KPI of near-hits reporting. Below are the results from the initiative for the year 2017. The analysis of the KPIs were then used to identify how the MRM department can use the MBA *Lean* to improve its efficiency and contribute to maximising the shareholders' wealth.

4.1.2.1. Geyser Maintenance Costs

Geyser maintenance costs are a KPI for township maintenance section. Figure 12 shows the costs associated with the geyser replacement and repairs for the year 2017 as compared to the previous years (2014-2016). Previously a concern of backlog on the maintenance job cards not being closed affected the efficiency of the team. The maintenance team engages business partners on work to be done. For their financial gain business partners engaged would tend to replace geysers rather than maintain as requested in the job cards. The KPI was closely monitored to ensure costs are contained and correctly assigned, therefore improving efficiency and containing costs by replacing only those that required to be replaced.

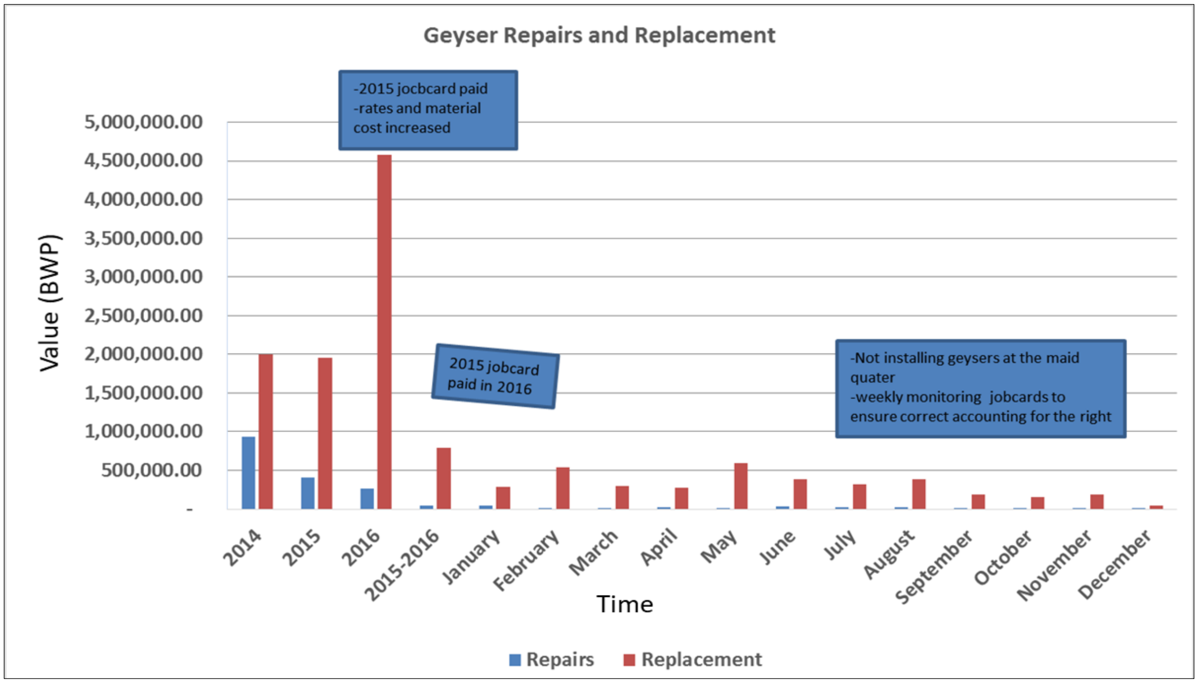


Figure 12: Costs for geyser maintenance and repairs

4.1.2.2. Valve Consumption

The graph (Figure 13) shows a slight reduction in costs for replacement and reduced costs for repairs compared to the previous years for the valve used by the processing plants. The costs for valve consumption are a KPI for cost reduction at the Engineering Department. Using only two keys (goal alignment and waste elimination), there was a reduction in procuring the valves and having the correct spares and the right amount of the valves in store. The value for stocks ordered decreased due to 5S works (proper storage, easy identification of spares, clearing of laydown areas), which identified the spares which were improperly stored. The process identified new and improperly stored stock from many squirrel storages around the processing plants). This assisted in reducing the costs and also improved the efficiency in the maintenance as the valves were now easily accessible (properly stored and labelled). This also reduced the time taken to access the valves.

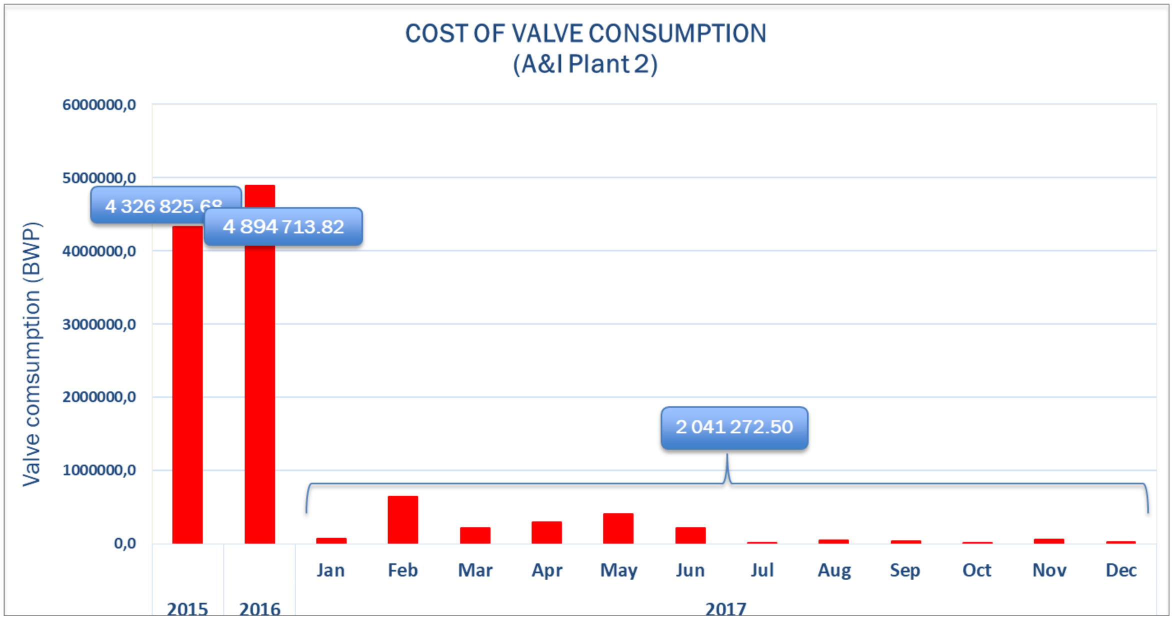


Figure 13: Cost of valve consumption

4.1.2.3. Jet Sumps Costs

Figure 14 shows the cost reduction in procurement of the jet sump cactus pipes as per the results of the MBA initiative. The waste elimination identified pipes, which were not properly stored and used for the rest of the year 2017. This saved the organisation's funds, which reduced the operating costs for the year 2016 and 2017. Figure 15 below shows how the pipes were identified, selected, sorted and stored in a labelled environment, which improved the efficiency and saved costs.

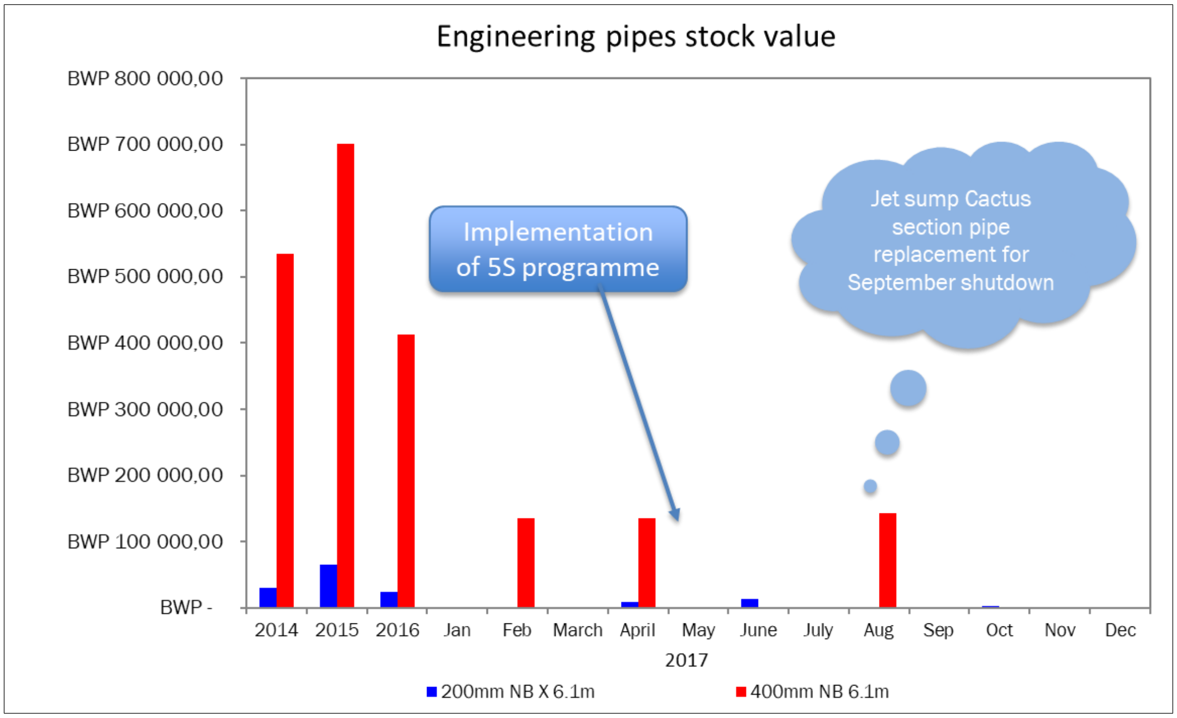


Figure 14: Costs for jet sump cactus pipes

Figure 15: Before and after pictures for the pipes identified during the initiative (Key 13 – Waste elimination)

4.1.2.4. Mining Equipment Queueing Time

Waiting and queueing time was one of the KPI for the mining department. Waiting time at the loading zone and queueing time at the waste dumps improved significantly for the year 2017, which fulfils the objective of waste elimination (time) and improving efficiency in the process (Figure 16). The queueing time for both hauling truck and the loading equipment has significantly influenced positively on the mining costs. Mining equipment is expensive to procure and maintain, therefore, when available, utilisation of this equipment is very important. The time taken by both the hauling trucks and the loaders should be kept to minimal to reduce the operating costs by moving more material in a shift than spending time waiting for either trucks or material. This improved the efficiency at the dumping site and improved cycle time. This was done through the 5S works (cleaning of the loading and dumping sites, providing labels that make it clear for truck drivers to identify where they are supposed to dump or park). Therefore, loading areas were also easily maintained. The outgoing shift would fill up the dump to improve on their performance, and improper standards were corrected on time. The teams then used the VMB to manage, monitor and control their performance on a daily basis.

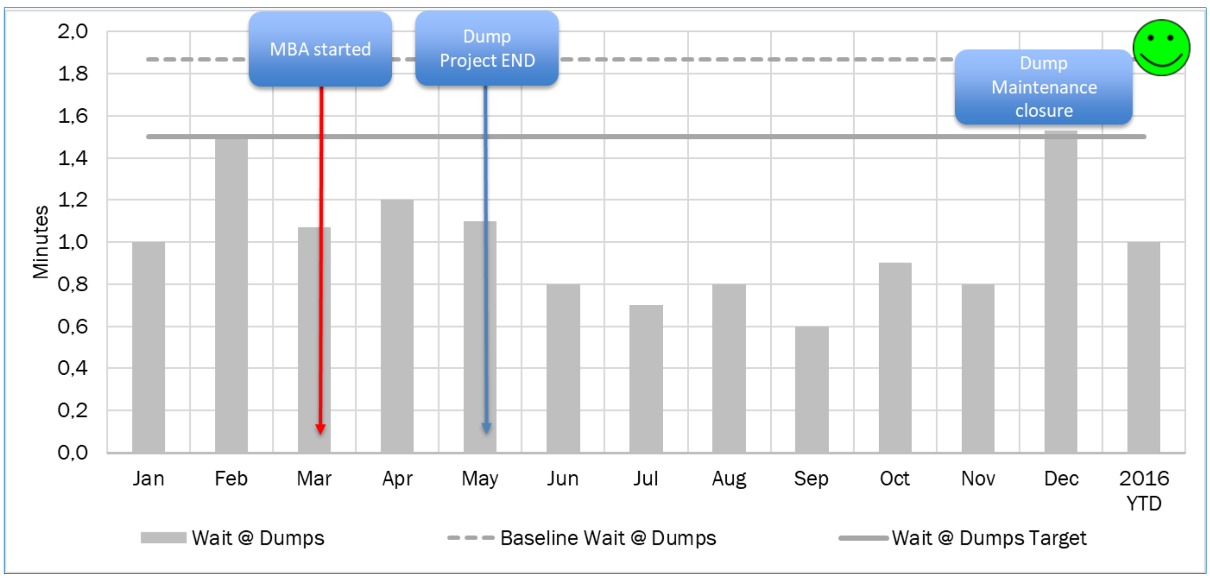


Figure 16: Queueing time for mining equipment

4.1.2.5. Near-Miss Incidents Reporting

Safety is an essential component of any workplace. It is very important in the mining industry as it is for both regulatory compliance and social licence to operate. Any harm incurred in the mining industry calls for costly stoppages, as there will be no production resulting in financial losses. Mining environments are very hazardous environments with great potential for environmental damage and loss of life. Debswana as a major contributor to the national wealth has put safety performance at its core of business. Safety to the environment, property and people plays a vital role in the organisation. The value for diamonds can be described as the intrinsic value, as it is a perceived value. Africa as a continent has been associated with 'blood' or 'conflict' diamonds, therefore, it is important for Debswana to protect its diamonds' value as it operates in an international environment. Conflict diamonds are mostly mined to fund civil wars, where human rights are violated. Organisational safety performance provides the indication of how the diamonds are produced by the organisation. Debswana's main objective of organisational safety is through zero harm to the people and environment principle, which results in safe mining, without violation of any legal requirements, the Kimberly process and other internationally recognised standards.

Mining environment processes are classified as high risks and consequences from these can cause harm to either the environment or human beings. Key controls have to be implemented to curb exposure to risks. As a control, one of the organisation's safety KPI is near-miss reporting. The organisation through the sustainability department uses the near-miss reporting to manage, monitor and provide safe working conditions for the employees. A near-miss incident is any unsafe act, situation or environment that has the potential to cause harm. The near-miss reporting enables likelihood reduction of reportable incidents occurrence. Unsafe conditions are continuously managed to create and sustain safe working environment. The Safety Pyramid (Figure 17) below illustrates the relationship between the near-miss and major incidents. Herbert William Heinrich in his Industrial Accident Prevention first proposed the safety pyramid: A scientific Approach in 1931.

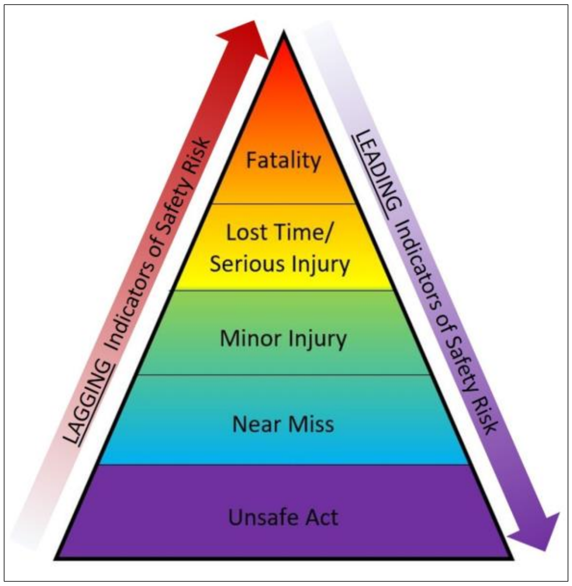


Figure 17: The Safety Triangle or Safety Pyramid

The near miss and unsafe acts are the highest leading indicators as per the pyramid above. Leading indicators provides how a desired outcome can be achieved while the lagging indicators measures the current performance, when an outcome has already been achieved.

There has been safety performance improvement over the years (Figure 18), and the improvement on the safety performance of the year 2017 is noticeable, which can be attributed with the MBA performance initiative and the reporting of near-miss incidents.

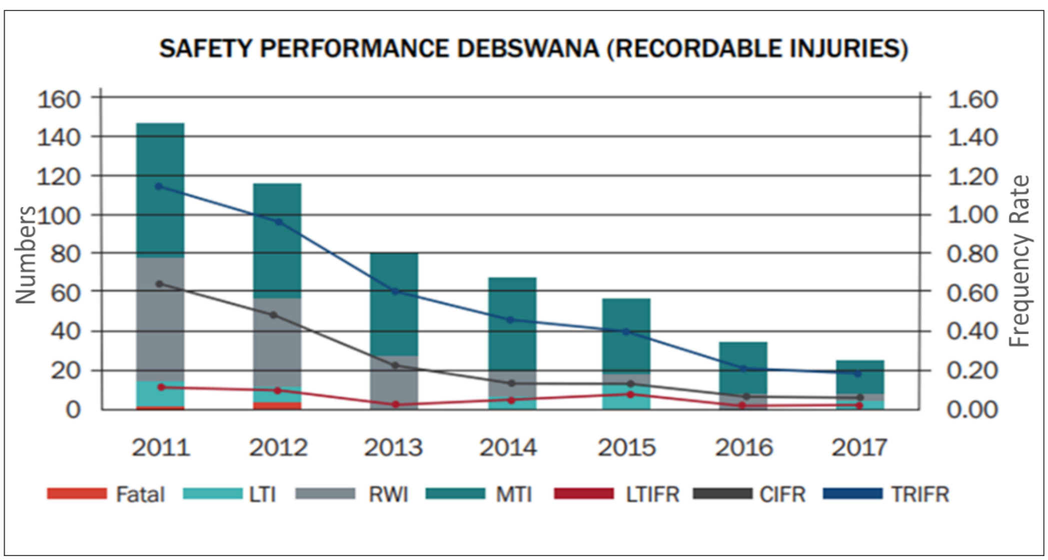


Figure 18: Debswana safety performance over the years (Debswana, 2017)

Abbreviations from Figure 18 above

LTI: Lost Time Injury

RWI: Restricted Work Injury

MTI: Medical Treatment Injury

LTIFR: Lost Time Injury Frequency Rate

CIFR: Classified Injury Frequency Rate

TRIFR: Total Recordable Injury Frequency Rate

4.1.2. Discussions

The implementation of MBA *Lean* programme assisted OLDM to achieve operational excellence. This was achieved by ensuring improved understanding of operational team contributions towards the attainment of operational goals aligned with 2018 HPO Operational Strategy. Through Key 2 of the 20 Keys to workplace improvement, every section was able to identify its key value drivers in the form of KPIs and the performance monitored daily. This enabled the organisation to make critical decisions as early as possible, when needed and change could be managed effectively from the shop floor. Moreover, it was imperative that there was focus on actions and decisions that would help operations deliver value by being proactive, agile and flexible to market conditions.

Cascading the strategic direction of an organisation to employees provided teams with information on how they contribute to the success of the organisation and shareholders' expectations. The initiative implemented by Debswana gave all the employees an opportunity to own their performance and their contributions.

Value can be created by the ability of an organisation to sustain performance over a period of time. This implies that with the implementation of the Key 2, where performance was measured daily and good performance sustained, this could result in improvement on the performance of the organisation, and value can be created.

Debswana MRM Department has the responsibility of optimally exploiting value from the mineral resource. This Department can benefit from the waste elimination key, especially on the processes to ensure flexibility and efficiency to the mining plans. Key value drivers like the ore extraction and mine-to-plan can add value when they are performed effectively, hence reducing the operating costs. Creating flexible mine plans can accommodate market changes, hence reducing waste (delays, costs from un-necessary transportation or long routes during hauling material). Another service provided by the MRM department is controlling and monitoring the exploitation of the mineral resources. The MBA concept would therefore provide a short-term control and monitoring tool through daily monitoring of mine plans and any changes or deviations can be addressed immediately. The initiative would also influence instant decision making, at the earliest convenience.

Improving Organisational Capability through the 20 Keys to Workplace Improvement

"By measuring the value added over all costs, including the cost of capital, EVA measures, in effect, the productivity of all factors of production and it shows what we need to find out and whether we need to take remedial action." (Watson, 2002). An organisation with many departments like Debswana can benefit from improving performance through the 20 Keys to workplace improvement approach (MBA concept), as when individual sections or mini-businesses improve, collectively they can reduce the unit cost, which reduces the cost on capital. A reduction on the cost of capital has a positive influence on the EVA. ''By definition, a sustained increase in EVA will result in an increase in the market value of a company'' (Gupta, 2011). The continuous improvement in EVA brings continuous increases in shareholder wealth.

4.2. De Beers Group of Companies Performance Analysis

Debswana, as part of the De Beers Group of Companies, is reported financially within the De Beers Group for the review period. Organisational performance over a period of 5 years (2014 to 2018) is presented in Figure 19 and Table 4. There is improvement of financial performance at global level however, this cannot be established for Debswana (OLDM), as the reporting is collective for Debswana operations. The revenue increased but the return on capital decreased due to an increase in capex.

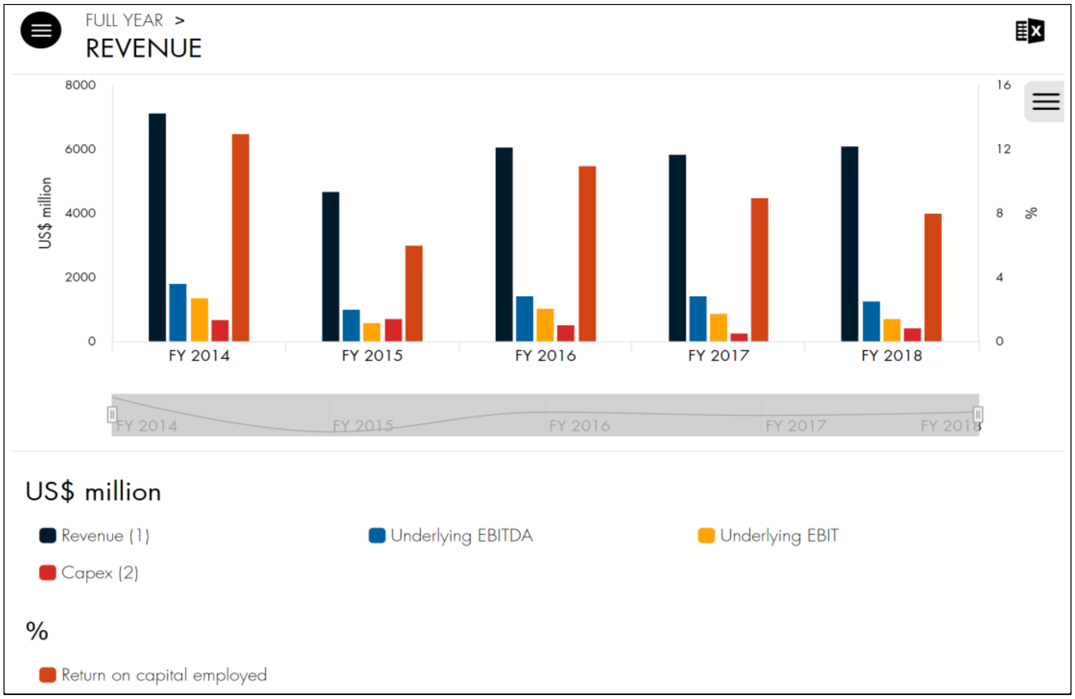


Figure 19: Financial performance of De Beers Group of Companies, from 2014 to 2018 (*(DeBeers Group, 2019)*

Over the 5-year period, the return on capital employed, revenue and underlying EBITDA was the lowest for the year 2015 and the highest during the year 2014. The return on capital measures organisational profitability and efficiency on the capital used. A high return on capital employed indicates organisational growth. EBIT provides an organisation's ability to create earnings while the EBITDA measures the actual profits that are realised by an organisation. EBIT is the company's net income before the interest and taxes are deducted and can be used to analyse the performance of an organisation's operations without the tax expenses and the cost of capital influencing it. The year 2017 group level performance does not show an exceptional increase for the all the economic performance indicators, except for EBITDA, which was slightly higher than 2016. All other performance indicators decreased from the year 2016.

Table 4: Financial performance of De Beers Group of Companies per business unit (Source: https://www.debeersgroup.com/reports/financial/data-centre)

	Units	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
FULL YEAR						
REVENUE						
Revenue	US$ million	7114	4671	6068	5841	6082
Underlying EBITDA	US$ million	1818	990	1406	1435	1245
Underlying EBIT	US$ million	1363	571	1019	873	694
Capex	US$ million	689	697	526	273	417
Return on capital employed	%	13	6	11	9	8
EBITDA BY BU						
Botswana (Debswana)	US$ million	604	379	571	484	495
Namibia (Namdeb Holdings)	US$ million	207	147	184	176	176
South Africa (DBCM)	US$ million	344	282	268	267	163
Canada	US$ million	178	154	79	205	231
Trading	US$ million	579	107	378	449	413
Other	US$ million	-94	-79	-74	-146	-233
EBIT BY BU						
Botswana (Debswana)	US$ million	579	352	543	447	441
Namibia (Namdeb Holdings)	US$ million	177	120	163	146	140
South Africa (DBCM)	US$ million	243	174	172	119	58
Canada	US$ million	77	65	13	58	78
Trading	US$ million	572	100	371	443	407
Other	US$ million	-285	-240	-243	-340	-430
CAPEX BY BU						
Botswana (Debswana)	US$ million	114	101	90	86	97
Namibia (Namdeb Holdings)	US$ million	37	30	65	33	38
South Africa (DBCM)	US$ million	296	279	156	114	177
Canada	US$ million	186	254	184	-5	127
Trading	US$ million	4	2	3	1	2
Other	US$ million	52	31	28	44	-24

Although Debswana's EBIT and EBITDA are the highest contributors to the De Beers financial performance, Table 4 above does not show any improvements for the year 2017 and 2018. Debswana performance was the highest for the year 2014 and improved during 2016. According to the 2018 financial year's reports, production increased by 6% to 24.1 million carats (2017: 22.7 million carats) at Orapa mine due to an increase in output driven by improvement in plant utilisation and re-commissioning the Damtshaa operation while Jwaneng mine production remained stagnant, (DeBeers Group, 2018).

Table 5 below considered comparing Debswana's production against the EBIT and unit cost from the reports to stakeholders. There is a slight performance improvement for the year 2017.

The results from the reports are not supportive of the theory being tested. For all the years under review, the average unit cost is $27/t, with reduced or increased production. The 2015 financial year had lower production and high price but the EBIT was the lowest. The year 2016 had the lowest production, price, unit cost and the highest EBIT performance. There was increase in production for the year 2017, high unit cost and a lower EBIT than the year 2017. This shows a slight improvement from the year 2016. Comparing the year 2017 and 2018, the year 2017 had lower carats produced, with a slightly higher price and had a higher EBIT than the financial performance for the year 2018, where there was more production but a lower EBIT. There was more improvement of performance in the year 2018 than the year 2017.

Table 5: Production data for Debswana diamond company (source: Reports to stakeholders)

Year	Carats Production (Volume)	Price (US $)	Unit Cost	Underlying EBIT (US $ mil)
2015	20368	178	27	352
2016	20501	152	26	543
2017	22684	159	28	447
2018	24132	155	28	441

4.3. Anglo American Performance Analysis

Anglo American Group owns De Beers Group, since 2012. Anglo American Group owns 85% of the De Beers Group, while the Botswana Government owns 15% (Anglo American plc, 2014). Therefore the financial and operational metrics reported (Appendix 1) are the same as the financials reported in Table 5 above by the De Beers Group. Table 6 below shows the economic contribution of Anglo American Group to Botswana (Appendix 2).

Table 6: Economic contribution in Botswana for the reporting period (source: Anglo American Tax and Economic Contribution reports)

Tax & Economic Contribution in Botswana (US$ millions)						
Year	**Corporate Taxes**	**Royalties & Mining Taxes**	**Other Payments Borne**	**Total Taxes Collected**	**Total Taxes Borne & Collected**	**Capital Investment (US$ millions)**
2018	448,8	326,6	5,7	93,7	**874,8**	**98,6**
2017	429,0	318,0	2,5	19,8	**769,3**	**86,0**
2016	472,9	362,2	0,2	113,5	**948,8**	**91,0**
2015	330,0	233,0	6,0	98,0	**667,0**	
2014	Not reported					**115,0**
5 Year Contribution	**526,9**	**655,9**	**93,3**	**145,1**	**1 421,2**	**390,6**

The year 2017 has the second lowest total taxes collected, with the year 2016 having the highest total taxes collected over the reporting period. The effect of the OLDM's improvement on Organisational Capability is not reflecting on the economic performance indicators. The highest capital investment was received during the year 2014 while 2017 had the lowest capital investment.

4.4. Limitations for Discussions

- Debswana is part of the De Beers Group of Companies and financial reports are consolidated and reported at global level.
- The reports on Debswana does not separate OLDM and Jwaneng operations.
- The diamond mining industry is very protective of the information shared on the public domain, therefore the details of the operational performance are not available.
- Debswana changed ownership from De Beers Group of Companies to the Anglo American Group, which reports differently, although some data is the same.

CHAPTER 5: CONCLUSIONS & RECOMMENDATIONS

5.1. Conclusions

The diamond industry is very sensitive about the financial performances that are published in the public domain. The data provided does not answer all the questions that were intended by the research, however, it gives evidence that business improvement strategies like the 20 Keys to Workplace Improvement have a positive effect of cost saving and making the companies effective, which theoretically, can positively influence both the EVA and the MVA if being monitored and measured.

1. Both the EVA and the MVA are influenced by the capital employed, which indicates that the reduction in the capital employed can have a positive influence in the two financial performance indicators.
2. The results from the 20 Keys to Workplace Improvement provides an indication that the there is a reduction in costs for the KPIs analysed above. This reduction can reduce the organisational capital employed, therefore positively affecting the EVA and MVA.
3. The 20 Keys to Workplace Improvement provides flexibility and efficiency to the system or processes when applied to a value-based system, resulting in improved Organisational Capability. This can also be utilised by the MRM Department, which manages the non-renewable value adding resource of an organisation.
4. Three of the Keys to Workplace Improvement methodology were implemented, giving evidence of cost savings and improving organisational efficiency, resulting in improved operating unit cost of the organisation. Reducing the unit costs influences the shareholders’ return, hence improving both the EVA and MVA.
5. The MBA *Lean* initiative improved efficiency in decision making, as the KPIs that drives value were monitored on daily basis and changes were implemented immediately. Each department was able to identify their Key Value Drivers, which one way or the other they have an influence on the unit cost of production

by lowering the operational costs. If the initiative is implemented across all Debswana operations, there can be improvement on the performance for all the 2018 Debswana strategic pillars.

6. The concept has proven to be able to assist in cost containment and improved organisational effectiveness, hence improving Organisational Capability, and maximising shareholders' value.

Improving Organisational Capability through the organisational continuous improvement approaches can influence the MVA and EVA of any organisation by reducing the cost of doing business. Debswana is operating as part of a bigger entity (De Beers Group and now Anglo American Group), and therefore the results of the MBA initiative are only visible at operational level than at an organisational level. The review of the data from the initiative gives an improvement on cost reduction and efficiency at operational level. The implementation of the initiative does not show a positive or negative influence on the overall organisational financial performance. EVA or MVA could not be calculated as the cost of capital is not reported anywhere in the reports.

In summary, value is created when an organisational ROIC is more than the cost of capital. Improving efficiency of processes and reducing operating costs can results in high earnings. Earnings greater than the cost of capital increases organisational value. However, small savings realised at operational level does not influence organisational EVA and MVA, when organisational financial performance is evaluated at global level.

5.2. Recommendations

There is limited information on the financial performance of diamond mining organisations, therefore, the above concepts should be evaluated against a different commodity in the mining industry to identify and quantify the benefits of improving organisation capability to the EVA and MVA. Other commodities like the base metals have an extensive data both regionally and globally.

Impact of the cost reduction and efficiency improvement generally takes a longer period for results to be realised. The improved performance needs to be sustained over time for a positive influence on both EVA and MVA, therefore, the data can be reviewed for more years after the implementation of the initiative.

Since the MBA initiative was implemented at OLDM operations only, the research can be done focusing only at operational level, with analyses focusing on the key value drivers for factors that influence the EVA. Factors that can be reviewed are revenue growth over time, actual value of cost reduction and capital invested. A formal request for the data can be applied for from the Debswana management.

REFERENCES

Ameels, A., Bruggeman, W. & Scheipers, G., 2002. *Value-Based Management Control Processes to Create Value through Intergration, A literature review.* s.l.:Vlerick Leuven Cent Management School.

Anglo American plc, 2014. *Annual Report 2014,* s.l.: https://www.angloamerican.com.

Anglo American plc, 2014. *Tax and Contribution Report 2014,* s.l.: https://www.angloamerican.com.

Anglo American plc, 2015. *Annual Report 2015,* s.l.: https://www.angloamerican.com.

Anglo American plc, 2015. *Tax and Economic Contribution Report 2015,* s.l.: https://www.angloamerican.com.

Anglo American plc, 2016. *Annual Report 2016,* s.l.: https://www.angloamerican.com/.

Anglo American plc, 2016. *Tax and Economic Contribution Report 2016,* s.l.: https://www.angloamerican.com.

Anglo American plc, 2017. *Annual Report 2017,* s.l.: https://www.angloamerican.com.

Anglo American plc, 2017. *Tax and Economic Contribution Report 2017,* s.l.: https://www.angloamerican.com.

Anglo American plc, 2018. *Integrated Annaul Report 2018.* [Online]
Available at: https://www.angloamerican.com/
[Accessed 26 October 2019].

Anglo American plc, 2018. *Tax and Economic Contibution Report 2018,* s.l.: https://www.angloamerican.com/.

Claassen, J. O. & Laurens, P. G., 2016. Mineral Resources Management: Evaluating mineral resource throughput Management. *South African Journal of Business Management,* Volume 47, pp. 9-20.

DeBeers Group, 2015. *Building Forever - Report to Society,* s.l.: DeBeers Group of Companies.

DeBeers Group, 2018. *Preliminary Financial Results for 2018,* s.l.: DeBeers Group.

DeBeers Group, 2018. *The Diamond Insight Report,* s.l.: DeBeers Group.

DeBeers Group, 2019. *DeBeers Group.* [Online]
Available at: https://www.debeersgroup.com/reports/financial/data-centre
[Accessed 1 May 2019].

Debswana, 2013. *http://www.debswana.com/Media/Reports.* [Online]
Available at: http://www.debswana.com
[Accessed January 2016].

Debswana, 2016. *Diamonds for Development; Report to Stakeholders 2016,* s.l.: www.debswana.com.

Debswana, 2017. *Report to Stakeholders 2017; Governance and Excellence,* s.l.: Debswana.com.

Debswana, 2019. *About Us: Debswana Diamond Company.* [Online]
Available at: http://www.debswana.com/Pages/default.aspx
[Accessed 15 June 2019].

Dosi, G., Faillo, M. & Marengo, L., 2003. *Organisational capabilities, patterns of knowlegde accumulation and governance structures in business firms,* s.l.: Laboratory of Economics and Management.

Ernst & Young, 2015. *www.ey.com.* [Online]
Available at: http://www.ey.com/GL/en/Industries/Mining---Metals/Business-risks-in-mining-and-metals
[Accessed 16 September 2015].

Ernst & Young, 2018. *Ernst & Young.* [Online]
Available at: https://www.ey.com
[Accessed 30 July 2018].

Geyser, M. & Liebenberg, I. E., 2003. Creating a new valuation tool for South African agricultural co-operations. *Agrekon,* 42(2), pp. 106-115.

Gupta, S., 2011. *Perfomance Measurement: A comparative study of EVA and Tradtional Perfomance Measurement Techniques.* Munich: s.n.

Johannesson, J., 2010. The Dynamics of Strategic Capability. *International Business Research,* 3(1), pp. 3-12.

Koller, T., 2018. *McKinnsey&Company; Strategy & Corporate Finance.* [Online]
Available at: https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/what-is-value-based-management
[Accessed 28 July 2018].

Koller, T., Goedhart, M. & Wessels, D., 2005. *Valuation; Measuring and Managing the value of Company.* 4th ed. New Jersey: John Wiley & Sons.

Koller, T., Goedhart, M. & Wessels, D., 2010. *Valuation; Measuring and Managing the Value of Company.* 5th ed. New Jersey: John Wiley & Sons.

Lewis, M. A., 2000. Lean production and Sustainable Competitive Advantage. *International Journal of Operations and Production Management,* 20(8), pp. 959 - 978.

Lilford, E. V. & Minnitt, R. C., 2005. A comparative study of valuation methodologies for mineral developments. *The Journal of The South African Institute of Mining and Metallurgy.*

Mitchell, P., 2018. *Ernst & Young.* [Online]
Available at: https://www.ey.com
[Accessed 28 July 2018].

Nave, D., 2002. How To Compare Six Sigma, Lean and the Theory of Constartints. *American Socisty for Quality*, March, pp. 73-78.

Petranolo, D., 1997. Benchmarking Organisational Capability using the 20 Keys. *The South African Journal of Industrial Engineering,* 8(2), pp. 16-32.

Rakshit, D., 2006. EVA Based Perfomance Measurement; A case study of Dabur India Limited. *Vidyasagar University Journal of Commerce,* Volume 11, pp. 40-59.

Roztocki, N. & Needy, K., 1998. *EVA for small manufacturing companies,* s.l.: University of Pittsburgh, Department of Industrial Engineering.

Rudenno, V., 2012. *The Mining Valuation handbook.* 4th ed. s.l.:John Wiley &Sons.

Sayed, N. S. & Sayed, G., 2015. Indian Banking Sector: Measurement and Analysis of Market Value Added An Empirical study in the selevted Indian Banks. *Journal of Management Research and Analysis,* 2(1), pp. 24-34.

Schienstock, G., 2009. Organisational Capabilities: Some reflections on the concept. *Intangible Assets and Regional Economic Growth (IAREG) Working paper 1.2c*, April.

Sichigea, N. & Vasilescu, L., 2015. Economic Value Added and Market Value Added - Mordern Indicators for Assessment the Firm's Value. *Annals of the Constantin Brancusi,* Issue Special Issue: ECO-TREND 2015, pp. 488-493.

Statistics Botswana, 2019. *Statistics Botswana.* [Online]
Available at: www.statsbots.org.bw
[Accessed 25 June 2019].

Statistics Botswana, 2020. *Statistics Botswana.* [Online]
Available at: https://www.statsbots.org.bw
[Accessed 23 October 2020].

Stern Value Management, 2015. *SternValueManagement.com.* [Online]
Available at: http://sternvaluemanagement.com/consulting-services-strategy-governance-financial-policy-operations/eva-training/

[Accessed 28 July 2018].

TICHA, I., 2010. Organisational capabilities as a source of competitive advantage:a conceptual framework. *Czech Academy of Agricultural sciences - Agricultural Journal,* 56(4), pp. 159-162.

Tuan, P. N. & Yoshi, T., 2010. Organisational Capabilities, Competitive Advantage and Perfomance in supporting Industries in Vietnam. *Asian Academy of Management Journal,* 15(1), pp. 1-21.

Ugboro, I., Obeng, K. & Spann, O., 2011. Strategic Planning as an Effective Tool of strategic management in Public sector organisations: Evidence from the Public Transit Organisations. *Administrative and Society,* October, 43(1), pp. 87 - 123.

Wang, X. & Zeng, Y., 2017. Organisational Capability Model: Toward Improving Organisational Performance. *Journal of Intergrated Design and Process Science,* 21(1), pp. 5-24.

World Bank, 2020. *The World Bank.* [Online]
Available at: https://www.worldbank.org
[Accessed 21 October 2020].

APPENDIX 1

Anglo American Annual Reports: Financial and Operations metrics extracts (2014-2018), (Source: Anglo American plc Annual Reports)

Financial and operational metrics[1]

	Production volume ('000 cts)	Sales volume ('000 cts)[2]	Price ($/ct)[3]	Unit cost ($/ct)[4]	Group revenue ($m)[5]	Underlying EBITDA ($m)	Underlying EBITDA margin	Underlying EBIT ($m)	Capex ($m)[6]	ROCE
De Beers	**35,297**	**31,656**	**171**	**60**	**6,082**	**1,245**	**20%**	**694**	**417**	**8%**
Prior year	33,454	32,455	162	63	5,841	1,435	25%	873	273	9%
Botswana (Debswana)	**24,132**	**–**	**155**	**28**	**–**	**495**	**–**	**441**	**97**	**–**
Prior year	22,684	–	159	28	–	484	–	447	86	–
Namibia (Namdeb Holdings)	**2,008**	**–**	**550**	**274**	**–**	**176**	**–**	**140**	**38**	**–**
Prior year	1,805	–	539	257	–	176	–	146	33	–
South Africa (DBCM)	**4,682**	**–**	**109**	**54**	**–**	**163**	**–**	**58**	**177**	**–**
Prior year	5,208	–	129	62	–	267	–	119	114	–
Canada[7]	**4,475**	**–**	**144**	**52**	**–**	**231**	**–**	**78**	**127**	**–**
Prior year	3,757	–	235	57	–	205	–	58	(5)	–
Trading	**–**	**–**	**–**	**–**	**–**	**413**	**–**	**407**	**2**	**–**
Prior year	–	–	–	–	–	449	–	443	1	–
Other[8]	**–**	**–**	**–**	**–**	**–**	**(233)**	**–**	**(430)**	**(24)**	**–**
Prior year	–	–	–	–	–	(146)	–	(340)	44	–

[1] Prepared on a consolidated accounting basis, except for production, which is stated on a 100% basis except for the Gahcho Kué joint operation in Canada, which is on an attributable 51% basis.
[2] Sales volumes are consolidated sales volumes and exclude pre-commercial production sales volumes from Gahcho Kué in 2017. Total sales volumes (100%), which are comparable to production, were 33.7 million carats (2017: 35.1 million carats). Total sales volumes (100%) include De Beers Group's joint arrangement partners 50% proportionate share of sales to entities outside De Beers Group from Diamond Trading Company Botswana and Namibia Diamond Trading Company and, in 2017, include pre-commercial production sales volumes from Gahcho Kué.
[3] Pricing for the mining business units is based on 100% selling value post-aggregation of goods. The De Beers realised price includes the price impact of the sale of non-equity product and, as a result, is not directly comparable to De Beers unit costs, which relate to equity production only.
[4] Unit cost is based on consolidated production and operating costs, excluding depreciation and operating special items, divided by carats recovered.
[5] Includes rough diamond sales of $5.4 billion (2017: $5.2 billion).
[6] In 2018, includes the acquisition of Peregrine Diamonds Limited for a consideration of $87 million. In 2017, includes pre-commercial production capitalised operating cash inflows from Gahcho Kué.
[7] In 2017, price excludes Gahcho Kué contribution from sales related to pre-commercial production, which were capitalised in the first half of 2017. Unit costs include Gahcho Kué contribution following achievement of commercial production on 2 March 2017.
[8] Other includes Element Six, downstream, acquisition accounting adjustments and corporate.

FINANCIAL AND OPERATIONAL OVERVIEW

Total revenue increased by 4% to $6.1 billion (2017: $5.8 billion), with rough diamond sales increasing by 4% to $5.4 billion (2017: $5.2 billion), driven by improved overall consumer demand for diamond jewellery and a 1% increase in the average rough diamond price index. The average realised price increased by 6% to $171/carat (2017: $162/carat), reflecting the lower proportion of lower value rough diamonds being sold in the second half, which resulted in a 2% decrease in consolidated sales volumes to 31.7 million carats (2017: 32.5 million carats). Other revenue also increased owing to improved 'high end' jewellery sales at De Beers Jewellers (consolidated for a full year in 2018, compared with nine months in 2017), partly offset by a 5% decrease in Element Six revenue due to a reduction in sales to the oil and gas market.

Underlying EBITDA decreased by 13% to $1,245 million (2017: $1,435 million). While unit costs and upstream profit margins were maintained, De Beers undertook incremental expenditure on a number of new initiatives, including the launch of Lightbox Jewelry (Lightbox™), Tracr™ and Gemfair™, as well as increasing expenditure in marketing, exploration and evaluation in Canada and increasing provisions in respect of closure obligations. Margins in the trading business were lower owing to volatile market conditions, and the margin at Element Six decreased as a result of lower sales to the oil and gas market.

MARKETS

Preliminary data for 2018 indicates an improvement in global consumer demand for diamond jewellery, in US dollar terms. Global growth during the first half of the year was driven by solid US and Chinese consumer demand. However, during the second half, while the US maintained its growth rate, increased political and policy uncertainty and stock exchange volatility led to a general slowdown of demand. Chinese demand also slowed following the escalation in US-China trade tensions, slower economic growth and stock market volatility. In India, the significant depreciation of the rupee reduced local demand in US dollar terms.

The midstream started the year on a positive note due to healthy demand for polished diamonds from US and Chinese retailers. However, in the second half, the low-priced product segment came under considerable pressure due to weak demand and surplus availability, the rapid depreciation of the rupee and a reduction in bank financing in the midstream. This resulted in a surplus of low-priced polished diamonds at the end of the year, leading to lower sales at the start of 2019.

For more information, refer to the Marketplace review section
See pages 14-15

Financial and operational metrics[1]

	Production volume ('000 cts)	Sales volume ('000 cts)[2]	Price ($/ct)[3]	Unit cost* ($/ct)[4]	Revenue* ($m)[5]	Underlying EBITDA* ($m)	Underlying EBITDA margin	Underlying EBIT* ($m)	Capex* ($m)[6]	ROCE*
De Beers	**33,454**	**32,455**	**162**	**63**	**5,841**	**1,435**	**25%**	**873**	**273**	**9%**
Prior year	27,339	29,965	187	67	6,068	1,406	23%	1,019	526	11%
Botswana (Debswana)	**22,684**	**–**	**159**	**28**	**–**	**484**	**–**	**447**	**86**	**–**
Prior year	20,501	–	152	26	–	571	–	543	90	–
Namibia (Namdeb Holdings)	**1,805**	**–**	**539**	**257**	**–**	**176**	**–**	**146**	**33**	**–**
Prior year	1,573	–	528	245	–	184	–	163	65	–
South Africa (DBCM)	**5,208**	**–**	**129**	**62**	**–**	**267**	**–**	**119**	**114**	**–**
Prior year	4,234	–	121	53	–	268	–	172	156	–
Canada[7]	**3,757**	**–**	**235**	**57**	**–**	**205**	**–**	**58**	**(5)**	**–**
Prior year	1,031	–	271	212	–	79	–	13	184	–
Trading	**–**	**–**	**–**	**–**	**–**	**449**	**–**	**443**	**1**	**–**
Prior year	–	–	–	–	–	378	–	371	3	–
Other[8]	**–**	**–**	**–**	**–**	**–**	**(146)**	**–**	**(340)**	**44**	**–**
Prior year	–	–	–	–	–	(74)	–	(243)	28	–

[1] Prepared on a consolidated accounting basis, except for production, which is stated on a 100% basis except for the Gahcho Kué joint venture in Canada, which is on an attributable 51% basis.
[2] Consolidated sales volumes (2017: 33.1 million carats; 2016: 30.0 million carats) exclude pre-commercial production sales volumes from Gahcho Kué. Total sales volumes (100%), which are comparable to production, were 35.1 million carats (2016: 32.0 million carats). Total sales volumes (100%) include pre-commercial production sales volumes from Gahcho Kué and De Beers' JV partners' 50% proportionate share of sales to entities outside De Beers from the Diamond Trading Company Botswana and the Namibia Diamond Trading Company.
[3] Pricing for the mining business units is based on 100% selling value post-aggregation of goods. The De Beers realised price includes the price impact of the sale of non-equity product and, as a result, is not directly comparable to De Beers unit costs, which relate to equity production only.
[4] Unit cost is based on consolidated production and operating costs, excluding depreciation and operating special items, divided by carats recovered.
[5] Includes rough diamond sales of $5.2 billion (2016: $5.6 billion).
[6] Includes pre-commercial production capitalised operating cash inflows from Gahcho Kué.
[7] For Canada, price excludes Gahcho Kué contribution from sales related to pre-commercial production, which were capitalised in the first half of 2017. Unit costs include Gahcho Kué contribution following achievement of commercial production on 2 March 2017.
[8] Other includes Element Six, downstream, acquisition accounting adjustments, projects and corporate.

FINANCIAL AND OPERATIONAL OVERVIEW

Underlying EBITDA increased by 2% to $1,435 million (2016: $1,406 million) despite lower revenue following the one-off industry midstream restocking in 2016. This performance was driven by improved margins, which benefited from lower unit costs (supported by higher production and efficiency drives across the business), a strong contribution from Canada (driven by Gahcho Kué's ramp-up and the closure of Snap Lake), and Element Six (which benefited from a recovery in oil and gas markets). This was partly offset by unfavourable exchange rates, and an increasing proportion of waste mining costs being expensed rather than capitalised, owing to an improved strip ratio at Venetia in South Africa.

Total revenue declined by 4% to $5.8 billion (2016: $6.1 billion) – as expected, given the benefit of strong midstream restocking in the first half of 2016. The average realised rough diamond price decreased by 13% to $162/carat (2016: $187/carat) mainly owing to a lower value mix; this was partly offset by an 8% increase in consolidated sales volumes to 32.5 million carats (2016: 30.0 million carats). This reflected stronger demand for lower-value goods in Sight 1 of 2017, following a recovery from the initial impact of India's demonetisation programme in late 2016, as well as the ramp-up of production from lower value per carat but high margin operations, including Orapa and Gahcho Kué. The lower-value mix was compensated in part by a higher average rough price index, which was 3% above that of 2016.

Capital expenditure reduced by 48% to $273 million (2016: $526 million), mainly owing to the completion of major projects, including Gahcho Kué; Debmarine Namibia's new exploration and sampling vessel, the SS Nujoma; and planned lower waste capitalisation at Venetia. The SS Nujoma, which was delivered three months ahead of schedule and under budget, was officially inaugurated in June 2017 and is fully operational.

MARKETS

Early signs are that global consumer demand for diamond jewellery registered positive growth in 2017 in US dollar terms, following a marginal increase in 2016. Sustained diamond jewellery demand growth in the US was once again the main contributor to this positive outcome. Demand for diamond jewellery by Chinese consumers grew marginally in local currency and dollar terms. In contrast, consumer demand for diamonds softened in India and the Gulf states, both in local currency and dollar terms, while Japan's consumer demand growth was flat in local currency and lower in dollars.

Diamond producers' primary stocks are estimated to have reduced considerably during the first half of 2017, as sentiment in the midstream improved and rough and polished inventories normalised for businesses in this segment of the value chain. However, as a result of US retailers tightly managing their inventories and the earlier timing of Diwali in India, there was a slight seasonal build-up of polished inventory in the midstream going into the fourth quarter. Overall, early indications are that additional consumer marketing undertaken during the main selling season had a positive effect on polished demand in the US, China and India in the final quarter of the year, leading to a positive impact on overall polished inventories.

For more information, refer to the Marketplace review section
See pages 11-13

Key performance indicators[1]

	Production volume ('000 cts)	Sales volume ('000 cts)[2]	Price ($/ct)[3]	Unit cost ($/ct)[4]	Revenue ($m)[5]	Underlying EBITDA ($m)	Underlying EBITDA margin	Underlying EBIT ($m)	Capex ($m)	ROCE
De Beers	**27,339**	**29,965**	**187**	**67**	**6,068**	**1,406**	**23%**	**1,019**	**526**	**11%**
Prior year	28,692	19,945	207	83	4,671	990	21%	571	697	6%
Debswana	**20,501**	**–**	**152**	**26**	**–**	**571**	**–**	**543**	**90**	**–**
Prior year	20,368	–	178	27	–	379	–	352	101	–
Namdeb Holdings	**1,573**	**–**	**528**	**245**	**–**	**184**	**–**	**163**	**65**	**–**
Prior year	1,764	–	553	243	–	147	–	120	30	–
South Africa	**4,234**	**–**	**121**	**53**	**–**	**268**	**–**	**172**	**156**	**–**
Prior year	4,673	–	131	58	–	282	–	174	279	–
Canada	**1,031**	**–**	**271**	**212**	**–**	**79**	**–**	**13**	**184**	**–**
Prior year	1,887	–	275	182	–	154	–	65	254	–
Trading	**–**	**–**	**–**	**–**	**–**	**378**	**–**	**371**	**3**	**–**
Prior year	–	–	–	–	–	107	–	100	2	–
Other[6]	**–**	**–**	**–**	**–**	**–**	**(74)**	**–**	**(243)**	**28**	**–**
Prior year	–	–	–	–	–	(79)	–	(240)	31	–

[1] Prepared on a consolidated accounting basis, except for production which is stated on a 100% basis, with the exception of the Gahcho Kué joint venture, which is on an attributable 51% basis.
[2] Sales volumes on a 100% basis were 32.0 million carats (2015: 20.6 million carats).
[3] Pricing for the mining business units is based on 100% selling value post-aggregation of goods. The group realised price includes the price impact of the sale of non-equity product and, as a result, is not directly comparable to group unit costs, which relate to equity production only.
[4] Unit cost is based on total production and operating costs, excluding depreciation and operating special items, divided by carats recovered. Comparatives have been restated.
[5] Includes rough diamond sales of $5.6 billion (2015: $4.1 billion).
[6] Other includes Element Six, downstream, acquisition accounting adjustments, projects and corporate.

INTRODUCTION

De Beers and its partners produce about a third of the world's rough diamonds by value, with the majority sold via De Beers Global Sightholder Sales to term contract customers (Sightholders) and accredited buyers, and the remainder via De Beers Auction Sales to auction customers. Downstream assets include the De Beers Diamond Jewellers joint venture and the Forevermark™ brand, which now features in 2,010 outlets in 25 key consumer markets around the world. Finally, Element Six sells synthetic diamonds for industrial diamond supermaterials applications.

FINANCIAL AND OPERATING OVERVIEW

Underlying EBITDA increased by 42% to $1,406 million (2015: $990 million). This was the result of higher revenues from stronger rough diamond demand, which led to reduced inventory levels, reflecting improved trading conditions compared with those experienced in the second half of 2015. Results also benefited from cost-saving programmes, portfolio changes, and the impact of favourable exchange rates. Unit costs decreased by 19% from $83/carat to $67/carat.

Total revenue increased by 30% to $6.1 billion (2015: $4.7 billion), driven by higher rough diamond sales, which increased by 37% to $5.6 billion. This was attributable to a 50% increase in consolidated sales volumes to 30.0 million carats (2015: 19.9 million carats), partly offset by a 10% decrease in the average realised rough diamond price to $187/carat (2015: $207/carat), reflecting the 13% lower average rough price index, offset to some extent by an improved sales mix.

MARKETS

Sustained diamond jewellery demand growth in the US and marginally positive growth for the full year in China (in local currency, though declining slightly in US dollars) contrasted with weakening demand in the other main diamond markets. In India, a month-long jewellers' strike in March, and the government's surprise demonetisation programme which started in November, had a considerable negative impact on demand. For the full year, global consumer demand, in US dollar terms, is estimated to be in line with 2015. Additional marketing in the US, China, India and Japan in the final quarter of the year, the main selling season, had a positive impact.

Producers destocked during 2016, as sentiment in the midstream improved and rough and polished inventories normalised, supported by a series of initiatives put in place by De Beers, starting in the second half of 2015. These included lowering rough prices, providing flexibility to Sightholders for their purchase arrangements and increased marketing activity to drive consumer demand.

For more information, refer to the Marketplace review section
See pages 06-08

DE BEERS continued

KEY PERFORMANCE INDICATORS[1]

	Production volume (000'cts)	Sales volume (000'cts)[2]	Price ($/ct)[3]	Unit cost ($/ct)[4]	Revenue ($m)[5]	Underlying EBITDA ($m)	Underlying EBIT ($m)	Capex ($m)	ROCE
De Beers	**28,692**	**19,945**	**207**	**104**	**4,671**	**990**	**571**	**697**	**6%**
Prior year	32,605	32,730	198	111	7,114	1,818	1,363	689	13%
Debswana	**20,368**	**–**	**178**	**34**	**–**	**379**	**352**	**101**	**–**
Prior year	24,237	–	172	31	–	604	579	114	–
Namdeb Holdings	**1,764**	**–**	**553**	**273**	**–**	**147**	**120**	**30**	**–**
Prior year	1,886	–	581	283	–	207	177	37	–
South Africa	**4,673**	**–**	**131**	**81**	**–**	**282**	**174**	**279**	**–**
Prior year	4,634	–	155	89	–	344	243	296	–
Canada	**1,887**	**–**	**275**	**229**	**–**	**154**	**65**	**254**	**–**
Prior year	1,848	–	312	279	–	178	77	186	–
Trading	**–**	**–**	**–**	**–**	**–**	**107**	**100**	**2**	**–**
Prior year	–	–	–	–	–	579	572	4	–
Other[6]	**–**	**–**	**–**	**–**	**–**	**(79)**	**(240)**	**31**	**–**
Prior year	–	–	–	–	–	(94)	(285)	52	–

(1) Prepared on a consolidated accounting basis, except for production which is stated on a 100% basis.
(2) Total sales volumes on a 100% basis were 20.6 million carats (2014: 34.4 million carats).
(3) Price for the mining business units based on 100% selling value post-aggregation.
(4) Based on the total cost per carat recovered, including depreciation.
(5) Includes rough diamond sales of $4.1 billion (2014: $6.5 billion).
(6) Other includes Element Six, downstream and acquisition accounting adjustments.

This 5% increase in average realised diamond prices to $207/carat (2014: $198/carat), reflected a stronger product mix, despite an 8% lower average rough price index for the period. From the final Sight in 2014 to the final Sight in 2015, the De Beers rough price index declined by 15%.

Owing to weaker rough diamond demand, De Beers reduced production, costs and capital expenditure. As a result of the cost saving programmes, supported by favourable exchange rate movements, consolidated unit costs declined from $111/carat to $104/carat.

MARKETS

Global consumer demand for diamond jewellery in 2015 is expected to have declined marginally in US dollar terms from the record levels of 2014, as growth in the US was offset by the economic slowdown in China and the strength of the dollar.

The US, the largest market for polished diamonds at approximately 45% of global market value, again saw the strongest growth, albeit at a slower rate than in 2014. Demand for diamond jewellery by Chinese consumers was stable, while in India, diamond jewellery demand contracted in local currency terms.

Weaker than expected consumer demand in 2015 resulted in retailers reducing their demand for polished diamonds from the midstream manufacturers. A build-up in polished stocks in the midstream put downward pressure on polished prices, and reduced the midstream's willingness to purchase additional rough diamonds. This was exacerbated by a more stringent financing environment.

For more information refer to the Marketplace review section
See pages 8–10

OPERATING PERFORMANCE

Mining and manufacturing

Rough diamond production decreased by 12% to 28.7 million carats (2014: 32.6 million carats) as De Beers reduced production in response to prevailing trading conditions.

Debswana's production decreased by 16% to 20.4 million carats, driven by a reduction in tailings production at Jwaneng, combined with the bringing forward of planned maintenance at both Jwaneng and Orapa. Debswana is focusing on improving reliability and cash costs, while maintaining flexibility, with Damtshaa, a satellite of Orapa, being placed onto temporary care and maintenance from 1 January 2016, affording the option of efficiently resuming production when market conditions allow.

In South Africa, production was in line with 2014, though below planned 2015 production. A decline at Venetia, owing to lower throughput and a reduction in tailings processing – again, in response to softer trading conditions – was offset by increased production at Kimberley. The completion of the sale of Kimberley Mines to Ekapa Minerals was announced on 21 January 2016.

Production at Namdeb Holdings decreased by 6%, as a result of a focus on lower grade mining areas in response to prevailing trading conditions. This impact was partly compensated by increased availability of the *Mafuta* vessel at Debmarine Namibia. The terms of a new 10-year sales agreement between De Beers and the Government of the Republic of Namibia are currently being finalised.

Key performance indicators

	Production volume[1] ('000 carats)	Consolidated sales volume[2] ('000 carats)	Price ($/ct)[3]	Revenue ($m)	Underlying EBITDA ($m)	Underlying EBIT ($m)	Capex ($m)	ROCE
De Beers	**32,605**	**32,730**	**198**	**7,114**	**1,818**	**1,363**	**689**	**15%**
Prior year	31,159	29,277	198	6,404	1,451	1,003	476	11%

(1) Represents diamond production on a 100% basis and is not directly comparable to consolidated sales volumes.
(2) Sales volumes (100% basis) were 34.4 million carats in 2014 (2013: 29.8 million carats).
(3) Average realised price.

FINANCIAL AND OPERATING OVERVIEW

De Beers' underlying EBIT increased by 36% to $1.4 billion (2013: $1.0 billion). The increase was due primarily to solid demand across key markets, particularly the US, which resulted in strong revenue growth. Operating costs benefited from favourable exchange rate movements, which offset underlying inflationary pressures.

De Beers' total sales rose 11% to $7.1 billion, with rough diamond sales up 12% to $6.5 billion. Higher rough diamond revenue was driven principally by a 12% increase in consolidated sales volumes to 32.7 million carats. Average realised diamond prices were in line with 2013 at $198/carat, driven by a 5% higher average rough price index in 2014, offset by a marginally lower product mix.

MARKETS

Consumer demand for diamond jewellery showed positive growth in local currency terms in all the main markets in 2014. The economic recovery gained momentum in the US, the largest consumer diamond market, which resulted in healthy diamond jewellery sales growth throughout the year. Growth in diamond jewellery demand in China continued, albeit at more modest levels, reflecting slowing economic growth. Macro-economic conditions in India started improving in the final quarter of 2014, following the election of a new government earlier in the year, which boosted consumer confidence, lifting hopes that growth will return.

Polished prices ended the year broadly in line with where they started in 2014, with the increase in the first half of the year being offset by a reduction in the second half. Rough diamond prices increased over the course of 2014, albeit with some softness experienced towards the end of 2014 and early in 2015.

In July, De Beers announced details of a new approach to its rough diamond Sightholder sales contracts. The new contract period, which will start in March 2015 and run for three years, with an option for De Beers to extend, requires, amongst other things, its rough diamond customers to comply with more rigorous financial and governance criteria in order to be eligible for supply.

OPERATING PERFORMANCE

Mining and manufacturing

De Beers' full year production increase of 5% to 32.6 million carats (2013: 31.2 million carats) reflected a strong performance from Debswana, partly offset by slightly lower production at Snap Lake and Kimberley, with all other regions performing broadly in line with 2013.

Debswana benefited from greater efficiency at its processing plants following operational improvement initiatives, producing 24.2 million carats (Orapa 12.9 million and Jwaneng 11.3 million). Performance was enhanced by recovery from the carry-over effects through 2012 and 2013 of the Jwaneng slope failure clean-up as well as the Orapa No. 1 plant maintenance stoppage that occurred in 2013. Jwaneng Cut-8 waste mining is progressing well, with just over 50% of the 500 million tonnes of waste stripping required to expose the ore now complete. During 2018, Cut-8 will become the main source of ore for Jwaneng and extend the life of one of the world's richest diamond mines to at least 2033, providing access to an estimated 91 million tonnes of ore, containing approximately 110 million carats[4].

In Namibia, production was marginally higher at 1.9 million carats (Namdeb (land operations) 0.6 million and Debmarine Namibia 1.3 million), driven by strong operational improvement by the MV Mafuta vessel. Namdeb production was broadly in line with the previous year, despite a 19-day strike in the third quarter. Namdeb Holdings has received a 15-year licence extension for both land and sea operations to 2035.

In South Africa, a 2% decrease in output to 4.6 million carats (Venetia 3.2 million, Voorspoed 0.7 million and Kimberley 0.7 million), was principally due to lower grades at Kimberley.

In Canada, production was slightly lower at 1.8 million carats (Snap Lake 1.2 million and Victor 0.6 million). A decline in production at Snap Lake of 0.1 million carats was due to the impact of flooding, forest fire smoke protocols, and reviewing and implementing revised ground support standards. Work continues to optimise Snap Lake to enable economic access to the promising, though challenging, orebody.

Element Six (E6) enjoyed a year of solid growth, with a strong performance in the synthetic industrial diamond product groups, both for abrasives and advanced technology applications. This growth was offset partially by weakness in tungsten carbide sales in the first six months. In order to continue improving customer service and operating efficiencies, E6 announced in April that it would close its plant in Robertsfors, Sweden, to focus on its primary plants in Shannon, Ireland, and Springs, South Africa.

Brands

Forevermark saw strong growth in 2014, with retail outlets up by 20%. The brand is now available in more than 1,500 outlets in 34 markets. Since the launch of Forevermark, more than one million diamonds have received the Forevermark inscription and unique identification number.

In 2014, De Beers Diamond Jewellers opened a new store in Selfridges in London and a concession in Saks Fifth Avenue, New York. There are now 35 De Beers stores in 12 key consumer markets around the world.

OPERATIONAL OUTLOOK

Diamond production (on a 100% basis) for 2015 is forecast to be in the range of 32 to 34 million carats, subject to market demand.

(4) Scheduled Inferred Resources (below 401 metres below ground level) included in the Cut-8 estimates constitute 81% (89.3 Mct) of the estimated carats. Not all Inferred Resources may be upgraded to Ore Reserves, even after additional drilling. The numbers given are scheduled tonnes and carats as per the 2014 Life of Mine plan and reflect changes made to the Cut-6 and Cut-7 designs following the Cut-6 slope failure in 2013. The scheduled tonnes and carats exclude the fourth pipe that is intersected during Cut-8 and stockpiled for treatment at the end of the 2014 Life of Mine plan.

APPENDIX 2

Anglo American Tax and Economic Contribution Report Contribution to Botswana (2014-2018) Extracts, (Source: Anglo American plc Tax and Economic Contribution Reports)

OUR ECONOMIC CONTRIBUTION IN BOTSWANA IN 2018

In a 50:50 partnership with the Government of the Republic of Botswana (GRB), De Beers has one of the richest diamond mines, by value, in the world at Jwaneng and one of the largest diamond resources, by volume, at Orapa.

TOTAL TAX AND ECONOMIC CONTRIBUTION

$1,734.7m

TOTAL PROCUREMENT

$672.8m

Refers to addressable expenditure only (excludes public sector spend) and includes all supply chain related spend from third party suppliers. It includes opex- and capex-related transactions and inter-business unit procurement.

CAPITAL INVESTMENT

$98.6m

Capital investment is defined as cash expenditure on property, plant and equipment, including related derivatives, proceeds from disposal of property, plant and equipment and direct funding for capital expenditure from non-controlling interests. Includes capitalised operating cash outflows.

LOCAL PROCUREMENT

$551.8m

Procurement of goods or services from within the same immediate area as the operation, as defined by each operation. A localised supplier is a supplier that meets the business unit criteria for localised procurement, allowing goods or services to be procured from within the same immediate area as the operation. This is defined using the same parameters and definitions as set out in SEAT Tool 2A – Profiling the Local Area.

WAGES AND RELATED PAYMENTS

$86.0m

Payroll costs in respect of employees, excluding contractors and certain associates' and joint ventures' employees, and including a proportionate share of employees within joint operations.

TOTAL TAXES BORNE AND COLLECTED

$874.8m

$448.8m

CORPORATE INCOME TAX
Calculated based on profits and includes withholding taxes.

$326.6m

ROYALTIES AND MINING TAXES
Revenue, production and profit based royalties.

$5.7m

OTHER PAYMENTS BORNE
Other payments directly incurred by Anglo American.

$93.7m

TAXES COLLECTED
Taxes paid by Anglo American on behalf of other parties as a result of the Group's economic activity.

CORPORATE SOCIAL INVESTMENT

$2.5m

Refers to all social investment spend that is not related to impact management, either from allocated budgets or established foundations.

OUR ECONOMIC CONTRIBUTION IN BOTSWANA IN 2017

In partnership with the Government of the Republic of Botswana (GRB), De Beers has one of the richest diamond mines, by value, in the world at Jwaneng and one of the largest diamond resources, by volume, at Orapa. In 2017, the GRB signed a Memorandum of Understanding with Anglo American, Debswana and De Beers Global Sightholder Sales to underpin the continued expansion of the Tokafala Enterprise Development programme.

TOTAL TAX AND ECONOMIC CONTRIBUTION

$1,617.6m

TOTAL PROCUREMENT

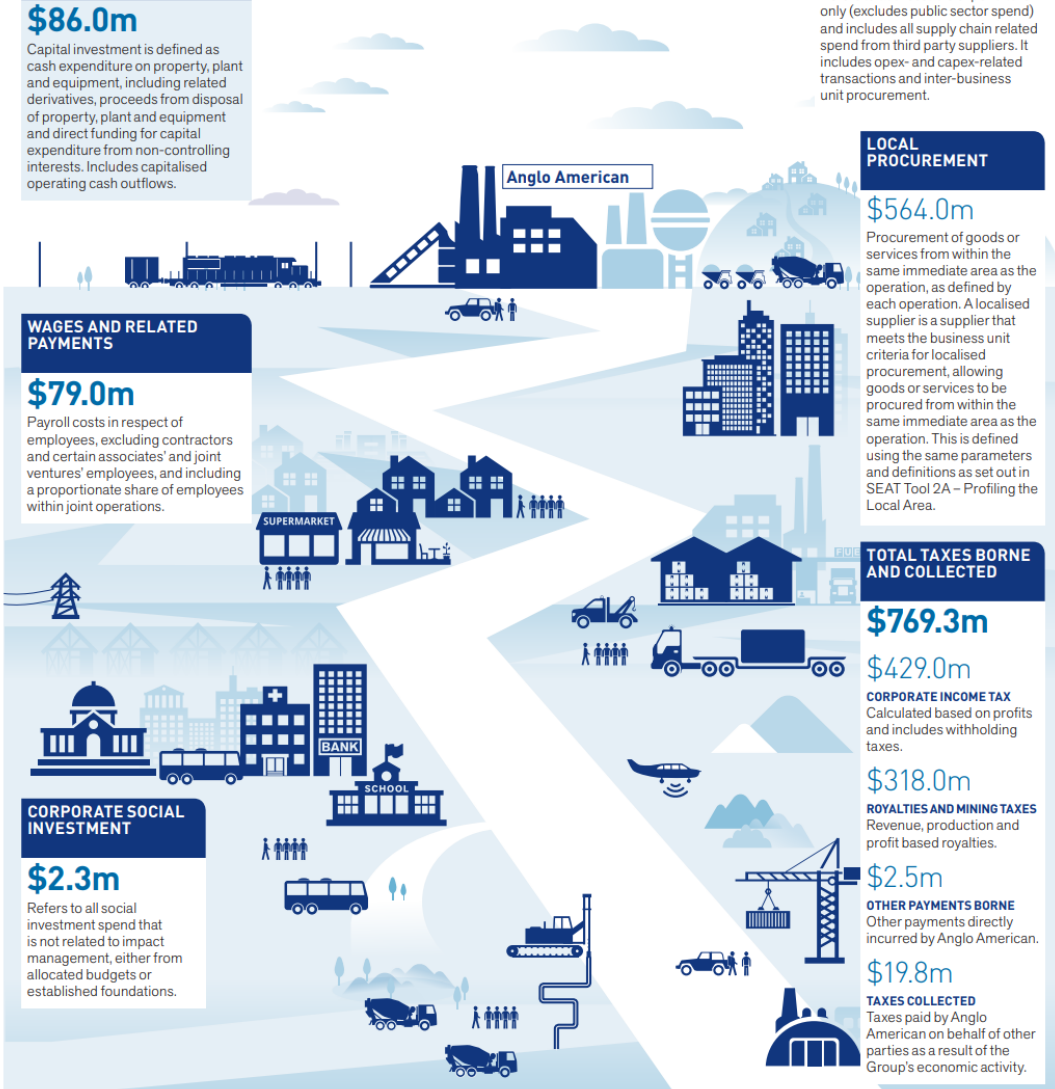
$681.0m

Refers to addressable expenditure only (excludes public sector spend) and includes all supply chain related spend from third party suppliers. It includes opex- and capex-related transactions and inter-business unit procurement.

CAPITAL INVESTMENT

$86.0m

Capital investment is defined as cash expenditure on property, plant and equipment, including related derivatives, proceeds from disposal of property, plant and equipment and direct funding for capital expenditure from non-controlling interests. Includes capitalised operating cash outflows.



WAGES AND RELATED PAYMENTS

$79.0m

Payroll costs in respect of employees, excluding contractors and certain associates' and joint ventures' employees, and including a proportionate share of employees within joint operations.

CORPORATE SOCIAL INVESTMENT

$2.3m

Refers to all social investment spend that is not related to impact management, either from allocated budgets or established foundations.

LOCAL PROCUREMENT

$564.0m

Procurement of goods or services from within the same immediate area as the operation, as defined by each operation. A localised supplier is a supplier that meets the business unit criteria for localised procurement, allowing goods or services to be procured from within the same immediate area as the operation. This is defined using the same parameters and definitions as set out in SEAT Tool 2A – Profiling the Local Area.

TOTAL TAXES BORNE AND COLLECTED

$769.3m

$429.0m

CORPORATE INCOME TAX
Calculated based on profits and includes withholding taxes.

$318.0m

ROYALTIES AND MINING TAXES
Revenue, production and profit based royalties.

$2.5m

OTHER PAYMENTS BORNE
Other payments directly incurred by Anglo American.

$19.8m

TAXES COLLECTED
Taxes paid by Anglo American on behalf of other parties as a result of the Group's economic activity.

BOTSWANA

De Beers has partnered with the Government of the Republic of Botswana for almost half a century. Debswana, the public-private partnership, continues to support the country's remarkable growth and development through its world class diamond reserves.

Botswana 2016 – US$ millions	Corporate income tax	Royalties and mining taxes	Other extractive payments	Other non-extractive payments borne	Total taxes borne	Total taxes collected	**Total taxes**
Payments to government – controlled operations	–	–	–	–	–	–	–
Payments to government – non-controlled operations	**472.9**	**362.2**	**0.2**	**39.6**	**874.9**	**113.5**	**988.4**
Total payments to government	**472.9**	**362.2**	**0.2**	**39.6**	**874.9**	**113.5**	**988.4**
	Capital investment	Total addressable procurement spend	Percentage of procurement from host communities	Wages and related	Corporate social investment	**Total economic contribution**	**Total tax and economic contribution**
Economic contribution	**91.0**	**485.0**	**81%**	**78.0**	**1.0**	**655.0**	**1,643.4**

Operations (* non-controlled)
Jwaneng*, Orapa*

NUMBER OF EMPLOYEES

1,557

TOTAL TAX & ECONOMIC CONTRIBUTION TO THE BOTSWANA ECONOMY IN 2016

$1,643m

TOTAL TAXES BORNE AND COLLECTED FOR THE PERIOD 2014–2016[1]

$2,968m

JOBS SUPPORTED THROUGH ENTERPRISE DEVELOPMENT FOR THE PERIOD 2008–2016

2,041

[1] As disclosed in the Anglo American Sustainability Reports.

A summary of our tax contribution on a project-by-project basis can be found at: **angloamerican.com/project-by-project-2016**

TAKING TOKAFALA FORWARD

Tokafala was launched in January 2014, a partnership between the Government of the Republic of Botswana, Anglo American, De Beers and Debswana. The programme aims to promote economic development by catalysing the growth of existing small and medium-sized companies in Botswana, through:

- Business mentoring and advisory support tailored to the specific needs of the enterprise.
- Helping clients evaluate their financing needs, building financial models and preparing applications.
- Market access support, helping enterprises establish linkages to potential buyers.

Since inception, the programme has supported over 260 businesses, growing revenues by an average of 39%[2] and creating total revenue of 49.1 million Pula (US$4.5 million). Overall, there continues to be a high success rate, with 36% of clients accessing new finance, with 11.8 million Pula (US$1.1 million) accessed from commercial sources. These clients come from a diverse range of sectors, including, professional services, consumer goods, and industrial goods and services, to name just a few.

More broadly, the partnership between Botswana and De Beers to develop the country's diamond resources continues to play an important role in the country's transformation, and last year we celebrated the unique role diamonds have played in Botswana's development in its 50 years since independence.

[2] Percentage revenue growth for 2016 based on 2014 and 2015 average revenue growth.

Nkata Seleka, founder of Sleek Foods, is supported by the Tokafala Programme. The company produces a range of self-developed condiments made from local produce.

PAYMENTS TO GOVERNMENT IN KEY OPERATING JURISDICTIONS continued

Botswana

US$ millions	Corporate income tax	Royalties, mining and environmental taxes	Employment taxes	Other payments	Total borne	Total collected	Total paid
Total	**330**	**233**	**4**	**6**	**573**	**98**	**671**

Brazil

US$ millions	Corporate income tax	Royalties, mining and environmental taxes	Employment taxes	Other payments	Total borne	Total collected	Total paid
Iron Ore							
Federal	–	7	24	5	36	30	66
Minas Gerais	–	3	–	10	13	–	13
Municipal	–	–	–	1	1	12	13
Total	**–**	**10**	**24**	**16**	**50**	**42**	**92**
Nickel							
Federal	–	1	18	2	21	19	40
Goiás	–	2	–	–	2	4	6
Municipal	–	–	–	7	7	–	7
Total	**–**	**3**	**18**	**9**	**30**	**23**	**53**
Niobium							
Federal	77	–	5	2	84	2	86
Goiás	–	1	–	–	1	–	1
Municipal	–	–	–	1	1	–	1
Total	**77**	**1**	**5**	**3**	**86**	**2**	**88**
Phosphates							
Federal	24	1	10	3	38	4	42
Goiás	–	–	–	–	–	4	4
São Paulo	–	–	–	1	1	–	1
Municipal	–	–	–	3	3	3	6
Total	**24**	**1**	**10**	**7**	**42**	**11**	**53**
Total	**101**	**15**	**57**	**35**	**208**	**78**	**286**

Botswana

US$ millions	2014
Capital investment	115
Taxes borne	988
Total procurement	818
Localised procurement from host communities	98
Spend on wages and related	88
Enterprise development: Number of businesses supported	63
Enterprise development: Number of jobs supported	620
Social investment spend	0.92

COMMUNITY DEVELOPMENT IN PARTNERSHIP WITH THE GOVERNMENT OF BOTSWANA

In 2012 Anglo American acquired an additional 40% interest in De Beers, increasing our ownership to 85%. As a result of that transaction Anglo American and De Beers started a process of engagement with the Government of the Republic of Botswana (GRB) in order to understand how to better support the development priorities of the country. After sharing information on our approach to promoting socio-economic development, a leadership team in the GRB selected talent development and enterprise development programmes to be implemented in partnership with Anglo American and De Beers.

The talent development programme, Bokamoso ('The Future'), aims to promote the development of talented Batswana graduates via a two-year secondment to Anglo American operations outside Botswana, enabling candidates to develop skills, knowledge and experience which will enable them to return home and contribute to the diversification of the economy. Bokamoso will deliver a pool of Batswana talent with broad-based, practical, international exposure – providing a solid platform for accelerated career progression.

The enterprise development programme, Tokafala ('To Improve'), aims to promote economic development and stimulate employment creation in Botswana by supporting the growth of micro, small- and medium-sized companies. Over three years the Tokafala programme aims to:

- Support 560 micro and 420 small and medium enterprises (SMEs).
- Support more than 5,500 jobs.
- Provide capacity building to at least five government. enterprise development institutions.

During 2014, its first year operating in Gaborone, Tokafala supported 63 SMEs and 620 jobs.

Both programmes have been structured as a 50/50 partnership with the Botswana government.

Image
From left: Anglo American chief executive Mark Cutifani, resident director and chief executive of De Beers Botswana Neo Daniel Moroka, and former Minister of Trade and Industry for the Republic of Botswana, Hon. Dorcas Makgato-Malesu, at the launch of the Bokamoso and Tokafala programmes in 2013.