Value creation, commodity prices and effective operating working capital management in the platinum industry

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Executive Summary

Wealth creation is a commonly known concept in the business world that leads to the key focus of organisations: to create long term and sustainable value therefore maximising shareholders' wealth. An aspect of value-based management, which is an instrument to measure wealth creation, is when capital is invested at returns greater than the cost of capital. The management of an organisation are obliged to utilise value-based concepts to ensure sustainable wealth is being created.

Organisations in the mining industry are bound to the cyclical demand of its product, which evidently affects wealth creation. It is therefore critical to adapt to the condition of the market to ensure sustainable wealth is created throughout the cycle. In essence, sustainable value creation can be measured by how effective and timeous strategies are executed throughout the cyclical commodity market to optimise wealth creation. Specifically, operating working capital management, which is one of various aspects that can be managed to ensure sustainable wealth creation, can be evaluated to determine an organisation's effectiveness.

An attempt was made to determine whether mining organisations manage wealth throughout the commodity price cycle by managing operating working capital effectively. The research was limited to a specific division of the mining industry, namely the platinum producing organisations.

A comparative analysis was conducted amongst the platinum producers on data from the platinum category of the Johannesburg Stock Exchange (JSE) for ten years from 2001 to 2010. The results of the comparative analysis illustrate that these organisations manage operating working capital differently, which evidently distinguish the leaders in the industry. It will be of great value for all platinum producers to have benchmark information available to identify new value creating opportunities.

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All thanks and praise to our Lord for His presence, without Him in our lives all is lost – thank You for being in mine.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Wealth creation is a concept that has been commonly used within the business world therefore it is argued that organisations' primary aim should be to maximize shareholders' wealth (Brigham & Ehrhardt, 2005:109). A company's latitude for implementing the necessary measures to improve employee and community relations can be minimized if it cannot satisfy shareholders needs.

Libby, Libby and Short (2004:704) suggest that investors use three factors to consider before opting to invest in a company:

- Economic factors that include the overall health of the company, unemployment rates, inflation and interest rates
- Industry factors indicating growth or contraction within the industry in which the company operates
- Individual factors which should be limited not only to financial indicators but also to its products as well as media coverage and reputation.

One aspect of value-based management, which is an instrument to measure true wealth creation, is when capital is invested at returns higher than the cost of capital. Managers of an organisation are required to utilize value-based performance metrics for improved decision making at various levels, which could entail managing the balance sheet and income statement as well as developing short- and long-term business strategies (Koller, 1994:87).

For organisations in the mining sector it is quite common to have a cyclical demand for the commodity it produces which evidently affects the commodity's selling price. Therefore, to ensure wealth creation is managed throughout the cycle, these organisations should continuously adapt to the condition of the market.

The resource sector has traditionally played an important role in the South African economy due to its large mineral deposits, especially in the foreign trade area. Exports of commodities represent about 30% of South Africa's Gross Domestic Product (GDP), therefore it is not surprising that the country has attracted a substantial amount of investment, nationally as well as internationally. Its Mining organisations therefore have to manage value creation to ensure a reflection of an attractive investment opportunity throughout the economic cycle of the commodity it produces.

Currently, the price of various commodities, including copper, gold, lead, nickel and platinum, are trading at very high levels on both a yearly and historical basis, and the share prices of the major mining organisations have been driven higher because they earn more money selling commodities when the price is higher. These organisations, operating in the commodity business environment, normally maximize output when market conditions are bullish and the demand is peaking. On the other hand, the organisations tend to position themselves on the lower level of the cost curve to ensure sustainability and continued existence. It can be argued that the industry leaders are those organisations that optimally position themselves on either side of the market requirement.

In essence, value creation can be measured by how effectively and timeously these organisations execute value creation strategies in the cyclical commodity market to extract maximum returns. An operating working capital strategy for example can be implemented as part of a broader approach to value creation. Organisations will be able to generate cash more quickly, which will enable them to operate more easily in a bearish commodity market. Just as important, organisations with ample cash in a downturn have the freedom to make bolder, more strategic moves and can position themselves more strongly for the future.

According to Pindyck and Rotomberg (1990:1173), the cyclical trend of commodity prices can be attributed to:

- supply and demand change in commodity volume.
- macroeconomic shocks, for example income and interest rates that may affect all prices together, which evidently affect the cost of production.
- speculators who overreact to new information and may cause anomalies between supply and demand volumes.

The decision makers of the organisation are bound to consider these fluctuations when planning investments, even if they cannot time them to coincide with the most favourable part of the commodity price cycle (Roberts & Torries, 1994:153). Organisations must also accommodate high price episodes as well as intervals of lower prices and encourage the desired level of inventory and production output during both expansion and recession phases of the market to ultimately increase profitability.

Creating and maintaining share attractiveness throughout the commodity price cycle, a flexible yet constructive value based management strategy, is required since investors persist in wanting a more than proven resource base. One of the advantages these organisations enjoy is the ability to control operating working capital and to flex production throughout the demand curve.

1.2 PROBLEM STATEMENT

In the platinum sector, where the price index has risen to record highs in the past 10 years, the question must be raised as to how much wealth organisations have been able to create for shareholders. Have they utilised all opportunities in a bullish market and freed capital to invest during the bearish times?

Although the price index in the platinum sector has risen to record highs it is not clear whether organisations in the sector have been able to utilise opportunities originating from a bullish market to create sustainable value for shareholders.

1.3 OBJECTIVES OF THE STUDY

The objectives of this study can be summarised as primary and secondary objectives.

1.3.1 Primary objective

The primary objective of the study is to:

- investigate and determine whether the platinum producing organisations manage wealth creation throughout the commodity price cycle by managing operating working capital effectively.

1.3.2 Secondary objectives

The secondary objectives of the study are to:

- investigate and determine how effective operating working capital is managed in the platinum industry
- investigate and determine if leaders in operating working capital management can be distinguished from the rest.
- investigate and determine the trend of operating capital investment in the cyclical commodity environment
- investigate and determine whether a positive economic value added is obtained throughout the commodity price cycle.

1.4 RESEARCH METHODOLOGY

The research methods include literature and an empirical study.

1.4.1 Literature/theoretical study

A literature study will be conducted on the Value Based Management (VBM) concept by focusing on the principles of VBM and the link to business strategy.

The following indicators were investigated and utilized to conceptualize the commodity price movement:

- Value based management approach, including benefits and critique
- Measuring value creation with accounting measures and value based methods
- Commodity and business cycles specifically related to the platinum industry
- Financial reports from various platinum producers.

1.4.2 Empirical study – Quantitative study

The quantitative research will be completed by making use of historical financial data obtained from a database, as well as the platinum commodity price index, to determine how effective organisations managed operating working capital during the commodity market demand cycle.

A quantitative study will be conducted to investigate whether a correlation can be drawn between the price index and the operating capital expenditure of the various organisations as well. Finally a quantitative study will be conducted to investigate the extent of economic value added for operating capital invested in the organisation.

1.5 SCOPE OF THE STUDY

The field of study is financial management. The research focused on whether VBM has been effectively implemented in the commodity industry specifically related to operating working capital and the commodity price cycle. Mining organisations listed on the Johannesburg Stock Exchange (JSE), in particular platinum producers, were considered.

1.6 LIMITATIONS OF THE STUDY

The findings of this research will be limited to a specific division of the mining sector, which are platinum producers. It might therefore not be possible to extrapolate the findings to other divisions or sectors of a particular industry.

1.7 LAYOUT OF THE STUDY

Chapter 1 has set out the context behind the specific research topic chosen. In this chapter the problem statement was formulated, the research goals, research methods, and limitations given.

Chapter 2 will present a literature study which focuses on the theoretical basis of the study. Value based management is the centre point of the theoretical study, including an overview of working capital management, linking it to VBM.

Chapter 3 applies to an empirical investigation the theory of what was discussed in Chapter 2.

In *Chapter 4* the results from the investigation are analyzed and interpreted in order to determine whether VBM has been effectively implemented by management, with primary focus on working capital management.

In *Chapter 5* a conclusion is drawn from the results obtained during the empirical analysis. Recommendations, suggestions and conclusions will be made based on these functions.

CHAPTER 2

VALUE CREATION AND COMMODITY PRICE CYCLES

2.1 INTRODUCTION

The purpose of this chapter is to present theories concerning value maximization and how to ensure sustainable value creation. It introduces a link between the underlying principles of value based management (VBM) and value creation. The chapter is divided into two main sections, the first of which describes the concept of value creation and wealth maximization. In order to maximize shareholders' value, the internal drivers of shareholders' value must be measured. This is crucial for the manager to understand the present situation and to make strategic and financial decisions to achieve and maintain the goal of maximizing shareholders' value. Secondly, the business cycle, commodity supply and demand structure and the cyclic price in the mining environment are discussed. Cyclical and commodity producing organisations seems to share a common feature, insofar as their value seems to be more dependent on the movement of a macro variable (the commodity price or the growth in the underlying economy) than it is on organisation specific characteristics. In other words, it seems that the value of a cyclical company is inextricably linked to the price of the commodity it produces, just as the value of a cyclical company is tied to how well the economy is doing. Since both commodity prices and economies move in cycles, the greatest challenge in valuing these organisations might be tied to either earnings or cash flows reported in the most recent year. It is of importance to understand this concept as it may affect the ability to manage value based management systems in order to create wealth during the cycles of this business environment.

2.2 THE IMPORTANCE OF VALUE CREATION

Value creation can be defined as the wealth created for the shareholders of an organisation through price appreciation of stock and dividends (Knight, 1998:21). Although organisations exist to create value for their owners, the executives and managers do not always prioritise the maximizing of shareholder value, because of perceived conflicts with other goals. Shareholder value does not necessarily conflict with good citizenship toward employees, customers, suppliers, the environment or the local community. These organisations that respect the constituents noted above tend to exceed the performance of its competition, which suggests that shareholder value can only be realised after being delivered to these constituents (Young & O'Byrne, 2000:2). There are, however, various aspects related to this value creation concept, since it is a very subjective matter and can be viewed through several paradigms. Knight (1998:25) also states that value is 'in the eye of the beholder', therefore there are a variety of opinions about value and each of them can be correct. Factors contributing to these perspectives can be:

- ***Quality of information***

  Information that is not always uniformly available and does not always include all the important categories within the scope of coverage therefore may affect the quality.
- ***Perception of control***

  Individuals who have some control over the share price movement of an organisation have a different perception of its value compared to another individual due to the position of control.
- ***Time horizon***

  Shareholders may have a short-term or long-term overview of the value of an organisation, which will impact on the perception of value.
- ***Uncertainty***

  The greater the uncertainty of an organisation's future results the greater the variance in the potential value.

- ***Tolerance of risk***

  Two investors can have the same information, perception of control and uncertainty about future prospects, yet still place different value on an organisation because of a difference in tolerance for risk (Knight, 1998:25).

Since the individual's perception is dynamic and changes over time, the view of value today may be different from tomorrow.

Investors have always cared about stock returns, but according to Young and O'Byrne (2000:5), a growing predominance of the shareholders' wealth creation regime has been visible over the past 30 years, which can largely be attributed to several major developments:

- The globalization and deregulation of capital markets
- The end of capital and exchange controls
- Advances in information technology
- More liquid securities markets
- Improvements in capital market regulation
- Generational changes in attitudes towards savings and investment
- The expansion of institutional investment.

These developments encouraged stock exchanges to improve the attractiveness of local organisations to foreign investors, by lifting trading restrictions of foreign brokers, adopting technologically advanced trading systems and boosting the depth and liquidity of the exchanges to reduce transaction costs. With these developments, a new generation of investors emerged with a different attitude towards institutional investment. Inadvertently, the trend toward ever greater institutional investment has been increased over time and more people have participated in equity markets (Young and O'Byrne, 2000:7). From these events, it is evident that some action should be taken by organisations to encourage this evolution.

The amalgamated objective of an organisation should be to maximize shareholder wealth. It is indicated that value or wealth creation is a corporate mentality and is an

important aspect of the growth of the organisation. It comes into existence by creating reengineering and restructuring of thoughts. The growth and size is not important for the organisations, however those that create value seem to dominate their competitors by being more profitable and fast growing (Damodaran, 1997:20). Value creation in a broader sense seems to be important because it relates to the achievement of business objectives and the following promotion of economic growth.

In this context it is important to note that shareholders, who are the owners of an organisation are responsible for electing the board of directors responsible for maximizing the wealth. The board in turn appoints managers whose primary focus is to work on behalf of the shareholders to maximize the value of shareholders' investments (Brigham & Ehrhardt, 2005:7). The question remains as to: how the shareholders' value can be maximized?

It is argued that organisations have to adopt certain management methodologies, which will serve as enablers in the quest to respond to the above-mentioned question. In this regard it is important to adopt a methodology that encourages innovation and creates new opportunities to enhance shareholder value. One such methodology is managing value, also known as value based management (VBM). If it is implemented properly, the probability of improvements in stock market performance in the long run is increased. A comprehensive VBM system can span all levels of the corporation and have a positive impact on all employees (Ryan & Trahan, 1999:47). To comprehend the essence of VBM, a detailed overview will be provided in the following section.

2.3 VALUE BASED MANAGEMENT

According to Bromwich and Walker (1998:392), VBM measures are generally based on a comparison between corporate market value and corporate accounting book value and/or the residual income measure. Most definitions reflect a similar way of thinking, though authors tend to cover their concepts vaguely in the way the different practices are described.

The following set of publicists describes the output of value-based management:

- "… essentially a management approach whereby organisations' driving philosophy is to maximize shareholder value by producing returns in excess of the cost of capital" (Simms, 2001:34).

- "… a framework for measuring and, more importantly, managing businesses to create superior long-term value for shareholders that satisfies both the capital and product markets" (Ronte, 1999:38).

Another group focuses on the combination of the process and the outcome:

- "… a combination of beliefs, principles and processes that effectively arms the company to succeed in the battle against competition from the outside and the institutional imperative from the inside. These beliefs, principles and processes form the basis of a systematic approach to achieve the company's governing objective" (McTaggart & Gillis, 1998:18).

- "The founding principle underlying Value-based Management is the discounted cash model of firm value. However, VBM is more than a performance measurement system. Proponents argue that if it is to be successful it must be used to tie performance to compensation. The guiding principle underlying the use of VBM, then, is that measuring and rewarding activities that create shareholder value will ultimately lead to greater shareholder value" (Martin & Petty, 2001:3).

The following source describes just the process:

- "Value-based Management is a holistic management approach that encompasses redefined goals, redesigned structures and systems, rejuvenated strategic and operational processes, and revamped human-resources practices. Value-based Management is not a quick fix but a path requiring persistence and commitment" (Boulos, Haspeslagh & Noda, 2001:54).

The following reference defines inputs, process and outputs of value-based management as scarce:

- “VBM is a prescribed and usually repetitious way of carrying out an activity or a set of activities that propagate its values all over the organisation. It is a robust disciplined process that is meant to be apparent in the heart of all business decisions” (Morrin & Jarell, 2001:399).

A growing evidence base indicates that organisations with a good reputation in (1) product and service quality, (2) ability to attract, develop and retain talented people, and (3) community and environmental responsibility, tend to outperform stock market averages (Young & O’Bryne, 2000:13). VBM has its roots in a number of disciplines from finance and strategy to accounting and human resource management. According to Arnold and Davies (2000:1), it is an approach to corporate strategy, operations and organisation in which the primary purpose is at all times shareholder wealth maximization, that is, investing in projects the return of which exceeds the cost of capital results in value creation, while investing in projects with returns below the cost of capital destroys value. Cokins (2004:11) notes that there will always be trade-offs in the value creation process because of arguments such as whether products or services expansion would result in an increase or decrease in shareholder wealth. Organisations need to focus on value creation through operational and management activities because of the interrelationship that exist between real assets and financial assets (Cokins, 2004:11).

The creation of shareholder value must be sustainable. It is ineffective to create value in one year, and the following year see all the hard work of the previous year nullified because of lack of focus. Value is created over time as a result of a continuing cycle of strategic and operating decisions (Martin & Petty, 2001:6). VBM systems are based on the fundamental premise that in order to sustain the wealth creation process, managerial performance must be measured and rewarded using metrics that can be linked directly to the creation of shareholder value (Martin & Petty, 2001:6).

The key elements of a VBM system designed to build and support a sustainable cycle of creation can be seen in Figure 1 (below):

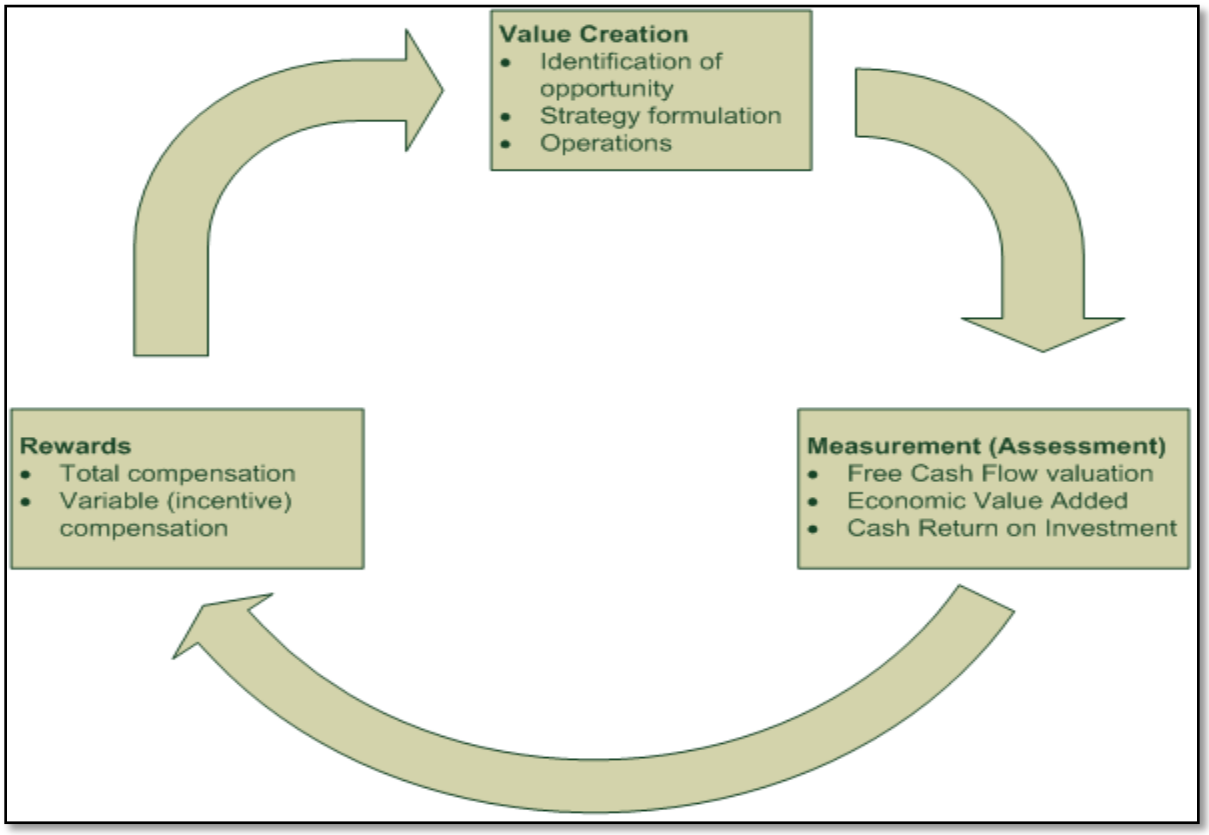


Figure 1 - Value Cycle

(Source: Adapted from Martin & Petty, 2001:6)

Figure 1 indicates that for sustainable value creation, opportunities that are identified and strategically formulated for implementation need to be measured for effectiveness of value created by means of free cash flow evaluation, economic value added (EVA) or cash flow return on investment. Rewards to management should then be coupled with the outcome of the opportunity, either the total compensation or variable compensation.

Martin and Petty (2001: 9) identify three primary elements that make VBM successful, namely:

- Top executives of the organisation must fully support VBM before it can transform the operating culture of the organisation

- There must be a link between the behaviour and compensation of individual managers to impact on VBM
- All level employees need to understand the VBM system to be effective.

Athanassakos (2007:1397) also suggests that VBM includes an alignment of corporate strategy, performance reporting and incentive compensation to make decisions that maximize value. According to Starovic *et al.* (2004:2), VBM is not a descriptive process but can and should be adapted to suit its circumstances, that is, there is no “one size fits all” model.

2.3.1 Development of the VBM approach to management

Brigham and Erhardt (2005:150) state that investors must be compensated for bearing risk. Managers are therefore accountable for evaluating the effects of alternative strategies on the value of the organisation. There have been various management approaches for improving organisational performance, some of which Koller (1994:87) lists:

- Total quality management (TQM), where the core focus is on improving the quality of products and processes.
- Flat organisations, which are organisational structures with few or no levels of intervening management between staff and managers. The concept is that workers who are well trained will be more productive when they are more directly involved in the decision making process instead of being closely supervised by many layers of management.
- Empowerment, which refers to increasing the spiritual, political, social, racial, educational, gender or economic strength of individuals.
- Continuous improvement, which is an ongoing effort to improve products, processes and services.
- Reengineering, where well-known engineering methods of process analysis, activity costing and value-added measurement are implemented to improve products, processes and services.

- Kaizen, which is a Japanese concept that focus on continuous improvement of processes in all aspects of the organisation
- Team building, to improve organisational performance.

Many of these approaches have succeeded, but most have failed due to unclear performance targets poorly aligned to the ultimate goal of creating value. In recent times, business executives have concentrated on improving operational processes such as manufacturing, supply chain, sales and marketing. Koller (1994:87) notes that the large majority of large change processes have failed to produce the results expected because they are missing an important ingredient, namely a lack of corresponding changes in the business management processes and organisational culture. A lack of changes regarding an economic focus; clarity about how capital is to be deployed and managed in the future and how ownership and accountability for operational changes are to be balanced across the value chain, only serve to undermine the sustainability of these operational changes. According to Koller (1994:87), VBM is the solution to the problem of unclear targets since it provides an unambiguous metric value upon which an entire organisation can be built.

The VBM approaches are argued to subsume or render most, if not all, other types of performance measures at the corporate and strategic business unit levels unnecessary. Managers are often conditioned to think in grand terms, to strive to go global, or to be the number one company in the market, regardless of the consequences for value. A study by Haspeslagh, Noda and Boulos (2001:65) used *Cadbury Schweppes* as a case in point, which expressed ambition through the 1980s and 1990s to catch up with *Coca-Cola* and *Pepsi* while driving toward “a million tons of sugar consumption” in the confectionery business. Even though *Cadbury* was one of the most admired organisations in Britain throughout this period, the share price obstinately lagged behind those of its competitors.

In implementing VBM, firstly it is inevitable for the organisation to move out of its current mindset. To achieve a better alignment, management should focus dually on the company strategy and create value. Managing for value means that the right

combination of capital and other resources to generate cash flow from the organisation should be utilized. It should also be an ongoing process of investing and operating decision making that includes a focus on value creation. A focus on value-oriented decision making in the four key management processes of planning, budgeting, compensation, and management reporting should be implemented, as illustrated in Figure 2 below (Knight, 1998:102):

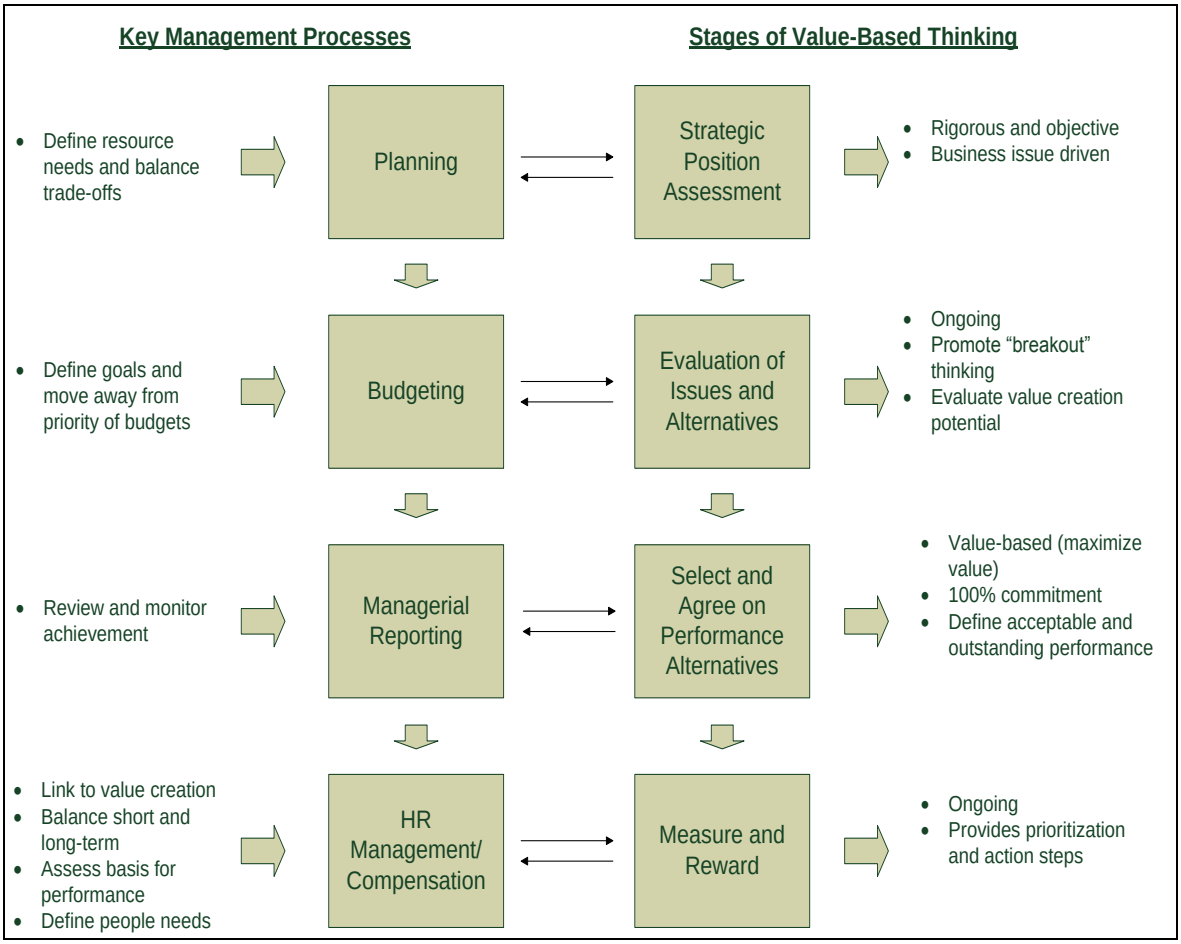


Figure 2 - Relationship of Management Processes to Value-Based Thinking

(Source: Adapted from Knight, 1998:102)

Knight (1998:102) suggests that together, when focused on value, these key management processes reinforce the value mind-set.

2.3.2 Benefits of VBM as a management approach

Remarkable benefits can be achieved when VBM is implemented effectively. Koller (1994:87) states that VBM is similar to restructuring in order to achieve maximum value on a continuous basis and often realizes an improved economic performance.

Value Based Management (2011:1) lists the following aspects for which VBM provides consistency:

- The corporate mission (business philosophy)
- The organisation strategy (course of action to achieve mission and purpose)
- Corporate governance (who determines the corporate mission and regulates the activities of the corporation)
- The organisation culture
- Organisation communication
- Decision processes and systems
- Performance management processes and systems
- Reward processes and systems.

According to Koller (1994:87), “when VBM is implemented well, it brings tremendous benefit to the organisation.” It is very effective and can have a significant impact which is often realised in improved economic performance. Several organisations that have implemented a VBM approach have obtained significant improvements or have shown increasing value in the organisation. To illustrate the performance that can be attributed to implementing a VBM approach, a list of organisations indicating the change in behaviour and the impact it had on the organisation is illustrated in the Table 1 (below).

Table 1 - Examples of VBM's impact

Business	***Change in behaviour***	***Impact***
Retail and household	Shifted from broad national growth program to focus on building regional scale first	30-40% increase in potential value
Insurance	Repositioned product portfolio to emphasize products most likely create value	25% increase in potential value
Oil production	Used new planning and control process to help drive major change programme	Multimillion dollar reduction in planning function through streamlining
Banking	Chose growth versus harvest strategy, even though five-year return on equity very similar	124% potential value increase
Telecoms	Generated ideas for value creation - New service - Premium pricing	240% potential value increase in one unit

(Source: Koller, 1994:88)

Experience has shown that where the mindset of an organisation has been aligned with a VBM perspective, people become empowered to improve decision making and work more effectively as a team. Each person therefore shares the risks and ownership of the organisation (Pienaar, 2008:26).

2.3.3 Critique of VBM as a management approach

Besides the philosophic and ethical objections to shareholder value maximization, Grant (2009:1) identifies three undesirable consequences of shareholder maximization:

- Organisations have substituted low cost debt for high cost equity to increase stock market value, failing to consider the risk implications – especially during economic downturns which would result in capital being spent at a higher cost.
- An emphasis on short-term financial performance over the long-term development of the business.
- Self-enrichment by senior executives of organisations. CEOs have been awarded huge stock options and bonuses because of wrong interpretation and implementation of VBM models.

The drawbacks of VBM may include (Anon, 2009e):

- VBM implementation requires tolerance on all levels and can be resource consuming for the organisation.
- Value creation is almost the same as corporate strategy.
- VBM requires strong and explicit top down support and buy-in.
- External consultants may be required to implement VBM in an organisation.
- Training for staff on VBM can be expensive and time consuming
- There is no perfect VBM system yet implementation is still based on trial and error.

Starovic *et al.* (2004:22) list the following disadvantages:

- VBM is complicated by the various definitions and metrics proposed.
- Implementing VBM at the lower level is a daunting task.
- It is a costly and time consuming exercise.
- The metrics can become complex and difficult to understand and manage.

It is evident from most of the research that the VBM critique is mainly related to the implementation process or misinterpretation issues and highlights the areas of failure when implementing a VBM approach in an organisation. Therefore, an important aspect to take cognizance of is that VBM might not have a fixed methodology but can be moulded to fit the organisation's culture.

2.3.4 Value based management performance metrics

Value-Based Management (VBM) has become a popular topic in financial management and is measured in various forms. Numerous consulting firms have developed and popularized metrics designed to help corporations implement VBM systems (Ryan & Trahan, 1999:46). Ameels, Bruggeman and Scheipers (2002:12) describe value enhancing managers as those who create value by increasing the company's value relative to the cost of capital at its disposal.

One method of calculating the value of an organisation is using its listed share value. The stock market provides the necessary information to calculate the value of the

company unambiguously. A first approach to measure shareholder value from the perspective of a quoted company is total shareholder return (TSR), that is share price appreciation plus dividends. The following equation explains this measure (Megginson *et al.,* 2010: 132):

$$\boldsymbol{Total\ Shareholder\ Return} = \frac{(\boldsymbol{P_{t+1} - P_t}) + \boldsymbol{D_{t+1}}}{\boldsymbol{P_t}} \quad (1)$$

Where,

P_{t+1} = Selling or expected selling price of the share at the end of the period

P_t = Purchase price of the share

D_{t+1} = Dividends paid

A recent survey by Haspeslagh *et al.,* (2001:62) stated that TSR is the value measurement metric applied in 7.4% of the organisations that responded in a survey conducted to determine whether organisations use value-based measures. TSR represents the change in capital value of a company over a one-year period, plus dividends, expressed as a positive or negative percentage of the purchase value.

On the other hand, many organisations estimate the warranted value of common stock indirectly, using alternative valuations models. The warranted value of common stock can also be used to assess divisional performance and to provide information supporting decisions on a corporate level. For the purpose of the discussion and objective of developing the understanding between wealth creation and VBM, the focus will be on alternative valuation models (Haspeslagh *et al.*, 2001:62).

2.4 MEASURING SHAREHOLDER VALUE CREATION

There are various methods available to management for measuring wealth creation for shareholders, albeit the valuation of an organisation or an investment opportunity can be subdivided into two main categories, accounting and economic measures. According to Holian and Reze (2009:1), the argument over whether accounting measures of profits

are useful approximation figures for organisational performance has been an ongoing argument in the industrial organisation literature. Fisher and McGowan (1983:90) argue that, "…there is no way in which one can look at accounting rates of return and infer anything about relative economic profitability…" Similar arguments can also be found in the accounting and finance literature.

Most organisations are tweaking the bookkeeping to smoothen out earnings and meet expectations of the viewer, and this has been the real issue (Stewart, 2002:1). Due to these arguments, various methods co-exist for profit measures in the industry. The popularized metrics designed to help organisations to implement and measure the impact of VBM practices include (Atrill & McLaney, 2007:313):

- Discounted Cash Flow (DCF)
- Cash Flow Return on Investment (CFROI)
- Return on Invested Capital (ROIC)
- Economic Value Added (EVA).

Financial ratios also portray various aspects of business achievement, for example (Atrill & McLaney, 2007:313):

- Sales revenues
- Profits
- Return on capital employed.

These ratios assist management to determine whether the company is increasing the wealth of its shareholders and these measures are important indicators for wealth creation (Atrill & McLaney, 2007:313).

Each of these measures comprise techniques that are appropriate depending on the valuation goal. The following section will describe the methods in detail and identify which was found most suitable for the purpose of this study.

2.4.1 Accounting measures of value

Accounting measures, also referred to as financial ratios, may be calculated using values in financial statements of organisations, which are income statements and/or balance sheets. Financial statements involve the comparison of the organisation's performance with others in the industry and evaluating financial trends in the organisation's position over a period by analyzing these ratios. Management can therefore indentify inefficiencies and implement the necessary corrective actions to improve the organisation's performance (Brigham & Erhardt, 2005:443). White, Sondhi and Fried (2003:5) also note that financial statements, augmented footnotes and supplementary data, provide information that is relevant, reliable and timely, to make investment decisions to meet the objectives for financial reporting. Financial statement analysis consists of various categories of financial ratios that include (1) liquidity ratios, (2) activity ratios, (3) debt ratios, and (4) market test ratios (Megginson, Smart & Graham, 2010: 40). Although each of these categories consists of various ratios, only selected ratios will, for purposes of this study, be analysed.

2.4.1.1 Profit and Earnings per Share

To achieve profit maximisation actions are taken to make a positive contribution to an organisation's profits. This objective translates into maximizing earnings per share (EPS). EPS is a popular measure among investment analysts in evaluating the operating performance and profitability of a company (Libby, Libby & Short, 2007:111). It is a measure of return on investment based on the number of shares outstanding:

$$\textit{Earnings per share } (EPS) = \frac{\textit{Net Income}}{\textit{Average number of common shares outstanding}} \qquad (2)$$

It is however important to note that the EPS calculation tends to be inconsistent with share-price movements of an organisation (Black, Wright & Davies, 2001:49). A study conducted by Beneke (2007:66) proved, however, that firstly EPS is the only metric that can be used to predict share price movement in non-mining and non-financial organisations in South Africa. Secondly, an organisation funded mostly by debt may

appear more profitable than one funded by equity, despite the underlying economic profits being the same. It therefore does not entertain the value creation of an organisation.

Nor are earnings taking into account the risk, working capital and fixed investment that are required to produce growth, as most of these are subject to manipulation, as in the *ENRON* and *Tyco* situations, in which exploitation of loopholes in the accounting policies were exercised for revenue recognition.

2.4.1.2 Dividend yield

Dividend yield is equal to the annual cash dividend by the current stock price of an organisation (Megginson *et al.,* 2010: 49):

$$\boldsymbol{Dividend\ yield = \frac{Annual\ Dividends\ Per\ Share}{Price\ Per\ Share}} \quad (3)$$

It is therefore linked to the cash flow that a shareholder may expect to receive, but is it an accurate measure of wealth?

An organisation's payout policy describes the choices made by the management team regarding the distribution of cash to shareholders. It can either be decided to leave dividends constant, adjust or not pay any dividends out to shareholders over a period of time. The outcome will indicate what cash flow will be available and utilised for further investment to increase share value.

Another aspect that can be raised is what will happen to an organisation's dividend yield as its share price declines. It is evident from the equation above that an increase in dividend yield will materialize when the share price fall, which contradicts "value" being created (Megginson *et al.,* 2010: 480). A zero dividend yield on a share price that is growing at the expected rate of return by the market will not add any economic value, in the same manner as organisational profit that only covers the cost of capital. It is also difficult to link dividend yield to an organisation's cost of capital directly.

Therefore, in this context it makes it difficult to measure wealth with dividend yield since value can be created without any dividends paid out as well as increasing dividend yields when the share price is falling.

2.4.1.3 The Du Pont formula

The Du Pont formula utilises elements from both the income statement and balance sheet in the equation. It calculates the return on equity (ROE) with profitability, asset utilisation and leverage to highlight the influence of both the net profit margin and the total asset turnover on an organisation's profitability. The return on equity (ROE) can be calculated as described in Figure 3 (below):

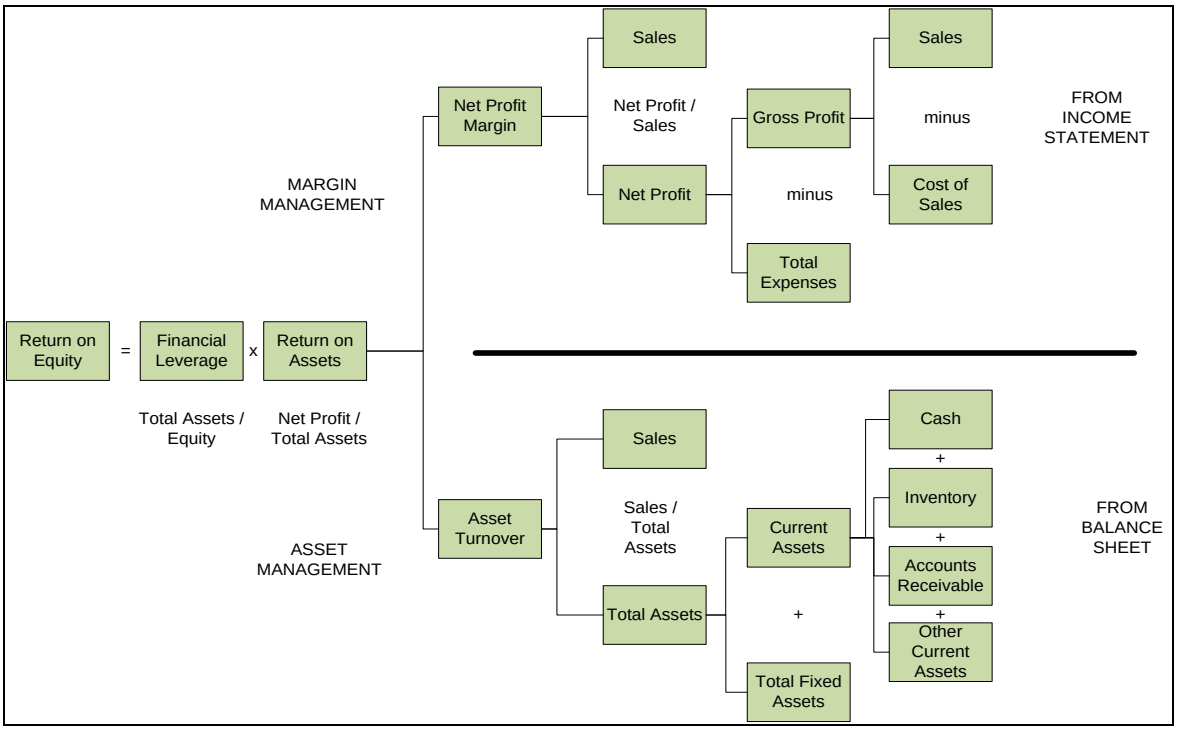


Figure 3 - Du Pont Strategic Profit Model

(Source: Grant, 2009:147)

Grant (2009:147) has indicated that the Du Pont formula is used by managers and investors to highlight an organisation's return on assets and financial leverage. This formula allows the organisation to break the return on common equity into three

components linked to the financial statements that can be used as measuring tools to manage value creation (Megginson *et al.,* 2010:48):

- A profit-on-sales component (net profit margin) tying with income statement which illustrates operating efficiency
- An efficiency-of-asset-use component (total asset turnover) linking to the balance sheet and the income statement
- A "financial leverage use" component (asset-to-equity ratio) tying directly to the balance sheet, also known as the 'equity multiplier'.

De Wet & Hall (2007:60) stated:

> ROE increases with more financial gearing, as long as the returns earned on the borrowed funds exceed the cost of the borrowings. The danger inherent in increasing the financial gearing beyond a certain level is that the increased financial risk may cause the value of the company and the share price to fall.

It may be concluded that an increase in ROE due to an increase in the net profit margin or asset turnover is a good indication for the company. However, if the financial leverage is the source of the increase and the organisation is appropriately leveraged, it may become more risky with an increased debt to equity ratio where stock might deserve a greater discount. Measurement of value through ROE therefore provides an incentive to increase debt for growth, which makes further investment more risky.

Although ROE is used extensively Black *et al.* (2001:50) found that it is not consistent with the creation of shareholder value. This evidently increases the risks on returns, making it difficult to value the wealth created.

2.4.1.4 Market Ratios

Market ratios relate the organisation's market value, as per share price, to specific accounting values. These ratios provide insight into the organisation's performance and also reflect its past and future performance (Megginson *et al.,* 2010:49). Two market ratios, one focusing on earnings and the other on book value, are discussed below:

- According to Megginson *et al.* (2010:49), the **price/earnings (P/E) ratio** measures the amount that investors are willing to pay for an organisation's earnings. The P/E ratio is a measure of an organisation's long term growth prospects and of investor confidence on the organisation's future performance. The equation below describes the P/E ratio Megginson *et al.* (2010:49):

$$Price/Earnings(P/E)ratio = \frac{Market\ price\ per\ share\ of\ common\ stock}{Earnings\ Per\ Share} \quad (4)$$

A high P/E ratio, according to financial literature, indicates the belief that an organisation will achieve rapid earnings growth in the future.

- The **market/book (M/B) ratio** is another parameter that indicates how investors view the organisation's performance. It relates the market value of the organisation's shares to its book value. The equation below describes the M/B ratio (Megginson *et al.,* 2010: 49):

$$Market\ /\ Book\ (M/B)\ ratio = \frac{Market\ price\ per\ share\ of\ common\ stock}{Book\ value\ per\ share\ of\ common\ stock} \quad (5)$$

Where:

$$Book\ value\ /\ share\ = \frac{Common\ stock\ equity}{Number\ of\ common\ stock\ shares\ outstanding} \quad (6)$$

2.4.2 Value based methods

According to Rappaport (1987:57), the shortcomings of accounting-based measurements are abundant. Listed below are some of the most important flaws:

- Alternative accounting measures may be employed
- Risk is excluded
- Investment requirements are excluded
- Dividend policy is not considered

- Time value of money is ignored.

To overcome these problems the economic value added or residual income approaches have been developed. Economic value added has been recognized as a basis for many value-based metrics. It is defined as the net operating profit after tax of an organisation less the invested capital multiplied by the weighted average cost of capital (Hanlon & Peasnell, 1998:422). Another method to determine shareholder value is discounting the future cash flows expected from an asset to calculate the present value (Ameels *et al.,* 2002:15). In the following section these methods are elaborated upon.

2.4.2.1 Market Value Added (MVA)

Market value added (MVA) has often been used as a performance measure to quantify value to shareholders. It is defined as the difference between the market value of the organisation's stock and the amount of equity capital supplied by shareholders. Hence, maximising the difference, the greater the shareholders' wealth (Brigham & Ehrhardt, 2005:109).

MVA can be regarded as a useful measure to evaluate how organisations manage shareholder expectations. MVA is calculated as in the equation below (Stewart, 2002:20):

$$\textbf{MVA = Market value of company – Invested capital} \qquad (7)$$

Where:

Market value = Market price / share x number of shares issued

MVA can also be defined as the cumulative measure of corporate performance and represents the net present value of past and projected capital of an organisation (Stewart, 1991:153). An organisation increases its MVA by increasing the difference between the company value and the amount of capital invested in the organisation. It should be noted that MVA is a cumulative measure, therefore assesses performance over time. The difference or change in MVA from one period to another can indicate whether value has been created or destroyed in an organisation (De Wet & Hall, 2004:41).

2.4.2.2 Cash flow discounting based methods

Discounted cash flow (DCF) methods determine the organisation's value by estimating the cash flows that will be generated in the future and discounting it at a rate equivalent to the flow's risk (Fernandez, 2007:17). Megginson *et al.* (2010:155) describe the process as determining an asset's expected cash flow, choosing a discount rate that reflects the asset's risk and calculating the present value. The internal rate of return (IRR) or net present value (NPV) are computed and utilised to make the decision on whether or not a project is feasible to undertake.

The different DCF methods start with the following equation (Megginson *et al,* 2010:155):

$$V = \frac{CF_1}{1+k} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \cdots + \frac{CF_n + V_n}{(1+k)^n} \quad (8)$$

Where:

CF_i = cash flow generated by the organisation in the period *i*.

V_n = residual value of the organisation in the year *n.*

k = appropriate discount rate for the cash flow's risk.

According to Fernandez (2007:21) in order to calculate the value of the organisation using this method, the free cash flows are discounted using the weighted average cost of capital (WACC). Since capital is usually obtained from debt and equity, the cost of both these sources has to be taken into account. The WACC is based on the percentages of debt and equity (common and preferred) and the cost of debt, the cost of stock for both common and preferred, and the corporate tax rate. The formula is as follows (Brigham & Ehrhardt, 2005:321):

$$WACC = w_d r_d (1 - T) + w_{ps} r_{ps} + w_{ce} r_s \quad (9)$$

Where

w_d = weight of debt

$r_d(1 – T)$ = after-tax cost of debt

w_{ps} = weight of preferred equity

r_{ps} = cost of preferred equity

w_{ce} = weight of common equity

r_s = cost of common equity

The cost of debt is equal to the interest rate that an organisation needs to pay for long-term debt capital. Preferred stock is used by some organisations as a source of finance. It is important to note that preferred dividends are not tax deductible. Further details are not relevant to this research and therefore not discussed.

The cost of common equity is an opportunity cost, therefore the organisation should earn on its reinvestment earnings as much as its shareholders could have earned on alternative investments of equivalent risk (Brigham & Ehrhardt, 2005:311).

There are different methods that can be utilised to estimate cost of capital of which the capital asset pricing model (CAPM) is the more widely used. Bond-yield-plus-risk-premium is primarily used by private organisations (Brigham & Ehrhardt, 2005:312). There is no method that supersedes the other with all subject to errors in practice (Brigham & Ehrhardt, 2005:311). In the CAPM model the share price performance of an organisation is correlated to the overall market performance through the beta coefficient. The expected return on a specific asset is equal to the sum of risk-free rate and the premium that depends on the asset's beta (ß) and the expected risk premium on the market portfolio (Megginson *et al.*, 2010:208). The relationship is described by the following equation:

$$E(R_i) = R_f + \beta_i[E(R_m) - R_f] \quad (10)$$

Where:

$E(R_i)$ = Expected rate of return

R_f = Risk free rate

$ß_i$ = beta of the organisation (that is a standardised measure of the risk of an individual asset that captures only the systematic component of its volatility

$E(R_m)$ = Expected rate of return of the market.

One restriction of the DCF valuation method is that the assumption is always made that no flexibility exists after an investment decision is made. Therefore, traditional DCF valuation methods normally undervalue opportunities for value to be created in an organisation (Brennan & Schwartz, 1985:40).

2.4.2.3 Stock dividend growth valuation methods

Stock dividend growth valuation methods are a way of valuing an organisation based on the theory that stock equals the present value of all future benefits that investors expect it to provide (Megginson *et al.*, 2010:131). In this context it makes it difficult to measure wealth with dividend growth since value can be created without any dividends being paid out.

2.4.2.4 Economic Value Added (EVA)

The EVA metric, which has been trademarked by Stern Stewart, is a residual income type measure of economic profit that an organisation can use to get a better measure of the value being created or destroyed for its shareholders. This EVA metric is described by the following equation (Young & O'Byrne, 2000:43):

$$\boldsymbol{EVA = NOPAT - [IC \times WACC]} \quad (11)$$

Where:

NOPAT = Net operating profit after tax of the organisation.

IC = Invested Capital: Total assets of the organisation less any non-operating assets, investments, excess cash and securities.

WACC = The weighted average cost of capital for the organisation.

Alternatively, EVA can be calculated using the equation (Young & O"Byrne, 2000:43):

$$\boldsymbol{EVA = [ROIC - WACC] \times IC} \quad (12)$$

Where:

ROIC = Return on Invested Capital.

WACC = Weighted average cost of capital.

IC = Invested capital: Total assets of the organisation less any non-operating assets, investments, excess cash and securities.

Economic profit takes into account the operational efficiency of the organisation as well as the financial resources (capital) it utilises in doing so. It is therefore suitable to utilise the economic profit concept which includes the cost of capital since the study includes an analysis on value creation and capital budgeting. By using data extracted from published accounts, analyses can be drawn of returns generated from capital investments throughout the business cycle of the organisation, and compared with the cost of capital. It also enables the analyses of value drivers in the organisation's operation to show competitive advantages or shortfalls. These analyses by themselves can be utilised to implement management programmes to increase and maintain the organisation's value.

2.4.3 EVA evidence in the field

ThyssenKrupp is managed and controlled using a VBM system (Controlling, 2011:6), the objective being to "systematically and continuously increase the value of the enterprise – through profitable growth and a focus on businesses which offer the best development opportunities in terms of competitiveness and performance." The key elements of this management system are an integrated control system, value-based performance indicators as well as extensive measures to achieve value-enhancing growth, enhance efficiency and optimize capital employed.

ThyssenKrupp has developed a central performance indicator for the VBM system implemented that measures the value added in a period at all levels of the group: this is defined as the ThyssenKrupp Value Added (TKVA). The indicator reflects the EVA rationale where the value is equal to earnings before interest and taxes (EBIT) less cost of capital. The cost of capital corresponds to the product of weighted average cost of capital (WACC). Capital employed is defined as net assets plus net working capital.

Three strategic levers have been defined to increase TKVA (Controlling, 2011:13):

- Increased operating efficiency: This has a direct positive impact on TKVA. If no additional capital is needed for the improvement measures, the increase in EBIT with constant capital employed leads to an increase in TKVA. It is also reflected in the DuPont equation where the ROE of an organisation is directly correlated to its operating efficiency.
- Profitable growth: New projects can contribute to profitable growth and thus also to value creation. The condition for this is investment in projects and businesses which generate EBIT higher than the costs of the additional capital invested.
- Optimisation of capital employed, which is described in two ways:
    - Portfolio management: Reducing investment in business activities which earn less than its cost of capital leads to value growth.
        - Elimination of value destroyers.
    - Asset management: Reducing capital employed without reducing EBIT leads to value growth.
        - Efficient use of capital available in the company (equipment, buildings, inventories, receivables, liabilities).

Investing in projects that generate returns higher that their costs of capital makes a major contribution to value-enhancing growth, therefore increasing the organisation value. *ThyssenKrupp* has developed the ThyssenKrupp Plus program of measures to increase operating efficiency, mostly by cost-cutting measures. Optimized capital employment from business activities has enabled the organisation to free up capital.

In the past fiscal year, *ThyssenKrupp* generated positive value added and the TKVA was €37 million compared to a negative TKVA (€3,419) million in the previous year, since the value added measures have been implemented.

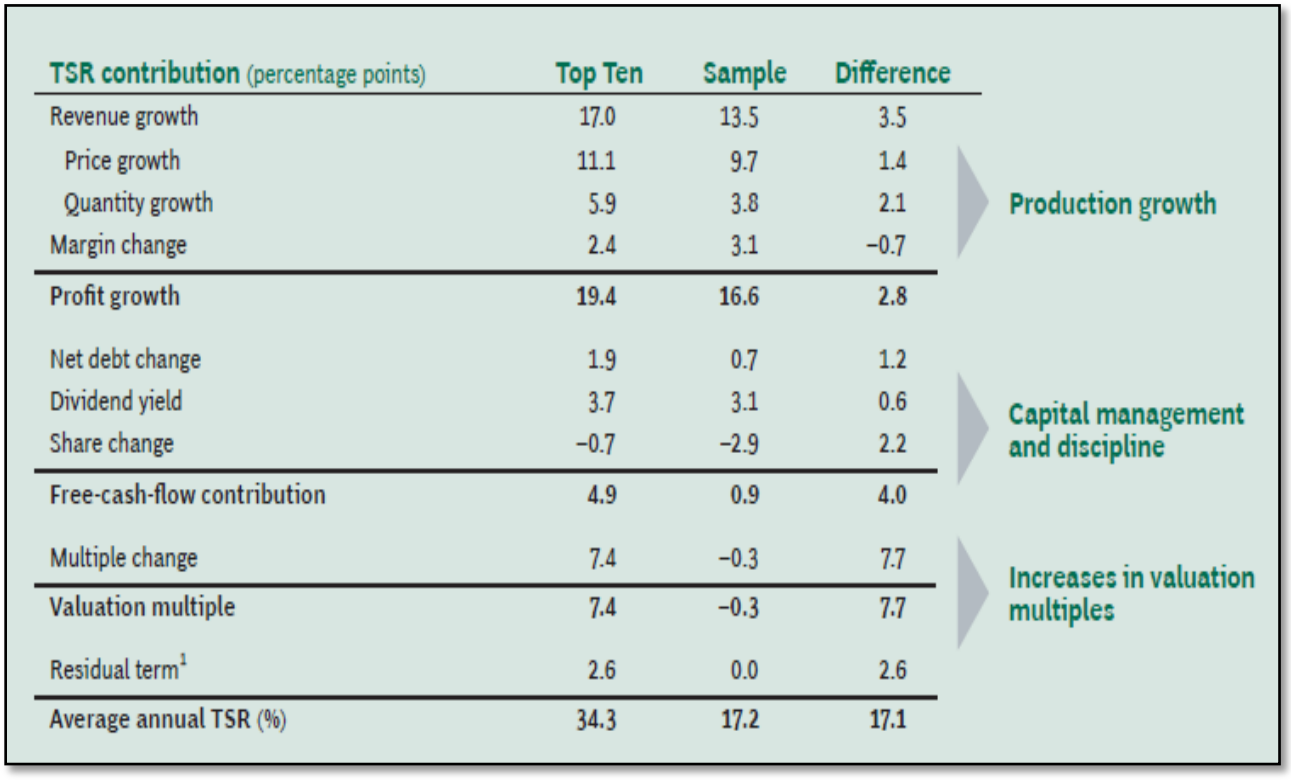
2.4.4 Effectiveness of Value Creation

A study conducted by the *Boston Consulting Group* (BCG) on top mining organisations from 1999 to 2009, where substantial shareholder value was created, showed that only

about half of total shareholder return (TSR) could be explained by strong commodity prices (Krinks *et al.*, 2011:5). Based on the BCG research conducted, as well as cash flow management principles, various aspects can attribute to the high TSR including:

- Production growth
- Capital management and discipline
- Increase in valuation multiples.

An average annual TSR of 34.3% was obtained on the top mining organisations in the BCG research group over the past decade (1999 - 2009) and can be subdivided as indicated in Figure 4 (below).



TSR contribution (percentage points)	Top Ten	Sample	Difference	
Revenue growth	17.0	13.5	3.5	
Price growth	11.1	9.7	1.4	
Quantity growth	5.9	3.8	2.1	Production growth
Margin change	2.4	3.1	−0.7	
Profit growth	**19.4**	**16.6**	**2.8**	
Net debt change	1.9	0.7	1.2	
Dividend yield	3.7	3.1	0.6	Capital management and discipline
Share change	−0.7	−2.9	2.2	
Free-cash-flow contribution	4.9	0.9	4.0	
Multiple change	7.4	−0.3	7.7	Increases in valuation multiples
Valuation multiple	7.4	−0.3	7.7	
Residual term[1]	2.6	0.0	2.6	
Average annual TSR (%)	34.3	17.2	17.1	

***Figure 4* - Total Shareholder Return**

(Source: Krinks *et al,* 2011:16).

In Figure 4 the TSR is broken down into three levers: production growth, capital management discipline, and increases in valuation multiples. The sample comprises 37 global organisations with a market valuation greater than $5 billion, sales greater than

$1 billion and a free float of at least 25%. The top 10 organisations are determined by calculating the average annual TSR and comparing it to the total sample. It should be noted that besides the price growth portion of the TSR, the quantity growth and free cash flow contribution carried a significant weight. This result indicates that disciplined capital management and timing of new capital investment can lead to greater TSR.

These factors or value drivers per se will be investigated to assess whether organisations have effectively utilized opportunities in a bullish market and freed capital to invest during the bearish times that attributed to the total TSR.

2.4.4.1 Production Growth

Organisations in the mining sector (or in general) have limited control over the commodity price fluctuations but have a considerable influence on how much it produced, which include:

- Expanding existing operations
- Identifying and expediting new capital projects
- Acquiring projects and mines in anticipation of demand growth.

The rate of growth is probably one of the most important strategic choices that organisations have to make. The growth in an investment base can be funded from retained earnings alone (Young & O'Byrne, 2000:414). Organisational strategies however may call for a period of growth that does not add economic value to an organisation, utilising external sources of finance where the cost of capital might exceed the cost of equity. An example of such a situation can be explained by an organisation implementing a blue ocean strategy that "seek to gain a dramatic and durable competitive advantage by inventing a new industry or distinctive market segment that renders existing competitors largely irrelevant and allows the organisation to create and capture altogether new demand" (Thompson, Strickland & Gamble, 2010: 200). In this instance cost of capital might be overlooked and the core focus is to obtain capital to expedite the project. In any event, managing capital budgeting is crucial to wealth creation since economic growth will only occur when the return on invested capital

(ROIC) exceeds the cost of capital. Conversely, increasing the rate of growth while ROIC is below the cost of capital simply destroys value, faster (Kaiser, 2003). This VBM approach can be described by the following the EVA equation (Copeland, Koller & Murrin, 2000:116):

$$\boldsymbol{EVA = (ROIC - WACC) \times TOC} \tag{13}$$

Where:

ROIC = Return on invested capital.

WACC = Organisation's average cost of capital.

TOC = the total cash invested in the organisation over its life, net of depreciation.

This equation measures whether the organisation is creating or destroying value. In accordance with EVA, the organisation will only be able to create value by:

- increasing the ROIC and keep the WACC and invested capital constant
- reducing WACC and keep ROIC and invested capital constant
- increasing invested capital in projects that yield a ROIC greater than WACC
- Withdrawing capital from projects that yield a ROIC lower than WACC
- Creating longer periods where ROIC is expected to be more than WACC.

2.4.4.2 Capital management and discipline

Effective capital budgeting management in an organisation must be exercised to ensure that projects deliver an adequate rate of return – one that exceeds the cost of capital.

The ROIC tree (Copeland *et al* 2000: 116) measures the return on invested capital:

$$\boldsymbol{ROIC = \frac{NOPAT}{Invested\ Capital}} \tag{14}$$

hence,

$$\boldsymbol{ROIC = \frac{EBIT}{Invested\ Capital} \times (1 - tax)} \tag{15}$$

Using revenue as a x1 multiplier,

$$\boldsymbol{ROIC = \frac{EBIT}{Revenue} \times \frac{Revenue}{Invested\ capital} \times (1 - tax)} \quad (16)$$

Where:

NOPAT = EBIT (1-tax)
EBIT = Earnings before income tax

The EBIT to Revenue ratio is the *operating margin*; the Revenue to Invested Capital ratio is the *capital turnover*. Both the operating margin and capital turnover ratios can be evaluated to compare the different organisations' value creation activities.

Operating Margin

Operating margin measures the percentage of sales remaining after deducting all costs and expenses other than interest and taxes. An analysis of operating margins can be subdivided into ratios of the cost of goods to revenue, overheads to revenue and depreciation to revenues. According to Jacobs (2003:31), when only public information is utilised, inconsistencies in disclosure levels and underlying accounting policies may limit the effectiveness of this aspect. *Anglo Platinum*, for example, discloses on-mine (mining and concentrator) costs separately from off-mine (smelting and refining) costs, in comparison with *Impala,* that includes smelting with the concentrating costs but excludes the refining costs.

Capital turnover

Capital turnover measures how effectively the company employs its invested capital (Copeland *et al.*, 2000:116).

From the economic value added equation:

$$\boldsymbol{EVA = OC \times [ROIC - WACC]} \tag{17}$$

Since

$$\frac{\boldsymbol{EVA}}{\boldsymbol{OC}} = \boldsymbol{[ROIC - WACC]} \tag{18}$$

Where:

OC = Operating capital invested

ROIC = Return on Invested Capital

WACC = Weight Average Cost of Capital.

Each element of capital (working capital, net property, plant & equipment and other assets) can then be analysed.

2.5 COMMODITY PRICES DURING BUSINESS CYCLES

The largest contributor to total shareholder return obtained from mining businesses over the past ten years, was sales growth. A significant portion can be attributed to commodity price increases, but a reasonable portion came from increases in production (Krinks *et al.,* 2011: 7).

The decision makers of the organisation are bound to consider these price fluctuations when planning investments, even if they cannot be timed to coincide with the most favourable part of the commodity price cycle (Roberts & Torries, 1994:154). The question should be raised: Has the organisation utilised all opportunities in a bullish market and freed capital to invest during the bearish times, that is, has the organisation implemented an effective value based management system (EVA, product growth and capital expenditure management) that will effectively create wealth for the shareholders during the cyclical demand of its product?

2.5.1 The business cycle environment

The resource sector has played a significant role in the global economy, especially in the foreign trade area. This effect can be seen in several 'net- commodity -export-driven' countries. One can imagine the impact price movement of commodities has on these economies. Dramatic increases have been observed in various commodities such as oil and base metals over the past decade, and have had important implications for both inflation and economic activity in various countries around the world. A sustained commodity price increase would generate an appetite for production increase and expansions in the commodity-producing sectors which in turn create wealth effects and raise consumption (Cheung & Morin, 2007:184). The downward trend of commodities may also lead to lower production levels and minimal economic returns.

It is evident from the above, as well as from research done by Labys, Achouch and Terraza (1999:236), confirming a strong correlation between international business cycles and metal price cycles, that commodity price fluctuations and business cycles are difficult to segregate from each other. It is therefore imperative to understand these

concepts as they instigate decision making processes in organisations and ultimately steer the directions they will follow for future growth.

Business cycles can be seen as repetitive sequences, whether contracting or expanding events, or even just slowdowns or speedups within a market-oriented economy (Dua & Banerji, 1999:177). Burns and Mitchell (1946:3), who founded the National Bureau of Economic Research (NBER) in 1920 defined it as follows:

> *Business cycles are a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions and revivals which merge into the expansion phase of the next cycle; this sequence of changes is recurrent but not periodic; in duration business cycles vary from more than one year to ten or twelve years; they are not divisible into shorter cycles of similar character with amplitudes approximating their own.*

It should be noted that the reference is made to the “aggregate economic activity”, which encompasses not only the country’s GDP but also aggregate indicators of production, sales, income and employment.

A study conducted by Reinhart and Wickham (1994:175) identified the key fundamentals behind **commodity prices** and more importantly quantified the relative contributions of supply and demand changes. On the demand side, it was found that the real dollar effective exchange rate and the state of the business cycle in industrial countries are closely linked to the cyclical movement of world commodity prices. On the supply side, strong productivity growth of commodity sectors relative to the rest of the economy and the increased commodity supply relative to the rest of the economy are the primary causes of the relevant trend of the commodity prices.

2.5.2 The commodity price relation to business cycles

The existence of business cycles is caused by the effect of disequilibrium in the economic environment. Organisations are obliged to direct production on the basis of profit rates which are predicted by the forecasted demand of the product (Okisho, 1994:5). Okisho (1994:5) further argues that product commodities may not be demanded at the price predicted during the related production period and in other cases will not fulfil the required demand. In these instances excess demand or a surplus of the product commodity may occur. The prices of commodities in excess demand rise and in excess supply will fall. This occurrence may induce organisations to alter their production decisions and change the business cycle.

According to Damodaran (2009:4), the key characteristic of commodity producing organisations is that they are dependent on the price of the commodity for its earnings and value, which results in the following commonalities:

- The Commodity price cycle: Despite all efforts of good wealth management and the most effective strategic and business choices, commodity organisations will see revenues decrease during significant economic downturn and benefit hugely when the upside start. Accounting-measured parameters, which include measures such as profit margins and asset turnover, are heavily dependent on the commodity price since it has a direct impact on the organisations' revenue.

- Volatile earnings and cash flows: The volatility in revenues in commodity organisations is significant at the operating income level since these organisations have relatively high fixed costs. Therefore, commodity organisations tend to keep mines operational during the downturn because costs for shutting down and reopening operations can be extensive.

2.6 CONCLUSION

The global importance of commodities cannot be exemplified more than through its impact on global markets. Fluctuation in commodity prices tends to impact on both production and investment decisions made by organisations. From this literature survey it is concluded that economic measures are superior to accounting measures of value since economic measures take into account the cost of capital in the organisation. Commodity prices and business cycles have been discussed to understand the nature of their fluctuating nature and measurable instruments to analyze these changes.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The empirical investigation applies the theory of what was discussed in Chapter 2. The results from the investigation are analyzed to determine whether value based management (VBM) has been effectively implemented by management in the platinum industry, with primary focus on operating working capital management.

3.2 DEFINITION OF OBJECTIVES

In general, the objectives of the study are to apply the theory discussed in Chapter 2 on organisations operating in the platinum industry in order to evaluate performance based on certain profit indicators. Of significant interest is the cyclical environment in which organisations operate, therefore vigilant changes in operating strategy can be essential to implement in order to maintain a profit-making position. The results of the applied theory are described in Chapter 4 and conclusions to be drawn from it are presented in Chapter 5.

The objective of the study as stated in Chapter 1 need to be defined in terms of specific variables. Derived from Chapter 2, three value drivers relating to the ability to create value for organisations were identified for consideration in terms of relationship with and ability to create value if managed correctly during business cycles for the organisations considered in the study:

- Operating working capital management
- Management of invested capital during commodity cycles - in this study defined as net operating fixed capital
- Management of economic value added during commodity cycles.

3.2.1 Effective management of Operating working capital

To free up cash flow for further investment, actions are taken to make a positive contribution towards free cash flow. When the commodity cycle is on the upturn, the impact of an effective operating working capital management system can have a great influence on funding a strategic project with cash on hand or funding through a debt offering.

A comprehensive approach to the management of operating working capital can reduce funds tied up in inventory, receivables and payables, depending on the position in the cyclical commodity market. The following are measures that can assist in identifying trends of ineffective management of operating working capital, evidently affecting cash flow:

- Inventory retention (average days to sell inventory): The availability of product when the commodity cycle is on the upturn can be advantageous. It is however imperative to note that high inventory retention may lead to higher holding costs. These costs may include rent, insurance, theft and other costs of maintaining a stock of goods to be sold. If any trend however does exist between inventory retention and the commodity cycle, a direct correlation is proposed to ensure availability of goods during the upturn and low goods retention during the downturn. This will ensure that low cash volume is hold up in inventory that can be utilised in other aspects of the organisation.

- Debt collection period: A constant or reducing collection period on accounts receivable over time without losing sales can indicate that the organisation is keeping or improving their credit terms for the customer, even in bullish market conditions. It is therefore proposed that no indirect correlation between the debt collection period and commodity cycle should exist.

- Credit payment period: A constant or increasing collection period on accounts payable over time without damaging credit terms can indicate that the organisation is managing their free cash flow even in bearish market conditions. It is therefore

proposed that no direct correlation between credit payment period and commodity cycle should exist.

A comparison can then be drawn amongst the various organisations to determine each response to market conditions.

3.2.2 Operating capital management during cyclical commodity environment

Production growth is an important contributor to value creation, both in acquisitive organisations and those that do not engage in mergers or acquisitions (Krinks *et al.,* 2011:5). Growth can be measured in various ways. For this study, a measure that is comparable across the pool of organisations being investigated in the platinum industry should be utilised, irrespective of the defined operational processes. Growth can be seen in different ways by the beholder, often being volume of production, which in the platinum producing environment is measured in ounces. However, this causes difficulties in calculative comparison since outer parameters in various organisations are set up differently, based on the operations.

An example of this effect can be related to the management of the refining process of platinum in the organisations listed. *Anglo American*, *Impala* and *Lonmin* each fully operate their own refineries, while competitors either sell the concentrate produced, or have it treated by one of the three organisations mentioned above at a cost plus a margin rate. It is therefore possible that platinum production volumes are declared that include more than one organisation's produce since it was produced during the same refining process. If the growth rate is limited to the production of metal, no comparison can be drawn from these statistics. Volume of platinum production will therefore be discounted as a measure of growth in this event.

Another measure of growth, such as headline earnings, earnings per share, and dividend growth are all considered to be unreliable based on research shown in Chapter 2, and therefore will not be suitable for the purpose of the study. Showing the growth relation to revenue will also be difficult to compare due to the effect of volatile

commodity prices on returns. One of the best options can be measuring growth in total assets.

The growth in total assets however may include non-mining ones, securities or short-term holdings, and may distort figures for the actual growth of the organisation. It might introduce a bias against organisations that opted not to re-invest in current operations or pay out dividends. Only using long term assets would exclude net working capital from the analysis, which plays a significant role in determining free cash flow of the organisation. Therefore, a measure needs to be implemented that will include operating working capital in the analysis, so that organisations which have added value by vigorous controls on current assets and liabilities are incorporated.

For the purpose of this research, operating capital will be utilized and is seen as the most appropriate measure for calculating growth. Operating capital includes, long-term assets and net operating working capital, however excludes non-operating assets and access cash.

3.2.3 Value Creation on Operating Capital invested

Growth should not come at any cost, but to create value it must be both profitable and cost efficient. In general, platinum mining organisations require strong capital budgeting discipline to maintain economic profitability during the growth phases (Jacobs, 2003:15). Derived from the EVA equation, EVA per operating capital invested can be calculated as:

$$\frac{EVA}{Operating\ capital\ invested} = (ROIC - WACC) \tag{19}$$

If an organisation invests in projects at a return on invested capital (ROIC) lower than their cost of capital (WACC), it will evidently result in a negative EVA per operating capital invested, destroying value creation.

3.3 METHOD OF ECONOMIC ANALYSIS

The following section describes the methodology followed to evaluate the value creating aspects in the various organisations included in the study.

3.3.1 Sample selection

The objective of the study is to determine the effectiveness of managing operating capital amongst the various organisations in the platinum industry in terms of creating value to its shareholders. The sample pool of JSE listed organisations is quite small but each is unique. As an example, one of the largest platinum producers is controlled by a holding company that may also participate in strategic decision making. Another large platinum producer, in contrast, is managed independently whilst another has recently become a large role player in the platinum industry.

To ensure comparative representation to the market in this study, as many organisations as possible were included.

3.3.2 Data collection

The following section describes the process followed to obtain the required information.

3.3.2.1 Financial reports

The standardised published financial statements of the organisations for the period 2001-2010 (where available) were used as a primary source of data for the economic analysis. These financial statistics were compiled by *McGregor BFA*. The organisations and financial years evaluated in this study are shown in Table 2 (below):

Table 2 - List of Organisations evaluated for this study

Organisation evaluated	Financial information studied
COMPANY A	2001 - 2010
COMPANY B	2006 - 2010
COMPANY C	2005 - 2010
COMPANY D	2001 - 2010
COMPANY E	2007 - 2010
COMPANY F	2001 - 2010
COMPANY G	2007 - 2010
COMPANY H	2001 - 2010
COMPANY I	2004 - 2010
COMPANY J	2001 - 2010
COMPANY K	2010
COMPANY L	2009 - 2010
COMPANY M	2010
COMPANY N	2005 - 2010

During the evaluation of the organisations listed in Table 2, several shortcomings in information available resulted in some not being included in the investigation. Three organisations (COMPANIES K, L and M) could not be further evaluated due to insufficient financial information. Even though financial information for another three organisations (COMPANIES B, G and N) were available for a longer period, data such as turnover and cost of sales were not adequately available to draw any significant conclusion, therefore they were also been discarded. A total of eight organisations were further evaluated (COMPANIES A, C, D, E, F, H, I & J).

3.3.2.2 Interest Rates and Exchange rates

A long-bond yield rate as indicated in the South African Reserve Bank data was utilized. Since share returns are based on the long term, it is most appropriate to utilise a long-bond yield rate.

3.3.2.3 Cost of Capital

The cost of capital for the organisations in the platinum industry was calculated using ten years of financial information in the McGregor BFA database. Since capital is usually obtained from debt and equity, the cost of both these sources was to be taken into account. The Weighted Average Cost of Capital (WACC) is based on the percentages of debt and equity (common and preferred) and the cost of debt, the cost of stock for both common and preferred, and the corporate tax rate.

The Capital Asset Pricing Model (CAPM) was used for calculating the cost of equity which can only be estimated to a certain degree of accuracy. Therefore, errors inherent in the calculation of cost of equity will also affect the measurement of EVA, which should be kept in mind when using EVA to determine the value of organisations.

3.3.3 Data Analysis

All data required for the analysis was collated in *Microsoft Excel*, linked to the database of the financial information obtained from the *McGregor BFA* database. Calculations were conducted using principles of value creation as discussed in Chapter 2 and structured as follows.

Data that includes total fixed assets, operating current assets and operating current liabilities are extracted to determine the efficiency of the management of operating working capital. The inventory retention, average debt collection period and average credit payment period are calculated to evaluate the first value driver, i.e., effective management of operating working capital. The parameters indicated in section 3.2.1, namely inventory retention, debt collection period and credit payment period, are correlated to the effective platinum pricing (which illustrates the commodity cycle) over the relevant period. A comparative analysis is conducted amongst the various organisations by calculating the weighted average of the parameters indicated above. Each one of the organisations' results is compared to this value.

The second value driver (operating capital management during the cyclical commodity environment) is determined by evaluating the amount of operating capital spent over the

commodity cycle. Operating capital is defined as the sum of the net operating working capital and net operating fixed assets (Copeland, Koller & Murrin, 2000:116). A comparative analysis is conducted amongst the various organisations by calculating the weighted average of the parameters indicated above. Each one of the organisations' results is compared to this value.

The third value driver (value creation on operating capital invested) is determined by evaluating the EVA earned during the investment of operating capital in the organisation. This is done by correlating the EVA value to the Operating Capital spent in the specific year for the 2001 – 2010 period (or period where required information was available). The correlation indicates the equivalent EVA obtained by the investment of operating capital. The effectiveness of the various organisations is determined by the rate of EVA created with all operating capital value spent. An industry rate of EVA is also determined to evaluate whether the individual organisations operates more efficient than the industry average.

3.3.4 Evaluating best performing organisation

In evaluating the most efficient organisation in managing operating working capital, it is suggested that each of the three aspects, that is inventory retention of finished product, debt collection period and credit payment, be evaluated separately, as will the investment of net operating capital.

3.3.4.1 Inventory retention

Buchmann and Jung (2011:3) indicate that inventory is one of the most overlooked sources of cash, meaning that high inventory retention holds up valuable capital that could be utilized elsewhere. In addition, high inventory levels may results in additional costs such as handling, storage, insurance and theft.

In the commodity producing industry, this notion can also be validated. According to Damodaran (2009:4), shutting down and reopening operations can be extensive in commodity organisations, therefore it might be advantageous to follow the commodity price cycle and increase inventory during the upward movement of the commodity price

cycle. It is therefore suggested that the most efficient organisation should be evaluated based on the lowest inventory retention period as well as the organisation with the best inventory retention correlation to the commodity price cycle.

The following section describes the methodology to rank the various organisations in terms of performance.

The organisation with the lowest inventory retention period will be the benchmark and obtain a ranking of 1. A ranking for each of the other organisations will be calculated by dividing the benchmark inventory retention period with the inventory retention period of the organisation being evaluated. The following equation illustrates the process:

$$Ranking_{Organisation\ X} = \frac{Inventory\ retention_{benchmark}}{Inventory\ retention_{Organisaiton\ X}} \quad (20)$$

This process is repeated for each organisation evaluated in the study. As an example:

Organisation 1 with 20 inventory retention days compared to organisation 2 with 25 inventory retention days and Organisation 3 with 50 inventory retention days. Organisation 1 will therefore be the benchmark and obtain a ranking of 1.

$ranking_{organisation\ 1} = 20/20 = 1$ (1^{st} place)

$ranking_{organisation\ 2} = 20/25 = 0.8$ (2^{nd} place)

$ranking_{organisation\ 3} = 20/50 = 0.4$ (3^{rd} place)

The organisation with the highest correlation between inventory retention days and the commodity price cycle value will be the benchmark and obtain a ranking of 1. A ranking for each of the other organisations will be calculated by dividing the inventory correlation of the organisation being evaluated by the benchmark inventory correlation. The following equation illustrates the process:

$$Ranking_{Organisation\ X} = \frac{Inventory\ correlation_{Organisation\ X}}{Inventory\ correlation_{benchmark}} \quad (21)$$

This process is repeated for each organisation evaluated in the study. As an example:

Organisation 1 with a correlation of 0.3 compared to organisation 2 with a correlation of 0.65 and Organisation 3 with a correlation of 0.8. Organisation 3 will therefore be the benchmark and obtain a ranking of 1.

$ranking_{organisation\ 1}$ = 0.3/0.8 = 0.375 (3rd place)

$ranking_{organisation\ 2}$ = 0.65/0.8 = 0.8125 (2nd place)

$ranking_{organisation\ 3}$ = 0.8/0.8 = 1 (1st place)

The average of the two rankings is then calculated to obtain the overall 1st place:

$ranking_{organisation\ 1}$ = Average (1, 0.375) = 0.6875 (3rd place)

$ranking_{organisation\ 2}$ = Average (0.8, 0.8125) = 0.8063 (1st place)

$ranking_{organisation\ 3}$ = Average (0.4, 1) = 0.7 (2nd place)

3.3.4.2 Debt collection period

Buchmann and Jung (2011:3) indicate that debt collection periods should be optimized to replenish outstanding capital of the organisation. It is therefore suggest that the most efficient organisation should be evaluated based on the lowest debt collection period.

The following section describes the methodology to rank the various organisations in terms of performance.

The organisation with the lowest debt collection period will be the benchmark and obtain a ranking of 1. A ranking for each of the other organisations will be calculated by dividing the benchmark debt collection period with the debt collection period of the organisation being evaluated. The following equation illustrates the process:

$$Ranking_{Organisation\ X} = \frac{Debt\ collection\ period_{benchmark}}{Debt\ collection\ period_{Organisation\ X}} \quad (22)$$

This process is repeated for each organisation evaluated in the study. As an example:

Organisation 1 with 20 debt collection period compared to organisation 2 with a 25 debt collection and Organisation 3 with a 50 debt collection period. Organisation 1 will therefore be the benchmark and obtain a ranking of 1.

$ranking_{organisation\ 1} = 20/20 = 1$ (1^{st} place)

$ranking_{organisation\ 2} = 20/25 = 0.8$ (2^{nd} place)

$ranking_{organisation\ 3} = 20/50 = 0.4$ (3^{rd} place)

3.3.4.3 Credit payment period

Buchmann and Jung (2011:3) point out two extremes in the spectrum of credit payments, viz. fast-paying organisations at one end and organisations that are "lean on the trade" and use unpaid payables as a source of financing at the other. Between these two extremes is the optimum point, for a more effective, favourable price, with payment terms to delivery timeframes that exist for the mutual benefit of the organisation and its creditors.

It is quite difficult to obtain the optimum point in the platinum industry since various aspects might play a role in identifying it. Therefore, it is proposed that the industry average, which might include both extremes as noted above, should be defined as the optimum credit payment period, i.e., the organisation with the credit payment period closest to the industry average will then be defined as the most efficient in this section.

The following section describes the methodology to rank the various organisations in terms of performance.

The organisation with the credit payment period closest to the industry average's payment period will obtain the highest rating. The industry average will be the benchmark and obtain the number 1 rank in this instance. Note that the organisations may have a credit payment period that is higher or lower than the industry average. For organisations with a higher payment period, the ranking will be calculated by dividing the benchmark payment period with the payment period of the organisation being evaluated. The following equation illustrates the process:

If credit payment period$_{benchmark}$ < credit payment period$_{Organisation\ X}$ then

$$Ranking_{Organisation\ X} = \frac{Credit\ payment\ period_{benchmark}}{Credit\ payment\ period_{Organisation\ X}} \quad (23)$$

If credit payment period$_{benchmark}$ > credit payment period$_{Organisation\ X}$ then

$$Ranking_{Organisation\ X} = \frac{Credit\ payment\ period_{Organisation\ X}}{Credit\ payment\ period_{benchmark}} \quad (24)$$

This process is repeated for each organisation evaluated in the study. As an example:

Industry average credit payment period of 20 days compared to organisation 1 with a 15 credit payment period and Organisation 2 with a 50 credit payment period.

Ranking$_{industry\ average}$ = 20/20 = 1 (1st place)

Ranking$_{Organisation\ 1}$ = 15/20 = 0.75 (2nd place)

Ranking$_{Organisation\ 2}$ = 20/50 = 0.4 (3rd place)

3.3.4.4 Investment of operating capital

As described by Jacobs (2003:13), growth should not come at any cost, and to create value it must be both profitable and cost efficient. It is clear that organisations that invest operating capital that produces the highest EVA per operating capital invested should be declared as the most effective organisation. However, Krinks *et al.* (2011:13) also note that production increases during the upside of the commodity cycle, contributing a significant amount of the total shareholders' return. Therefore, it is proposed that organisations with the best correlation between operating capital invested and the commodity price cycle should also be considered as effective. A combination of these variables will therefore be utilised to determine the overall best performer.

The following section describes the methodology to rank the various organisations in terms of performance.

The organisation with the highest EVA per operating capital invested will be the benchmark and obtain a ranking of 1. A ranking for each of the other organisations will be calculated by dividing the EVA per operating capital invested of the organisation being evaluated by the benchmark EVA per capital invested. The following equation illustrates the process:

$$Ranking_{Organisation\ X} = \frac{EVA\ per\ operating\ capital\ invested_{Organisation\ X}}{EVA\ per\ operating\ capital\ invested_{benchmark}} \quad (25)$$

This process is repeated for each organisation evaluated in the study. As an example:

Organisation 1 with an EVA per operating capital invested of 0.8 compared to Organisation 2 with an EVA per operating capital invested of 0.6 and Organisation 3 with an EVA per operating capital invested of 0.4. Organisation 1 will therefore be the benchmark and obtain a ranking of 1.

$ranking_{organisation\ 1} = 0.8/0.8 = 1$ (1^{st} place)

$ranking_{organisation\ 2} = 0.6/0.8 = 0.75$ (2^{nd} place)

$ranking_{organisation\ 3} = 0.4/0.8 = 0.5$ (3^{rd} place)

The organisation with the highest correlation between operating capital growth rate and the commodity price cycle value will be the benchmark and obtain a ranking of 1. A ranking for each of the other organisations will be calculated by dividing correlation of the organisation being evaluated with the benchmark correlation. The following equation illustrates the process:

$$Ranking_{Organisation\ X} = \frac{Correlation_{Organisation\ X}}{Correlation_{benchmark}} \quad (26)$$

This process is repeated for each organisation evaluated in the study. As an example:

Organisation 1 with a correlation of 0.3 compared to organisation 2 with a correlation of 0.65 and Organisation 3 with a correlation of 0.8. Organisation 1 will therefore be the benchmark and obtain a ranking of 1.

$ranking_{Organisation\ 1} = 0.3/0.8 \quad = 0.375 \quad (3^{rd}\ place)$

$ranking_{Organisation\ 2} = 0.65/0.8 \quad = 0.8125 \quad (2^{nd}\ place)$

$ranking_{Organisation\ 3} = 0.8/0.8 \quad = 1 \quad (1st\ place)$

The average of the two rankings is then calculated to obtain the overall 1^{st} place:

$ranking_{Organisation\ 1} = Average\ (1, 0.375) \quad = 0.6875 \quad (3^{rd}\ place)$

$ranking_{Organisation\ 2} = Average\ (0.75, 0.8125) \quad = 0.7813 \quad (1^{st}\ place)$

$ranking_{Organisation\ 3} = Average\ (0.5, 1) \quad = 0.75 \quad (2^{nd}\ place)$

CHAPTER 4

RESULTS AND DISCUSSION

4.1 EFFECTIVENESS OF OPERATING WORKING CAPITAL MANAGEMENT

The first value driver being evaluated is the effectiveness of the management of operating working capital in the organisation. Three sets of variables are compared amongst the various organisations namely inventory retention, debt collection period and credit payment period.

4.1.1 Inventory retention

The inventory retention of the various organisations was plotted over a time period in comparison with the weighted average retention period of the industry. The platinum commodity price over this period was also plotted as a reference for the commodity price cycle.

4.1.1.1 COMPANY A

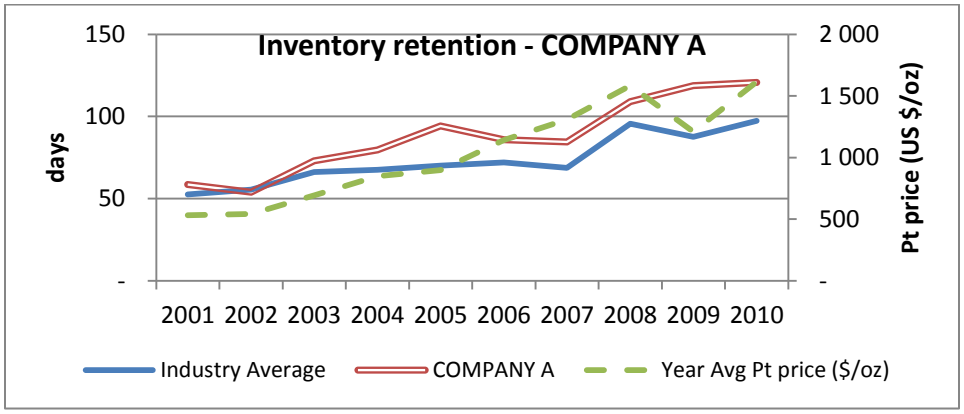


Figure 5 - Inventory retention – COMPANY A

In Figure 5 (above) the inventory retention period of COMPANY A is plotted with the weighted average inventory retention period of the industry on the same vertical axis over the period that is investigated (2001–2010). The annual average price of platinum (US$/oz) is plotted on a secondary vertical axis to illustrate the commodity market cycle

of the industry. It is evident that COMPANY A has inventory retention that increases with the commodity price and is higher than the industry average. This may indicate that the organisation favours higher inventory levels during the upswing of the commodity cycle than does the industry.

4.1.1.2 COMPANY C

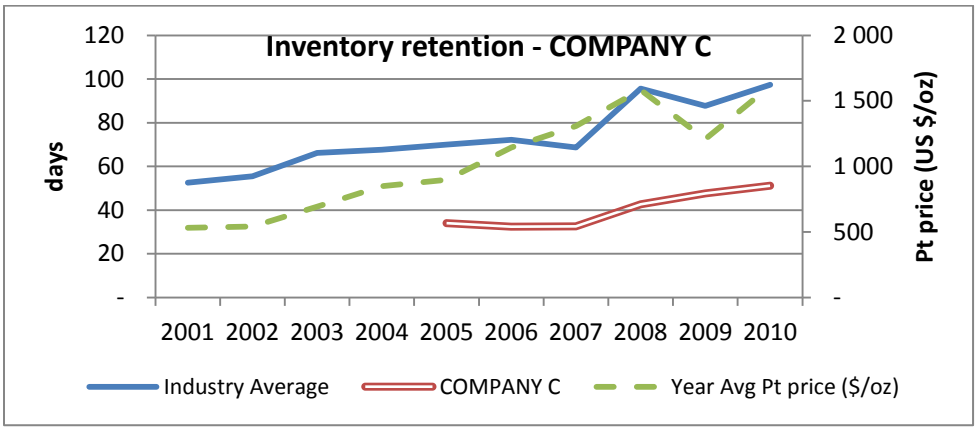


Figure 6 - Inventory retention – COMPANY C

Figure 6 (above) shows that COMPANY C has inventory retention that increases with the commodity price; however it is much lower than the industry average. A plausible reason for this effect is that the product demand may hamper the organisation to increase inventory, or it is more focused on replenishing stocks to keep costs associated with high inventory levels, low.

4.1.1.3 COMPANY D

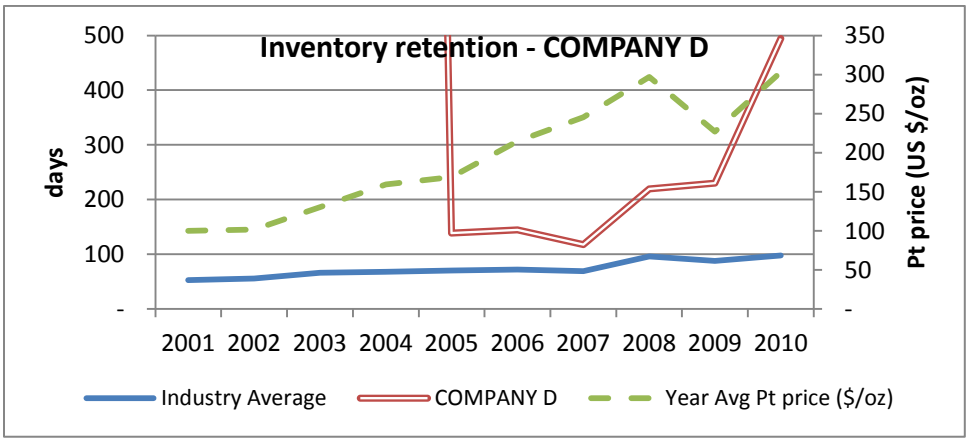


Figure 7 - Inventory retention – COMPANY D

Figure 7 (above) shows that COMPANY D has inventory retention that increases with the commodity price, with a much higher inventory retention rate than the industry average. The shootouts at the beginning and end of the period cannot be clarified with the information available. COMPANY D is quite a new entry to the platinum market, a possibility for this anomaly in inventory retention being that the inventory produced does not conform to required specification of the market.

4.1.1.4 COMPANY E

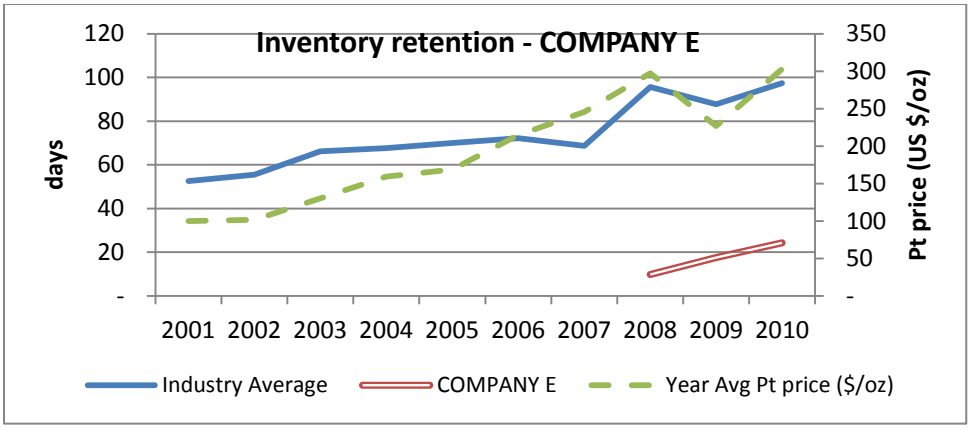


Figure 8 - Inventory retention – COMPANY E

Figure 8 shows that COMPANY E has inventory retention that increases with the increasing commodity price with a lower retention rate compared to the industry average. Similar to COMPANY C, COMPANY E might have low inventory retention during the early stages; however it is aggressively increasing inventory volume.

4.1.1.5 COMPANY F

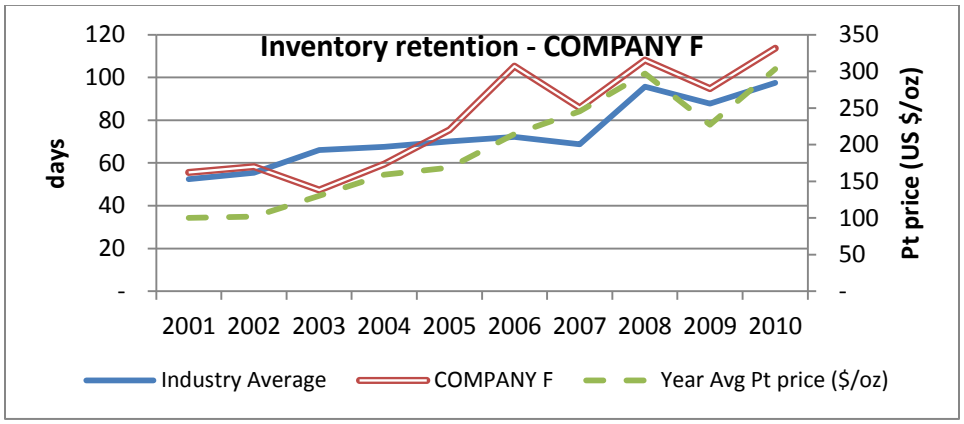


Figure 9 - Inventory retention – COMPANY F

Figure 9 shows that COMPANY F has an inventory retention that increases with the increasing commodity price with a very similar retention rate compared to the industry average. Similar to COMPANY A, COMPANY F maintains a good correlation to the commodity price cycle, possibly to leverage on the increasing commodity prices seen during the investigated period. Economies of scale might also lead to lower inventory associated expenses per unit therefore driving up inventory can make it cost effective.

4.1.1.6 COMPANY H

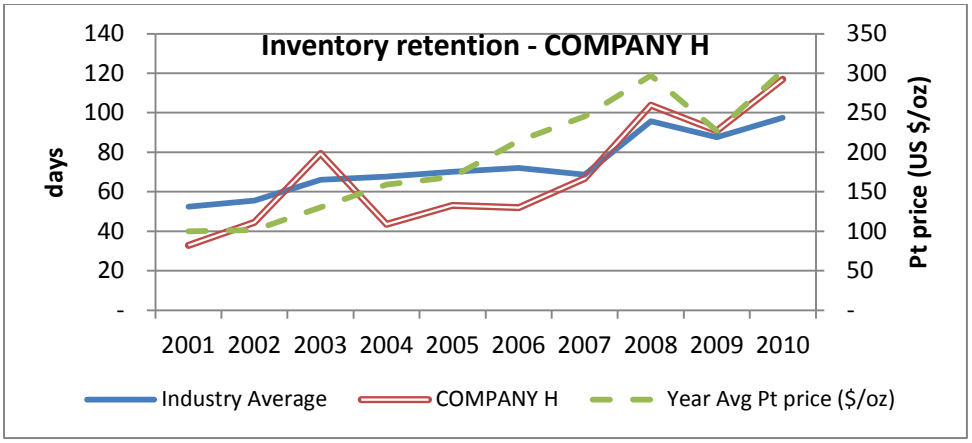


Figure 10 - Inventory retention – COMPANY H

Figure 10 shows that similar to COMPANY F, COMPANY H has inventory retention that increases with the increasing commodity price and a very similar retention period as the industry average.

4.1.1.7 COMPANY I

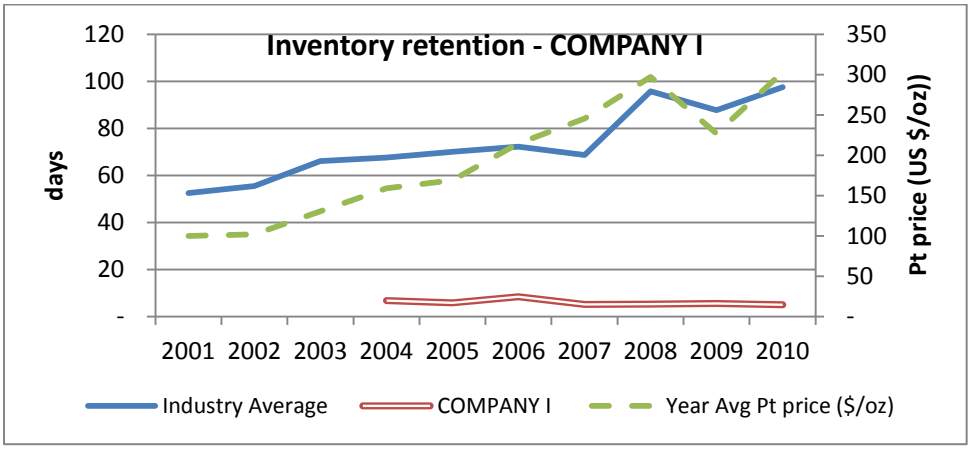


Figure 11 - Inventory retention – COMPANY I

Figure 11 shows that COMPANY I has inventory retention that stays constant (or decrease slightly) with the increasing commodity price and a lower retention period as the industry average. It is notable that COMPANY I has not been able to ramp up production levels, therefore impacting on its inventory retention. Operating at these low inventory levels might not be effective and makes it difficult to be opportunistic in the market by means of taking on more sales or customers during an increasing commodity price cycle.

4.1.1.8 COMPANY J

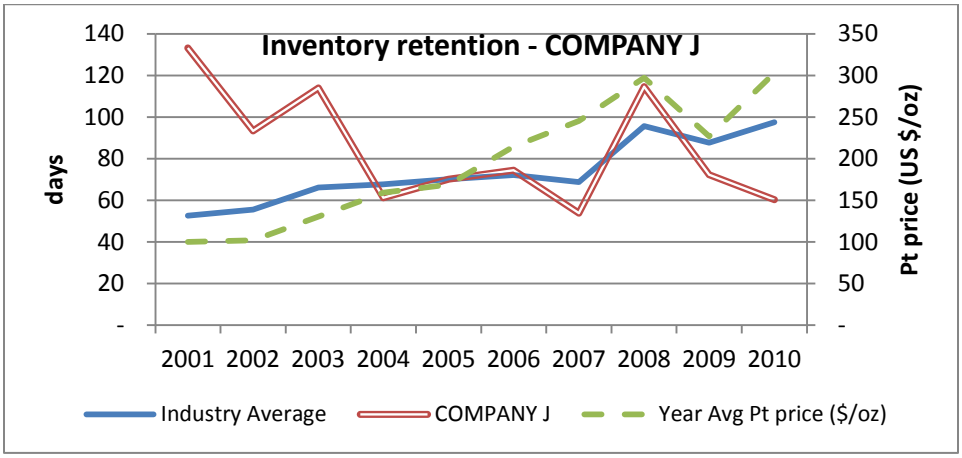


Figure 12 - Inventory retention – COMPANY J

Figure 12 shows that COMPANY J has inventory retention that does not show a significant correlation to the increasing commodity price. During the period 2001-2004 the inventory retention rate was indirectly proportional to the upward trend of the commodity price. A definite step change is visible during the latter part of the period.

From the figures described in section 4.1.1, it is evident that there is a trend of the industry to follow the trend of the commodity price cycle, specifically during a rising commodity price, most probably to capitalise on a stronger market requirement.

4.1.2 Debt collection period

The debt collection period of the various organisations was plotted over a time period in comparison with the weighted average collection period of the industry. The platinum commodity price over this period was also plotted as a reference for the commodity price cycle.

4.1.2.1 COMPANY A

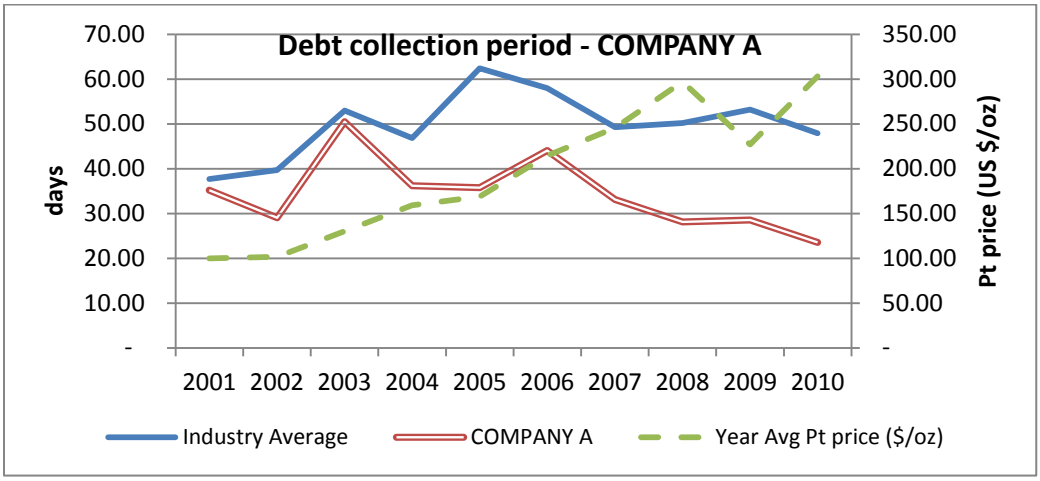


Figure 13 - Debt collection period – COMPANY A

In Figure 13 the debt collection period of COMPANY A is plotted with the weighted average debt collection period of the industry on the same vertical axis over the period that is investigated (2001-2010). The annual average price of platinum (US$/oz) is plotted on a secondary vertical axis to illustrate the commodity market cycle of the industry. From Figure 13 it is evident that COMPANY A has a debt collection period that decreases with the increasing commodity price and is lower than the industry average. A decrease in the debt collection period, irrespective of the commodity price cycle, results in a quicker influx of cash to the organisation, which is positive.

4.1.2.2 COMPANY C

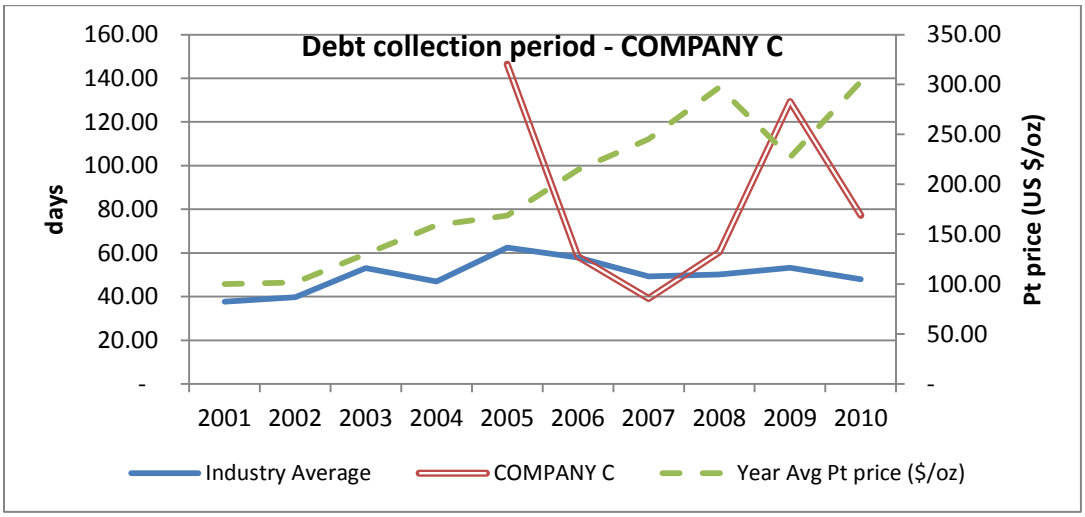


Figure 14 - Debt collection period – COMPANY C

Figure 14 shows that COMPANY C has a debt collection period that does not show any significant correlation with the increasing commodity price, however it is more often higher than the industry average.

4.1.2.3 COMPANY D

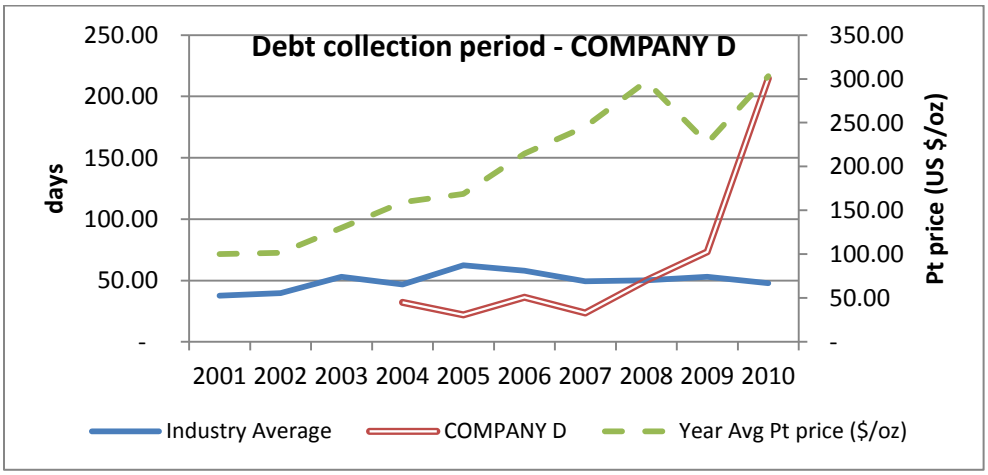


Figure 15 - Debt collection period – COMPANY D

Figure 15 shows that COMPANY D has a debt collection period that increases with the increasing commodity price with a significant increase in the 2009-2010 period that pushes its collection period high above the industry average. It is plausible that bad debt can be evident due to this significant step change.

4.1.2.4 COMPANY E

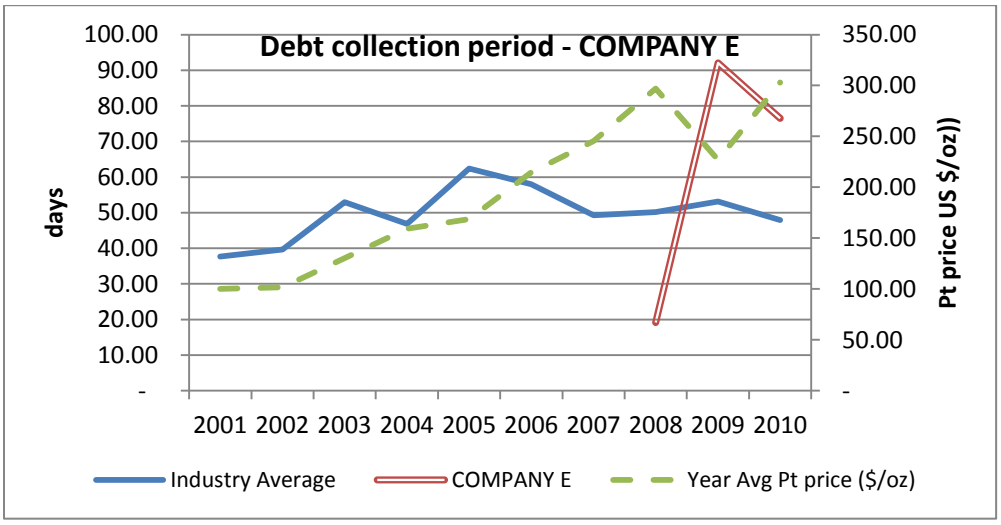


Figure 16 - Debt collection period – COMPANY E

Figure 16 shows that COMPANY E has a debt collection period that increases with the increasing commodity price but it is quite difficult to evaluate due to the significant variance in data during the 2008-2010 period.

4.1.2.5 COMPANY F

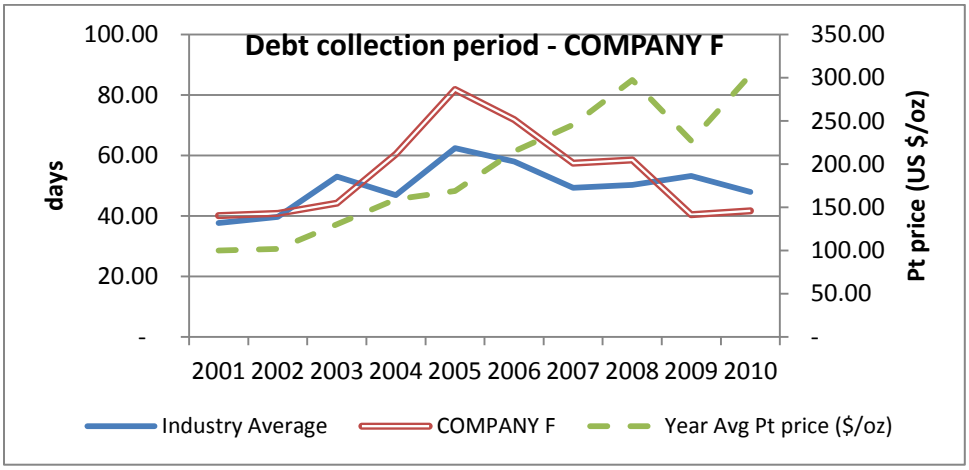


Figure 17 - Debt collection period – COMPANY F

Figure 17 (above) shows that COMAPNY F has a debt collection period that increases with the increasing commodity price during the 2001-2004 period and decreases with the increasing commodity price during the latter part of the period with a very similar

collection period compared to the industry average. A significant step change from 2001 – 2004 to 2005 – 2010 is visible.

4.1.2.6 COMPANY H

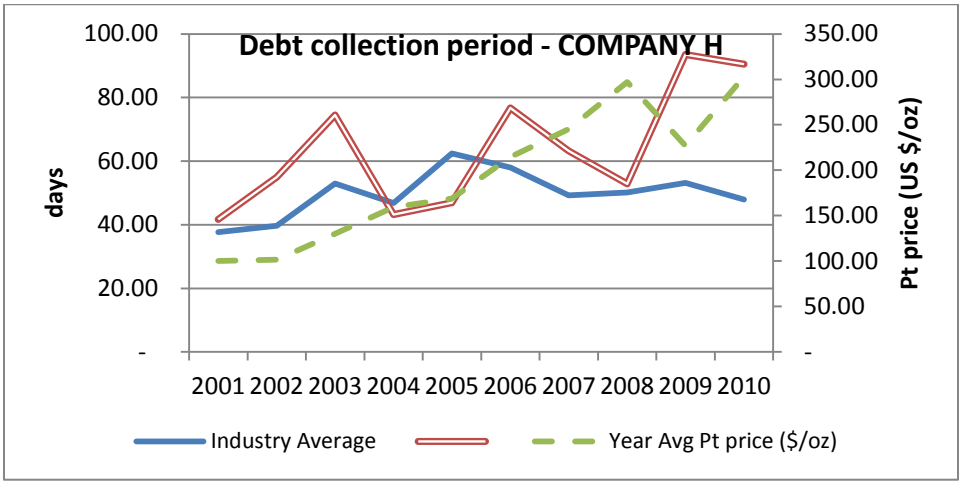


Figure 18 - Debt collection period – COMPANY H

Figure 18 shows that COMPANY H has a debt collection period that increase with the increasing commodity price and a very similar retention period as the industry average, however, it stays continuously above the industry average from 2005 onwards.

4.1.2.7 COMPANY I

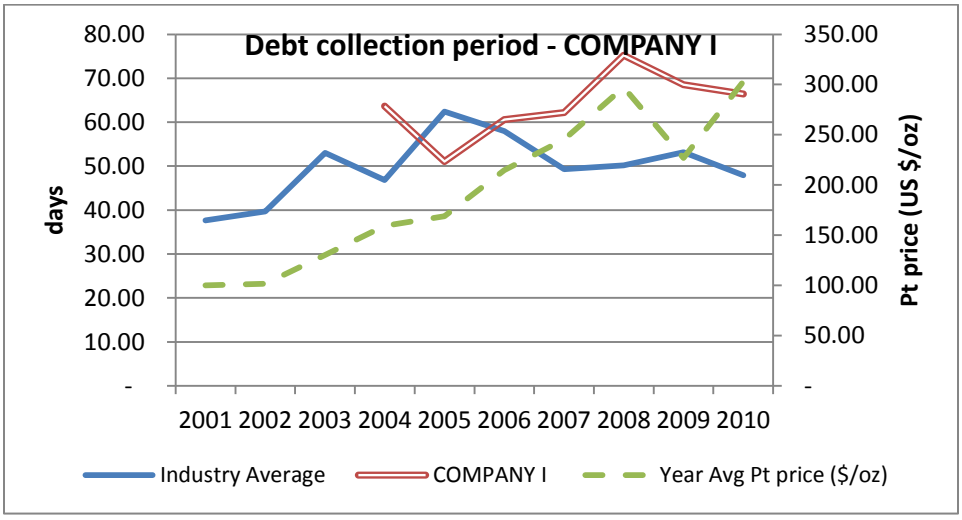


Figure 19 - Debt collection period – COMPANY I

Figure 19 (above) shows that COMPANY I has a debt collection period that increases with the increasing commodity price and a higher collection than the industry average

4.1.2.8 COMPANY J

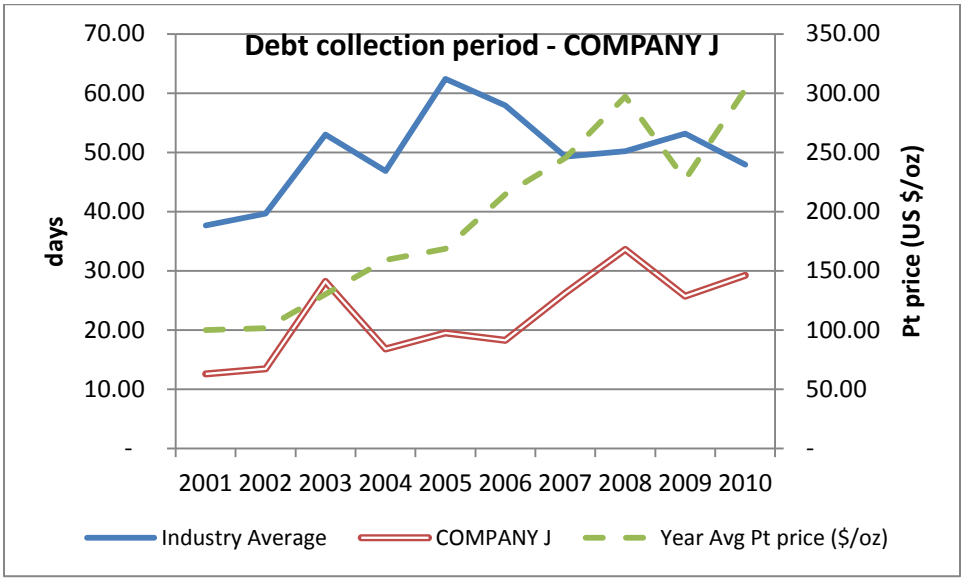


Figure 20 - Debt collection period – COMPANY J

Figure 20 show that COMPANY J has a debt collection period that increases with the increasing commodity price; however it is significantly lower than the industry average, which is a good reflection on the management controls in place to maintain the *status quo.*

It is evident from the figures described in section 4.1.2 that debt collection is widely spread across the various organisations in the platinum industry. As Buchmann & Jung (2011:3) suggests, it is however significant to reduce the debt collection period to increase cash flow in the organisation.

4.1.3 Credit payment period

The credit payment period of the various organisations was plotted over a time period in comparison with the weighted average payment period of the industry. The platinum commodity price over this period was also plotted as a reference for the commodity price cycle.

4.1.3.1 COMPANY A

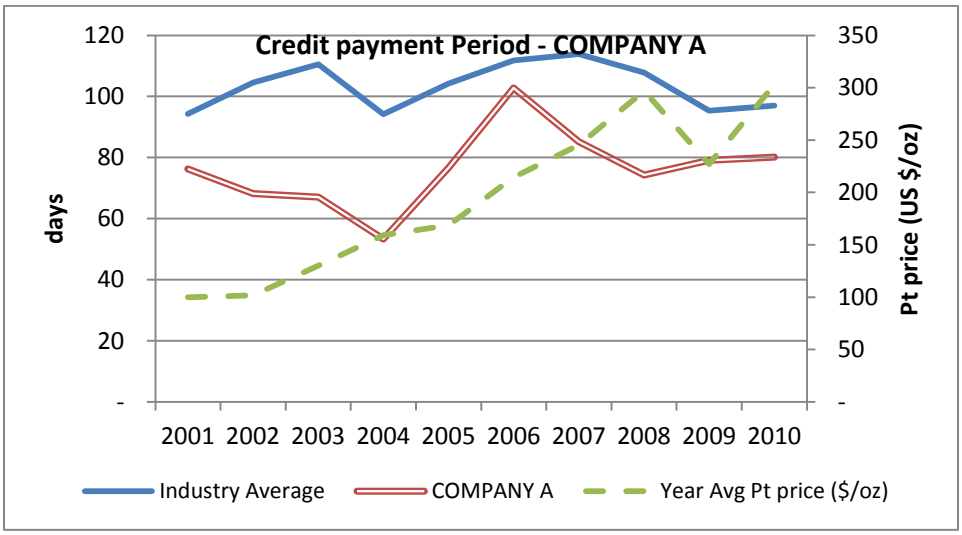


Figure 21 - Credit payment period – COMPANY A

In Figure 21 the credit payment period of COMPANY A is plotted with the weighted average credit payment period of the industry on the same vertical axis over the period that is investigated (2001-2010). The annual average price of platinum (US$/oz) is plotted on a secondary vertical axis to illustrate the commodity market cycle of the industry. From Figure 21 it is evident that COMPANY A has a credit payment period that shows significant correlation with the increasing commodity price and is lower than the industry average.

4.1.3.2 COMPANY C

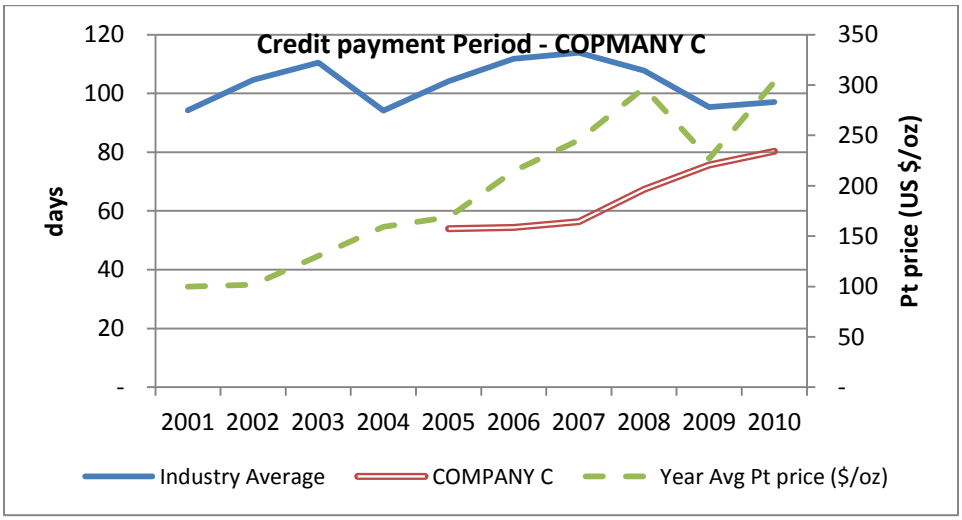


Figure 22 - Credit payment period – COMPANY C

Figure 22 (above) shows that COMPANY C has a credit payment period that increases with the increasing commodity price and is significantly lower than the industry average.

4.1.3.3 COMPANY D

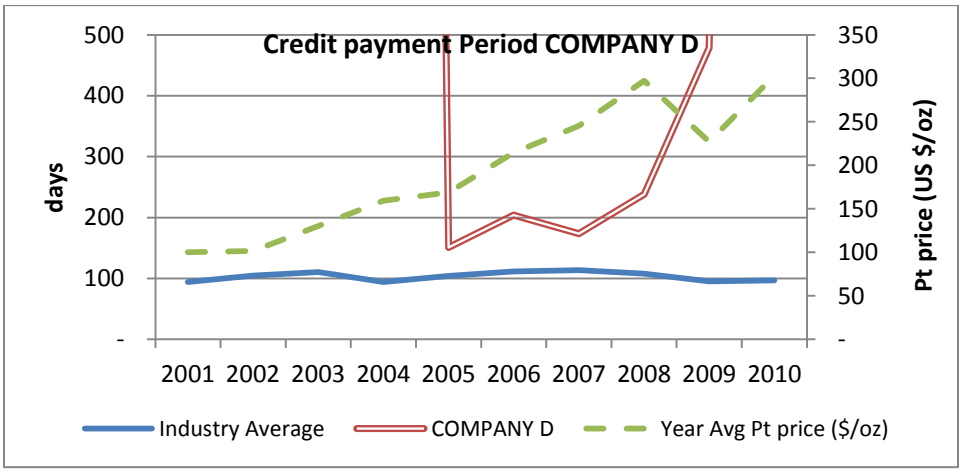


Figure 23 - Credit payment period – COMPANY D

Figure 23 shows that COMPANY D has credit payment period that does not show a clear correlation with the increasing commodity price. There is however a significant increase in the 2009-2010 period that pushes its payment period high above the industry average. The payment period is also greater than the industry average throughout the period.

4.1.3.3 COMPANY E

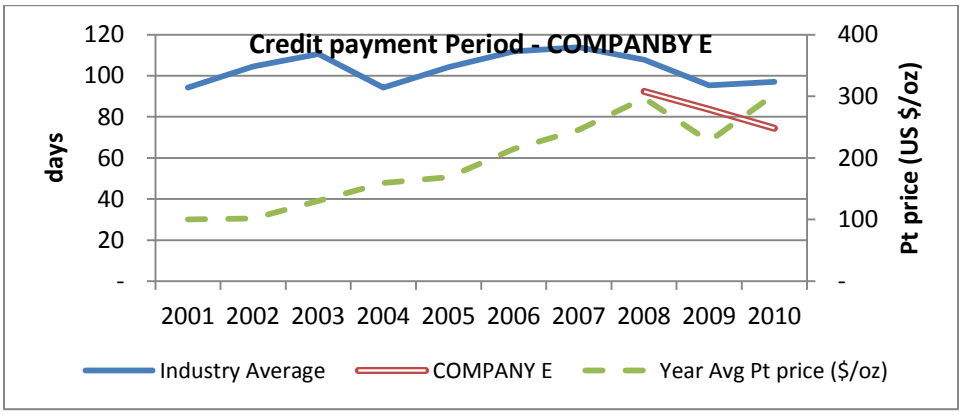


Figure 24 - Credit payment period – COMPANY E

Figure 24 (above) shows that COMPANY E has a credit payment period that decreases over time but it is difficult to evaluate due to the minimal available data. It is also evident that the payment period is lower than the industry average over the investigative period.

4.1.3.4 COMPANY F

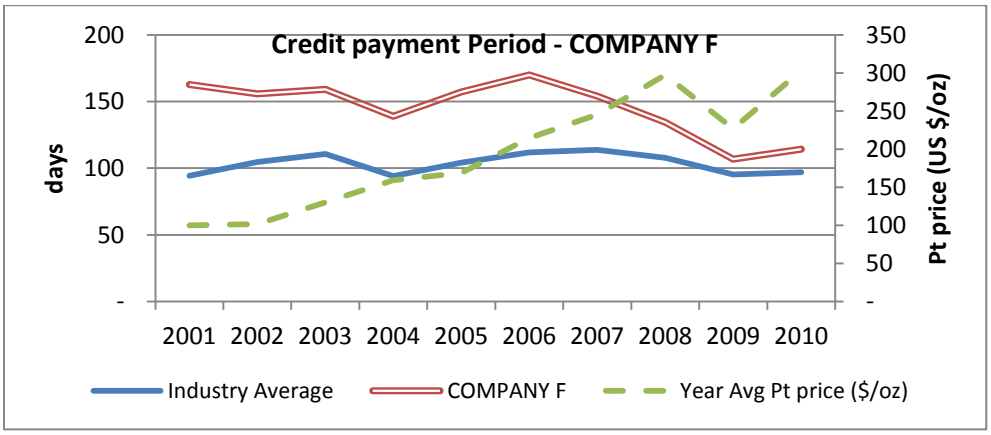


Figure 25 - Credit payment period – COMPANY F

Figure 25 shows that COMPANY F has a credit payment period that decreases with the increasing commodity price with a higher payment period compared to the industry average. It is however noticeable that the gap between COMPANY F's payment and the industry average's payment period has reduced significantly during the period.

4.1.3.5 COMPANY H

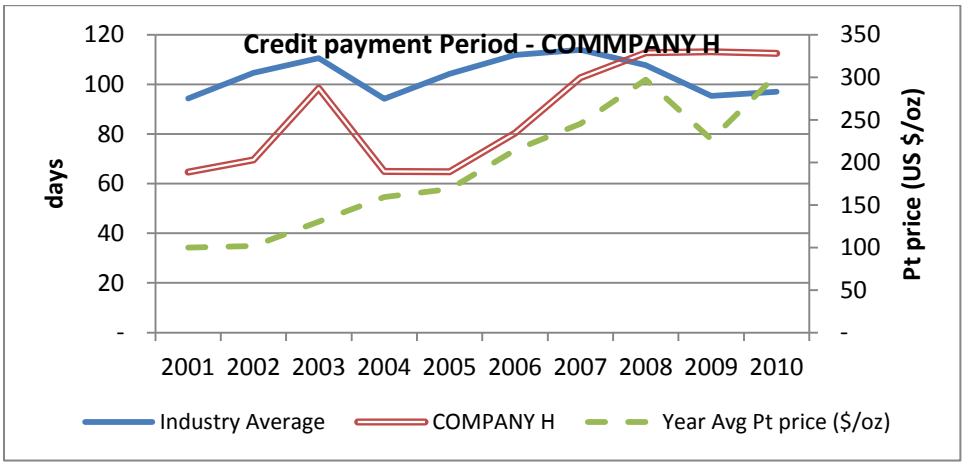


Figure 26 - Credit payment period – COMPANY H

Figure 26 shows that COMPANY H has a credit payment period that does not have a significant correlation with the increasing commodity price during 2001-2004, however it shows an increase with the increasing commodity price during 2005-2010. A payment period as the industry average, however, stays below the industry average up to 2008.

4.1.3.6 COMPANY I

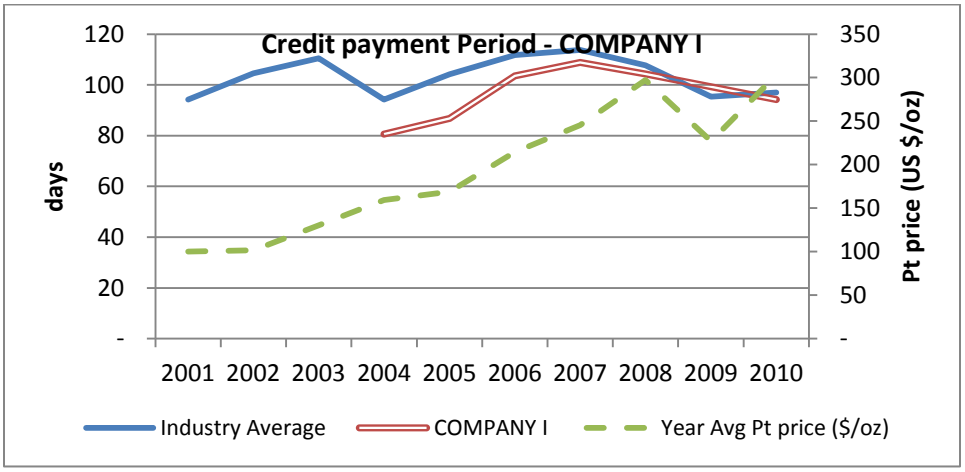


Figure 27 - Credit payment period – COMPANY I

Figure 27 shows that COMPANY I has a credit payment period with a similar trend and value as the industry average from 2004.

4.1.3.8 COMPANY J

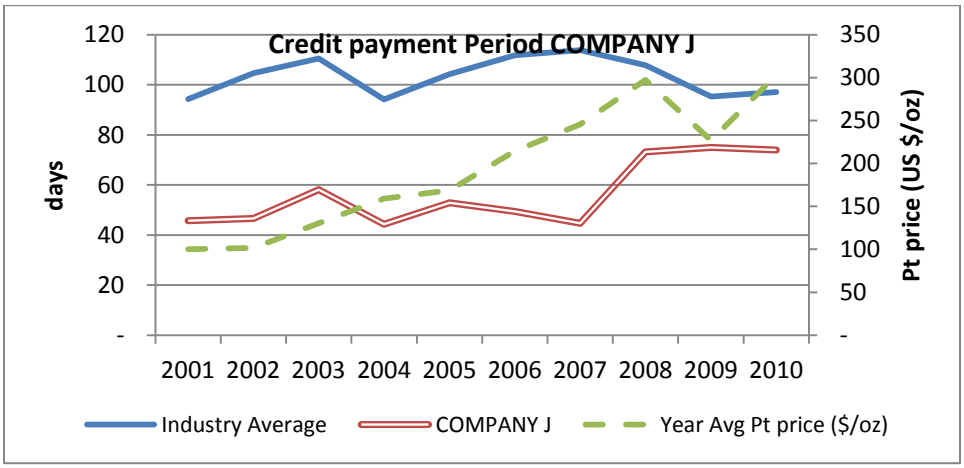


Figure 28 - Credit payment period – COMPANY J

Figure 28 shows that COMPANY J has a credit payment period that does not correlate significantly with the increasing commodity price; however it is lower than the industry average.

From the figures described in section 4.1.3 it is evident that credit payment periods are well scattered across the industry. It can be argued that suppliers and service providers would prefer quick payment and might introduce discount rates for early payment, on the flipside higher payment periods may lead to a greater dwell time of cash in the organisation. Buchmann & Jung (2011:3) suggests a balance between the two extremes is beneficial for the organisation.

4.2 OPERATING CAPITAL MANAGEMENT DURING THE COMMODITY CYCLE

The operating capital management during the cyclical commodity environment was evaluated by correlating the operating capital growth rate (with the first year's data as base) of the various organisations with the commodity price. The weighted average operating capital growth rate of the industry was also plotted on the same axis to illustrate the performance of the individual organisations to the industry. The industry operating capital growth rate was found to be 0.19 (with 2001 as base) for every US

$100/oz increase in the platinum commodity price with a regression coefficient (r^2) of 0.8263.

4.2.1 COMPANY A

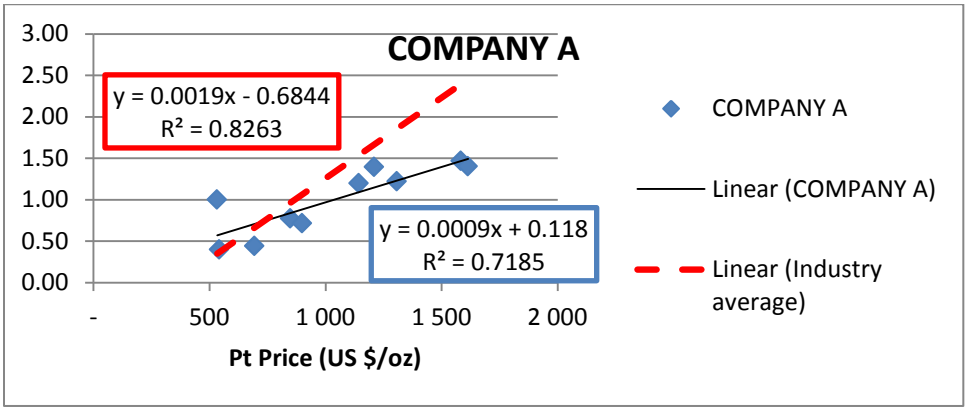


Figure 29 - Operating capital growth rate – COMPANY A

In Figure 29 the operating capital growth rate of COMPANY A and weighted average operating capital growth rate of the industry is correlated to the annual platinum price (US$/oz). The platinum price is used as the independent variable. It is evident from Figure 29 that COMPANY A has obtained an operating capital growth rate of 0.09 (with 2001 as base) for every US$100/oz increase in the platinum commodity price with a regression coefficient of 0.7185. The industry operating capital growth rate was determined as 0.19 for every US$100/oz increase in the platinum commodity price with a regression coefficient of 0.8263.

4.2.2 COMPANY C

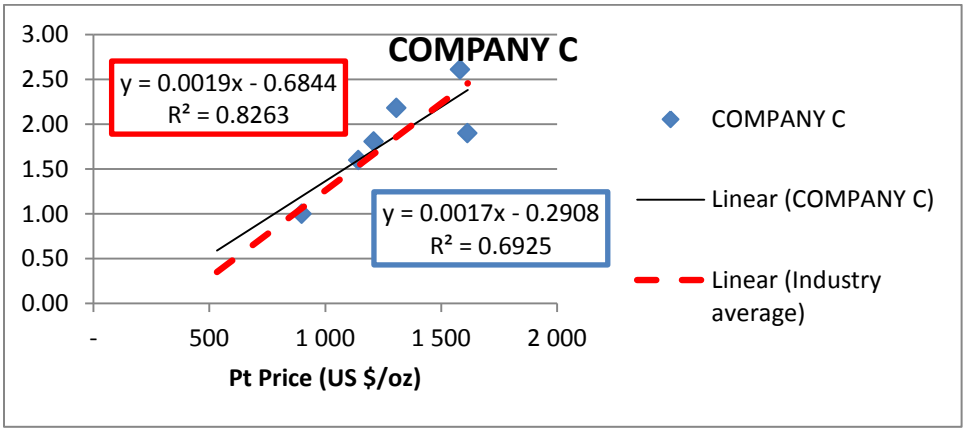


Figure 30 - Operating capital growth rate – COMPANY C

Figure 30 shows that COMPANY C has obtained an operating capital growth rate of 0.17 (with 2005 as base) for every US$100/oz increase in the platinum commodity price with a regression coefficient of 0.6925.

4.2.3 COMPANY D

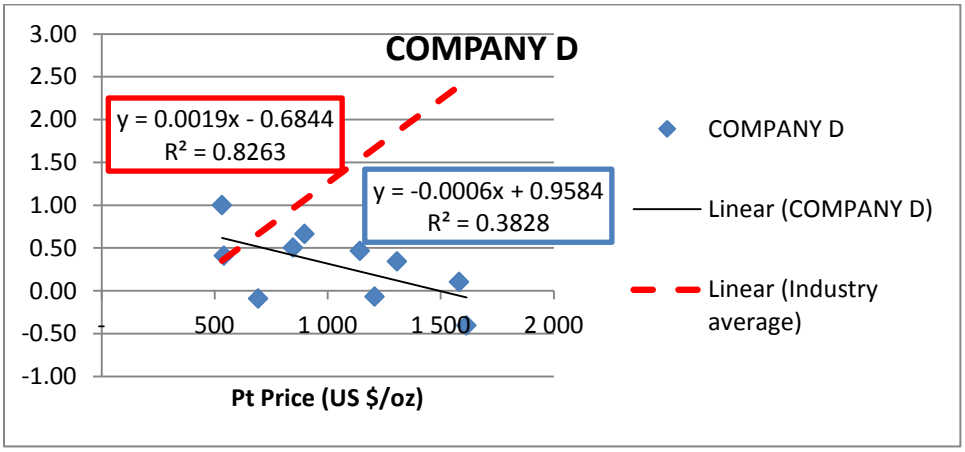


Figure 31 - Operating capital growth rate – COMPANY D

Figure 31 shows that COMPANY D has obtained an operating capital growth rate of -0.06 (with 2001 as base) for every US $100/oz increase in the platinum commodity price with a regression coefficient of 0.3828.

4.2.4 COMPANY E

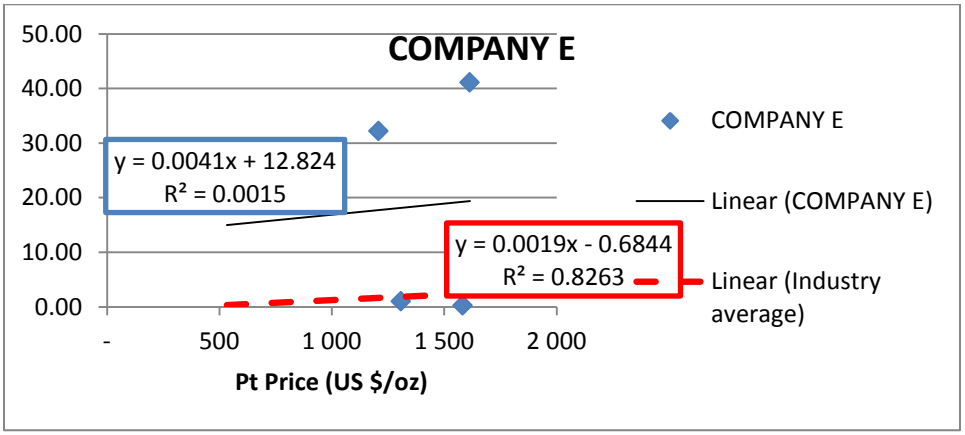


Figure 32 - Operating capital growth rate – COMPANY E

Figure 32 shows that COMPANY E has obtained an operating capital growth rate of 0.41 (with 2007 as base) for every US $100/oz increase in the platinum commodity price with a regression coefficient of 0.0015.

4.2.5 COMPANY F

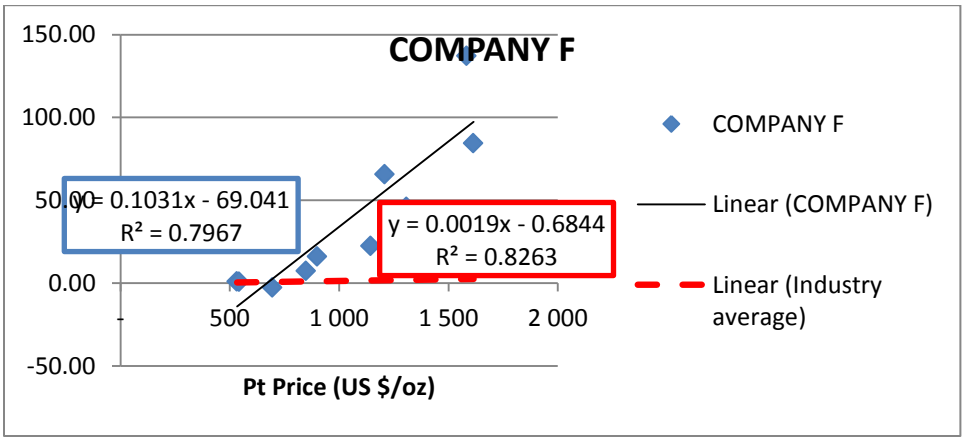


Figure 33 - Operating capital growth rate – COMPANY F

Figure 33 shows that COMPANY F has obtained an operating capital growth rate of 10.31 (with 2001 as base) for every US $100/oz increase in the platinum commodity price with a regression coefficient of 0.7967.

4.2.6 COMPANY H

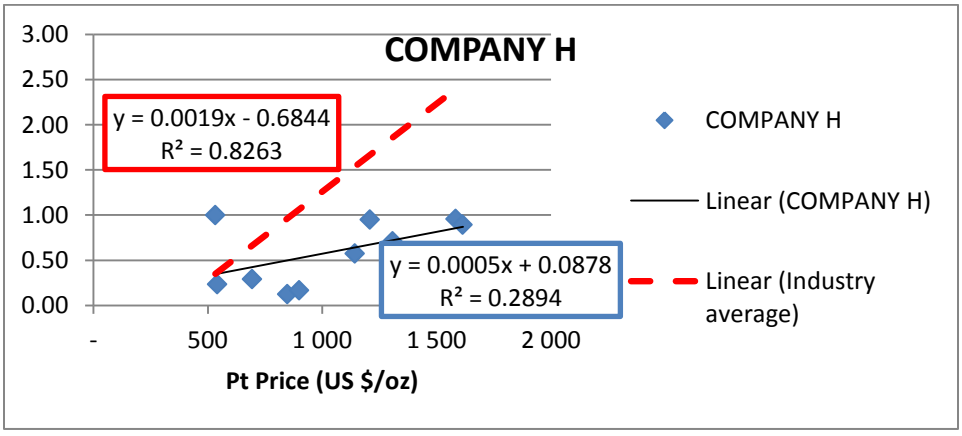


Figure 34 - Operating capital growth rate – COMPANY H

Figure 34 shows that COMPANY H has obtained an operating capital growth rate of 0.05 (with 2001 as base) for every US $100/oz increase in the platinum commodity price with a regression coefficient of 0.2894.

4.2.7 COMPANY I

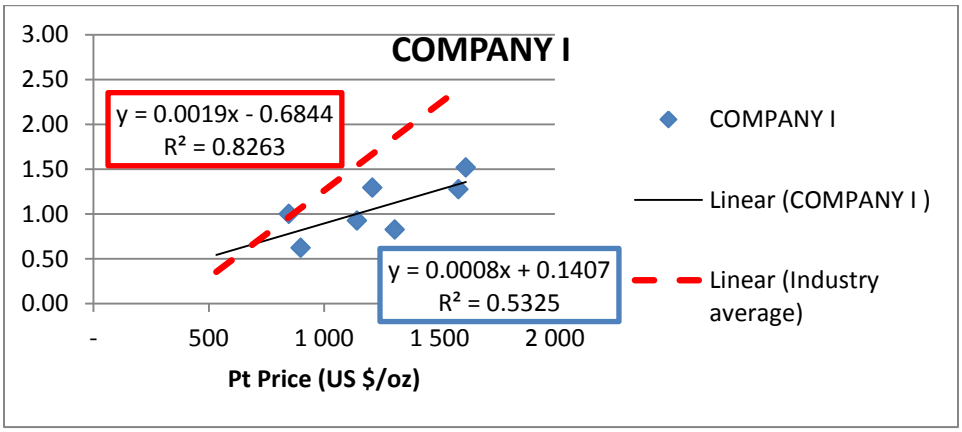


Figure 35 - Operating capital growth rate – COMPANY I

Figure 35 shows that COMPANY I has obtained an operating capital growth rate of 0.08 (with 2004 as base) for every US $100/oz increase in the platinum commodity price with a regression coefficient of 0.5325.

4.2.8 COMPANY J

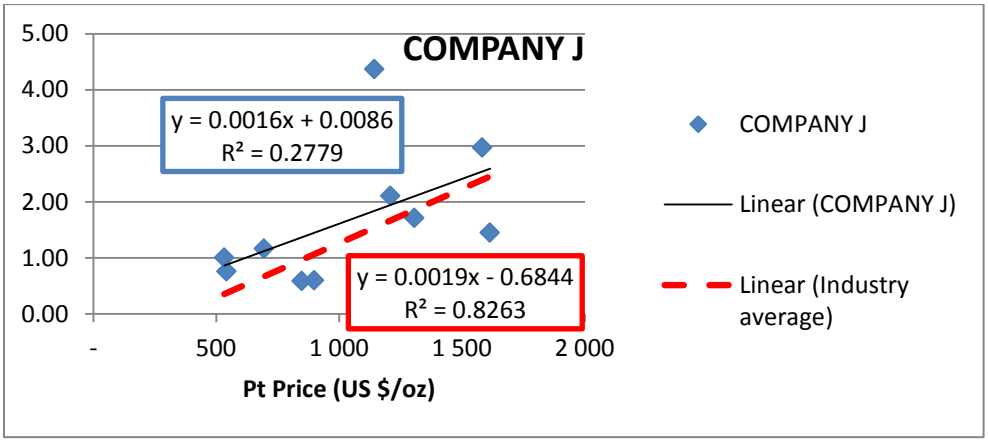


Figure 36 - Operating capital growth rate – COMPANY J

Figure 36 shows that COMPANY J has obtained an operating capital growth rate of 0.16 (with 2001 as base) for every US $100/oz increase in the platinum commodity price with a regression coefficient of 0.2779.

It is evident from the figures in section 4.2 that the greater portion of organisations have a lower rate of operating capital investment compared to the industry average, even though a direct correlation between the two variables exists. It is only evident in one evaluation that the growth rate of operating capital is indirectly proportional to the industry. It might be possible that the specific organisation divested assets that did not contribute positively to the economic value added to the organisation. Section 4.3 will indicate whether economic value was added in either event.

4.3 VALUE CREATION ON OPERATING CAPITAL INVESTMENT

The value creation during investment of operating capital for the various organisations in the platinum industry was evaluated by correlating the EVA obtained to the amount of operating capital invested during the period being investigated. The industry equivalent EVA was calculated at different operating capital investments and was also plotted on the same axis to illustrate the performance of the individual organisations to the industry. The industry equivalent EVA was found to be R 788,000 (with 2001 as base) for every R 1,000,000 operating capital invested with a regression coefficient of 0.4691.

4.3.1 COMPANY A

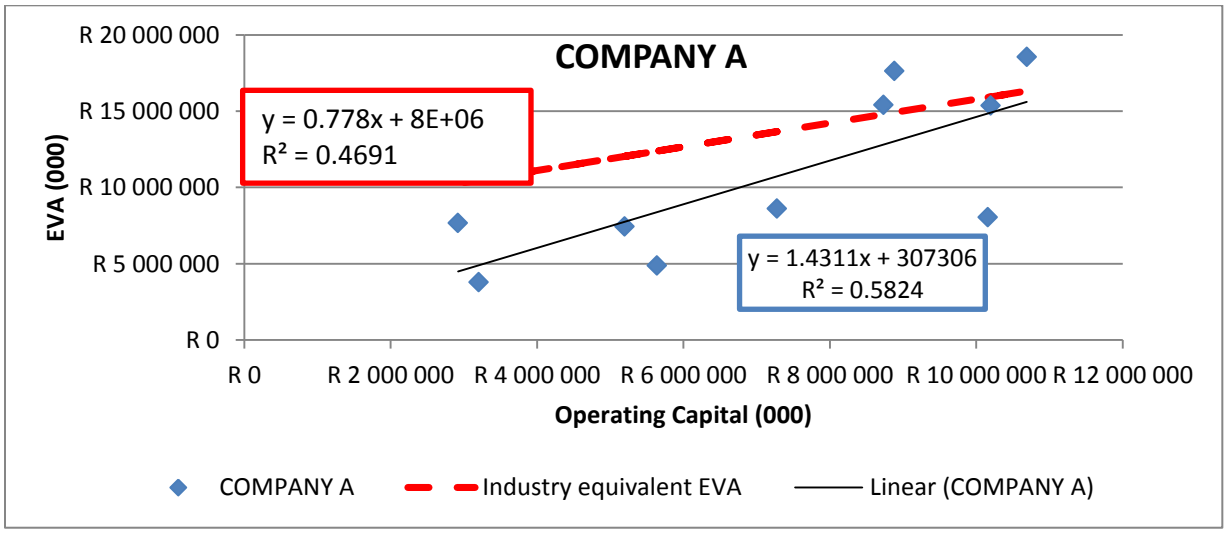


Figure 37 - EVA on operating capital invested – COMPANY A

In Figure 37 the EVA of COMPANY A and EVA of the industry is correlated to the operating capital invested. The EVA per operating capital invested is determined by the gradient of the straight line regression of the data points. The operating capital invested is used as the independent variable. From Figure 37 it is evident that COMPANY A obtained an EVA of R 1.43 million for every R 1 million operating capital invested with a regression coefficient of 0.5824 which is below the industry average.

4.3.2 COMPANY C

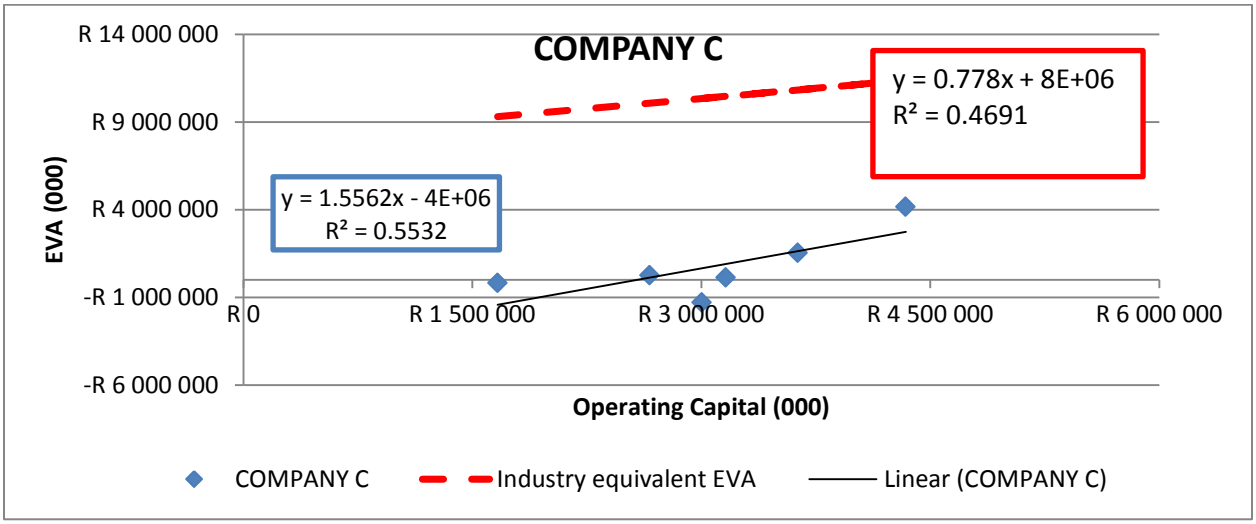


Figure 38 - EVA on operating capital invested – COMPANY C

Figure 38 shows that COMPANY C obtained an EVA of R 1.55 million for every R 1 million operating capital invested with a regression coefficient of 0.5532 which is below the industry equation for EVA.

4.3.3 COMPANY D

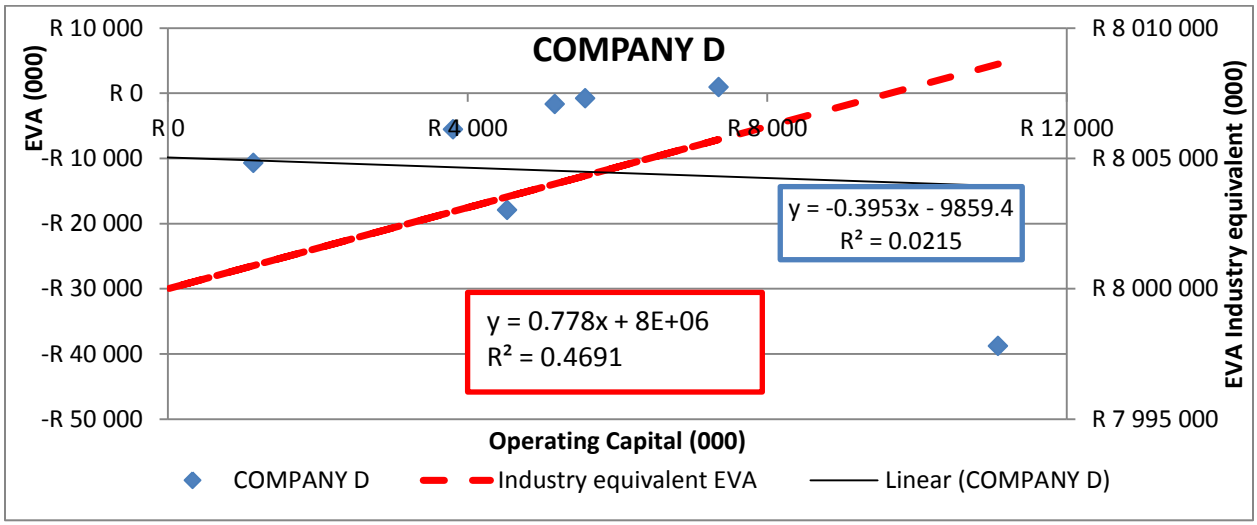


Figure 39 - EVA on operating capital invested – COMPANY D

Figure 39 shows that COMPANY D obtained an EVA of -R 0.4 million for every R1 million operating capital invested with a regression coefficient of 0.0215.

4.3.4 COMPANY E

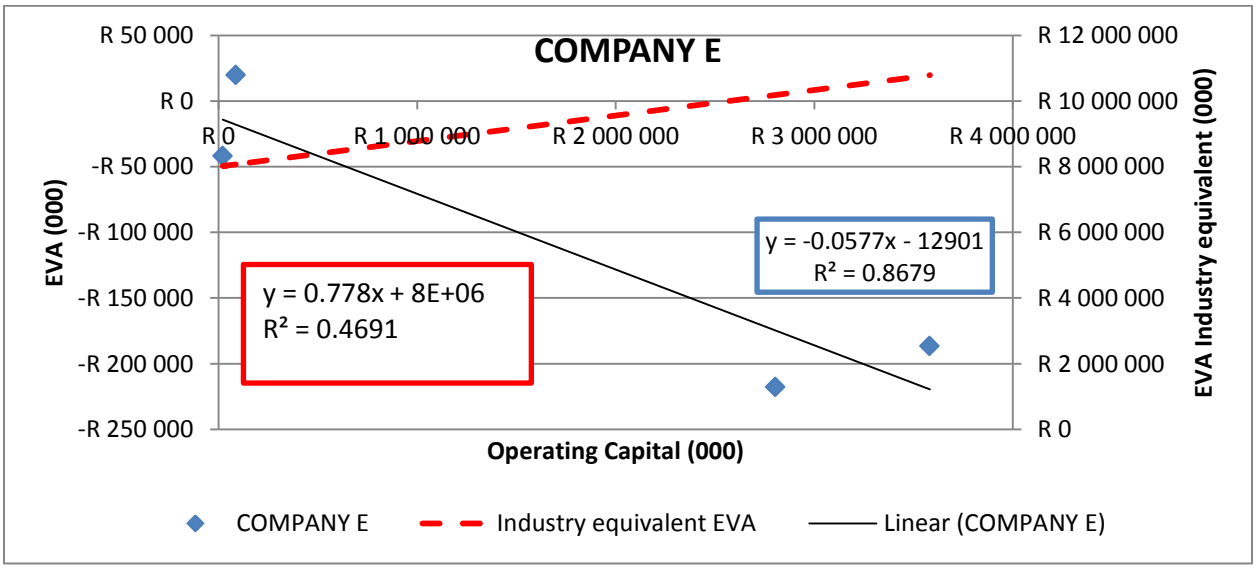


Figure 40 - EVA on operating capital invested – COMPANY E

Figure 40 shows that COMPANY E obtained an EVA of -R 0.06 million for every R 1 million operating capital invested with a regression coefficient of 0.8679.

4.3.5 COMPANY F

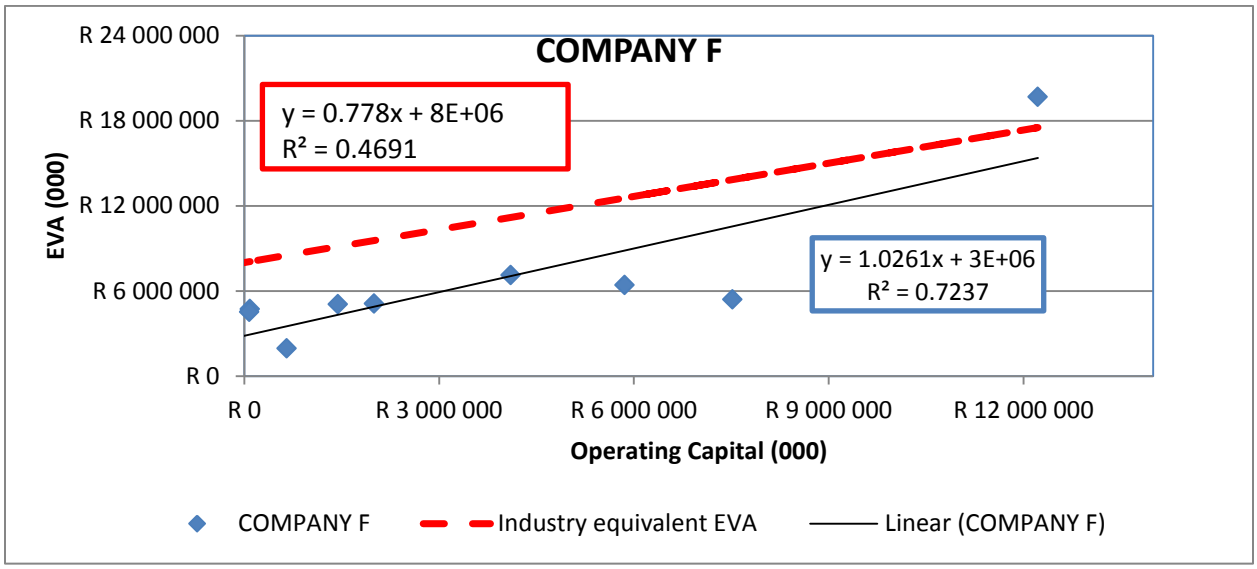


Figure 41 - EVA on operating capital invested – COMPANY F

Figure 41 shows that COMPANY F obtained an EVA of R 1.03 million for every R 1 million operating capital invested with a regression coefficient of 0.7237.

4.3.6 COMPANY H

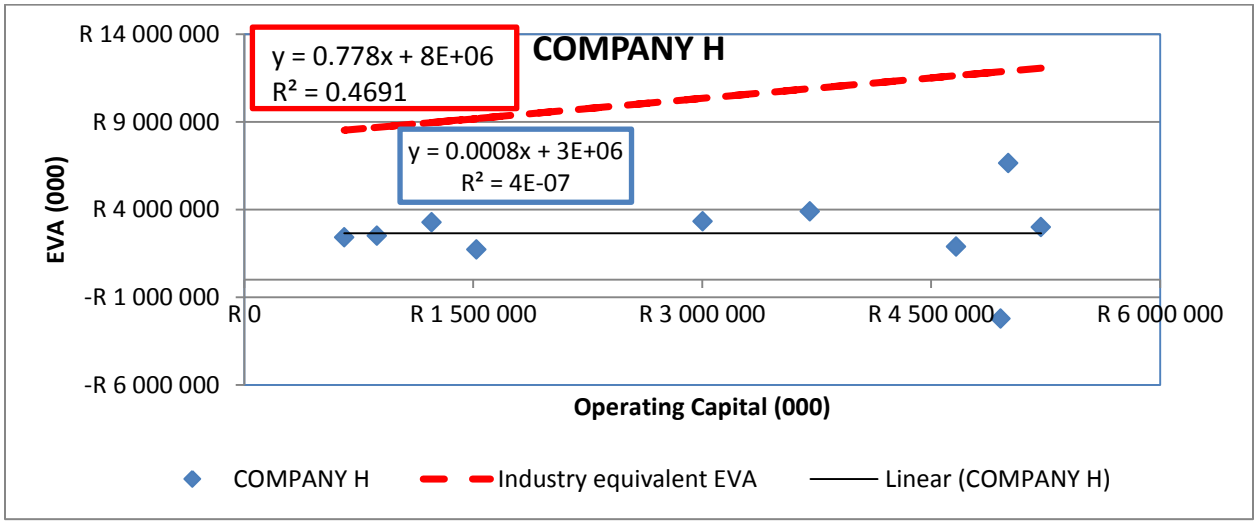


Figure 42 - EVA on operating capital invested– COMPANY H

Figure 42 shows that COMPANY H has not obtained any significant EVA during the operating capital investment. The regression coefficient is also insignificant.

4.3.7 COMPANY I

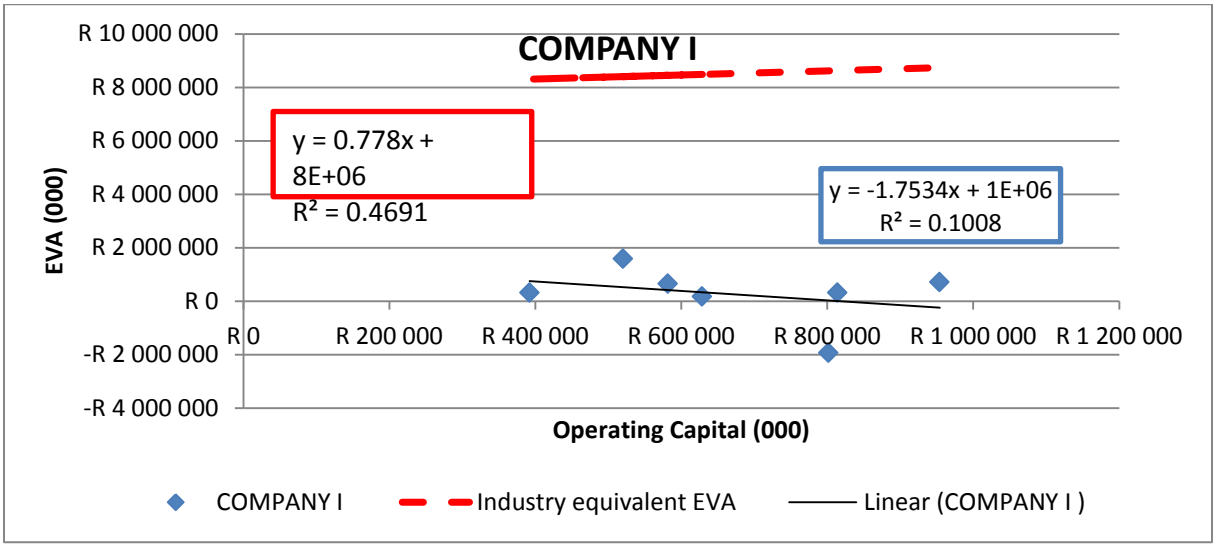


Figure 43 - EVA on operating capital invested – COMPANY I

Figure 43 shows that COMPANY I has obtained an EVA of -R1.75 million for every R1 million operating capital invested with a regression coefficient of 0.1008.

4.3.8 COMPANY J

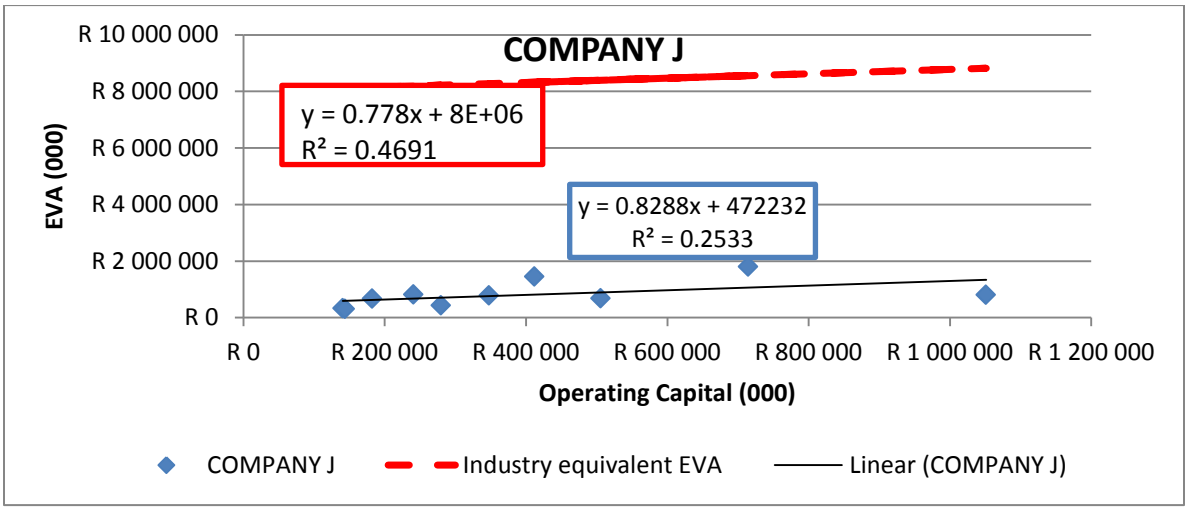


Figure 44 - EVA on operating capital invested – COMPANY J

Figure 44 shows that COMPANY J has obtained an EVA of R0.83 million for every R1 million operating capital invested with a regression coefficient of 0.2533.

It is evident from the figures described in section 4.3 that COMPANY C has the highest EVA per operating capital invested compared to the other organisations evaluated in the study. A negative EVA per operating capital invested was obtained by COMPANY E and I, indicating that value was destroyed when operating capital was employed. Economic value can therefore be gained or destroyed while operating capital is invested, irrespective of an upward trend of the commodity price cycle.

4.4 SUMMARY OF RESULTS

The results from the studies were collated to determine the most efficient organisation under the various value drivers.

4.4.1 Inventory retention

Table 3 - Summary of results obtained from the inventory retention evaluation

Organisation evaluated for this study	**Inventory retention (Avg days)**	**Stdev**	**R^2**	**#Ranking (Inventory retention)**	**#Ranking (Inventory correlation to commodity)**	**Avg #Ranking**
COMPANY A	87.82	23.16	0.758	0.07	0.90	0.48 (3rd)
COMPANY C	40.08	8.23	0.3982	0.15	0.47	0.31
COMPANY D	1,087.40	2,287.91	0.2778	0.01	0.33	0.17
COMPANY E	17.24	7.30	0.0007	0.35	0.00	0.17
COMPANY F	80.37	24.45	0.8459	0.07	1.00	0.54 (2nd)
COMPANY H	68.38	28.28	0.6565	0.09	0.78	0.43
COMPANY I	**5.99**	**1.20**	**0.2805**	**1.00**	**0.33**	**0.67 (1st)**
COPMANY J	84.67	27.38	0.1818	0.07	0.21	0.14
INDUSTRY AVERAGE	73.33	15.49	0.836			

From Table 3 it is evident that COMPANY I has obtained the highest ranking at 0.67. It is however important to note that COMPANY I's market share is relatively small in comparison with the large organisations such as COMPANY F, A and H. An inventory retention period of 5.99 days might also be low in comparison with the average of the industry which is 73.33, and for this reason it might be further investigated to evaluate whether that low retention period make it viable to operate or not. It is also observed that the large organisations (COMPANIES F, A and H) achieved a ranking of 0.54, 0.48 and 0.43 respectively, with an arithmetic mean inventory retention of close to 78 days. This suggests that a good benchmark should be in the order of 70 days inventory retention.

4.4.2 Debt collection period

Table 4 - Summary of results obtained from the debt collection period evaluation

Organisation evaluated for this study	**Debt Collection period**	**Stdev**	**Min collection period**	**Max Collection period**	**#Ranking**
COMPANY A	34.39	8.01	23.53	50.46	0.65 (2nd)
COMPANY C	85.12	42.92	39.16	146.43	0.26
COMPANY D	64.69	68.50	22.10	214.73	0.35
COMPANY E	62.59	38.38	19.19	92.04	0.36
COMPANY F	53.69	14.75	40.05	81.72	0.42 (3rd)
COMPANY H	63.81	19.06	41.73	93.48	0.35
COMPANY I	63.95	7.49	51.02	75.23	0.35
COPMANY J	**22.37**	**7.19**	**12.59**	**33.61**	**1.00 (1st)**
INDUSTRY AVERAGE	49.81	7.53	37.66	62.42	

From Table 4 it is evident that COMPANY J has obtained the highest ranking followed by COMPANY A then COMPANY F. The rest of the smaller organisations seem to manage their debt collection in a similar manner.

COMPANY H, as one of the larger organisations, should obtain better statistics though. Compared to the industry average, six of the eight organisations are slower debt collectors, which may be a significant area of improvement if debt collection is well managed.

4.4.3 Credit payment period

Table 5 - Summary of results obtained from the credit payment period evaluation

Organisation evaluated for this study	Credit payment period	Stdev	Min payment period	Max payment period	#Ranking
COMPANY A	76.31	12.84	53.35	102.77	0.74
COMPANY C	64.65	11.49	53.94	80.27	0.63
COMPANY D	2,174.70	3,424.88	151.13	8,634.47	0.05
COMPANY E	83.51	8.99	74.45	92.43	0.81 (3rd)
COMPANY F	145.29	21.19	106.78	169.90	0.71
COMPANY H	88.36	21.53	64.67	113.06	0.85 (2nd)
COMPANY I	**96.80**	**10.18**	**80.61**	**108.81**	**0.94 (1st)**
COPMANY J	56.39	12.89	44.37	74.98	0.55
INDUSTRY AVERAGE	**103.34**	**7.64**	**94.18**	**113.82**	**1.00**

From Table 5 it is evident that COMPANY I is highest ranked with COMPANY H and COPMANY E following closely second and third. COMPANY F with a credit payment period of 145 days (which is close to 5 months) might risk being branded as a bad payer. COMPANY A, on the other hand, can negotiate better terms with its suppliers without impacting the relationship to obtain higher cash retention in the organisation.

4.4.4 Investment of operating capital

Table 6 - Summary of results obtained from the investment of operating capital evaluation

Organisation evaluated for this study	**EVA per operating capital invested**	**Operating capital growth rate correlation to market**	**#Ranking (EVA)**	**#Ranking (Correlation)**	**Avg #Ranking**
COMPANY A	1.43	0.72	0.92	0.90	0.91 (2nd)
COMPANY C	**1.55**	**0.69**	**1.00**	**0.87**	**0.93 (1st)**
COMPANY D	-0.40	0.38	-0.26	0.48	0.11
COMPANY E	-0.06	0.01	-0.04	0.01	-0.02
COMPANY F	1.03	0.80	0.66	1.00	0.83 (3rd)
COMPANY H	-	0.29	-	0.36	0.18
COMPANY I	-1.75	0.53	-1.13	0.67	-0.23
COPMANY J	0.83	0.28	0.54	0.35	0.44
INDUSTRY AVERAGE		0.83			

From Table 6 it is evident that COMPANY F has shown the most efficient growth in operating capital invested during the investigative period, with COMPANY A following closely and COMPANY F in third. There is a clear distinction between the top performers and the rest. Note the negative rankings attained by COMPANY E and COMPANY I, which is an indication that a negative EVA was obtained during the investment of operating capital. COMPANY H, as one of the large players, ranked 5th in the evaluation, and showed much room for improvement in managing invested capital. It is also evident that economic value can be destroyed, even in an increasing commodity price environment, if capital investment is not managed appropriately.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 EVALUATING EFFICIENT OPERATING WORKING CAPITAL IN THE PLATINUM INDUSTRY

The research has successfully shown that a clear distinction exists amongst various organisations in the platinum industry in terms of their efficiency to manage operating working capital. Correlations between inventory retention and the commodity price cycle clearly indicated that organisations tend to consider the positive impact that available inventory during the upside of the commodity can have on the revenue of the organisation. It was also evident that the same organisations understand the impact of high inventory retention on cash flow by managing a downward trend in the inventory levels during the commodity price cycle.

The industry weighted average debt collection period was shown to be relatively constant during the upside of the commodity price cycle, illustrating that the various organisations have not relaxed their control measures throughout the period. Even with a constant debt collection period, some organisations indicated higher collection periods than the industry average, which could be improved to improve inflow of cash to the organisation. The fact that the industry average collection is lower indicates room for improvement.

It is quite difficult to determine the optimum in the credit payment period of organisations in the platinum industry since the main objective is to retain cash in the organisation as long as possible, but not to the detriment of services providers' performance or increasing costs (such as higher interest rates). The various organisations were evaluated by comparing them to the industry average. It is however recommended that further studies to be conducted to evaluate what the optimum credit payment period would be in a cyclical commodity market such as platinum.

5.2 EVALUATING EFFICIENT INVESTMENT OF OPERATING CAPITAL IN THE PLATINUM INDUSTRY

Measuring growth in operating capital and EVA during the commodity price cycle indicated that some organisations do optimise strategies to invest in new capital while maintaining a continuous growth in EVA. However, it was evident that in some instances capital was employed without a positive EVA. A plausible explanation might be that the upswing in the commodity cycle from 2001 to 2008 prompted some to grow at a non-economic profitable manner. This however can be further investigated.

5.3 RECOMMENDATIONS FOR PRACTICAL IMPLEMENTATION IN THE PLATINUM INDUSTRY

The key value drivers evaluated during this study illustrated the performance of the various organisations within the platinum industry. It is evident from the results obtained that no specific organisation is the leader in all facets investigated, which shows that there are areas where value creating opportunities can be identified. Newly formed organisations might also benefit from the comparisons drawn and measure itself against the industry, or the market leaders base their operating working capital management to enhance their ability to create sustainable value.

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APPENDIX – Additional information

Table 7 – Example of Economic Value Added Model (COMPANY F)

Description (000)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
051 Turnover	11,969,100	11,901,500	11,807,000	11,809,100	12,540,800	17,500,200	31,481,500	37,619,000	26,121,000	25,446,000
053 Cost Of Sales	5,120,300	5,764,900	6,523,300	7,549,400	8,317,800	10,185,200	17,009,500	19,888,000	16,359,000	17,294,000
073 Earnings Before Interest and Tax	6,711,800	6,206,800	4,352,800	2,907,600	6,945,400	7,581,500	11,635,700	22,244,000	10,265,000	8,323,000
076 Taxation	1,974,300	1,694,900	1,219,700	801,900	906,500	2,259,700	3,373,200	4,715,000	1,941,000	1,554,000
Net Operating Profit After Taxes (NOPAT)	4,737,500	4,511,900	3,133,100	2,105,700	6,038,900	5,321,800	8,262,500	17,529,000	8,324,000	6,769,000
014 Total Fixed Assets	32,200	33,600	30,300	42,800	50,400	0	1,402,100	2,438,000	2,621,000	2,988,000
Operating Current Assets	2,339,100	2,502,000	2,588,400	3,488,100	4,972,200	6,742,500	9,880,100	17,102,000	8,025,000	9,939,000
026 Total Inventory	779,300	920,100	847,400	1,229,800	1,721,100	2,936,000	3,997,400	5,893,000	4,248,000	5,382,000
027 Debtors	1,313,400	1,332,200	1,430,800	1,954,500	2,807,900	3,442,100	4,951,100	6,022,000	2,888,000	2,904,000
029 Cash And Bank	223,700	220,300	310,200	303,800	443,200	364,400	931,600	5,187,000	441,000	1,065,000
030 Other Current Assets	22,700	29,400	0	0	0	0	0	0	448,000	588,000
Operating Current Liabilities	2,282,300	2,458,100	2,844,500	2,875,100	3,582,400	4,741,100	7,181,000	7,318,000	4,786,000	5,409,000
033 Creditors	2,282,300	2,458,100	2,844,500	2,875,100	3,582,400	4,741,100	7,181,000	7,318,000	4,786,000	5,409,000
034 Bank Overdraft	0	0	0	17,200	0	0	3,600	0	0	0
Net Operating Working Capital (NOWC)	56,800	43,900	-256,100	613,000	1,389,800	2,001,400	2,699,100	9,784,000	3,239,000	4,530,000
Operating Capital (OC)	89,000	77,500	-225,800	655,800	1,440,200	2,001,400	4,101,200	12,222,000	5,860,000	7,518,000
change in OC	1.0	0.9	-2.5	7.4	16.2	22.5	46.1	137.3	65.8	84.5
Inventory (days)	55.55	58.26	47.41	59.46	75.52	105.22	85.78	108.15	94.78	113.59
Average collection period (days)	40.05	40.86	44.23	60.41	81.72	71.79	57.40	58.43	40.36	41.66
Average payment period (days)	162.69	155.63	159.16	139.01	157.20	169.90	154.09	134.31	106.78	114.16

024 Total Long Term Loan Capital	309,100	293,800	326,400	269,600	299,500	572,400	1,576,300	3,012,000	2,876,000	3,325,000
032 Short Term Borrowings	24,500	26,800	204,700	551,400	3,300	76,500	77,700	46,000	270,000	333,000
074 Total Interest Paid	14,400	15,700	33,300	67,100	37,400	58,500	81,900	155,000	169,000	319,000
Cost of debt	4.3%	4.9%	6.3%	8.2%	12.4%	9.0%	5.0%	5.1%	5.4%	8.7%
Weighted average cost of debt	14.9%									
075 Profit Before Taxation	6,697,400	6,191,100	4,319,500	2,840,500	6,908,000	7,523,000	11,553,800	22,089,000	10,096,000	8,004,000
076 Taxation	1,974,300	1,694,900	1,219,700	801,900	906,500	2,259,700	3,373,200	4,715,000	1,941,000	1,554,000
Tax	29.5%	27.4%	28.2%	28.2%	13.1%	30.0%	29.2%	21.3%	19.2%	19.4%
Weighted average tax	23.7%									
Cost of Equity (CAPM)	16.8	-3.4	8.8	53.5	121.7	13.7	44.9	-45.1	42.3	21.9
D/E	6.87	2.05	2.35	2.08	0.98	2.45	0.93	0.94	0.47	0.54
D	87.3%	67.2%	70.1%	67.5%	49.5%	71.0%	48.2%	48.5%	32.0%	35.1%
E	12.7%	32.8%	29.9%	32.5%	50.5%	29.0%	51.8%	51.5%	68.0%	64.9%
WACC	11.3	6.2	10.1	24.6	67.9	11.4	28.3	-17.6	32.6	18.4
EVA	4,727,429	4,507,125	3,155,993	1,944,438	5,061,060	5,094,250	7,100,350	19,676,156	6,413,473	5,385,193