

The Relationship Between Entrepreneurial Intensity and Shareholder Value Creation

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Innovation and entrepreneurship have long been regarded as sources of value and wealth creation. Previous research has shown that there is a positive relationship between enterprises' levels of entrepreneurship and their financial performance. Little research, however, has hitherto focused on measuring the relationship between entrepreneurship and shareholder value creation. In this study the relationship between the entrepreneurial intensity and the shareholder value created by an enterprise is investigated. An adapted corporate entrepreneurship (CE) measurement instrument is applied in order to gauge entrepreneurial intensity, while shareholder value creation is measured by the market-adjusted total share return (TSR) and the value based financial performance measure Economic Value Added (EVA). The study is conducted for a sample of enterprises listed in the industrial sector of the Johannesburg Securities Exchange (JSE) for the period 2003–2005. The contribution of the study is the focus on the relationship between entrepreneurial intensity and shareholder value creation, rather than purely on the accounting-based financial performance of an enterprise.

Key Words: entrepreneurial intensity, value based financial performance measures, economic value added

JEL Classification: L25, L26

Introduction

Innovation and entrepreneurship have been emphasised in recent years by the popular business press, corporate leaders and academics (Hamel and Breen 2007; Hof 2004; Planting 2004; Covin and Slevin 1991; Lumpkin and Dess 1996; Leibold, Probst, and Gibbert 2002). The potential of entrepreneurship to create value for various stakeholders (Morris 1998) and value for shareholders (Vozikis et al. 1999) has heightened academic

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interest in the field. A number of studies have investigated the relationship between the level of corporate entrepreneurship (CE) of an enterprise and its financial performance (Wiklund 1999; Wiklund and Shepherd 2003; 2005; Zahra 1991; Zahra and Covin 1995). However, most of these studies have concentrated on traditional accounting measures adapted from previous studies. The measures used in many of these studies did not build on a theoretical rationale of economic and entrepreneurship theory, despite the growing recognition of 'the importance of theory-based measures to entrepreneurship research' (Vozikis et al. 1999, 33).

Economic theory holds that firms exist to maximise value for shareholders. Many authors agree that one of the motivations for starting a business is the creation of wealth for the owner (Barringer and Ireland 2008; Longenecker et al. 2006). These two perspectives concur, in that one of the reasons for the existence of an enterprise is to create value for the owner, owners or shareholders. In the case of listed companies, their equity typically consists of publicly traded shares. The value of these shares changes over time, depending amongst others on the market's perception of the value of the company. Efficient market theory argues that these changes are based on the fact that 'investors continuously evaluate all information when valuing a share' (Fama 1974; 1991). Thus, if the market incorporates all information, measures should be derivable that allow for the evaluation and appraisal of the intensity of a firm's entrepreneurial orientation. Although the applicability of this rationale has received wide acceptance, the integration of entrepreneurship and finance theory remains limited (Brophy and Shulman 1992; Vozikis et al. 1999, 33).

Little previous research has focused on assessing the relationship between EI and shareholder value creation and, therefore, this study aims to focus on this research gap. The purpose of this study is twofold. Firstly, the EI of listed companies is determined and secondly, the relationship between the level of EI and the shareholder value created by a company, as represented by economic value added (EVA) and the market-adjusted total share return (TSR), is investigated. The contribution of this study is the focus on the relationship between EI and shareholder value creation, rather than merely on the financial performance of an enterprise. The next section provides an overview of the importance of the study, discusses the theoretical background of key concepts and highlights the problems of traditional versus value based financial measures. Subse-

quently the methodology, results and managerial implications are presented and discussed.

Importance of the Study

The importance of entrepreneurial behaviour in developing countries, such as South Africa, is emphasised by intensified competition in the global economy, the need for economic growth and the impact of entrepreneurial behaviour on future growth and value creation in listed companies.

Globalisation is transforming and integrating the world's economies (Hough 2004). Developing countries, such as South Africa, are experiencing the need to become more competitive and to operate globally (Gamble and Blackwell 2002) if sustainable economic growth and development is to occur (Porter 2004, 31). The World Economic Forum holds that the management of technology, innovation and information have emerged as key requirements for success in the 21st century (Claros et al. 2006). Therefore, South African companies need to become more entrepreneurial to increase their competitiveness, on both an organisational and country level.

Entrepreneurship is an important element in organisational development and economic growth (Antoncic and Hisrich 2001; Drucker 2002). Entrepreneurial behaviours and attitudes are key determinants of the ability of established firms to survive and prosper in turbulent environments (Lumpkin and Dess 1996). Consequently, listed companies, state-owned enterprises and small and medium-sized businesses are being urged to be more entrepreneurial. Several authors argue that traditional management methods that focused on control and efficiency no longer suffice in the knowledge economy where adaptability and creativity drive business success (Hamel and Breen 2007; Leibold et al. 2002). In South Africa entrepreneurship is also seen to be vital to address the issues of job creation, economic growth and the exploitation of opportunities (Von Broembsen, Herrington, and Wood 2005). The pursuit and exploitation of opportunities accentuate financial objectives for the firm, such as profitable customer acquisitions and market growth. Thus the creation of additional value, or wealth, for the owner-entrepreneur or for a group of owners (shareholders) is one of the main objectives of entrepreneurial activities. Such an emphasis makes the use of value based performance measures particularly relevant (Vozikis et al. 1999, 34).

The potential of entrepreneurial behaviour to create shareholder value

is implicit in the growth strategies companies pursue. When evaluating the financial performance of a company, it is important to distinguish between the value resulting from its current activities, and the value of future growth activities. According to O'Byrne (2000) it is not sufficient to merely maintain the current level of financial performance in order to maximise the shareholder value of a firm. The expected future growth in financial performance should also be considered, since it could significantly contribute to the total value of the firm. Madden (1999) indicates that firms which do not continuously act in an innovative way to increase their economic lifetime will ultimately cease to create economic value (the return on investment drops below the return required by investors). Such firms will face financial failure as investors move their investments to other firms that offer them acceptable levels of return.

To summarise, the importance of this study is emphasised by the role entrepreneurship could play in developing countries, such as South Africa; intensified competition in the global economy and the potential of entrepreneurial actions to create value for shareholders; and the impact of entrepreneurial behaviour on future growth and shareholder value creation in listed companies.

Theoretical Background

ENTREPRENEURIAL INTENSITY

Although there has been intense debate on how to define entrepreneurship, many authors (Morris and Kuratko 2002; Barringer and Ireland 2008) concur with Stevenson, Roberts, and Grousbeck (1989) that entrepreneurship can be described as 'the process of creating value by bringing together a unique combination of resources to exploit an opportunity'. This definition implies that (1) entrepreneurship may vary in terms of the extent and number of times it occurs, (2) entrepreneurship occurs in various contexts (start-up, corporate and others); (3) that it is a process that can be managed; and (4) that it creates value and it is opportunity-driven.

Implicit in the definition provided by Stevenson, Roberts, and Grousbeck (1989), entrepreneurship may vary in terms of extent and the number of times it occurs. Morris and Sexton (1998) refer to the varying levels of entrepreneurship as *Entrepreneurial Intensity* (EI). They view EI as a function of the degree and frequency of entrepreneurship as shown in figure 1 (Morris and Sexton 1996). The notion of entrepreneurial intensity is derived from the conjecture that entrepreneurial behaviour may

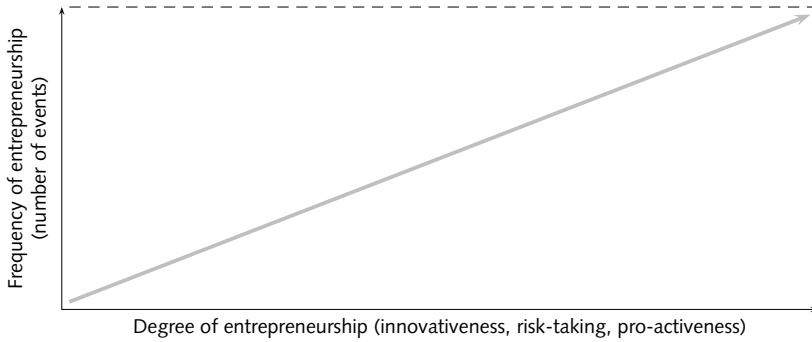


FIGURE 1 Entrepreneurial Intensity (adapted from Morris and Sexton 1996)

differ in terms of its levels of innovativeness, pro-activeness and risk-taking characteristics. This variation may be visualised as opposites on a conceptual continuum, where one extreme would represent conservative behaviour and another extreme would represent entrepreneurial behaviour (Barringer and Ireland 2008). Frequency of entrepreneurship refers to the number of times an enterprise acts entrepreneurially (for example, develops new products or processes), while the degree of entrepreneurship (also referred to as entrepreneurial orientation) could be assessed by three dimensions: innovativeness, risk-taking, and pro-activeness.

Innovativeness, the first dimension of the degree of entrepreneurship, refers to the ability to generate ideas that will culminate in the production of new products, services and technologies. Risk-taking, the second dimension, involves the determination and courage to make resources available for projects that have uncertain outcomes, in other words involve risk. Attempts are made to manage these risks by researching a market, recruiting and employing skilled staff or other strategies. Pro-activeness, the third dimension, indicates top management’s stance towards opportunities, encouragement of initiative, competitive aggressiveness and confidence in pursuing enhanced competitiveness (Morris 1998). In the view of Morris and Sexton (1996) EI is a function of the degree and frequency of entrepreneurship. This is supported by Antoncic and Hisrich (2001). Conversely, Lumpkin and Dess (1996) argue that not three, but five dimensions should be used to measure entrepreneurship, namely autonomy, competitive aggressiveness, pro-activeness, innovativeness and risk-taking. In contrast with these views, this study argues for a view of autonomy as an internal condition that influences the organisational climate. Competitive aggressiveness forms part of the pro-

activeness sub-dimension. Other researchers support this view (Morris et al. 2006; Kreiser, Marino, and Weaver 2002).

The term *Entrepreneurial Intensity* (EI), therefore, refers to the variable nature of entrepreneurship within an established enterprise. As shown in figure 1, various positions of EI are possible, since different scores can be obtained on the frequency axis and degree of entrepreneurship axis. Although Morris and Sexton (1996) assessed entrepreneurial intensity in a corporate context, entrepreneurship can indeed occur in various contexts.

These organisational contexts may range from start-up firms, growing independent businesses, multinationals, even to non-profit organisations, such as semi-state institutions or organisations with a social purpose. Within these different contexts the definition of Stevenson, Roberts, and Grousbeck (1989) applies, since the process and required inputs are similar, even if the outputs differ. Although authors distinguish between corporate entrepreneurship, intrapreneurship and entrepreneurship (Birkinshaw 2003; Sharma and Chrisman 1999), the similarities between these contexts are generally greater than the differences (Morris and Sexton 1996). *Corporate Entrepreneurship* (CE), generally, refers to the development of new business ideas and opportunities within large and established corporations (Birkinshaw 2003). In most cases, CE describes the total process whereby established enterprises act in an innovative, risk-taking and pro-active manner (Zahra 1993; Dess, Lumpkin, and McGee 1999; Bouchard 2001), where intrapreneurship is generally used to refer to the behaviour of the individual. Guth and Ginsberg (1990) argued that CE is any effort to combine resources in new ways in order to create value for the firm. In all the different contexts entrepreneurship can be seen as a process with different stages.

Even though entrepreneurship and innovation are inherently unpredictable, chaotic and creating ambiguity, the entrepreneurial process can nevertheless be managed. Entrepreneurial events are characterised by different stages, such as opportunity identification, business concept definition, assessment of the resource requirements, acquisition of the needed resources, and then management and harvesting of the business (Morris and Kuratko 2002). The ability to act entrepreneurially is linked to the perception of opportunity.

The pursuit of opportunities also emphasises that those opportunities, which create the greatest value, should be exploited. Schumpeter (1934) pioneered the theory of economic development and value creation

through the process of technological change and innovation. He introduced the notion of 'creative destruction' (Schumpeter 1942) noting that, following a technological change, certain rents become available to entrepreneurs, which later diminish as innovations are adopted. These rents were later named Schumpeterian rents, defined as rents stemming from risky initiatives and entrepreneurial insights in uncertain and complex environments. Corporate entrepreneurship should not only focus on seeking new markets, but also create new opportunities in existing markets (Block and MacMillan 1993). Thus the creation of value or wealth for the owner-entrepreneur or for a group of owners (shareholder) is the objective of entrepreneurial activities. Such an emphasis makes the use of shareholder value creation (or destruction) particularly relevant (Vozikis et al. 1999).

To conclude, firms may vary in terms of the intensity of their entrepreneurial actions. Actions could be regarded as entrepreneurial if they are focused on opportunities and create value, regardless of the resources that firms control. The focus of this study is on the entrepreneurial intensity in established firms and the value that is created for shareholders.

SHAREHOLDER VALUE CREATION

Since the purpose of any enterprise is defined as long-term value creation, its corporate performance should be measured by considering the value it created (Monks and Minnow 2001). Value Based Management (VBM) could be defined as the process of continuously maximising shareholder value (Copeland, Koller, and Murin 1994). When applying VBM techniques, shareholder value creation becomes the main objective of all employees and the management of the enterprise.

According to Copeland et al. (1994), VBM is a combination of two elements. On the one hand it consists of adopting a value-creation mindset throughout an enterprise. All employees should understand that all their actions should be directed towards achieving this objective. Furthermore, this value-creation mindset needs to be combined with the necessary management processes and systems to ensure that the employees actually behave in a manner that creates value (Copeland et al. 1994).

PROBLEMS WITH TRADITIONAL FINANCIAL MEASURES

During the last three decades, a number of studies empirically analysed the relationship between CE and organisational performance (Goosen,

DeConing and Smit 2002; Kreiser, Marino and Weaver 2002; Zahra and Garvis 2000; Lumpkin and Dess 1996; Singh 1990). Although many of these report a positive relationship, most call for longitudinal designs since entrepreneurial activities contribute to the long-term performance of the enterprise (Goosen et al. 2002; Antoncic and Hisrich 2001). For example, the cost of implementing entrepreneurial initiatives may be high in the initial year of implementation, especially in the areas of product and process innovations. The returns on such investments may only be realised two to three years in the future, since radical product innovations may take time to diffuse through the market. Processes and business innovations need to be understood and used by employees to yield economies of scale or scope (Barringer and Ireland 2008; Schilling 2008). Zahra (1993) argues that the strength of the relationship between CE and organisational performance will increase over time. In contrast, other authors indicate that the existence of such a relationship depends on the circumstances in the external environment, and the perceptions of management (Zahra, Nielsen, and Bogner 1999).

The majority of the studies investigating the relationship between CE and financial performance utilised traditional accounting-based measures to evaluate financial performance. These traditional financial performance measures predominantly focus on the short-term financial performance of an enterprise (the measures are usually calculated for a fiscal year). The benefits of entrepreneurial activities are, however, usually experienced over the long-term, and this casts some doubt on the suitability of using the traditional measures to quantify financial performance (Vozikis et al. 1999, 35–36).

Furthermore, the accounting treatment of items such as research and development (R&D) and goodwill negatively influences the short-term financial performance of an enterprise. Although these expenses are expected to generate profits in future, the full amounts are usually allocated during the financial year in which they were incurred. This may have a negative effect on innovation, since management and divisions may postpone or decrease expenditure and efforts on R&D to maintain current profit levels. Value based measures aim to overcome some of the limitations of traditional financial measures.

TRADITIONAL VS. VALUE BASED FINANCIAL MEASURES

The major financial objective of an enterprise is the maximisation of shareholder value (Brigham and Houston 2001). All management deci-

sions and strategies should contribute towards this objective. Management, however, faces the problem of determining what the effect of its actions would be on the future financial performance of the enterprise. In order to quantify and manage financial performance, a significant number of traditional financial measures have been developed. These measures, however, are exposed to numerous weaknesses. Amongst others, the measures are exposed to accounting distortions (Stewart 1991; Ehrbar 1998), they exclude the enterprise's cost of capital (Young and O'Byrne 2001), and they are based on historic cost information rather than current replacement values (Peterson and Peterson 1996). In the majority of previous studies where the relationship between CE and financial performance were investigated, these traditional measures are applied as measures of financial performance (Goosen, DeConing, and Smit 2002; Kreiser, Marino, and Weawer 2002; Lumpkin and Dess 1996; Zahra 1993).

With a view to overcome some of the limitations associated with the traditional measures, a number of vB financial performance measures were developed. Proponents of the vB measures report high correlations between the measures and the creation of shareholder value (Stewart 1994; Walbert 1994; O'Byrne 1996) and they are considered to be a major improvement over the traditional financial performance measures. These measures attempt to remove some of the accounting distortions contained in the traditional measures. The most important improvement, however, is that the value based measures include the enterprise's cost of capital in their calculation. An enterprise's cost of capital is influenced by the market's perception of its risk and its expected future returns. By incorporating the cost of capital, the value based measures evaluate the market's perception of the current, as well as the expected future financial performance of the enterprise.

According to Brophy and Shulman (1992), these vB measures should more accurately reflect the financial performance of a company. In the case of listed companies, share prices reflect the market's perception of the risk and future return of the companies. Since their share prices are readily available, it should be easier to quantify cost of capital figures for listed enterprises than for smaller delisted or newer firms. They argue that by considering these vB measures, researchers are able to evaluate not only the current market valuation of a company, but also changes in this valuation.

One of the most well-known and widely applied vB measures is Economic Value Added (EVA®). This measure, which was developed and

trademarked by the New York consulting firm Stern Stewart, calculates the difference between an enterprise's Net Operating Profit after Tax (NOPAT) and a capital charge (Young and O'Byrne 2001). The capital charge is determined by multiplying the enterprise's Weighted Average Cost of Capital (WACC) with the invested capital at the beginning of the financial year. The EVA value represents the enterprise's economic, rather than accounting profit (Peterson and Peterson 1996), and makes provision not only for the cost of debt capital, but also the cost of all other forms of capital (Grant 2003). Maximising an enterprise's EVA should result in an increase in the shareholder value created (Stewart 1991).

In terms of the prerequisites identified in Goosen et al. (2002), EVA offers a number of improvements over the traditional financial performance measures. Most importantly, the implementation of a VBM system based on EVA should ensure an increased focus on the creation of shareholder value not only at the corporate level, but also at divisional levels (Young and O'Byrne 2001). Since EVA can be calculated and interpreted at the divisional level, employees are able to understand their influence on the enterprise's overall value creating ability. Alternatively, EVA can be translated into divisional value drivers in those cases where the calculation of the measure proves problematic, or where the value drivers are more directly linked and controlled by the division (Young and O'Byrne 2001). Translating EVA into these value drivers and combining it with EVA-based bonuses could enhance innovation (Young and O'Byrne 2001).

ENTREPRENEURIAL INTENSITY AND VALUE CREATION

A significant benefit from the measures EVA and TSR is that such an appraisal of the firm reflects not only the company's expected financial performance, but also the market's evaluation of the firm's entrepreneurial posture. This is a reflection of a company's current actions, including the company's pursuit of opportunities, and how such pursuits change a company's future competitiveness when valuing a share. Additionally the market evaluates the characteristics of a firm that may impact on the pursuit of future opportunities, such as new product, process, service or business developments in response to changes in the environment.

Furthermore, value based measures could provide greater insight than accounting measures alone. For example, the economic value added and created represents more than growth in a single accounting measure or in the size of the company. Rather, additional value creation occurs when the market place confers a positive judgment on the overall actions of the

firm. This is critical since it is possible for a firm to experience growth in accounting or size variables, without the creation of additional value.

The measure of EVA has the benefit of being based on the firm's outputs, i. e., cash flows resulting from the intensity of entrepreneurial actions (Bruton et al. 1996). Since the long-term view of the benefits of CE are taken into consideration and the timing (and risk) of the benefits are considered, EVA and TSR do not exhibit the problems associated with the traditional accounting-based measures.

Finally EVA has practical applicability, because there is evidence that it may provide insightful differentiation among various firms' EI positions, since all firms are not equally entrepreneurial. The differences between firms should be reflected in the value creation measure. Firms that create additional value over time should have a higher EI over time, as they have been the best at creating and pursuing opportunities in the environment. Those firms that destroy value over time should have the lowest EI. Therefore, it could be argued that value based measures, such as EVA (internal measure) and TSR (external measure), should show a positive relationship with increased EI.

Methodology

The objective of this study is firstly to determine the entrepreneurial intensity of listed companies and secondly to investigate the relationship between EI and EVA and EI and TSR respectively. The sample and measuring instruments will subsequently be discussed.

SAMPLE AND DATA COLLECTION

Data regarding the EI of companies were collected by a cross-section telephone survey between August and October 2005. The key respondent was the relevant Chief Information Officer (CIO). A total of 82 companies participated in this survey, and were included in the initial sample. In order to calculate the EVA and TSR values, the enterprises had to be listed on the Industrial Sector of the JSE Securities Exchange for the period 2003 to 2005. Since the industrial sector is the second largest sector in the South African economy and accounts for just over 16 percent of the country's GDP (Mboweni 2006), this is a legitimate sample for this type of study. Linked to the innovation imperative of established businesses and the fact that listed companies incorporate market perceptions of their cost of capital, this sample is well suited to the type of analysis conducted in this study. Because of the nature of their operations, enterprises listed in the Financial and Mining sectors were excluded from the

study. When considering the initial sample, a total of 79 enterprises provided complete EVA values for the period under investigation. In order to be included in this study, enterprises had to provide complete EVA, TSR and EI data. A total of 55 enterprises provided the necessary values, and are thus analysed in the remainder of the study.

MEASURING INSTRUMENTS

A measurement instrument was adapted to assess EI within South African enterprises. In order to ensure its validity and reliability, items from existing measuring instruments that have proved to be reliable and valid in previous research studies were used where possible, such as the Entrepreneurial Performance Index (EPI) of Morris and Sexton (1996) and the ENTRESALE (Kwandwalla 1977; Miller and Friesen 1978; Covin and Slevin 1989; Knight 1997). These were enhanced by questions formulated by the researchers (based on the literature) to ensure that each variable in the measurement instrument was represented by at least three items. Respondents needed to indicate their answers on a 9-point Likert scale, since it is easier for a respondent to visualise a 9-point scale, as opposed to a 7-point scale, when participating in a telephone interview. EI consists of the degree and frequency of entrepreneurship. Degree of entrepreneurship consists of three dimensions: innovativeness, risk-taking and proactiveness.

- *Innovativeness*: Three items measure the relative innovativeness of a company: emphasis on R&D or marketing of existing products, the number of new products and degree of change in product lines over the last two years. Respondents were asked to indicate to what extent their companies reflect these types of behaviour. The mean score, calculated as the average of three items, was used to assess a company's relative innovativeness.
- *Risk-taking*: Three items assess the relative risk-taking propensity of a company: the degree of risk (low vs. high) of projects; the strategic posture (wait-and-see or bold and aggressive) of the company and the type of behaviour to achieve goals (cautious vs. bold). The items requested respondents to specify to what extent their companies reflect these types of characteristics. The mean score, calculated as the average of three items, measured a company's relative risk-taking propensity.
- *Proactiveness*: Three items gauged the proactiveness dimension of

a company: posture towards competitors, initiator of action and first-to-market or follower strategy. Respondents were required to signify to what extent their companies reflect these types of actions. The mean score, calculated as the average of three items, was used to determine the relative proactiveness of a company.

Frequency, which refers to the number of entrepreneurial events, may be applied to many different areas, including the introduction of new products, services, processes, as well as new businesses. The Entrepreneurial Performance Instrument (EPI) questionnaire, used by Morris and Sexton (1996), contained a number of items to measure frequency. These items were related to new product, new service and new process introductions. Since this study viewed new business development as a part of CE, the questionnaire was expanded to include this dimension as well.

- *Product frequency*: Respondents were informed that new product introductions refer to repositioning of products, product improvements, and additions to product lines, new category entries as well as new-to-the-world products. They were requested to rank the degree of product improvements over the past two years, compared to the past five years relative to their own performance and the performance of their competitors on a 9 point Likert-scale with 1 being significantly less and 9 being significantly more. They were also asked to indicate the degree of change in their products (improvements or 'new-to-the-world' products). The mean of three items provided an indication of product frequency.
- *Service frequency*: Service introductions include modifications of existing services, additions and services not offered before, and respondents were asked to rate the degree of service improvements over the last two years compared to the past five years relative to their own performance and that of competitors; as well as the degree of change in service offerings (improvements or services that did not previously exist in the market) on a 9-point Likert scale. Service frequency was assessed by the mean of these three items.
- *Process frequency*: Process innovations refer to new systems for managing inventories, an improved process for collecting outstanding debtors or other processes that could improve the effectiveness or efficiency of operations. Respondents were required to appraise the degree of process improvements over the last two years compared

TABLE 1 A summary of Cronbach Alpha coefficient values to determine the internal consistency of Entrepreneurial Intensity

Construct	Cronbach Alpha Coefficient Values
Degree of Entrepreneurship	0.88
Innovativeness	0.80
Risk-taking	0.88
Proactiveness	0.77
Frequency	0.79
Frequency Product	0.68
Frequency Service	0.74
Frequency Process	0.77
Frequency Business	0.67

to the past five years relative to their own performance, that of their competitors, and also to what extent these processes were new (improvements or processes not previously used in industry). The mean score of these three items provided an indication of the process frequency of a company's behaviour.

- *Business development frequency*: New business was seen as new markets, acquisitions and mergers, internal ventures and spin-offs. Respondents were asked to evaluate the degree of business development over the past two years, compared to the past five years relative to the company's own performance and that of competitors. Additionally the degree of new business development (market penetration or market development) was also assessed. Business development was measured by the mean of these three items.

Cronbach Alpha coefficients were computed to assess the internal consistency of the constructs assessed by the measurement instrument. These values are shown in table 1. The two constructs *frequency* and *degree of entrepreneurship* Cronbach Alpha coefficients were 0.79 and 0.88 respectively. The dimensions of degree of entrepreneurship innovativeness, risk-taking and pro-activeness were 0.80, 0.88 and 0.77 respectively. The dimensions of frequency product, service, process and business were 0.68, 0.74, 0.77 and 0.67 respectively. These coefficients would appear to satisfy Nunally's (1978) suggested minimum criteria for internal reliability. Coefficients lower than 0.5 are regarded as questionable, coefficients close to 0.70 as acceptable and coefficients of 0.80 as good (Sekaran 1992).

The EVA figures used in this study were obtained from the McGregor BFA Database (2005). The EVA values for the most current financial year (EVA₂₀₀₅) were downloaded. In order to investigate the longitudinal nature of the relationship between EI and EVA, the change in EVA over the period 2003 to 2005 (EVA₂₀₀₃₋₂₀₀₅) was also calculated. Since the absolute monetary values of EVA are influenced by the size of the enterprise, the EVA values were standardised by dividing the figures by the enterprise's invested capital at the beginning of the financial year (IC_{t-1}).

$$EVA = NOPAT - (WACC \times IC_{t-1}). \tag{1}$$

Dividing throughout with IC_{t-1} yields:

$$\frac{EVA}{IC_{t-1}} = \frac{NOPAT}{IC_{t-1}} - \frac{WACC \times IC_{t-1}}{IC_{t-1}} = ROCE - WACC, \tag{2}$$

where: ROCE = Return on Capital Employed and WACC = Weighted Average Cost of Capital.

The resulting figures provide an indication of the percentage margin earned above (or below) the enterprise's WACC. Positive values indicate excess returns, while negative values indicate returns below the WACC.

The market-adjusted share return (TSR) was calculated as the difference between the annual compounded return on a company's shares, and that of the All Share Index (ALSI). This value represents the excess return earned on the share above (or below) the overall market return. In order to calculate the annual compounded share return, the monthly returns on the share (consisting of the monthly capital gain/loss and all dividends received during the month) were calculated first. A twelve-month period ending December 2005 was used to calculate the compounded annual return on a share. Similarly, the monthly returns on the ALSI index were calculated (including dividend payments), and compounded over the corresponding period. Both the share and ALSI compounded returns were obtained from the McGregor BFA database (2005).

The statistical analysis was conducted using Statistica version 7.1. Correlations and best subset regression analyses were used to determine the relationship between EI, its constructs and EVA and TSR.

Results

The first part of this section describes the sample by focusing on the size of companies (as measured by the number of employees) and also provides descriptive statistics of entrepreneurial intensity and its constructs.

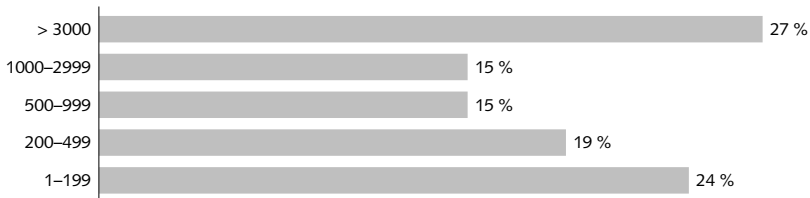


FIGURE 2 Size of companies in the sample, reflected by the number of employees ($n = 72$)

TABLE 2 Descriptive statistics of degree and frequency of entrepreneurship and its dimensions

Variables	Mean	Median	Std. dev.	Coef. var.	N
Degree of entrepreneurship	5.4634	5.4444	1.1023	0.2018	82
Innovativeness	5.4715	5.3333	1.5126	0.27648	82
Pro-activeness	6.1056	6.3333	1.5404	0.2523	82
Risk-taking	4.8130	4.667	1.738	0.3611	82
Frequency of entrepreneurship	5.8894	5.9167	1.3308	0.2260	82
Product	5.8694	6.0000	1.5168	0.2584	82
Service	5.7843	5.6667	1.7561	0.3036	82
Process	5.6573	6.0000	1.8179	0.3213	82
Business	5.8148	5.8333	1.6358	0.2813	82
Entrepreneurial Intensity	11.4469	11.2222	2.0206	0.1765	82

The second part contains the results from the correlation analyses, while the final part presents the results of the best subset regression.

The sample of firms used in the study consists of listed companies on the Industrial Sector of the JSE. As shown in figure 2 most of the companies (27%) employed 3000 and more employees, while 24% employed less than 200 employees. Thus both smaller and larger companies formed part of the sample.

Table 2 contains descriptive statistics of entrepreneurial intensity and its dimensions, using the mean, median, standard deviation and coefficient of variation to describe the data.

Table 2 describes the Entrepreneurial Intensity of companies listed in the Industrial Sector of the JSE. Examining the dimensions of degree of entrepreneurship, it would be seen that most companies score the highest on the pro-activeness dimension with a mean of 6.11, while their risk-taking propensity is the lowest with a mean of 4.81. The frequency of

TABLE 3 Correlation coefficients between EVA₂₀₀₅ and EVA_{2003–2005} and the independent variables (*p* values in parentheses)

Correlations	EVA ₂₀₀₅	EVA _{2003–2005}
Entrepreneurial Intensity	0.0841 (0.5341)	0.2823** (0.0368)
Degree of entrepreneurship	0.1474 (0.1919)	0.3057*** (0.0065)
Innovativeness	0.0882 (0.4364)	0.1532 (0.1805)
Risk taking	0.1189 (0.2935)	0.1857 (0.1036)
Pro-activeness	0.0962 (0.3962)	0.3032*** (0.0070)
Frequency	0.0637 (0.6378)	0.1598 (0.2439)
Product	0.1904 (0.1091)	0.1716 (0.1554)
Service	0.1313 (0.2895)	0.2624** (0.0347)
Process	0.0540 (0.6592)	0.1344 (0.2780)
Business	-0.0015 (0.9903)	-0.1603 (0.1916)

NOTES *** Significant at the 1 percent level. ** Significant at the 5 percent level.

entrepreneurship overall has a higher mean of 5.89 compared to degree of entrepreneurship (mean = 5.46). Product frequency innovations are the highest (mean = 5.87), while process innovations are the lowest (mean = 5.66).

The next section contains an analysis of the relationship between EI and EVA and between EI and TSR by employing correlation analysis. Thereafter a best subset regression analysis is used to determine which of the dimensions of degree and frequency of entrepreneurship explains the majority of the variance in EVA and TSR.

Correlation Analysis

ENTREPRENEURIAL INTENSITY AND ECONOMIC VALUE ADDED

Perusal of table 3 indicates that the correlations between EVA₂₀₀₅ and the independent variables are all statistically insignificant. The correlation coefficients are all low, and indicate that no statistically significant relationships exist between EVA₂₀₀₅ and any of the independent variables.

The value of EVA₂₀₀₅, however, is calculated by considering only the most recent financial information. When investigating the relationship between CE and financial performance a longitudinal approach is preferred (Goosen, DeCining, and Smit 2002). To address this approach, the change in an enterprise’s level of EVA from 2003 to 2005 (EVA_{2003–2005}) was also calculated. When the correlations between this measure and the

independent variables were considered, some were found to be statistically significant.

The correlation between EI and $EVA_{2003-2005}$ is statistically significant ($p < 0.05$). It appears that as the degree of entrepreneurship increases, there is also an increase in the economic value added. This finding is supported by the literature, which argues that higher levels of entrepreneurship should lead to value creation by the enterprise over the longer term (Hayton 2005; Goosen, DeConing, and Smit 2002; Zahra, Nielsen, and Bogner 1999).

In general, the degree of entrepreneurship exhibits a statistically significant relationship with $EVA_{2003-2005}$ ($p < 0.01$). The components of the degree of entrepreneurship, innovativeness, pro-activeness and risk-taking, exhibit varying levels of significance. Although numerous authors (Barringer and Bluedorn 1999; Birkinshaw 2003; Dess et al. 1999) advocate the importance of innovation in today's complex business environment, it appears that there is no statistically significant correlation between innovativeness and $EVA_{2003-2005}$ in the case of this dataset. In addition, no statistically significant correlation was found between risk-taking and $EVA_{2003-2005}$. The companies used for this analysis are listed companies and are accountable to shareholders. It is therefore, reasonable to expect that they would be cautious and careful in managing risk regarding uncertain investments. However, a statistically significant correlation exists between pro-activeness and $EVA_{2003-2005}$ ($p < 0.01$). Pro-activeness reflects the tendency of top management to anticipate future trends, opportunities and initiate strategies, rather than follow competitors. This type of commitment is essential for VBM systems to be successfully implemented in companies.

No statistically significant correlation was found between frequency of entrepreneurship and $EVA_{2003-2005}$. In terms of its dimensions: product, process or business frequency, no statistically significant correlation was found. However, frequency of service innovations shows a statistically significant correlation with $EVA_{2003-2005}$ ($p < 0.05$). This is a surprising finding, but may be ascribed to service innovations generally being less costly to implement than product, process and business innovations.

ENTREPRENEURIAL INTENSITY AND TOTAL SHARE RETURN

Examination of table 4 indicates that the correlation between EI and TSR is not statistically significant. A statistically significant correlation,

TABLE 4 Correlation coefficients between TSR and the independent variables

Variables	TSR
Entrepreneurial Intensity	0.1460
Degree of entrepreneurship	0.2217**
Innovativeness	0.0721
Risk taking	0.1262
Pro-activeness	0.2663**
Frequency	-0.0345
Product	0.0073
Service	-0.0193
Process	-0.2179*
Business	-0.2050*

NOTES ** Significant at the 5 percent level. * Significant at the 10 percent level.

however, exists between the degree of entrepreneurship and TSR. One should bear in mind that the TSR measure used in these analyses represents excess return earned on the share above the overall market return. Therefore, it would appear that as the degree of entrepreneurship increases, the shareholder value increases in excess of the market return. Even though the TSR values are calculated for the current year only, these values should reflect market perceptions with regard to future financial performance in an efficient market (Biddle, Bowen, and Wallace 1997). The literature argues that the strength of this value creation will increase over time as levels of entrepreneurship increase (Hayton 2005; Goosen, DeConing, and Smit 2002; Zahra, Nielsen, and Bogner 1999).

Similarly to the results obtained for EVA₂₀₀₃₋₂₀₀₅, the components of the degree of entrepreneurship show varying significance levels. No statistically significant correlation between innovativeness and TSR and risk-taking and TSR was found. However, a statistically significant correlation exists between pro-activeness and TSR ($p < 0.05$). Pro-activeness reflects the tendency of top management to spot trends and opportunities to take initiative in the market, rather than being reactive and following competitors. This finding also implies that a pro-active attitude of top management generates excess shareholder returns.

Comparable to the results of EI and EVA₂₀₀₃₋₂₀₀₅ no statistically significant correlation was found between frequency of entrepreneurship and TSR. In terms of its dimensions: product or service frequency, no statis-

tically significant correlation was found. However, frequency of process and business innovations show a statistically significant negative correlation with TSR ($p < 0.10$). This finding is to be expected, and may be ascribed to the cost of process and business innovations often being high in the year they are implemented, while the returns realised from these innovations are generally evident over a longer term.

Additionally it should be pointed out that several external market factors also influence TSR. Examples of these include general economic conditions, irrational market behaviour, and global market crises. Since EI only partly contributes to the overall TSR value, it is unrealistic to expect very high correlations with TSR.

Regression Analysis

Multiple regression analysis was used to assess the degree of relationship between the VB measures and the dimensions of degree and frequency of entrepreneurship. The first regression model assessed was the relationship between degree and frequency of entrepreneurship and the change in EVA (EVA_{2003–2005}). These results indicated that although the degree of entrepreneurship had a statistically significant relationship with EVA_{2003–2005}, only 7.62% (adjusted $R^2 = 0.0762$) of the variance in EVA_{2003–2005} was explained by degree of entrepreneurship. The second regression model assessed the relationship between EI and TSR, to determine whether higher levels of entrepreneurship resulted in excess share returns. Again, the results indicated that degree of entrepreneurship had a significant relationship with TSR. The adjusted regression coefficient, however, was only 0.0938. Therefore, it was decided to use best subset regression analysis to determine how the separate dimensions of degree and frequency of entrepreneurship influence these two VB measures.

Best subset regression analysis runs all possible regressions between the dependent variable and all possible subsets of independent variables and enables the user to find the best regression model, given a specified number of independent variables (fewer than 14). It excludes variables which do not contribute to increasing the regression coefficient. The criterion used in determining which estimated regression equations are the best for only a number of predictors is the value of the coefficient of determination (R^2) (Hair et al. 2006). Consequently, best subset regression analysis has the benefit over stepwise regression, forward selection and backward elimination for which the best model for a given number of variables will be found.

TABLE 5 Summary of the best subset regression analysis conducted to determine the most relevant dimensions of EI for EVA_{2003–2005}

Variables	β	Std. err. of β	<i>B</i>	<i>t</i> (50)	<i>p</i> -level
Intercept	–	–	–16.7512	–1.68	0.09*
Pro-activeness	0.2905	0.1317	2.9436	2.21	0.03**
Risk taking	0.1894	0.1256	1.6972	1.51	0.13
Product	–0.3938	0.2222	–4.2504	–1.77	0.08*
Service	0.7415	0.2092	6.9883	3.54	0.00**
Business	–0.3769	0.1434	–3.6043	–2.63	0.01**
Innovativeness	–	–	–	–	–
Process	–	–	–	–	–

NOTES $R = 0.5657$, $R^2 = 0.3200$, adjusted $R^2 = 0.2520$, $F(5,50) = 4.7051$, $p < 0.0013$; std. err. of estimate: 13.3818; ** significant at the 5 percent level, * significant at the 10 percent level.

The results of the best subset regression analysis in table 5 indicate that pro-activeness, service, business and product innovations are statistically significant contributors to the variance in EVA_{2003–2005} at the 90% confidence level. Pro-activeness ($t = 2.21$) and service innovations ($t = 3.54$) are positively and significantly related to EVA_{2003–2005}, while product and business innovations are negatively and significantly related to the change in EVA_{2003–2005}. The independent variables explain 25% (adjusted $R^2 = 0.25$) of the variation in EVA_{2003–2005}.

It is interesting to note that especially service innovations and the pro-activeness dimension of the degree of entrepreneurship contribute towards this relationship to the change in EVA. Product and business innovations show a negative relationship towards the change in EVA, since these innovations are often costly and the results seem to indicate that the return on these innovations may be longer than the three year period used in the analysis above. These results suggest that entrepreneurial strategies could yield long-term benefits. However, if firms are only focused on short-term annual financial results their long-term entrepreneurial intensity and competitiveness may decline.

A best subset regression analysis was also conducted with TSR as dependent variable, but weak results were obtained. It seems that TSR, which is an external measure of shareholder value creation, is influenced by many external factors, such as general economic conditions, irrational market behaviour, political instability of emerging markets, and

global market crises. Thus the influence of EI on the overall TSR value is weak.

Conclusions

This study contributes to the current literature by describing the EI of manufacturing firms listed on the JSE and focusing on the relationship between EI and shareholder value creation, rather than merely on the accounting-based financial performance measures of an enterprise. Data obtained from companies listed on the JSE for the period 2003–2005 strongly suggest that the relationship between EI and financial performance should be viewed longitudinally. The results indicate that there is a statistically significant relationship between EI and the change in an enterprise's level of EVA from 2003 to 2005. It appears that companies with higher degrees of entrepreneurship create more economic value added over the longer term. In particular, the pro-active dimension of the degree of entrepreneurship appears to contribute toward this value creation. Similar results were found when the association between EI and TSR was examined. No statistically significant relationship exists between EI and TSR, but a statistically significant relationship exists between degree of entrepreneurship and TSR, again with the pro-activeness dimension contributing to this relationship with shareholder value creation. It appears that companies with higher degrees of entrepreneurship create excess returns for shareholders above market returns.

Frequency of entrepreneurship (in general) was not found to exert a statistically significant relationship with EVA and TSR. The correlation analysis indicates that frequency of product innovations shows no relationship with EVA or TSR. Frequency of service innovations, however, shows a statistically significant correlation with $EVA_{2003-2005}$ ($p < 0.05$). This may be ascribed to service innovations generally being less costly than product, process and business innovations. Frequency of process and business innovations has a statistically significant negative correlation with TSR ($p < 0.10$). This finding is to be expected, since process and business innovations are generally more costly and take a longer period to realise returns.

The best subset regression analysis supports the above findings and indicates that EI explains 25% of the variance in the change in EVA. The constructs: pro-activeness, service, product and business showed the best regression equation with the change in EVA. Pro-activeness and service innovations exhibit a positive relationship with the change in EVA, which

indicates that the market evaluates top management stance towards opportunities, encouragement of initiative, and competitive aggressiveness positively, as well as service innovations. However, the negative relationship observed for product and business innovations suggest that the cost of entrepreneurial initiatives is high and may in some instances only be recouped over a longer period (more than three years).

Only companies listed on the JSE could be included in this study, since published financial and share data are not available for unlisted companies. Consequently it would prove difficult to calculate EVA, cost of capital and TSR values for unlisted companies over a period of time. The specific focus on only those companies that provided complete EVA and TSR data over the period investigated, however, could expose the study to a survivorship bias.

Future researchers should measure EI longitudinally and ought to determine whether it is a stable characteristic of a company or whether it varies over time. These measures could then be correlated with VB measures. Whereas this study investigated the relationship between EI and historic EVA and TSR values, investigating the effect of current EI levels on future EVA and TSR values could provide further insight. Additional future research could focus on determining whether enterprises that incorporate VB measures in their compensation systems may differ in terms of EI from those that do not.

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