

Entrepreneurial orientation and corporate governance structures at the firm level in the South African oil and gas industry

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Orientation: Corporate governance systems (CGS) have been observed as one of the most important structures and mechanisms that regulate the relationships between executives and shareholders. By having well-defined and established CGS, company board members and executives are able to shape company vision and increase managerial commitment towards formulating strategies that espouse an entrepreneurial orientation (EO). Firms with high levels of EO tend to be innovative and encourage creative initiatives in new products and technology developments.

Research purpose: In an emerging economy such as South Africa, one of the primary goals of an organisation is growth and good governance, which can be achieved through well-governed structures and continuous innovation in the face of challenges. This study identified potential links between the multidimensional constructs of CGS and EO at the firm level in the South African oil and gas industry.

Motivation for the study: One of the greatest challenges faced by organisations when implementing CGS is to ensure compliance.

Research design, approach and method: Board members and senior decision-makers were surveyed in the South African oil and gas industry, using a structured questionnaire. A series of correlational analyses were used to determine the strength of relationships between the dimensions of EO and CGS.

Main findings: By drawing extensively on existing theory on EO, this study found that the different dimensions of CGS have a significant and positive relationship with each of the EO dimensions – innovation, risk-taking and proactiveness.

Practical/managerial implications: Corporate boards supportive of entrepreneurship must provide appropriate reward systems, top management support, explicit goals and appropriate organisational values which signal to employees that entrepreneurial behaviour action is desirable. Practitioners should scrutinise their governance structures in their organisations to ensure an alignment with EO practices.

Contribution/value-add: Generally, research on EO and governance in Africa as a whole may be considered as valuable, as very few empirical studies have been previously conducted which focus on the nexus of CGS and EO. The study is one of the first to conduct empirical research on EO and CGS in an emerging market and unique industry context – the South African oil and gas industry.

Introduction

Corporate governance in South Africa has transformed over time and is recognised as being necessary to the success and revitalisation of the country's entrepreneurial activities, economic growth and sustainability through the enforcement of stringent regulations and ethical change practices (Malherbe & Segal, 2001; Van Tonder, 2006). One of the greatest challenges faced by organisations in today's growing volatile business environment, when implementing corporate governance systems (CGS), is to ensure compliance. This is particularly relevant in a developing country context, where Afro-centric leadership is required (Geldenhuys & Veldsman, 2011).

Corporate governance systems have been observed as one of the most important structures and mechanisms that regulate the relationships between executives and shareholders (Zahra, 1996). In South Africa, the first King Report on corporate governance (King I) (Institute of Directors, 1994) incorporates a code of corporate practices and conduct, the first of its kind which was aimed at promoting the highest standards of corporate governance in South Africa organisations

(Dekker, 2002; IOD, 2002; Mans, 2011). Dekker (2002) observed in his analytical paper on the King II Report (IOD, 2002), that organisations have to 'comply if not, explain' matters relating to boards' transparency on take-overs. Moreover executives' responsibilities in setting out controls and monitoring of strategic decision processes that will position the organisation to be economically sustainable are prescribed (Esser & Dekker, 2008; West, 2006). In the same manner, the King III Report (IOD, 2009) extends the duties of boards and executives to be directly involved in strategic decision controls, as well as in the implementation of organisational core competencies. This includes involvement in securing codes of good practices, including but not limited to compliance with legislative, environmental, energy, labour and national occupational health and safety guidelines (Miller & Meelis, 2005).

Researchers have documented that organisations can address challenges by scrutinising their CGS and ensuring an alignment with their vision, mission, strategies, objectives and goals through an effective and well-structured board, along with executives that can direct, monitor and support entrepreneurial initiatives (Gabrielsson, 2007). By having well-defined and established CGS, company board members and executives are able to shape company vision and increase managerial commitment towards formulating strategies that lead to a sustainable competitive advantage.

Not only are organisations seeking to re-orientate themselves to become strategically innovative, but previous literature and empirical findings point to entrepreneurial orientation (EO) as an important element in organisational and economic development (Kreiser, Marino & Weaver, 2002). Entrepreneurship within organisations is a fundamental posture, instrumentally important to strategic innovation, particularly under shifting external environmental conditions (Knight, 1997; Urban, 2010). Many firms are seeking to transform their organisations (Serfontein, Basson & Burden, 2009) and look to EO as a way of combating the lethargy and bureaucracy that often accompany business size and cultural lock-ins (Burns, 2004; Morris, Kuratko & Covin, 2008).

The relationship between EO and CGS has long puzzled researchers, where little empirical evidence has been found to support the idea that governance structures relate to any type of entrepreneurial activity at the corporate level (Beaver, Davies & Joyce, 2007; Fiegener, 2005). Despite the importance of EO to firms, literature on corporate governance has tended to focus on issues relating to the board and executives' demographics, ownership structure, board size, board composition and organisation performance, without assessing any potential relationships or linkages between entrepreneurship initiatives and different corporate governance mechanisms. Several researchers agree that insufficient attention has been paid to the role of how board and executive members may influence the adoption of entrepreneurial activities at their firms (Naldi, Nordqvist, Sjöberg & Wiklund, 2007; Thyil & Young, 2010).

Purpose of study and research objectives

Boards, executives and senior decision-makers are involved in various governance roles (Fiegener, 2005) in terms of decision control activities that go beyond overseeing management performance (South African Petroleum Industry Association, 2009). As a result of these overarching roles, these board members are able to be directly involved in supporting, championing and sponsoring major entrepreneurial innovative activities at the corporate level (Hung & Mondejar, 2005).

The South African oil and gas industry faces a challenging environment that is required to make capacity additions, innovate regularly as a result of rapid change in technological advancement and also consider new and alternate products which are environmentally friendly (Henderson & Cool, 2003). These challenges are confirmed by the South African Petroleum Industry Association (SAPIA), which advocates skills transformation at all levels of the corporate structure whilst, at the same time, acting competitively and responding to ethical and environmental challenges (Miller & Meelis, 2005).

Despite these imperatives, firms in the South African oil and gas industry have been relatively unsuccessful in formulating and implementing stringent CGS that will enhance speedy transformation, whilst, at the same time, encourage corporate entrepreneurial activities and attract international investment (Rossouw, Van der Watt & Malan, 2002; West, 2006). A deep and thorough understanding of entrepreneurship at the firm level and CGS is important not only for academic purposes but also has salience for practitioners and policymakers. These implications relate to firm profitability and competitiveness, as well as to the overall economic performance of industry and the national economy (Bosma & Harding, 2006).

The critical question this study seeks to address is whether or not there are any significant relationships or links between the various attributes of CGS and levels of EO. The study investigates if there is any significant relationship between the CGS dimensions of board effectiveness, board knowledge and experience, board commitment and board involvement in decision control, with the EO dimensions of innovativeness, proactiveness and risk-taking.

Building on existing theoretical and conceptual frameworks, this study has relevance to academics, senior decision-makers, and governance practitioners. The study contributes to existing literature and extends current knowledge of the EO construct by linking it with CGS and applying it to an under-researched context: the oil and gas industry in an emerging market. The study aids in understanding the nexus between the various dimensions of CGS and EO, thereby advancing the knowledge of entrepreneurial practices in this highly capitalised and highly regulated industry.

The study starts by briefly reviewing past research on CGS and EO in order to operationalise the constructs under

investigation. The research methodology is then delineated, in terms of sampling, instrument design and data analysis best suited to test the hypotheses. The results are scrutinised in terms of previous theory and contextualised from an emerging market perspective. Both theoretical and practical implications are drawn from the empirical evidence and recommendations for future research are made.

Literature review

Corporate governance systems

The importance of corporate governance at both the national and firm level in reshaping economic growth and sustainability, in both developed and developing economies, has been emphasised in recent years (Mans, 2011). Corporate governance plays a pivotal role in promoting the efficient use of resources both within the organisation and the broader economy, whilst, at the same time, fostering a positive interaction between the organisation and the economy both domestically and globally (Haniffa & Hudaib, 2006).

The oil and gas industry constitutes building blocks at every stage of production and consumption in key sectors of economic life such as petrochemicals, chemicals, agriculture, construction, manufacturing and services industries. Human lives have been revolutionised through this industry's tremendous growth, with the promise of economic sustainability at maturity (Mbendi Information Services, 2008). The South African oil and gas industry has undergone, and is still undergoing, a series of transformations from the industry that served the apartheid era of secrecy and boycotts to one more in line with the democratic and economic needs of South Africa (Miller & Meelis, 2005). The last 10 years has produced a wave of activity in the industry to initiate and invigorate rigorous innovative thinking through EO (SAPIA, 2009). South Africa, as an emerging economy, has adopted international standards in formulating CGS through the series of King Reports – King I (IOD, 1994), King II (IOD, 2002) and King III (IOD, 2009). These reports on governance codes aim to shape and guide organisations towards sustainable economic growth (Wieland, 2005). There has been mounting pressure in transitional and emerging economies for board involvement to be more transparent with greater accountability, specifically in relation to strategic entrepreneurial decision control, so as to ensure innovative growth and sustainability (Judge & Zeithaml, 1992). Growth and sustainability are likely to take shape when entrepreneurial decision control is exercised by top management to encourage entrepreneurial thought and action throughout the organisation (Morris & Kuratko, 2002).

In South Africa, board and executive roles and responsibilities are prescribed by the King III Report on corporate governance and codes of best practice (IOD, 2009; South African Institute of Chartered Accountants, 2009), where the board and its executives must exercise a skilful approach to governance (Okpara, 2010) and have competence and ability to challenge management preferences and monitor performance. Through an effective and competent monitoring board, which

understands the industry environment, executive members are able to monitor demand and supply, trends and forecasts, and act proactively by carefully considering capacity building in terms of the firms earning potential (Henderson & Cool, 2003). Board involvement in decision controls includes non-routine decision-making, resource allocations and strategic decisions that could affect the long-term performance of the organisation (Cutting & Kouzmin, 2002).

Recent studies have focused on the complexities of CGS and board commitment required towards building integrity in order to execute their responsibility (Windsor, 2009). Consequently, the need to focus on the qualities of governing boards' and executives' capabilities, the evaluation of boards and executives' professional expertise and qualifications, the experiences and integrity of the directors (Rossouw *et al.*, 2002), issues of information provision, transparency, transformation, monitoring, reporting, knowledge and competence (Esser & Dekker, 2008), as well as the extent of board and executive participation in management controls, in organisations where corporate entrepreneurial activities take place, is pivotal (Filatotchev & Nakajima, 2010; Naldi *et al.*, 2007).

In the corporate context, an effective board is one that can efficiently implement its role and responsibilities (Nicholson & Kiel, 2004), show commitment to the successful execution of the organisations' entrepreneurial strategic decisions (Mustakallio, Autio & Zahra, 2002), and review and approve strategic plans, risk management, valuation of capital commitment and take complex decisions (Kor & Sundaramurthy, 2009). The absence of qualified board and executive members may negatively impact the ability of the board to perform effectively, particularly as trends indicate that boards of directors have been grossly undermined by shareholders in terms of appointments and recruitment (Allcock & Filatotchev, 2010; Ensley, Pearson & Amason, 2002; Larcker & Tayan, 2011). One of the basic considerations in appointing and recruiting executives is to ensure a high quality and knowledgeable board that understands the organisations' core competencies and its own distinct roles and responsibilities to achieve long-term performance (Mwenja & Lewis, 2009).

The knowledge and experience that board and executive members possess has a direct impact on how governance principles are applied and organisational goals achieved (Pukthuanthong & Sundaramurthy, 2009). Moreover, for boards and executives to effectively perform their duties, they need to have the requisite capabilities, general knowledge and expertise (Kor, 2003), which, in turn, will reflect on their ability to position the organisation in terms of adopting an EO.

Corporate governance and the process of managing, controlling and monitoring of operational activities are diverse in nature and context specific (Cutting & Kouzmin, 2002). Recognising the multifarious nature of corporate governance, the construct is best conceptualised as

multidimensional, reflecting the guidelines, as pointed out in King III Report (IOD, 2009; SAICA, 2009), and consisting of the following four dimensions (Cutting & Kouzmin, 2002; Ogbechie, 2009):

- Board effectiveness and its competence in diagnosing and evaluating events and trends in the larger environment that may present specific entrepreneurial opportunity for the organisation.
- Directors' and executives' knowledge and experience in the organisational strategic issues, such as the organisations' competitive position in the industry environment and the directors' and executives' ability to examine performance and how well the organisation is doing on long-term entrepreneurial goals.
- Board commitment and recognition of complexities to foster effective decision-making and help reverse failed initiatives and policies.
- Board involvement in decision controls, such as reviewing and rectifying entrepreneurial opportunities, threats and risks to which the organisation may be exposed.

Prior literature on GCS has focused on ownership structure, agency-related issues and alternative structures for the board of directors. This narrow focus on traditional issues of CGS does not adequately address how elements of governance structures may support or hinder corporate innovation, risk-taking and proactive behaviour in the face of technological change and environmental uncertainty (Core, Holthausen & Larcker, 1999; Cutting & Kouzmin, 2002; Diochon, 2010; Ensley *et al.*, 2002).

Investigating the oil and gas industry, several researchers (Armour & Teece, 1978; SAPIA, 2009) find that a key part of a technological and innovative strategy is the interaction of that strategy with the ventures' external environment (Zahra & Bogner, 1999). Miller and Meelis (2005) report that the period post-1994 introduced changes in South African legislation which had a significant negative effect on this industry. The oil and gas industry is constantly faced with the challenges of technological advancement, capacity expansion, innovation in alternate products, and faces a high degree of market, environmental and regulatory uncertainty (SAPIA, 2009). When the environment is characterised by complexity and dynamism, firms have to anticipate future scenarios and develop proactive EO strategies to counteract ambiguous and unstructured surroundings (Allen & Stearns, 2004). Moreover, many firms that wish to adopt entrepreneurial behaviour may be negatively affected if the organisations' CGS do not support EO (Henderson & Cool, 2003). Gabrielsson (2007) finds that an active board and executives can have a strong influence on an organisation's value-creation ability through their commitment to take an entrepreneurial posture. Similarly, Drew, Kelly and Kendrick (2006), propose that researchers adopt an integrated approach to manage corporate risk, which enhances board and executives' knowledge and competence to handle complexities of risk in meeting strategic organisational goals.

Entrepreneurial orientation

In an emerging economy such as South Africa, one of the primary goals of an organisation is growth and this can be achieved by continuously innovating in the face of growing global challenges (Urban, 2010). Entrepreneurial orientation is one of the prerequisites for organisational success, where Fang, Yuli and Hongzhi (2009) point out that any organisation with high levels of EO tends to be innovative and encourages creative initiatives in new products and service development, particularly in the space of advancement of new technologies and novel ideas. Entrepreneurial orientation incorporates firm-level processes, practices and decision-making styles (Lumpkin & Dess, 1996) where entrepreneurial behavioural patterns are recurring (Covin & Slevin, 1991; Dess & Lumpkin, 2005). The theoretical basis of the EO construct lies in the assumption that all firms have an EO, even if levels of EO are very low.

The extant organisational research provides theoretical support for the EO construct, in both the fields of entrepreneurship and strategic management. The EO construct is salient not only for large organisations but also for small and medium-sized organisations, under different stages of economic development, in varied cultural contexts (for a detailed review of EO, see Urban, 2011). Table 1 provides a consolidation of how the entrepreneurship phenomena have been conceptualised in previous studies and is made manifest in organisations.

Extensive research confirms that EO has three dimensions: innovativeness, risk-taking, and proactiveness (Covin & Slevin, 1989, 1991, 1997; Kreiser *et al.*, 2002; Lumpkin & Dess, 1996).

Innovativeness is the fundamental posture of an entrepreneurial organisation in terms of developing new products or inventing new processes (Drucker, 1979; Schumpeter, 1934). Innovativeness as an attribute describes an organisations' willingness to add newness with added value. Consequently, the first hypothesis is formulated to reflect the innovation dimension of EO as it relates to the different dimensions of CGS:

- **Hypothesis 1:** The EO dimension of innovation is positively related with the levels of board effectiveness, knowledge, commitment and involvement.

Risk-taking is associated with the willingness to commit significant resources to opportunities and to take calculated business risks (Aloulou & Fayolle, 2005). Risk-taking, according to Voss, Voss and Moorman (2005), is a commitment to experimentation in the face of uncertainty. The second hypothesis is informed by the risk-taking dimension of EO, where it is expected that:

- **Hypothesis 2:** The EO dimension of risk-taking is positively related with the levels of board effectiveness knowledge, commitment and involvement.

Proactiveness is perseverance in ensuring initiatives are implemented and is concerned with adaptability and tolerance of failure. This leads to the third hypothesis, where:

TABLE 1: Summary of entrepreneurial phenomena in established organisations.

Author	Focal entrepreneurial phenomenon	Locus of entrepreneurship	Relationship between entrepreneurship phenomenon and strategy	Causally adjacent antecedents of the entrepreneurial phenomenon	Causally adjacent outcomes of the entrepreneurial phenomenon
Burgelman (1983)	ICV	Corporate management, new venture division management, group leader or venture manager	Corporate strategy can be extended to accommodate new business activities resulting from ICV	Structural context –organisational and administrative mechanisms used implement the current corporate strategy	Corporate strategy changes
Covin and Slevin (1991)	EO	Not specified	Reciprocal relationship between EO and strategy	Firm performance, strategic variables, managerial and organisational variables	Firm performance, strategic variables, environmental variables, managerial and organisational variables
Dess <i>et al.</i> (2003)	Sustained regeneration, organisational rejuvenation, strategic renewal, domain redefinition	Not specified	Not specified	Prior organisational knowledge	Acquisitive and experimental organisational learning
Floyd and Lane (2000)	SR	Top-level, middle-level and operating-level managers	SR process leads to change in strategy	Microenvironment, competitive environment, organisational control systems	Microenvironment, competitive environment, organisational control systems
Guth and Ginsberg (1990)	ICV and SR	Not specified	Strategy directly affects ICV and SR	Environmental variables, strategic leaders, organisation conduct or form variables, firm performance	Firm performance
Hornsby, Naffziger, Kuratko and Montagno (1993)	Individual-level entrepreneurial behaviour	Individual or organisational members	Not specified	Organisational characteristics, individual characteristics, precipitating event	Business and feasibility planning
Kuratko, Hornsby and Goldsby (2004)	Individual-level entrepreneurial behaviour	Individual or organisational members	Individual-level entrepreneurial behaviour affects and is affected by strategy, both indirectly (organisation is mediator)	Organisational antecedents – rewards, management support, resources, organisational boundaries, work discretion or autonomy	Intrinsic and extrinsic individual-level outcomes, financial and behavioural organisational-level outcomes
Kuratko, Ireland, Covin and Hornsby (2005)	Individual-level entrepreneurial behaviour	Middle-level managers	Not specified	Organisational antecedents – management support, work discretion or autonomy, rewards and reinforcements, time availability, organisational boundaries	Various possible individual- and organisational-level outcomes
Lumpkin and Dess (1996)	Entrepreneurial orientation	Not specified	Strategy and EO are distinct, non-casually related phenomena	Not specified	Firm performance
Urban and Barreira (2010)	Entrepreneurial orientation	Top level management serving as a proxy for firms	Reciprocal relationships between EO and technology orientation	Firm performance, individual and organisational variables	Firm performance and competitive capability of firms
Urban (2011)	Organisational corporate level strategy	Top and middle level management serving as a proxy for firms	Elements of organisational architecture associated with corporate entrepreneurship strategy	Firm performance, and organisational variables	Firm's competitive capability and growth indicators

Source: Adapted from Ireland, R.D., Covin, J.G., & Kuratko, D.F. (2009). Conceptualizing corporate entrepreneurship strategy. *Entrepreneurship Theory and Practice*, January, 22. <http://dx.doi.org/10.1111/j.1540-6520.2008.00279.x>

ICV, Internal corporate venturing; EO, Entrepreneurial orientation; SR, Strategic renewal.

Note: For more information, please see the full reference list of the article, Molokwu, V.B., Barrera, J., & Urban, B. (2013). Entrepreneurial orientation and corporate governance structures at the firm level in the South African oil and gas industry. *SA Journal of Human Resource Management/SA Tydskrif vir Menslikehulpbronbestuur*, 11(1), Art. #443, 15 pages. <http://dx.doi.org/10.4102/sajhrm.v11i1.443>

- **Hypothesis 3:** The EO dimension of proactiveness is positively related with higher levels of board effectiveness, knowledge, commitment and involvement.

These dimensions have been extensively documented and, according to Lumpkin and Dess (1996), all the dimensions are central to understanding the entrepreneurial process, although they may occur in different combinations, depending on type of entrepreneurial opportunity the firm pursues. Firms can only be labelled as entrepreneurial if they are simultaneously risk-taking, innovative and proactive (Covin, Green & Slevin, 2006). These separate hypotheses are formulated to discern if any associations are significant, based on each of the EO dimensions as well as on an aggregate overall EO score. The formulation of the hypotheses allows for the testing of both one-dimensional and multidimensional levels of these constructs.

Research design

Research approach

This research relies on a quantitative, cross-sectional empirical approach which is based on primary data sources. The context of the study is the South African oil and gas industry. By focusing on a single industry sector, a greater homogeneity of context is achieved which addresses the concerns of broad applicability versus perfect suitability for narrower groups. Studies across industries often produce results that apply to all, whilst applying to none at the same time (Davidsson, 2004), because they only capture a tiny fraction of each firm's manifestation of EO. Consequently, the focus is on a single industry. The important issue about sampling, in general, is not statistical but theoretical representativeness; that is, the elements in the sample represent the type of phenomenon about which the theory makes statements (Davidsson, 2004).

A research design involving a Web-based self-reporting survey instrument was administered, which was sent to a select sample of board members and executives in the South African oil and gas industry. The survey was distributed via SurveyMonkey (<http://www.surveymonkey.com>), which was selected principally because of its functionality and, more importantly, because it was considered suitable for the target population of key company decision-makers who are likely to use online resources regularly.

Research method

Research participants

The South African oil and gas industry represented the target population for this study. The sampling frame was derived from a dataset collected from International Business Monitor specialist publishers, who maintain a business information database on global emerging markets in more than 125 countries worldwide. These publications – the South Africa Oil and Gas Alliance and Vibrant Media register – maintain a decision-makers database of organisations across the South African oil and gas industry (SAPIA, 2009). Based on this sampling frame, 425 board members and executives across the oil and gas industry, ranging from executive and non-executive directors, chief executive officers (CEOs), company secretaries and the top management team members, were surveyed using non-probability sampling. A total of 173 boards, executives and senior decision-makers responded, representing a response rate of 40.7%. A number of respondents indicated that not all items were applicable to their situation and subsequently these responses were assigned as missing data, rendering a final sample of 119 complete responses.

Measuring instrument

The research survey design was a self-reporting online closed questionnaire consisting of two sections (see Appendix). Care was taken to ensure clarity in terminology and to ensure that the items of the questionnaire addressed each of the hypotheses.

Section A of the instrument was designed to reflect the theoretical dimensions of CGS, which included variables on board effectiveness and competence, knowledge and experience, commitment and recognition of complexities, involvement in strategic decision-making processes and monitoring and control, which was made up of 43 items. These items were measured using a seven-point scale, from 1 (*strongly agree*) to 7 (*strongly disagree*), with numbers 2 through 6 depending upon their best estimate of an intermediate position (see Appendix).

Section B of the instrument was designed to reflect the EO dimensions of innovation, risk-taking and proactiveness, consisting of nine items. Many alternative EO conceptualisations are to be found (Brown, Davidsson & Wiklund, 2001) and have demonstrated some usefulness; however, as Davidsson (2004) suggests, using the existing

EO measure has the advantage of theoretical backing, a multidimensional construct and theoretically meaningful relationships established in previous studies, thus allowing for more refined knowledge to evolve. Consequently, EO was measured along a seven-point bi-polar Likert scale, with nine items representing the three dimensions of innovativeness, proactiveness, and risk-taking. Respondents had to circle number '1 if the statement on the left-hand side of the scale best described their reaction to the question', or circle number '7 if the statement on the right-hand side of the scale best described the reaction to the question' (see Appendix). Previous studies (Urban, 2010) have established EO scale validity in the South African context; however, EO scale reliability was re-tested for this sample of respondents.

Consistent with previous studies (Wiklund, 1999) control variables included, firm age, firm size in terms of employee numbers, the position currently occupied by the respondent, the respondent's number of years in current position, and the board size and its composition.

In order to ensure the instrument had face and content validity, a preliminary analysis via a pilot test was undertaken. This process allowed the researcher to refine the questionnaire design to maximise responses. This procedure ensured that the respondents had no difficulties in answering the questions and there was no problem in recording the data.

Research procedure

Data were collected by means of an online mail survey questionnaire administered to the target sample. A personalised letter accompanied each questionnaire, explaining the aim and objectives of the research and assuring the respondent of the confidentiality of the responses. A follow-up request was sent out approximately two weeks after the initial survey.

Statistical analysis

Data analysis was conducted, where descriptive and inferential statistics were calculated using the STATISTICA software system, version 10 (2011).

Initially, demographic profiles of the respondents were calculated using frequency distributions and corresponding graphs, followed by an examination of the scale reliabilities. Descriptive statistics included calculating measures of central tendency (the mean and median values, variability), the standard deviation, range and distribution shape (skewness and frequency distributions) and internal consistency reliability of the scales, by reporting on their Cronbach's alpha values. Negative skewness values indicated a clustering of scores at the high-end of the scale. The Kolmogorov-Smirnov, Lilliefors, and Shapiro-Wilks tests were used to check for normality of data distributions and rendered a significant *p*-value of 0.000, which revealed that normality assumptions had been violated, which is quite common in large samples. Transformations of the score distributions were computed in an attempt (though unsuccessful) to transform the negatively

TABLE 2: Profile of the respondents.

Question	Variables	Response count	Response %
Respondents' position at company	CEO	12	10.1
	Executive director	26	21.8
	Non-executive director	7	5.9
	Company secretary	3	2.5
	Top manager	27	22.7
	Senior decision-maker	32	26.9
	Others	12	10.1
	Total	119	100
Respondents' principal line of business	Gas	13	11.9
	Petrochemical	17	15.6
	Refining	17	15.6
	Construction and pipeline	7	6.4
	Logistics	18	17.3
	Trading and marketing	14	12.8
	Exploration	19	17.4
	Engineering and ITC	14	12.8
		Total	119

CEO, chief executive officer; ITC, information technology centre.

skewed score distribution into normally distributed scale. With a reasonably large initial sample size as used in this study ($n = 119$), skewness will not make a substantive difference in the analysis (Tabachnick & Fidell, 2007).

Consequently, the hypotheses were tested using a Pearson correlation analysis, where the corresponding scatter plots were scrutinised. Moreover, canonical correlation analysis was also employed as additional analyses, because this technique can accommodate any metric variable without a strict assumption of normality (Hair, Black, Babin & Anderson, 2010). Canonical correlation analysis allows for multiple measures to be summarised into variates or linear combinations of variables with optimised weighting, extracting maximum variance from the original measures (Hair *et al.*, 2010).

Results

Frequencies and percentages of respondent characteristics are presented in Table 2. The table is self-explanatory and reveals a diverse profile of board members from a diverse set of businesses in the oil and gas industry.

Descriptives were calculated for the content section of the instrument which comprised the CGS and EO scales. Each of these scales' dimensions in terms of values of central

tendency, variability, skewness, and internal consistency is shown in Table 3. These summary statistics show that the values of the means and medians of all the scales are skewed towards the high end of the 1–7-point Likert scale, indicating agreement with the item. Thus the responses to these scales are generally positive or very positive, an observation consistent with the skewness of the scales. Internal consistency reliability coefficients, as measured by Cronbach's coefficient, are all well within the accepted norm of 0.70 (Nunnally, 1978). The average inter-item correlations for the items reflect average to high scores, suggesting that the sub-scales measure the same construct (Hair, Black, Babin & Anderson, 2011).

To test the hypotheses, the Pearson correlations coefficients were calculated for each of the scale dimensions (Table 4). All of the correlations are highly significant ($p < 0.001$), providing support for all of the hypotheses in terms of positive associations between the dimensions of EO and CGS. Figure 1 provides the matrix plot in terms of the correlation matrix, where there is a preponderance of observations in the top right corner of each scatter plots. However, these points are not considered to be extreme values or outliers and thus are not considered to have created a spurious correlation as the overall direction of the relation in each case is generally consistent for points across the entire range of each scale.

In view of the theoretically multivariate nature of both the CGS and EO constructs and, as mentioned, the skewness of these scales, canonical correlation was used to further analyse the hypotheses. Canonical correlation analysis is viewed as a logical extension of multiple regressions as the latter involves a single dependent variable (Hair *et al.*, 2011). The objective of the canonical analysis was to correlate simultaneously the four dimensions of CGS with the three dimensions of EO. This is achieved via the construction of an optimally weighted linear combination of the four dimensions of CGS and a second optimally weighted linear combination of the three dimensions of EO in a manner that maximises the correlations between the two sets of variables.

The value of the canonical correlation is high at $R = 0.860$ and is interpreted as the simple correlation between the weighted sum of the scales of CGS and EO. The canonical

TABLE 3: Descriptives for corporate governance systems and entrepreneurial orientation scales.

Construct	Construct dimensions	Valid <i>N</i>	Mean	Median	Minimum	Maximum	SD	Skewness	Cronbach alpha	Average item correlation
CGS	Board effectiveness	119	5.27	5.11	2.11	7.00	1.13	-0.43	0.84	0.45
	Knowledge	119	5.80	6.11	1.00	7.00	1.22	-1.76	0.93	0.65
	Commitment	119	5.79	6.08	2.08	7.00	0.99	-1.81	0.90	0.54
	Involvement	119	5.28	5.50	2.36	6.43	0.72	-2.11	0.81	0.35
EO	Innovation	119	5.78	6.11	1.44	7.00	1.07	-2.06	0.89	0.59
	Proactiveness	119	5.69	6.09	1.73	7.00	1.15	-1.92	0.74	0.33
	Risk-taking	119	5.06	5.33	1.33	6.33	0.84	-2.26	0.94	0.76

CGS, Corporate governance systems; EO, entrepreneurial orientation; *N*, used to indicate number of respondents; SD, standard deviation.

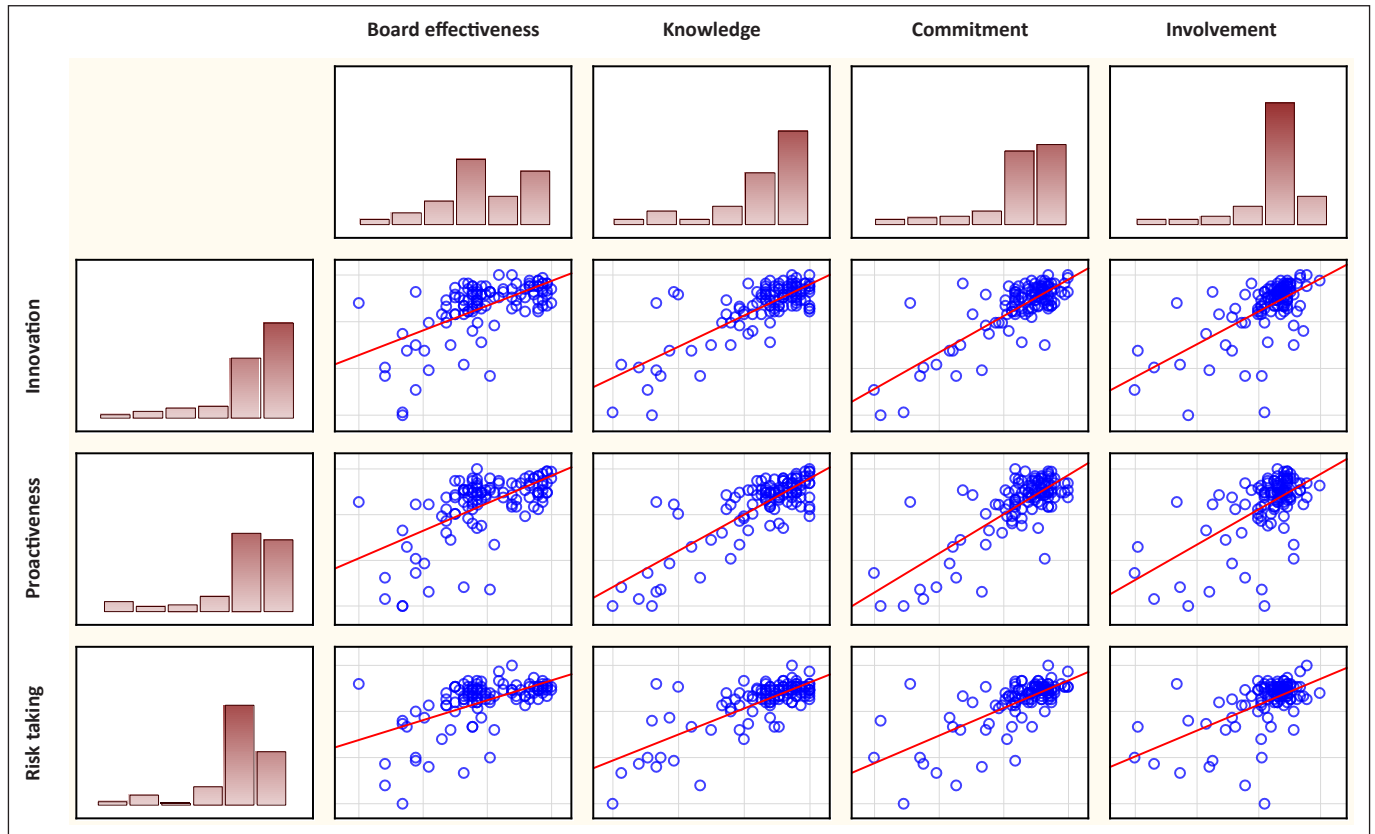


FIGURE 1: Matrix plot for the linear relations between corporate governance systems and entrepreneurial orientation dimensions.

TABLE 4: Correlation matrix for corporate governance systems and entrepreneurial orientation dimensions.

Dimensions	Innovation	Proactiveness	Risk-taking
Board effectiveness	0.61*	0.61*	0.57*
Knowledge	0.79*	0.82*	0.76*
Commitment	0.81*	0.77*	0.70*
Involvement	0.64*	0.62*	0.58*

$n = 119$.

*, Correlation is significant at the 0.001 level (2-tailed).

R is the overall multivariate correlation between the two sets of variables (Figure 2). Moreover, the canonical R -square value of $R^2 = 0.732$, which shows that almost three-quarters of the variance in the two sets of variables have been accounted for by the first canonical root. This is considered substantial as the summary measure has accounted for most of the variance in the two data sets, as delineated by the weighted sum of the scales of CGS and EO. Moreover, the variance extracted by all the canonical roots is high for each set of variables (89.73% and 100% for CGS and EO, respectively).

The factor structures of the first linear combination of the summarised CGS variables show that knowledge, followed by commitment, are the most strongly represented dimensions in the composite measure. The factor structure of the first linear combination of EO shows that innovation, proactiveness and risk-taking contribute similarly and strongly to the composite measure of EO (see Table 5). The redundancy indices of 54.78% and 65.61% for CGS and EO, respectively, show that approximately 55.00% of the

variance in the set of CGS variables and almost two-thirds of the variance in the set of EO variables can be accounted for by the canonical roots. In an attempt to try reduce the dimensionality of the four sub-scale scores of CGS to their common underlying dimension(s) or factor(s) and, similarly, to reduce the dimensionality of the three sub-scale scores of EO to their underlying common factor(s), factor analysis was employed in conjunction with the canonical correlation analysis. The factor scores – that is, the weighted combinations of the respective scale scores for CGS and EO – were highly correlated. A correlation of $r = 0.84$ between the CGS factor score and the EO factor score is almost the same as the canonical score of $R = 0.86$. These results have validated the canonical correlation scores by again showing a correlation of almost identical strength between the factor scores of CGS and EO. These combined results provide support for all of the hypotheses in terms of positive associations between the various dimensions of EO and CGS.

In summary, the multivariate canonical root analysis and factor analysis can be regarded as having both produced an adequate summary of the two sets of measures. Both techniques independently revealed a single dimension underlying the CGS scale and a single dimension underlying the EO scale, with canonical analysis arriving at a factor structure for latent roots and the factor analysis providing a factor structure for the underlying factors. Moreover, the results derived from both the canonical analysis and factor analysis reflect highly positive and significant correlations between the hypothesised constructs.

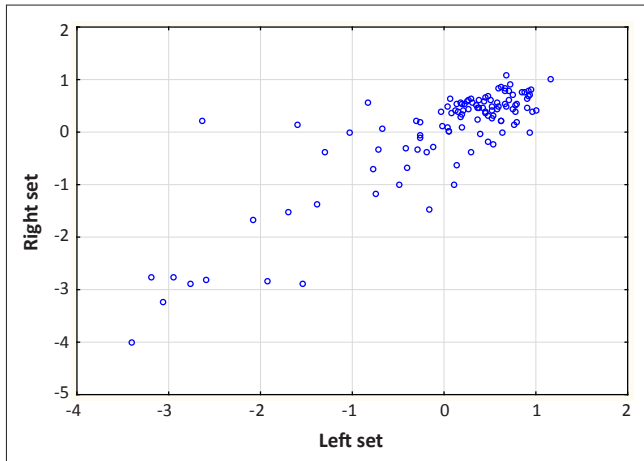


FIGURE 2: Canonical variance between the weighted sum of the scales of corporate governance systems and entrepreneurial orientation.

TABLE 5: Factor structure of the first root of corporate governance systems and entrepreneurial orientation.

Variables	CGS	EO
Knowledge	0.976534	-
Commitment	0.945164	-
Involvement	0.758205	-
Board effectiveness	0.738787	-
Proactiveness	-	0.973359
Innovation	-	0.963181
Risk-taking	-	0.892665

CGS, Corporate governance systems; EO, entrepreneurial orientation.

Ethical considerations

The research relied on a survey and formal protocols were followed to ensure ethical standards were maintained. No vulnerable categories of participants were surveyed nor were any participants or researchers exposed to any potential risks or harm that they would not otherwise be exposed to. Similarly, anonymity was guaranteed in questionnaires, with all data being kept confidential and safe from unauthorised access once it had been collected. Participants were informed that they have the right to remain anonymous in the final report.

Discussion

The primary focus of this study is to determine if any potential links between the dimensions of EO and CGS exist in a sample of firms in the South Africa oil and gas industry. This industry is constantly faced with the challenges of technological advancement and a need for innovation in alternate products, which necessitates robust corporate governance structures. Under these circumstances, it is suggested that boards, executives and decision-makers are able, through their effectiveness, commitment, knowledge and involvement, to create and develop initiatives that will allow for stronger linkages to be more entrepreneurially oriented. The results emanating from this study confirm earlier research that boards and executives play a pivotal role in developing and monitoring an organisation's capacity and ability to be entrepreneurially oriented (Naldi *et al.*, 2007).

Based on the empirical results of this study, all of the hypotheses are fully supported, where significant associations between the dimensions of EO and CGS are found. Moreover, the strength of the correlations between the dimensions of EO and dimensions of CGS reveal that board knowledge, followed by commitment, are the most strongly associated with the EO dimensions of innovation, risk-taking and proactiveness. The importance of these variables resonates with previous research, which finds that EO is more advanced where there are high levels of board commitment (Cutting & Kouzmin, 2002). Commitment of time and cognitive energy is required by boards and executives for the effective fostering of EO. Pro-entrepreneurship organisational architectures are likely to take shape when there is an entrepreneurial strategic vision endorsed by the board and top management that encourages entrepreneurial thought and action throughout the organisation (Morris & Kuratko, 2002).

A deep and thorough understanding of the association between CGS and EO is important not only for academic purposes but because the subject has salience for practitioners. These implications relate to the profitability and competitiveness of the firm. As opportunities drive strategy, almost any opportunity is relevant to the firm. Once an opportunity is identified, resources are needed to exploit it. An entrepreneurial firm attempts to maximise value creation by exploiting opportunities, whilst minimising the resources required to support such entrepreneurial initiatives. The resources are the starting point and only opportunities that relate to existing resources are relevant to the firm. Commitment to opportunity is related to strategic action at the board level. Research on entrepreneurial behaviours and opportunity is well documented, where opportunity-focused firms are innovative and creative and where the propagation of new ideas is encouraged at this top-management level (Kuratko & Audretsch, 2009). The present study results confirm that board commitment of resources and control of resources is pivotal to fostering higher levels of EO.

Furthermore, firms match strategy-making (micro level) with board level strategic dynamics (macro level) to exploit existing core business opportunities or explore potential new growth opportunities (Burgelman & Grove, 2007).

To ensure alignment between EO and CGS, corporate boards supportive of entrepreneurship must institutionalise appropriate reward systems and management support structures and help formulate explicit goals and relevant organisational values which signal to employees that entrepreneurial behaviour is desirable. For EO to become a meaningful conduit for a corporation's value creation activities, it cannot be confined to a specialist function within the organisation. Entrepreneurial orientation needs to permeate the entire organisation, where organisations pursuing EO are likely to exhibit a cascading yet integrated set of entrepreneurial actions at the board, senior, middle, and first-levels of management, with managers across levels being jointly responsible for their organisation's entrepreneurial actions (Hornsby, Kuratko, Shepherd & Bott, 2009).

Generally, research on EO and governance in Africa as a whole may be considered as valuable, as very few empirical studies have been previously conducted which focus on the nexus of CGS and EO. In developing economies, where growth is often the primary goal of organisations, EO in firms can be particularly critical for firm profitability and survival (Antoncic & Hisrich, 2001). One major characteristic of firms in emerging markets is that established firms are being transformed into market-oriented enterprises. As the economy becomes more market-based, it is necessary for these reformed enterprises to undergo an entrepreneurial transformation at the organisational level in order to adapt to the transitioning institutional environment and maintain competitiveness in both local and global markets. The majority of research in EO and CGS has been conducted in the USA and, with the relevance of international entrepreneurship being recognised (Jantunen, Puumalainen, Saarenketo & Kylaheiko, 2005), the importance of further interrogating EO in an emerging country context is important. There is a need for further theorisation and empirical analysis of these different constructs under different contexts. Such investigations allow researchers to compare and examine different associations between CGS and EO under different environmental contexts (Bosma, Stam & Wennekers, 2010).

Limitations of the study

A limitation of the article is that a cross-sectional study loses the dynamic aspects of EO, which prevents conclusions about causal relationships from being drawn. The study also has typical survey design limitations, in that data were obtained from a self-administered questionnaire, where self-serving bias may have influenced the responses. In order to reduce social desirability in reporting high levels across questions, the survey instruction emphasised honesty for self-assessment. The results must also be interpreted with the observation that other contingencies are not incorporated in the study, particularly as they relate to measurement issues. Future research could examine possible mediating and moderating effects of board size, composition on the relationship between the dimensions of CGS and EO.

Conclusion

The present study links directly into the research pipeline which suggests that EO within organisations is a fundamental posture, instrumentally important to strategic innovation, particularly under shifting external environmental conditions. A contribution is made by extending current knowledge of the EO construct by linking it with different dimensions of a firm's CGS. The results provide support for the hypotheses that boards, executives and decision-makers are able to link higher levels of firm EO, through the CGS dimensions of effectiveness, commitment, knowledge and involvement.

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Competing interests

The authors declare that they have no financial or personal relationship(s) which may have inappropriately influenced them in writing this article.

Authors' contributions

B.U. (University of Witwatersrand) was the project leader, J.B. (University of Witwatersrand) was responsible for project research design and V.B.M. (University of Witwatersrand) wrote the manuscript as part of his Masters dissertation.

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Appendix starts on the next page →

Appendix: Instrument

Section A: Board effectiveness on competence that shapes firm's strategic entrepreneurial direction

For each statement below, please indicate your strength of agreement:

1. The board sets clear organisational priority on entrepreneurial activities for the year ahead.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

2. The governing board of my firm delays actions until issues become urgent and critical.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

3. Our governing board tends to focus more on current concerns than on preparing for technological changes that would enhance creative ideas and innovation.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

4. The board of directors often discusses and initiates where the organisation should be headed in three years or more on technological, product-market or administrative innovation.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

5. Within the past year, the governing board of my firm has reviewed the organisation's strategies for attaining its long-term goals ahead of competitors on capacity expansion.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

6. The board discusses and initiates events and trends in the larger environment that may present specific entrepreneurial opportunities for my firm.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

7. The governing board converts unsuccessful novel ideas into more creative and innovative ones.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

8. When faced with an important issue, the board often arrives at a solution by generating several creative and tested approaches through R&D.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

9. The board influences the involvement, of employees at all levels in entrepreneurial activities within my firm.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

Section A: Professional knowledge and experiences

The Governing Board members of my firm:

1. Have enough experience to detect problems on directors' involvement in the process of fostering entrepreneurial orientation within the organisation.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

2. Have enough training to detect problems on directors' involvement in the process of fostering entrepreneurial orientation within the organisation.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

3. Have expertise sufficient to allow the board to add value to the decision-making process.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

4. Are fully aware of the competitive position of my firm.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

5. Are well versed in the organisational and strategic issues of my firm.

Strongly disagree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Strongly agree

6. Are well experienced in the industry environment in which we operate.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

7. Have a retreat or special session at least every two years to examine performance on long-term entrepreneurial goals.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

8. Initiate directors' involvement in skill transformation and training on individual employees' entrepreneurial capabilities across different segments of my firm.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

9. Periodically set aside time to learn more about issues facing directors and managers in process of risk-taking, development of new initiatives and implementation of changes that will enhance entrepreneurial activities within the firm.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

Section A: Board commitment and recognition of complexities

The Governing Board members of my firm:

1. Take regular steps to keep informed of important trends in the industry that might affect the organisations' technological and innovative initiatives.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

2. Explicitly examine the risks of any important decision it is about to make.

Strongly disagree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Strongly agree

3. Seek information related to innovation and technological advancement from leaders of other similar organisation outside their operating environment.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

4. Attend meetings regularly.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

5. Are always well prepared when they attend meetings.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

6. Have reasonable information before being asked to ratify major unsuccessful and failed entrepreneurial initiatives.

Strongly disagree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Strongly agree

7. Always conduct substantive and thorough discussions of key issues during board meetings.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

8. Usually debate strategic decisions openly and constructively during meetings.

Strongly disagree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Strongly agree

9. Actively provide insight, advice and support on key decisions.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

10. Are always attuned to the concerns of a variety of stakeholders.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

11. Commit themselves sufficiently to foster effective decisions and reverse failed initiatives and policies.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

Section A: Board involvement in decision control

Board involvement in decision controls are defined for the purpose of this study, as non-routine, resource allocation and strategic decisions that should affect the long-term entrepreneurial

orientation and performance of the firm. Based on that introductory definition, please indicate your strength of agreement on your firm's board's general level of involvement in entrepreneurial decision-making.

1. The board is usually involved in formation and determining the firm's vision and mission that guide entrepreneurial strategic decisions.

Strongly disagree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Strongly agree

2. The board is usually involved in determining, reviewing and ratifying entrepreneurial strategic proposals that are initiated by top management.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

3. The board is usually involved in determining and enforcing changes in firm's policies.

Strongly disagree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Strongly agree

4. The board is usually involved in reviewing and evaluating entrepreneurial opportunities, threats and risks that the firm is exposed to.

Strongly disagree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Strongly agree

5. The board is usually involved with strategic innovative decisions with top management.

Strongly disagree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Strongly agree

6. The board is usually involved in determining business unit venturing, strategies and plans.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

7. The board is usually involved in ensuring appropriate organisation structure and entrepreneurial capabilities.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

8. The board usually accepts the evaluation given to it by top management without asking any probing questions.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

9. The board is usually involved with monitoring the progress of strategic decisions.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

10. The board is usually involved in determining the firm's ability to sustain long-term growth and investor value under well-defined objectives and best practices.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

11. The board is usually involved in strategic decisions with top management in investing heavily in cutting edge process technology-oriented R&D.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

12. The board is usually involved with top management in determining development systems that encourage initiatives and creativity amongst employees.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

13. The success of my firm on issues relating to innovation, creative initiatives and pioneering new ideas is in the hands of key decision-makers who were in my firm three years ago.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

14. The success of my firm on issues relating to innovation, creative initiatives and pioneering new ideas is in the hands of key decision-makers in my firm today.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

Section B: Measurement scales and items for entrepreneurial orientation

The following statements are meant to identify the collective management style and involvement on your firm's key decision-makers on entrepreneurial orientation. For each statement below, please indicate your strength of agreement.

In general, the Governing Board and Top Management of my firm favours:

1. Adopting creative methods of running business ahead of competitors.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

2. Introducing new products or technological capabilities ahead of competitors.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

3. Expanding capacity ahead of competitors.

Strongly disagree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Strongly agree

4. Clashing with competitors and adopting a very competitive, 'undo-the-competitors' posture.

Strongly disagree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Strongly agree

5. Continuously seeking opportunities (such as new market, new customers) related to the operations and technologies.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

6. Sponsorship of novel ideas by bearing the cost associated with unforeseen technological problems and failure in (new markets/customers resistance).

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

7. Striving to be a 'first mover' to capture the benefits of industrial pioneering.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree

8. Sharing knowledge and information on the downside of a 'first mover', such as customer's resistance to novel ideas.

Strongly disagree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Strongly agree

9. Close monitoring of technological trends and identifying future needs.

Strongly disagree

1	2	3	4	5	6	7
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 Strongly agree