AN EMPIRICAL ANALYSIS OF CORPORATE ENTREPRENEURSHIP IN THE SOUTH AFRICAN MINING INDUSTRY

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The South African mining industry faces unique challenges to remain sustainable. A sustainable competitive advantage can be achieved through continuous innovation and the creation of new ideas, often termed as corporate entrepreneurship. This article undertakes a multi-disciplinary investigation, where corporate entrepreneurship is interrogated as it permeates the entire firm, and contributes to the overall performance of an organisation. Based on a consolidation of various theories, models and frameworks, several constructs are identified in order to measure corporate entrepreneurship. A sample of 103 respondents at the managerial level is surveyed and descriptive and inferential statistics are used to analyse the data. Findings indicate that levels of intrapreneurship are mediocre, although effect sizes indicate practical significance. Specific recommendations are made how each of the dimensions constituting corporate entrepreneurship can be enhanced.

Key phraes: Corporate entrepreneurship, intrapreneurship, firm innovation, leadership, mining industry.

1 INTRODUCTION

The backbone of the South African economy is built on mining. The initial trigger for economic activity in South Africa was the rich endowment of minerals and resources in the country, which allowed for gold and diamond mining to become global industries. The South African mining industry is a critical role player in the South African economy, but mining companies face major challenges in terms of productivity of labour and capital and their impact on the cost of mining and extracting minerals (Macfarlane 2001). Moreover the volatility of the rand, the negative impact of rising input cost pressures and logistical constraints also detrimentally affects export volumes.

According to the Chamber of Mines of South Africa (2005) the South Africa's mining industry has to focus on productivity and cost trends to remain competitive. Operating margins have to remain, or become more competitive to attract investment into the industry, and to sustain existing operations. For the industry to remain competitive, it must be provided with an operating and investment environment that does not disadvantage it in relation to local and global mining organisations.

One way to address these challenges would be for the South African mining industry to upgrade its innovative ability, i.e., to become more entrepreneurial in the face of the aforementioned challenges, intensifying global competition and accelerating technological change. Mining companies are generally viewed as bureaucratic and inhospitable to creativity and innovation. It has been reported that in many mining

companies potential ideas and innovations go unnoticed due to structural impediments, and/or little or no incentive for employees to bring such ideas forth. The South African Global Entrepreneurship Monitor (GEM) 2005 report investigates just how innovative South Africa firms are by measuring customer, competitor, and technology orientations. These GEM findings indicate that innovative businesses (high on the three different orientations) constitute a tiny percentage of new and established firms in South Africa (Von Broembsen, Wood & Herrington 2005). Another indicator of Africa's lack of success in becoming a meaningful partner in the process of globalization is evident at the corporate or firm level (Urban 2008). Although transnational corporations (TNC's) play a vital role in applying technology innovations and managerial practices around the world, out of the eighty largest TNC's not one came from a developing country. Based on the Technology Achievement Index (TAI) which captures the creation and diffusion of technology and building of human skill base to participate in technology innovations (UNDP 2001), no countries in sub-Saharan Africa (SSA) have made it onto the list of leaders or potential leaders. Such deficiencies illustrate the schisms that exist between the rich and poor countries in terms of technology and innovations. South Africa does not feature at all when it comes to patents granted to residents per million, as opposed to the 663 benchmark in South Korea (Luiz 2006).

The term entrepreneurship in corporations has been labelled in many different ways, which includes intrapreneurship (Kuratko & Hornsby 1998; Antoncic & Hisrich 2001, 2004), innovation entrepreneurship (Schumpeter 1934), innovation management (Drucker 1979), venture entrepreneurship (Tang & Koveos 2004), corporate intrapreneurship (Dess & Lumpkin 2005), strategic entrepreneurial posture (Covin & Miles1999), and internal corporate venturing (Kuratko *et al* 2005). Covin and Slevin's (1991) conceptual model of corporate entrepreneurship focuses on the integration of entrepreneurship, within the entire organisation, and helps elucidate how entrepreneurial orientation and entrepreneurial intensity contribute to the overall performance of an organisation. The concept of entrepreneurial orientation (EO) incorporates the firm-level processes, practices and decision-making styles (Lumpkin & Dess 1996). Prior theory and research (Khandwalla 1977; Miller 1983; Covin & Slevin 1991; Lumpkin & Dess 1996) indicates that an EO is a key ingredient for organizational success, and has been found to lead to increased performance (Zahra, Jennings & Kuratko1999; Kuratko *et al* 1993; Wiklund & Shepherd 2003).

2 STUDY RATIONALE AND AIMS

According to the South African Chamber of Mines the most fundamental challenge facing the South African mining industry is the productivity of labour and capital and

their impact on the cost of mining and extracting minerals (Chamber of Mines of South Africa 2005b). Further challenges are the volatility of the rand, the negative impact of rising input cost pressures on the sector and logistical constraints that affects export volumes (Chamber of Mines of South Africa 2005:3a). In addition to these challenges is the physical and economic depletion of ore (Minnit 2001:169). Apart from the physical depletion of mineral assets through consistent extraction which seriously affect local communities at a regional level, the principal obstacle to sustained economic growth and stability in mineral economies is the volatility of the revenue stream derived from mineral resource development (Minnit 2001:172). Based on these constraints it seems that the South African mining industry faces unique challenges to remain sustainable in the near future. The critical question this article seeks to answer is, in the face of obstacles and challenges are South African mining companies practising corporate entrepreneurship?

In developing economies, such as South Africa where growth is often the primary goal of organizations, innovation in firms can be particularly critical for firm profitability and survival (Antoncic & Hisrich, 2001; Butler 2002). Intrapreneurial organizations are judged according to how the firm uses technology and innovation to achieve objectives, such as maximizing profits, gaining market share, creating niche markets or adding value for stakeholders (Kuratko & Welsch 2001).

According to Morris and Kuratko (2002:vii), a sustainable competitive environment can only be achieved through continuous innovation and the creation of new ideas. Nayager and Van Vuuren (2005:29) also suggest that organisations need to develop new and improved products and services, as well as better operating technology and methods that are more effective than those of competitors to ensure a competitive advantage. The major premise of this article is that the mining industry should focus on developing new and innovative processes to overcome constraints and remains competitive; one way to achieve this is when organisations adopt an entrepreneurial orientation (Nayager & Van Vuuren 2005:29).

The main objective of this article is to identify present levels of corporate entrepreneurship in the South African mining industry. The article proceeds by investigating literature on corporate organisations to gain insights into the characteristics of intrapreneurial firms. Based on theoretical frameworks several constructs are operationalised with an intrapreneurial questionnaire. Statistical analysis is then conducted to establish levels of intrapreneurship as measured by different dimensions of firm innovation. Results are discussed and recommendations are made which can increase intrapreneurship in the South African mining industry.

3 LITERATURE ON CORPORATE ENTREPRENEURSHIP

Covin and Miles (1999:50) define corporate entrepreneurship as the presence of innovation plus the presence of the objective of rejuvenating or purposefully redefining companies, markets, or industries in order to create or sustain competitive superiority. Corporate entrepreneurship entails strategic renewal (organisational renewal involving major strategic and/or structural changes), innovation (the introduction of something new to the marketplace), and corporate venturing (corporate entrepreneurial efforts that lead to the creation of new companies within the corporate company) are all important and legitimate parts of the corporate entrepreneurship process (Refer to Covin & Miles 1999:50; Kuratko & Welsch 2001:348; Morris & Kuratko 2002:31).

Pinchot (1985:vii) see corporate entrepreneurship as entrepreneurial behaviour within an established business organisation. Related terms include organisational entrepreneurship, intrapreneurship and corporate venturing (Antoncic & Hisrich 2001:497; Morris & Kuratko 2002:31). According to Antoncic and Hisrich (2003:9) corporate entrepreneurship refers to emergent behavioural intentions of a company that are related to departures from the customary. Burns (2004:11) suggests that the objective of corporate entrepreneurship is to gain competitive advantage by encouraging innovation at all levels in the company. These include the corporate, divisional, business unit, functional or project team levels (Burns 2004:11). Lumpkin and Dess (1996) argue that corporate entrepreneurship has two primary aims, i.e. the creation and pursuit of new venture opportunities and strategic renewal.

Similarly, Sharma and Chrisman (1999:18) and Geisler (1993:53) describe corporate entrepreneurship as the process whereby an individual or group of individuals, in association with an existing company, create a new company or instigate renewal or innovation within that company.

Miller's (1983:770) conceptualisation of corporate entrepreneurship focuses on three related dimensions, i.e. proactiveness, innovation and risk taking; an argument supported by Zahra, Jennings and Kuratko (1999:50) and Morris and Kuratko (2002:39). Antoncic and Hisrich (2001:498) describe four intrapreneurship dimensions, new business venturing, innovativeness, self-renewal and proactiveness. Dess and Lumpkin (2005:147) propose two additional dimensions that are critical to what they term the entrepreneurial orientation (EO) concept: competitive aggressiveness and autonomy. The theoretical basis of the EO construct lies in the assumption that entrepreneurial firms differ from other types of firms, with extant organizational research providing theoretical support for the EO construct, in both the fields of entrepreneurship and strategic management. Five dimensions –

autonomy, innovativeness, risk taking, proactiveness, and competitive aggressiveness have been used to describe EO (Lumpkin & Dess 1996). The dimensions have been extensively documented, and according to Lumpkin and Dess (1996), all five dimensions are central to understanding the entrepreneurial process, although they may occur in different combinations, depending on type of entrepreneurial opportunity the firm pursues. The extent to which each of these dimensions is useful for predicting the success of business may be contingent on industry environment. Lumpkin and Dess (1996) provide a contingency perspective on how environmental and organizational factors moderate, mediate, independently effect, or interact with EO to enhance firm performance (Jantunen, Puumalainen *et al* 2005). Firms with an EO tend to outperform other organizational types in volatile environments and the more adaptive or more entrepreneurially orientated, the higher the level of firm performance than more conservative firms (Knight 1997).

According to Stopford and Baden-Fuller (1994:521), there are three principle types of corporate entrepreneurship, namely the creation of a new business within an existing company which is usually referred to as corporate venturing or sometimes intrapreneurship; the transformation or renewal of existing companies that can also be a process-driven innovation, including the adoption of new solutions to old problems, and frame-breaking or discontinuous change or changing the rules of competition of an industry. Thornberry (2001:527) argues for four types of corporate entrepreneurship, which are corporate venturing, intrapreneuring, organisational transformation and industry rule breaking. Others strands in the corporate entrepreneurship literature are prevalent, which include: corporate venturing, intrapreneurship, bringing the market inside, and entrepreneurial transformation (Covin & Slevin 1991). An overlap in these typologies is evident but they are nevertheless helpful in understanding various approaches towards conceptualising intrapreneurship. According to Hisrich and Peters (2002:49), certain factors and leadership characteristics need to be operant in establishing an intrapreneurial environment. In terms of innovation as major subset of entrepreneurism, Mathisen, Einarsen, Jørstad and Brønnick (2004:383) argue that the major factors found in work environments and social climates that may foster innovation and creativity are: (1) The combination of a supportive and challenging environment. (2) Commitment to ambitious, clearly specified, and attainable objectives or goals that are widely shared by the members of the company. (3) Freedom and autonomy regarding the choice of tasks and how they are performed. (4) Encouragement of ideas. (5) Sufficient time for creating ideas. (6) Appropriate feedback. (7) Recognition and rewards for creative initiatives. (8) A high level of risk taking and permissions towards errors. (9) A non-threatening environment. (10) A shared concern with excellence and high quality of performance.

The structure of the company is another primary ingredient necessary for an entrepreneurial climate. Entrepreneurial structures have disaggregated performance units with clear communication of employees' roles and responsibilities; they are supportive; they have performance-driven systems with a high level of discipline; and they have a clear mission and standards (Echols & Neck 1998:42). Bartlett and Goshal (1996:38) provide an example of the roles portrayed in an entrepreneurial structure, suggesting that in a flat, three-tiered company, front-line employees are the players and innovators; middle managers are the coaches and supporters who integrate tasks, develop the player's skills, facilitate organisational learning and help others achieve their best work; and the top leaders energise and shape the company's purpose and goals.

Echols and Neck (1998:39) argue that the more the company can exhibit entrepreneurial qualities and its people believe in behaving entrepreneurially, the greater the company's ability to achieve maximum innovation or entrepreneurial success will be. To foster such a climate, the most important thing for leaders is to behave as they would like employees to behave, and to model this behaviour consistently, predictably, and relentlessly. Leaders must be persistent in modelling the behaviour they want others to adopt – people will heed to behaviour and follow example (Urban 2006), but they will not change what they do on the basis of words alone (MacMillan & McGrath 2000:303). According to MacMillan and McGrath (2000:303) the most important behaviour on the part of the leaders involve dedicating a disproportionate share of their time, attention, and discretionary resources to creating new business models.

Studies of performance in large companies that use the concept of organisational climate (i.e., the perceptions of people about the kind of place it is to work in) have led to two general conclusions, namely the climate of a company can have significant impact on performance, and climate is created both by the expectations people bring to the company and the practices and attitudes of the key managers (Timmons & Spinelli 2007:540). Litwin and Stringer (1968:1) state that the term organisational climate refers to a set of measurable properties of the work environment, perceived directly or indirectly by the people who live and work in this environment and assumed to influence their motivation and behaviour. Others conceptualise organisational climate in terms of perceptions that individuals have of how their local work unit is managed and how effectively they and their day-to-day colleagues work together on the job (Kangis, Gordon & Williams 2000:532).

A firm's organisational climate is a relatively enduring characteristic of a company which distinguishes it from other companies and embodies members' collective perceptions about their company with respect to such dimensions as autonomy, trust,

cohesiveness, support, recognition, innovation and fairness. It is produced by member interaction, serves as a basis for interpreting the situation, reflects the prevalent norms and attitudes of the company's culture, and acts as a source of influence for shaping behaviour (Moran & Volkwein 1992:20; Ashkanasy, Wilderom & Peterson 2000:8). Consolidating these efforts, the climate of an organisation may be defined as the sum of the perceptions of the individuals working in that organisation (Refer to Litwin & Stringer 1968:66).

When examining the literature pertaining to the characteristics that foster and promote intrapreneurship and a commensurate conducive climate (Urban 2007), there are thirteen themes or constructs that dominate prior research in this area, see table 1:

Table 1: Themes associated with promoting corporate entrepreneurship

1.	***Visionary leadership / Entrepreneurial leadership*** (Pinchot & Pellman 1999:12; Kuratko & Welsch 2001:349; Hisrich & Peters 2002:52; Turner 2002:22; Cohen 2004:16; Nicholson-Herbert, Mkhize & Schroder 2004:43).
2.	***Management support*** (Kuratko, Hornsby, Naffziger & Mantangno 1993:32; Kuratko & Welsch 2001:351; Hisrich & Peters 2002:51; Turner 2002:45; Antoncic & Hisrich 2003:12; Gaw & Liu 2004:69; McBeth & Rimac 2004:20; Kuratko, Ireland, Covin & Hornsby 2005:703).
3.	***Sponsors (Champion)*** (Kuratko & Hornsby 1998:30; Pinchot & Pellman 1999:3; Kuratko & Welsch 2001:346; Morris & Kuratko 2001:93; Hisrich & Peters 2002:51; Turner 2002:49; Jones & George 2003:663; Kuratko & Hornsby 2001:54).
4.	***Tolerance for risks, mistakes and failure*** (Kuratko & Hornsby 1998:30; Kuratko & Welsch 2001:351; Hisrich & Peters 2002:50; Turner 2002:52; Cohen 2004:18; Gaw & Liu 2004:67; Nicholson-Herbert *et al* 2004:44).
5.	***Innovation and creativity; new ideas encouraged*** (Pinchot & Pellman 1999:13,20; Kuratko & Welsch 2001:347,350,351; Morris & Kuratko 2002:104; Cohen 2004:18; McBeth & Rimac 2004:21; Nicholson-Herbert *et al* 2004:43; Hisrich & Peters 2005:50).
6.	***Appropriate rewards and reinforcement*** (Kuratko *et al* 1993:32; Echols & Neck 1998:44; Kuratko & Welsch 2001:355; Hisrich & Peters 2002:50; Morris & Kuratko 2002:244; Turner 2002:184; Cohen 2004:18; McBeth & Rimac 2004:21; Nicholson-Herbert *et al* 2004:44).
7.	***Vision and strategic intent*** (Kuratko *et al* 1993:32; Anderson & West 1996:59; Pinchot & Pellman 1999:107,117; Kuratko & Welsch 2001:349; Hisrich & Peters 2002:47; Cohen 2004:17; Gaw & Liu 2004:69; Mathisen *et al* 2004:383).
8.	***Discretionary time and work*** (Kuratko *et al* 1993:30; Pinchot & Pellman 1999:110; Morris & Kuratko 2002:291; Antoncic & Hisrich 2003:526; Mathisen *et al* 2004:383; Kuratko *et al* 2005:703).
9.	***Empowered teams / Multi-disciplined teamwork and diversity*** (Kuratko *et al* 1993:28; Pinchot & Pellman 1999:109; Hisrich & Peter 2002:50; Turner 2002:55; Cohen 2004:18; Gaw & Liu 2004:68; McBeth & Rimac 2004:19; Nicholson-Herbert *et al* 2004:44).
10.	***Resource availability and accessibility*** (Russell & Russell 1992:645; Kuratko *et al* 1993:29; Russell 1999:72; Kuratko & Welsch 2001:355; Hisrich & Peter 2002:50; Turner 2002:58; Antoncic & Hisrich 2004:526; Timmons & Spinelli 2007:341).
11.	***Continuous- and cross-functional learning*** (Kuratko *et al* 1993:32; Echols & Neck 1998:40; Kuratko & Welsch, 2001:352; Jones & George 2003:662; McBeth & Rimac 2004; Nicholson-Herbert *et al* 2004:44; Gurunathan, Krishnan & Pusapathy 2004:61).

12. ***Strong customer orientation*** (Pinchot & Pellman 1999:113,133; Kuratko & Welsch 2001:352; Hisrich & Peters 2002:54; Turner 2002:188; Liu, Luo & Schi 2002:367; Cohen 2004:19; Dess & Lumpkin 2005:150).
13. ***Flat organisational structure with open communication and strong sense of belonging*** (Russell & Russell 1992:652; Kuratko *et al* 1993:32; Echols & Neck 1998:43; Pinchot & Pellman 1999:112; Rue & Byars 2000:13; Cohen 2004:18; McBeth & Rimac 2004:20).

4. RESEARCH METHODOLOGY

Two main measures of intrapreneurship (the ENTRESCALE and the corporate entrepreneurship scale) have evolved independently, with the corporate entrepreneurship scale (Zahra 1991, 1993) measuring activities such as venturing, innovation, and self-renewal activities. However the focus for this study is on the different dimensions of intrapreneurship, which have emerged from the literature and which identify the innovative and proactive disposition of managers at firms.

Level of analysis

With regard to level of analysis, studies focusing on intrapreneurship at the firm level, find many links with different variables, i.e., intrapreneurship is linked to strategic alliances (Marino, Strandholm *et al* 2002); management variables such as organizational strategy, structure and culture correlate with intrapreneurship (Goosen, de Coning & Smit 2002; Nayager & van Vuuren 2005); and the effect of intrapreneurship on the market orientation-performance relationship of a firm has been posited as curvilinear, i.e. the effect of a firm's market orientation on business performance is highest when the firms intrapreneurial practices are at a moderate level (Bhuian, Menguc & Bell 2005).

This firm level approach is consistent with classical economics in which the individual entrepreneur is regarded as a firm; addressing intrapreneurship at the firm level refers to mangers self-perception of a firm's strategic orientation, their self-perception will be closely related to the behaviour of the firm. Similarly, Wiklund (1999) argues that the intrapreneurship really measures a mangers self-perception and accordingly serves as a relevant proxy for measuring entrepreneurial strategy.

Kuratko and Hornsby (2001:5) confirm that the perception of managers on different aspects of the company's corporate organisation as well as the formal strategy that the company develops is important to the facilitation of internal entrepreneurship. Certain critical organisational factors must also exist and be perceived by managers to develop entrepreneurial behaviours and pursue entrepreneurial activities. Huy, (2001:72) argues that, taken as a group, managers are diverse, for instance in functional area, work experience, geography, gender, and ethnic background. These

respondents provide creative ideas about how to grow and change a business, and can make a pivotal contribution to innovation and change in large companies (Kanter 2004).

Constructing the questionnaire

The questionnaire consisted of two parts. Part 1 consisted of demographical information on the respondents and included variables such as age, gender, and company description.

In order to establish levels of intrapreneurship in these organisations, a questionnaire was designed (Part 2), using the following instruments as basis for the design:

- The Entrepreneurial Performance Index (EPI), developed by Michael M. Morris. (Morris & Kuratko 2002:292-294)
- The Corporate Entrepreneurship Assessment Instrument (CEAI) developed by Donald F. Kuratko, Jeffrey S. Hornsby, and Ray V. Montagno. (Morris & Kuratko 2002:295-298)
- The Innovation Climate Questionnaire, developed by Gifford Pinchot. (Pinchot & Pellman 1999:107-116)
- The Litwin and Stringer Organisational Climate Questionnaire (LSOQC), developed by Litwin and Stringer (1968).
- The Entrepreneurial Orientation (EO) scale. This scale initially developed by Khandwalla (1977), refined by Miller and Friesen (1983), and Covin and Slevin (1991), has been found to be highly valid and reliable at cross-cultural levels (Knight 1997). Through a consolidation of major studies on EO, Kreiser *et al* (2002), confirm the three main dimensions of EO, which make unique contributions to a firm's level of performance: product-market innovation, proactiveness of decision making, and risk taking (Kreiser *et al* 2002). Investigations pertaining to the psychometric properties of EO reveal that the sub-dimensions of innovation, proactiveness, and risk taking achieve the best model fit and that these three sub-dimensions vary independently of each other (Kreiser *et al* 2002).

Based on a selected consolidation of these instruments thirteen constructs were identified to measure intrapreneurship. Five items per construct were identified to evaluate the respondent's perception on each of these constructs. The measuring questionnaire used a four-point Likert scale and the respondents had to indicate their degree of agreement or disagreement with each item. A Likert scale, also referred to as a summated scale, consists of a collection of statements about the attitudinal

object (Huysamen 1994:125) and is presently the most popular type of scale in the social sciences (Huysamen 1994:126; Page & Meyer 2000:75).

Sampling and data collection

Five major mining companies operating in South Africa were selected to represent the mining industry, these were: De Beers (diamond mining sector), Goldfields (gold mining sector), Implats (platinum mining sector), Kumba Resources (coal, iron ore, base metals and industrial metals mining sectors) and SRX Uranium1 (uranium mining sector). Each one of these companies is a significant player in its sector of operation.

The research procedure entailed sending e-mails to the different offices of the identified mining companies, and appointments were set up. A further consideration was ease of access and entrance in terms of securing an audience with the managers for an interview. Interviews were conducted with CEO's, and after reference from the CEO to an official to assist with distribution of questionnaires was obtained, contact was made with the delegated official. The questionnaire was sent electronically to the delegated official who in turn distributed it electronically to managers in their employ. All data was then populated into a database from where the statistical analysis was done.

With the assistance of delegated officials at the different mining companies the survey questionnaire was sent to 600 managers. Of those who received the questionnaire 129 responded favourably. Of the 129 completed questionnaires received, 103 were used and 26 had to be discarded due to corrupt data, achieving a response rate of 17.71 percent.

Statistical analysis

The statistical analysis comprised descriptive statistics such as frequency, arithmetic mean ($\bar{x}$) and standard deviation (*s*) and inferential statistics such as t-test, Cronbach's alpha coefficients and analysis of variance (Refer to Neuman 1997:298; Wisniewski 2002:92; Levine, Stephan, Krehbiel & Berenson 2005:105). The data were statistically analysed, using STATISTICA.

5 RESULTS AND DISCUSSION

Demographical data

In terms of respondents by age group 11.88% of the respondents fell in the age group 26 to 30; 17.82% in the age group 31 to 35; 15.84% in the age group 36 to 40;

22.77% in the age group 41 to 45; 16.83% in the age group 46 to 50; and 14.85% over the age of 50. **By gender**, the respondents consisted of 74.26% male and 25.74% female. In terms of **respondents by employer,** 22.77% of the respondents work for De Beers; 21.78% for Goldfields; 21.78% for Implats; 32,67% for Kumba; and 0.99% for Uranium 1, and their combined **functional distribution** consisted of 4.95% Administration; 7.92% Finance; 10.89% Human Resources; 27,72% Operations; and 48.51% "Other" – this is a combination of smaller functionality groupings, e.g. safety, ventilation, etc. Reflecting the typical South African mining environment, the majority of respondents are male, in the 41-45 age group and situated in the operations function of the company.

Levels of corporate entrepreneurship surveyed

The findings of the survey are depicted in table 2 and are presented in order from the highest to the lowest calculated arithmetic mean value.

Table 2: Corporate entrepreneurship survey results

	Construct	n	$\bar{x}$	s	Cronbach's α
7	Vision and strategic intent	103	2.91	0.69	0.84
8	Discretionary time and work	103	2.84	0.71	0.85
11	Continuous- and cross-functional learning	103	2.79	0.61	0.81
5	Innovation and creativity / New ideas encouraged	103	2.76	0.63	0.8
12	Strong customer orientation	103	2.75	0.69	0.85
4	Tolerance for risks, mistakes and failure	103	2.73	0.53	0.62
1	Entrepreneurial leadership	103	2.72	0.73	0.83
6	Appropriate rewards and reinforcement	103	2.65	0.71	0.82
3	Sponsors (Champion)	103	2.6	0.63	0.77
2	Management support	103	2.56	0.6	0.71
13	Flat organisational structure with open communication and strong sense of belonging	103	2.56	0.69	0.79
9	Empowered teams / Multi-disciplined teamwork and diversity	103	2.54	0.64	0.74
10	Resource availability and accessibility	103	2.31	0.66	0.8

The construct vision and strategic content ($\bar{x}$ =2.91) obtained the highest arithmetic mean value, followed by the constructs discretionary time and work ($\bar{x}$ =2.84), continuous and cross-functional learning ($\bar{x}$ =2.79); innovation and creativity/new ideas encouraged ($\bar{x}$ =2.76) and strong customer orientation ($\bar{x}$ =2.75) respectively. The constructs resource availability and accessibility ($\bar{x}$ =2.31); empowered teams/multi-disciplined teamwork and diversity ($\bar{x}$ =2.54); flat organisational structure with open communication and strong sense of belonging ($\bar{x}$ =2.56) and management support ($\bar{x}$ =2.56) obtained the lowest scores.

Considering that the highest mean score of 2.93 and lowest means score of 2.33 fall in the range of 2 (slightly disagree) to 3 (slightly agree) it is evident that there are "middle-of-the-road" perceptions about intrapreneurship and a deduction can be made that the overall climate in the mining industry is average or mediocre for intrapreneurship to manifest. Therefore it can be argued that there is room for improvement to further enhance and promote intrapreneurship.

In order to determine the internal consistency between the items of the constructs, Cronbach's alpha coefficient was calculated (refer to Page & Meyer 2000:292). According to Huysamen (1994) an instrument that produces different scores every time that it is used on the same person under the same conditions, has low reliability. The Cronbach's alpha coefficient is based on the average correlation of variables within a test (Wisniewski 2002). The larger the Cronbach's alpha coefficient, the more reliable the scale. Cronbach (1951) suggests that for acceptable reliability the Chronbach's alpha coefficient should be higher than 0.7. In this study the internal consistency between the items in 12 of the 13 constructs is acceptable with the only exception the construct tolerance for risks, mistakes and failure (**α**=0.62). However Neuman (1997) indicates that values below 0.7 can be expected when dealing with diverse constructs.

To test for response bias, four of the participating mines' respondents were compared with respect to their opinions expressed. The ANOVAs found statistically significant differences on ten of the thirteen of the factors (See table 3). In this instance the factors not showing significance are appropriate rewards; continual, cross-functional learning; and strong customer orientation.

Table 3: Test for response bias (ANOVA)

Source of variation	*SS*	*df*	*MS*	*F*	*P-value*
Entrepreneurial leadership	10.11	3	3.37	7.49	0.00*
Management support	2.97	3	0.99	2.91	0.04*
Sponsors (Champion)	4.29	3	1.43	3.83	0.01*
Tolerance for risks, mistakes and failure	3.02	3	1.01	3.82	0.01*
Innovation and creativity / New ideas encouraged	5.89	3	1.96	5.67	0.00*
Appropriate rewards and reinforcement	2.22	3	0.74	1.46	0.23
Vision and strategic intent	3.61	3	1.20	2.62	0.05*
Discretionary time and work	3.98	3	1.33	2.74	0.05*
Empowered teams (Multi-disciplined and diverse)	3.37	3	1.12	2.90	0.04*
Resource availability and accessibility	3.80	3	1.27	3.09	0.03*
Continuous- and cross-functional learning	1.34	3	0.45	1.21	0.31
Strong customer orientation	3.50	3	1.17	2.56	0.06
Flat, open organisational structure	7.88	3	2.63	6.32	0.00*

**ANOVA statistically significant at 0.05 alpha level*

To test for practical significance, the various companies were compared across constructs denoting intrapreneurship. Cohen (1988:25) defined effect sizes as "small, *d* = 0.2," "medium, *d* = 0.5," and "large, *d* = 0.8". Therefore data with $d \geq 0.8$ is considered as practically significant, since it is the result of a difference having a large effect.

Table 4: Test for practical significance

Effect sizes between:	*De Beers & Gold Fields*	*De Beers & Implats*	*De Beers & Kumba*	*Gold Fields & Implats*	*Gold Fields & Kumba*	*Implats & Kumba*
	d	*d*	*d*	*d*	*d*	*d*
Entrepreneurial leadership	0.90**	0.19	1.40	0.57*	0.19	0.85**
Management support	0.31	0.14	0.81**	0.17	0.36	0.60*
Sponsors (Champion)	0.42*	0.08	0.76**	0.45*	0.28	0.77**
Tolerance for risks, mistakes and failure	0.56*	0.48*	0.95**	0.11	0.31	0.45*
Innovation and creativity / New ideas encouraged	0.33	0.07	1.10	0.24	0.59*	0.91**
Appropriate rewards and reinforcement	0.06	0.07	0.43*	0.01	0.43*	0.45*
Vision and strategic intent	0.16	0.38	0.40*	0.49*	0.19	0.74*
Discretionary time and work	0.22	0.07	0.64*	0.29	0.38	0.70*
Empowered teams (Multi-disciplined and diverse)	0.15	0.04	0.71*	0.11	0.47*	0.62*
Resource availability and accessibility	0.56*	0.60*	0.85**	0.01	0.24	0.23
Continuous- and cross-functional learning	0.10	0.00	0.43*	0.10	0.33	0.42*
Strong customer orientation	0.25	0.26	0.75*	0.03	0.41*	0.49*
Flat, open organisational structure	0.46*	0.38	1.32	0.09	0.60*	0.74*

** Medium effect (≥0.40 and <0.75) – Medium possibility exists in practice.*

*** Large effect (≥0.75 and <1.10) – Large possibility exists in practice.*

Key as per Thalheimer and Cook (2002):

Interpreting the effect sizes in table 4, reveals that several constructs have practical significance in terms of the combinations of companies; for instance the first construct in table 4 – entrepreneurial leadership, the significant effect sizes may be ascribed to noticeable differences in perception in terms of:

- The extent to which their leaders take a long-term view of the company and articulate the vision to all levels of the company.
- The extent to which their leaders challenge the status quo and inspire them to think, to reason and to act in innovative ways.

- The extent to which their leaders have a good balance between concern for production and concern for people.
- The extent to which their leaders lead by example and people are eager to voluntarily follow them.
- The extent to which their leaders seek to maximise value from opportunity without constraint to existing models, structures or resources.

6 CONCLUSIONS AND RECOMMENDATIONS

This article has contributed to the extant literature on intrapreneurship and complements existing studies investigating levels of intrapreneurial activity in a developing country context. The centrality of the topic under investigation - corporate entrepreneurship - is not new; nevertheless this article adds to a better understanding of intrapreneurship for a specific industry in a non-western country context, which in turn enhances the generalizability of intrapreneurship. Based on the existing literature it is clear that intrapreneurship can create value not only in different country contexts but can aid in the international expansion process which many firms in developing countries are now undertaking. For South African firms the increasing trend towards globalization presents multiple opportunities for international expansion (Rwigema & Venter 2004), and a strong intrapreneurial orientation can provide the necessary competitive advantage for SA and other African countries to compete globally.

Overall this article provides tentative evidence to support the objective of the study – to measure levels of intrapreneurship - however the evidence is not conclusive and further in-depth research will have to be conducted in order to reach more conclusive findings. Although only one industry represented by the five major players was surveyed it is important to remember that the important issue about sampling, in general, is not statistical but theoretical representativeness, i.e., the elements in the sample represents the type of phenomenon that the theory makes statements about (Davidsson 2004).

Since the internal consistency of the various dimensions denoting intrapreneurship were the first properties to be assessed, the reliability of the different dimensions measuring intrapreneurship has been established. Relatively high Cronbach's Alpha's (reliability coefficients) were obtained for all the constructs.

Based on mediocre scores obtained for different dimensions measuring intrapreneurship, South Africa's mining industry could well enhance its growth and performance if it improves the various practices associated with promoting intrapreneurship.

Based on the thirteen constructs that previous literature has identified as conducive for entrepreneurial activity and behaviour, together with the scores obtained for these constructs, the following conclusions are drawn in line with the empirical results:

- **Entrepreneurial leadership ($\bar{x}$ =2.72):** Although leaders take a long-term view of their companies the articulation of the vision to all levels of the company is seemingly lacking. Proactively seeking to maximise value from opportunity without constraint to existing models, structures or resources is lacking.
- **Management support ($\bar{x}$ =2.56):** Developing ideas for the improvement of the company is not encouraged strongly enough by management, and top management is not always aware of employees' ideas and suggestions. Support does not seem to be a regular occurrence because senior managers do not encourage innovators to bend rigid procedures in order to keep promising ideas on track.
- **Sponsors (Champion) ($\bar{x}$ =2.60):** Although there are managers who help employees to get their work done by removing obstacles and roadblocks, originators of new ideas find it difficult to implement because of the lack of influential people to support them.
- **Tolerance for risks, mistakes and failure ($\bar{x}$ =2.73):** Mining companies clearly take calculated risks at times, and practical experimentation by employees is acceptable and mistakes are allowed to an extent.
- **Innovation and creativity / New ideas encouraged ($\bar{x}$ =2.76):** Although mining companies in general do provide some opportunity for employees to be creative and try their own methods of doing the job, innovative and new ideas are not a regular occurrence and companies are not quick to respond to improved work methods developed by workers.
- **Appropriate rewards and reinforcement ($\bar{x}$ =2.65):** Recognition and rewards do occur in the mining industry, specifically in relation to job performance. Recognition and rewards often do not correlate with the value added by the innovation.
- **Vision and strategic intent ($\bar{x}$ =2.91):** In the mining industry organisational vision and strategies are usually relatively clear to middle-managers; whether the announced visions and strategies inspire them is a different matter, and what the vision and strategy mean on a departmental level is questionable.
- **Discretionary time and work ($\bar{x}$ =2.84):** Freedom to use time to safely divert from assigned tasks to explore new ideas without having to ask for permission also occurs, but given the free time to develop an idea further can be regarded as only marginally acceptable for effective corporate entrepreneurship.

- **Empowered teams / Multi-disciplined teamwork and diversity ($\bar{x}$ =2.54):** Cross-functional project teams have limited freedom to make decisions and act on them without needing to ask for permission, and often experience interfering from functional Superiors who are not part of the team.
- **Resource availability and accessibility ($\bar{x}$ =2.31):** Resources are not always readily available and accessible in pursuance of new ideas and opportunities, nor are attracting resource commitment for entrepreneurial ventures regarded as easy.
- **Continuous- and cross-functional learning ($\bar{x}$ =2.79):** Although ample opportunities for learning and growth exist, and employees are encouraged to stay abreast of developments in their functional fields, the sharing of their knowledge across functions is limited. Spending time and resources helping others outside their area in ways that are not part of their assigned responsibilities is therefore not a regular theme.
- **Strong customer orientation ($\bar{x}$ =2.75):** It is doubtful whether the mining industry's product and service innovation are driven by a strong customer orientation, and whether sufficient resources are spent in determining customer needs and satisfaction.
- **Flat organisational structure with open communication and strong sense of belonging ($\bar{x}$ =2.75):** Making decisions without going through elaborate justification and approval procedures are still a challenge in the mining industry. Subsequently the degree of hierarchical control is in many instances still elaborative.

Although several constructs indicate that intrapreneurship is not well supported, these scores are not trivial and it is proposed that the South African mining industry build on its strengths, capitalise on its opportunities, remedy its weaknesses, and counter its threats by adopting a more focused intrapreneurial orientation across the various dimensions constituting intrapreneurship. Nayager and Van Vuuren (2005: 37-38), confirm that companies which create an environment conducive to intrapreneurship will reap the benefits of increased profitability and perpetuated growth.

As part of the South African's governments initiatives to foster innovation, policies should encourage the diffusion, adoption and application of the very latest technologies, often the cornerstones of innovation, since a lot of potential exists in developing countries to "import and adapt" technologies developed in industrialized countries (Von Broembsen *et al* 2005). Moreover, specific programs should focus on established firms rather than on individual entrepreneurs, as is often recommended for developing economies where institutional conditions need to be strengthened first,

before entrepreneurship flourishes (Minniti *et al* 2005). Based on the measured dimensions of intrapreneurship, the following recommendations are made:

- Improve **entrepreneurial leadership** by articulating an entrepreneurial vision to all levels of the company, and instil an entrepreneurial mindset throughout the company to proactively seek to maximise value from opportunities without constraint to existing models, structures or resources. Establish entrepreneurship as dominant logic to improve the way managers conceptualise the business and make critical resource allocation decisions. Make managers accountable and responsible for innovative initiatives, and develop business acumen and competencies.
- Improve **management support** by encouraging the development of ideas for the improvement of the company, as well as encouraging innovators to bend rigid procedures in order to keep promising ideas on track. Institutionalise a system that would enable top management to be aware of employees' ideas and suggestions.
- Increase the number of **sponsors (champions)** by encouraging managers to help employees getting their work done by removing obstacles and roadblocks. Identify and mandate influential people in the company to support originators of new ideas to get those ideas implemented.
- Become more **tolerant toward risks, mistakes and failure** by allowing employees to take calculated risks and practical experimentation. Accept mistakes and failure as a learning process and learning necessitates mistakes. However, share risks and rewards with employees, as this is a fundamental precept of entrepreneurial- and investor behaviour. The implication is that individuals and teams could lose in terms of bonuses, freedom, research support or other resources if projects fail or under perform, and they are rewarded well when projects are highly successful.
- Make **innovation** a central topic in leadership development programmes. Encourage **new ideas** and allow employees to be **creative** and try their own methods of doing their jobs. Develop a set of metrics to track innovation inputs (such as the number of engineering hours devoted to innovative projects), throughputs (such as the number of new ideas entering the company's innovation pipeline), and outputs (such as the cost advantages gained from innovative breakthroughs).
- Appropriately **recognise and reward** employees in relation to job performance, and ensure that recognition and rewards to innovative employees correlate with the value added to the company. Share the wealth with those that help create it. Implement a system where small cash amounts are given for innovative

suggestions, and then redeemable points (for more significant cash awards) are earned based on how far the suggestion moves through the process of development, approval, implementation, and impact (cost savings or revenue generation).

- Make it a strategic imperative that the **vision and strategic intent** of the company are very clear to middle-managers and ensure that they take ownership of the announced visions and strategies; that it is embraced, and aligned with company objectives on departmental level.
- Give employees greater **freedom to use time** to safely divert from assigned tasks to explore new ideas without having to ask for permission, as well as allowing free time to develop an idea further.
- Allow **cross-functional project team's** greater freedom to make decisions and act on them without needing to ask for permission, and prevent interference from functional Superiors who are not part of the team.
- Institutionalise a system/procedure through which **resources** are made readily **available** and **accessible** in pursuance of new ideas and opportunities and implement a budget that commits resources for entrepreneurial ventures.
- Provide ample opportunities for learning and growth to take place, and encourage employees to stay abreast of developments in their functional fields to ensure **continuous learning**. Implement as system through which the sharing of their knowledge across functions can be facilitated to enhance **cross-functional learning**. Also encourage employees to spend time and resources helping others outside their area in ways that are not part of their assigned responsibilities.
- Design and implement a programme that exposes employees to customers of the company's products in order to create a **strong customer orientation** that would drive product and service innovation. Increase the allocation of resources for determining customer needs and satisfaction.
- In terms of structure the general orientation should be towards a more horizontal and less vertical design to support a **flat organisational structure with open communication and strong sense of belonging.** Downsize the degree of hierarchical control i.e., fewer layers in the structure of the company, and broader spans of control to promote the making of decisions without having to go through elaborate justification and approval procedures.

Limitations and future research

A cross-sectional design study of this nature prohibits any causal inferences, and thus directionality between the variables is not fully explored. The study loses the

dynamic aspects of intrapreneurial leadership actions, which prevents conclusions about causal relationships to be drawn. Another limitation relates to the specific context in which intrapreneurship was considered, a broader perspective could be taken where the findings may then be extrapolated to other African countries and to the international context. Future studies could be replicated with larger and more diverse samples allowing for a more fine-grained analysis of intrapreneurship levels.

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