SUSTAINABLE CORPORATE ENTREPRENEURSHIP INITIATIVES: A RISK AND REWARD ANALYSIS

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Abstract. Earlier studies recognize the importance of corporate entrepreneurship towards achieving a sustainable competitive advantage. This study proposes that the likelihood of individual participation in corporate entrepreneurship initiatives is contingent upon individual perceptions of rewards and risks. The research presents different scenarios, and tests several attributes that influence the decision to participate. Conjoint analysis utilisation simulates a real life situation where scenario analyses in varying combinations in terms of their intensity levels take place. The results indicate the most important attribute influencing the decision to participate is the probability of venture success followed closely by financial reward. As expected, job risk, pay risk and required effort are deterrents to participation; and individuals with past entrepreneurial experience are less concerned about job risk and have a higher positive perception regarding the probability of corporate venture success.

Keywords: corporate entrepreneurship, participation, decision-making, conjoint analysis.

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Introduction

Firms in emerging markets face rapid institutional changes, reflecting their rapidly changing economic climate and changes in levels of government involvement, ownership patterns, and enforcement of business laws. Because of such changes, one of the primary goals of any organisation is growth, which can be achieved by continuously innovating in the face of growing global challenges (Adekola *et al.* 2008). In recent years, corporate entrepreneurship (CE) has been the focus of considerable research activity (Covin, Kuratko 2008; Ireland

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et al. 2009; Phan *et al.* 2009). With the scope of CE widening, organizations lacking prior entrepreneurial recognition are adopting CE in order to survive and succeed in increasingly competitive and financially constrained environments (Antoncic 2006; Kuratko, Audretsch 2009; Neill, York 2011; Phelps 2009). CE typically refers to an organization's commitments to pursuing new opportunities, creating new units or businesses, innovativeness in terms of products, services and processes, strategic self-renewal, constructive risk-taking and pro-activeness (Antoncic, Hisrich 2004). A deep and thorough understanding of CE is important not only for academic purposes but for also regarding salience for practitioners and policy makers. These implications relate to firm profitability and competitiveness as well as to the overall economic performance of industry and the national economy (Fitzsimmons *et al.* 2005; Bosma, Harding 2006).

Many firms look to CE as a way of combating the lethargy and bureaucracy that often accompany business size and cultural lock-ins (Burns 2004). Schindehutte *et al.* (2000) point out that the spirit of entrepreneurship permeating the organization is essential to ensure a continuous flow of innovation, and that entrepreneurship has become a specialized function within the organization. The appointment of specific individuals or teams that drive and stimulate entrepreneurial activities, such as the creation of new ventures, culminate in active change. A firm increases the success probability of a CE strategy if it possesses the skills required to structure (accumulate and strategically divest), bundle (successfully combine), and leverage (mobilize and deploy) its resources (Sirmon *et al.* 2007).

Primarily, research on CE focuses on the attributes that promote entrepreneurial action but to some extent ignores the different groups that exist within an organization or implicitly assumes a homogenous promotion of CE within organizations (Kuratko *et al.* 2005). Hornsby *et al.* (2009) propose that managers at various levels have different roles that provide a form of structural ability to implement entrepreneurial ideas. Organizations pursuing CE strategies are likely to exhibit a cascading, yet integrated, set of entrepreneurial actions at the senior, middle, and first-levels of management, with managers across levels sharing joint responsibility for their organization's entrepreneurial actions (Hornsby *et al.* 2009). Sung and Choi (2011) propose four agents of innovation – top management, external environment, innovation and employees – that play distinct roles in the adoption and implementation stages of CE. The success of ventures practising CE is often attributed to the keen participation and specialised skill sets that certain managers and employees bring to the venture (Hornsby *et al.* 2002), and the influence that workplace peers may have on individuals to be entrepreneurial (Nanda, Sorensen 2010).

The combination of knowledge, skills and judgements of interested and committed employees and managers (Allen *et al.* 1997), and in particular market and technology knowledge acquisition (Melnikas 2011) ensure the success of CE initiatives (Bojica *et al.* 2011). Recent research confirms that managerial level and employee participation is important in understanding CE actions (Hornsby *et al.* 2009), particularly where making sense of the future by relevant employees generates a more asserted approach to innovation (Fuglsang, Mattsson 2011). The decision to participate in CE initiatives includes rewards of various types, such as financial incentives, opportunities for future growth, intrinsic rewards such as a feeling of achievement, satisfaction from completing interesting and challenging work, and increased

decision-making autonomy. On the other hand, deterrents to participation include various risks (job risk, pay risk, risk of failure), foregone opportunity costs and extra effort requirements. At the firm level, the availability of resources, a supportive structure, innovation capability, size effect and organisational culture that is tolerant of failure are variables that are promote CE participation (Aramburu, Saenz 2011).

Based on the relative dearth of research on the attributes influencing employee participation in CE, this study considers perceptions of personal attributes that either promote or hinder CE action. From a practical standpoint, and in line with calls for further research (Hornsby *et al.* 2009), researchers argue that future applications of CE strategy need to be more concerned with two things. Firstly, the perception of managers and employees regarding reward and risk attributes that precipitate CE actions, and secondly, the characteristics that are likely to influence the decision to participate in CE ventures. Western economies have extensively documented the advantages of CE, market orientation, and learning orientation, but little research on these critical competitive enhancing practices is available on emerging economies (Liu *et al.* 2003).

By employing conjoint analysis, the study is able to determine empirically which criteria used in the decisions to participate in CE actions are significant. The CE's underlying structure is a result of the respondents' profiles formed by their judgments (Shepherd, Zacharakis 1997). The study achieves the following:

– The measurement of the relative importance attributable to CE participation, where the research proposes that there is a significant positive correlation between the mean part worth utilities attributable to (a) incentive sharing, (b) expectations of success, while there is a significant negative correlation between the mean part worth utilities attributable to (c) job risk, (d) pay risk, and (e) exerted effort;

– The conduction of a conjoint analysis, which is an underutilized method in entrepreneurship research (Lohrke et al. 2010), but has the advantage of partitioning decision-making processes into underlying respondent preferences for attributes;

– The assembly of a sample of over 140 employees and managers at different organisational levels takes place in an under researched geographical emerging market area – Johannesburg, South Africa;

– The provision of preliminary evidence that attributes of both rewards and risks influence the decision to participate in CE activity, and past entrepreneurial experience influences significant differences in these attributes.

The method of this paper relies on employing *dichotomous manipulations* (high and low levels of intensity) (Monsen *et al.* 2010), which allows the modelling of various effects of attributes such as, potential rewards, perceived venture success probability, requisite effort, and risks (Vlasenko, Kozlov 2009) which may influence the willingness of employees and managers to participate in CE actions. Respondents choose from various scenarios where several attributes are analysed in different combinations in terms of their intensity levels. By utilising conjoint analysis, the selected methodology resembles a real life situation more closely than questionnaires or interviews, as it places a respondent in a situation where numerous attributes come into play when taking a decision (Orme 2009).

From both an academic and practitioner perspective, the paper contains important implications where empirical evidence will contribute to theory building in the CE domain and provide practical guidance on how to optimise rewards and mitigate risks using a dashboard of possible attributes to encourage CE participation.

1. Corporate entrepreneurship

There are various descriptions of entrepreneurship in corporations, which have conceptual roots in innovation entrepreneurship (Schumpeter 1934) and innovation management (Drucker 1979). Terms that are more recent include intrapreneurship (Antoncic, Hisrich 2001; Kuratko 2002; Pinchot 1985), venture entrepreneurship (Tang, Koveos 2004), corporate intrapreneurship (Dess *et al.* 2003), strategic entrepreneurial posture (Covin, Slevin 1989), and internal corporate venturing (Hornsby *et al.* 2002). A longstanding literature has conceptualized CE as a multidimensional phenomenon that incorporates the behaviour and interactions of the individual, organizational, and environmental elements within organizations (Covin, Miles 2007; Dess *et al.* 1999; Kuratko *et al.* 1993; Morris *et al.* 1994; Morris, Kuratko 2002; Zahra 1993). CE actions include strategic renewal (organizational 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. All of these are important and legitimate parts of the CE process (Covin, Miles 1999; Kuratko, Welsch 2001; Morris, Kuratko 2002).

The importance of participation in CE initiatives has been recognised in earlier models, in that CE sustainability is contingent upon individual members undertaking innovative activities, which stimulate positive perceptions in top-level management, which in turn leads to further allocation of necessary organizational support and resources (Kuratko *et al.* 2004; Hornsby *et al.* 2009). Top-level managers are responsible for putting into place pro-entrepreneurship organizational architectures, i.e. where the workplace exhibits structural, cultural, resource, and system attributes that encourage entrepreneurial behaviour, both individually and collectively (Morris *et al.* 2008; Schindehutte *et al.* 2000). The few studies (primarily conceptual studies) that have explored managerial levels have emphasized the role of first-level managers in a 'bottom–up' process of CE (Burgelman 1983). On the other hand research suggests a counter-weight to this 'bottom–up' process with arguments and empirical evidence providing support for the notion that given a specific organizational environment, senior managers have greater structural ability to 'make more of' the conditions and thus implement a greater number of entrepreneurial ideas than do first-level managers.

The entrepreneurial perceptions of strategy makers are important as they will pursue a more explorative CE strategy in situations framed as positive, less controllable and yet knowable, where the environments are perceived as munificent and dynamic (Neill, York 2011). Popular methods for evaluating the level of CE in organisations include the corporate entrepreneurship assessment inventory (Hornsby *et al.* 2002), entrepreneurial management (Brown *et al.* 2001), and as a distinct construct – entrepreneurial orientation (Covin, Slevin 1989; Khandwalla 1977), all of which include the principle of rewards/reinforcement as a key determining attribute. One

of the major elements in developing pro-entrepreneurship organisational architecture is the appropriate use of rewards (Damanpour 1991; Hornsby *et al.* 2002; Ireland *et al.* 2009). In most human resource practices, the basic principle is that practices differing in kind are complementary in sustaining innovation, in particular those infusing powerful individual incentives co-applied with practices infusing team spirit and organizational identification (Grandori *et al.* 2011). Correspondingly, a strategic competitive advantage is not possible where the corporate governance system does not incentivise and monitor management to undertake appropriate actions in gathering and utilising resources (Phan *et al.* 2009). A firm's entrepreneurially alert information system also imparts a significantly positive influence on CE (Simsek *et al.* 2009). Encouraging risk-taking (Vlasenko, Kozlov 2009) and innovative behaviours must be consistent with individualised performance assessment and compensation (Kuratko *et al.* 2011) particularly as human resources management practices can affect CE initiatives in varied ways (for an in-depth overview on CE and HRM, see Kuratko *et al.* 2011).

Resource availability, a supportive organisational structure, and a culture that is tolerant of failure are all attributes that motivate employees to participate in CE schemes (Hornsby *et al.* 2002; Ireland *et al.* 2009). The availability of resources indicates to employees that the project has sufficient funding for activation and is not at risk of premature cancellation, while a failure tolerant organisational culture indicates that failure is necessary for learning and improvement rather than a reason for dismissal. Both of these are signals that tend to reduce the risk of participation in the employee's mind, particularly as risk is often a deterrent to participation in CE ventures. Allen *et al.* (1997) suggest that participants join employee involvement programs when it is beneficial and not harmful to their interests, where personal and organisational rewards are often the motivator for joining (Verma, McKersie 1986). Personal rewards can be intrinsic – such as the opportunity to demonstrate and use underutilised knowledge and skills, while extrinsic rewards include impressing management, thus positioning one's self for advancement and being a part of a process that will improve organisational functioning (Miller, Prichard 1992). Individual-level autonomy provides the flexibility and freedom to pursue novel or interesting ideas, often for their own sake. Such individual experimentation and exploration is often the first step in the sequence leading from innovation to the establishment of new ventures (Grandori *et al.* 2011). Individuals may also transition incrementally by retaining their wage job while entering into self-employment. Such hybrid entrepreneurship corresponds to increased emphasis on nonstandard work arrangements, which may be particularly useful to highly capable individuals lacking entrepreneurial experience (Folta *et al.* 2010). Additionally, individuals yearning to satisfy a higher order need are more likely to participate in CE programs. Indeed, Allen *et al.* (1997) suggest that individuals not be encouraged to participate in CE programs unless their involvement meets their intrinsic needs and interests. If employees cannot see a clear link between effort and performance, and between performance and reward, they may remain unwilling to participate in CE initiatives (Kuratko *et al.* 2011).

Not only do participants face potential risks when participating in CE ventures, but also, often the employee is required to dedicate extensive hours and increased effort in order to make the venture successful. Agency theory assumes that employees feel differing degrees of aversion to work effort (Douglas, Shepherd 2002), where literature suggests that employees,

who are dedicated to the success of a CE venture, will work longer hours than their peers but will experience more stress (Sykes 1992; Monsen *et al.* 2010).

Aside from rewards and risks, employees are also less likely to participate if they sense that management is not sincere in its commitment to the CE program or if they feel that the company does not have the required resources to take the initiative through to success (Allen *et al.* 1997). Internal entrepreneurs or intrapreneurs have reduced exposure to financial risk as they rarely invest their own financial resources. They nevertheless still invest their own human capital and are exposed to career risk when participating in CE ventures. The success or failure of the CE venture to which they contribute may reflect positively or negatively on their reputation, and influence access to future, more rewarding positions (Morris *et al.* 2008). Often in a CE context, the main risks include personal reputation, possible lack of career advancement, demotion, lowered social status, and as an indirect threat – job loss (Sykes 1992). Organisations have differing views on failure and while some firms might not want to retain employees of failed ventures, others view it as a valuable management development experience. Even if the firm holds the latter view, time spent in a failed venture is a foregone opportunity for advancement or promotion, and perceived as risk by the employee (Antoncic 2003; Sykes 1992).

2. Hypotheses formulation

Figure 1 provides a graphical representation of both reward and risk variables and their expected effects on an employee's decision to participate in CE initiatives. The horizontal axis represents the employee's decision to participate (right) or not participate (left). High expectations of venture success and financial rewards will increase the probability of participating. Similarly, there are deterring forces, represented by pay risk, employment risk and extra effort, which will lower the probability of participation. Participant characteristics – entrepreneurial experience, gender and years of work experience may act either as motivators or as deterrents to the decision to participate. Existing research and expected relationships in terms of this model are the basis for separate hypotheses.
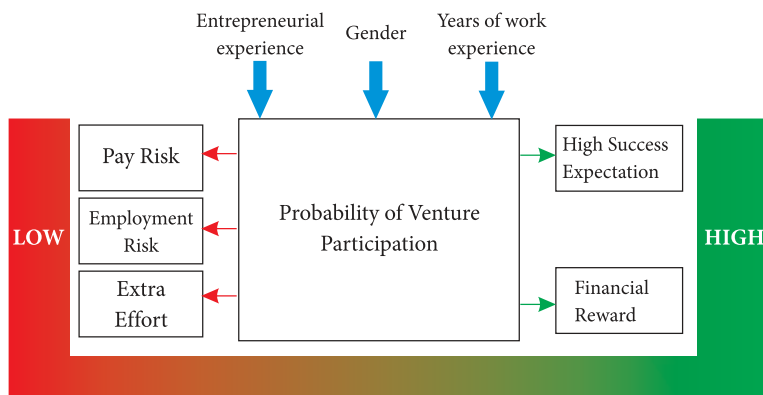

Fig. 1. Proposed attributes influencing employee participation in CE initiatives

2.1. Financial reward

This attribute indicates the magnitude of financial gain that an employee would expect from participating in CE venturing. One of the major elements in developing pro-entrepreneurship organisational architecture is rewards (Hornsby *et al.* 2002; Ireland *et al.* 2009). Typically, one would expect that the prospect of higher financial gain would be a prime motivator for participation in CE actions. Consistent with existing research that variable bonuses based on venture return on investment are the most preferable way of improving CE participation and performance of ventures (Fehr, Schmidt 2007), the first hypothesis states.

H1a. Higher levels of profit sharing incentives (financial reward) will result in a higher probability of CE participation.

2.2. Venture success probability

This attribute refers to the perception that employees have that the CE venture will be successful. Expected CE success gauges participation, where resource availability, a supportive organisational structure, and a culture that is tolerant of failure, are all indicators that success is highly probable (Hornsby *et al.* 2002; Ireland *et al.* 2009). Under these circumstances, the pro-entrepreneurship organisational architecture (Ireland *et al.* 2009) will increase perceptions of probability of CE success. Participants can sense if management is not sincere in its commitment to the CE initiative or if the required resources are unavailable to take the initiative through to success (Allen *et al.* 1997).

H1b. Higher expectations of venture success results in a higher probability of CE participation.

2.3. Employment risk

This attribute refers to the likelihood of the employee losing their job in the event that the CE initiative fails. A failure tolerant organisational culture indicates that failure is necessary for learning and improvement rather than a reason for dismissal, and consequently tends to reduce the risk of participation (Allen *et al.* 1997). Consequently, depending on the firm's environment and circumstances the perceived risk may be higher or lower. Individuals typically derive a disutility from risk (Douglas, Shepherd 2002), and therefore the rational expectation for any human being would be to attempt to minimise personal risk and maximise personal gain.

H2a. There is a negative relationship between job risk and the probability of employee CE participation.

2.4. Pay risk

Similar to employment risk, pay risk is an attribute that refers to an outcome following the failure of the CE initiative. In this particular instance, pay risk refers to a reduced remuneration (demotion) for the employee in the event of venture failure. High pay risk could de-motivate employees from participating in the CE initiative, as not participating could introduce an undesirable outcome (Douglas, Shepherd 2002).

H2b. There is a negative relationship between pay risk and the probability of employee CE participation.

2.5. Exerted effort

This attribute means the extent to which additional working hours affect an employee's willingness to participate in CE initiatives. Douglas and Shepherd (2000, 2002) find that work effort negatively relates to one's decision to be self-employed. These authors explain that individuals derive disutility or dissatisfaction from having to exert extra effort, and self-employed individuals have a lesser aversion to work effort. In the context of CE, often when working on a new initiative, the challenges are more demanding than those challenges typically faced by employees in their day-to-day job efforts. However efforts beyond the norm, and hours worked above regular working hours represent a 'disutility' to an employee, which is to be avoided (Douglas, Shepherd 2000). The employee involved in the CE venture views extended working hours as a foregone opportunity cost. Such opportunity costs could come in variety of forms, such as, time spent with family, second job, hobbies, and educational improvements (Amit *et al.* 1995; Cassar 2006).

H2c. There is a negative relationship between exerted effort and the probability of employee CE participation.

2.6. Participant characteristics

Demographic characteristics of participants estimate the likelihood of participation, since different characteristics affect the choice to participate or not to participate in CE initiatives. Allen *et al.* (1997) find that people who volunteer for CE type programs are usually more senior (Barrick, Alexander 1987; Norris, Cox 1987), better educated (Norris, Cox 1987), more ambitious (Miller, Prichard 1992), higher performers (Barrick, Alexander 1987), with higher self-esteem, and have a greater desire to be part of decision making (Buch 1991). Consistent with recent studies, characteristics which were hypothesised to influence the decision to participate in CE ventures included gender (Baum, Locke 2004), past entrepreneurial experience (Folta *et al.* 2010; Nanda, Sorensen 2010), and number of years of work experience (Dess *et al.* 2003).

In line with the study objectives, conjoint analysis tested the hypotheses. This approach allowed us to build onto existing research by assessing how trade-offs were made among different criteria when making decisions (Lohrke *et al.* 2010; Shepherd 2011). Using conjoint analysis, the respondents received various scenarios where several attributes featured in different combinations in terms of specified intensity levels. The respondents rated these scenarios on a scale of one to seven in terms of the likelihood of participation in CE initiatives. Using multiple regression analysis, the data provided the preference scores, or part-worth utilities, for each attribute. Consequently two combination hypotheses were formulated which incorporated the demographic variables with each of the individual hypotheses, and then reflect the conjoint tasks more accurately.

H3a. There are significant differences in the mean part-worth utilities attributable to participation in CE. There is a significant positive correlation between the mean part worth utilities attributable to (a) financial rewards, (b) expectations of success, while there is a significant negative correlation between the mean part worth utilities attributable to (c) job risk, (d) pay risk, and (e) exerted effort. The participants (1) gender, (2) past entrepreneurial experience, and (3) and number of years of work experience form the basis for these correlations.

H3b. There is a significant difference in the mean importance for (a) financial rewards, (b) expectations of success, (c) job risk, (d) pay risk, (e) exerted effort, based on the participants (1) gender, (2) past entrepreneurial experience, and (3) number of years of work experience.

3. Methodology

Typically, conjoint analysis is used in marketing research when identifying which of a product's attributes are most important, and to what extent these attributes contribute to a customer's decision to purchase a specific product (Green, Wind 1975). Respondents evaluate different combinations of attributes, which allows a calculation of the relative importance of the separate attributes. It is essentially an approach that resembles a real life situation more closely than questionnaires or interviews, as it places a respondent in a situation where numerous attributes come into play when taking a decision (Orme 2009). The researcher distributed the survey on a USB mass storage device and administered it electronically. Previous research supports the use of Internet/Web-enabled technology for conjoint analysis data collection (Sethuraman *et al.* 2005).

It is important to note that the number of attributes (independent variables) in this study is limited to five, which is well within the recommended limit for a full profile conjoint analysis. These five attributes are characterised by two levels of intensity (high = 1 and low = –1), resulting in 32 unique profiles or scenarios. In conjoint analysis, one can decide whether to use a full-factorial design, which includes all possible combinations, or a reduced number of combinations, by utilising a fractional factorial design (Green, Srinivasan 1990; Moore, Holbrook 1990). Typically a full factorial design is only used in instances where there are very few attributes and levels, thus resulting in a limited number of profiles (Orme 2009). Considering the study used five attributes with two levels each, the number of parameters to be estimated was equal to six (10 – 5 + 1). Based on Sawtooth software it is good practice to have 1.5 to 3 times more observations than parameters. In this case, anywhere between nine (6×1.5) and eighteen (6×3) observations were required. Consequently our 32($2^5 = 32$) observations would exceed the norm, and subsequently a fractional factorial design was deemed to be most suitable for this study (NIST/Sematech 2010). Moreover an orthogonal design was used to ensure that the statistical correlation between the attributes is equal to zero (Orme 2009; Monsen *et al.* 2010). Orthogonality allows for the separate estimation of each attribute independently of the others. In our case the five variables with two levels, rendered $S_{-1} = 16$ profiles. An orthogonal design with 16 profiles is both symmetrical and balanced, and falls within the scope of nine to 18 different scenarios, which is the recommended number of observations. An Excel random number generator positioned the orthogonal design rows randomly, providing a unique sequence of questionnaire scenarios (NIST/Sematech 2010).

3.1. Data and participants

Trying to identify samples of firms that exhibit CE strategies to various degrees (thus minimizing the restriction of range problem within the sample), was daunting. CE strategies may not be robust in firms, and firms with highly entrepreneurial CE strategies may be few in number, as continuously employing entrepreneurial CE strategies may render these firms vulnerable to collapse (Ireland *et al.* 2009). To counter-act such sample identification challenges, and in order to select firms with varying degrees of CE practices, the Technology Top 100 survey was used as a sampling frame, since it showcases the technological prowess of South Africa's most innovative organizations. This depends on 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 (Financial Mail 2010). The scrutinisation of these metrics served the purpose of assessing if there was any evidence of CE practices in these organisations. Firms with higher CE practices would score high on these metrics. Excluding cases with low levels of metrics indicating low CE activity, provided an effective final sample of 158 respondents. A wide range of businesses were sampled which included various industry sectors (manufacturing, professional services, wholesale/retail, and other services). Sample parameters included firm size measured through employment size class (80% of the sample had between 200–500 employees) and firm age (25% were 5 to 10 years old, 51% were 11 to 20 years old, and 23% were more than 20 years old).

In line with the study's objective, the target respondent was the individual. Characteristics of the respondents presented in Table 1, reveal some heterogeneity of the sample in terms of position occupied and work experience of the respondents.

Table 1. Respondent characteristics

Sample characteristics	Frequencies	Per cent of Respondents
Gender:		
Male	78	55%
Female	63	45%
Organisational Rank:		
Frontline Employee	21	15%
Lower Management	29	21%
Middle Management	44	31%
Senior Management	46	33%
Career track:		
Management track	54	38%
Technical track	14	10%
Technical and Management	47	33%
Not applicable	26	18%
Entrepreneurial Experience:		
No entrepreneurship experience	66	47%
Start-up experience	40	28%
CE venture experience	35	25%

Sample characteristics	Frequencies	Per cent of Respondents
Professional Experience:	Mean	Standard Deviation
Work experience (Years)	15.1	9.7
Industry experience (Years)	11.5	9.3
In current company (Years)	6.1	8.1
Current position (Years)	2.7	3.6

3.2. Decision scenarios

Since the instrument in this study is based on a prior established instrument (Monsen *et al.* 2010), and because the sample is drawn from a diversity of backgrounds with respect to gender, experience, etc., as discussed above, content validity, is maintained. A pilot study allowed maintenance of construct validity, overall study reliability and ensured that the wording and instructions of the questionnaire was clear and understandable. Following the pilot study, a seven-point rating scale representing seven scenarios was used, with '1 = no, will not participate' to '7 = yes, will definitely participate'.

Based on the instrument the respondents were asked to rate their likelihood of participation in a CE initiative for each one of the scenarios presented below. Each scenario constitutes of five attributes, reflecting our hypotheses, which can be either at a high or low level of intensity. Based on combinations of these five attributes, each respondent was required to select a choice from a continuum of seven answers. The different parameters below determined the participation decision:

Job risk = Low. There is a low probability (5%) that you and the other project team members will lose your jobs if the project fails;

Job risk = High. There is a high probability (50%) that you and the other project team members will lose your jobs if the project fails;

Pay risk = Low. A minimal portion of your and the team members' salary (2%) will be determined by achieving the project milestones and performance goals;

Pay risk = High A major portion of your and the team members' salary (30%) will be determined by achieving the project milestones and performance goals;

Exerted effort = Low. Participation in the project will require a small amount of extra work from every member of the project team beyond your typical current working hours (30 min per day);

Exerted effort = High. Participation in the project will require a large amount of extra work from every member of the project team beyond your typical current working hours (2 hours per day);

Expectation of success = Low. Overall, you estimate that the project has a low probability of success (15%);

Expectation of success = High. Overall, you estimate that the project has a high probability of success (80%);

Financial reward = Low. If the project succeeds, you and the other team members will share a minimal portion of the project's profits (0.5%) from the first three years;

Financial reward = High. If the project succeeds, you and the other team members will share a substantial portion of the project's profits (10%) from the first three years.

3.3. Data analysis

The analysis considered the data from the conjoint analysis to be a multiple regression problem. The independent or predictor variable comprised the characteristic of the decision variables (attribute levels). The observations of the dependent variable incorporated the respondents' ratings of the likelihood of participation in CE. The researcher created dummy variables for the high and low levels of each of the five attributes and assigned values to represent a low level of intensity (0) and for the high level (1). Each of the 16 scenarios has a unique line of zeros and ones assigned to it. Arranging the 158 responses in a long column and running a single regression proved inadequate because the nature of the data lead to highly correlated results. In this case, the 16 scenarios, repeated with each respondent, lead to serial correlation of the X (independent) variable. Such correlation leads to inflated statistical significance results, such as extremely high t-values and very low p-values (Hartmann, Gardner 1982).

In line with Monsen *et al.*'s (2010) recommendation, respondents with $p > 0.05$ values were considered as inconsistent responses and removed from the data set. The researcher manually checked all of the eliminated responses to determine consistency, or lack thereof, and ensure valid decision taking. It was determined that these responses ($p > 0.05$) were nonsensical and were most likely attributable to respondents randomly selecting ratings in the survey, despite clear instructions provided. In total, the researcher eliminated six responses from the data due to the same rating recorded for each scenario, and 11 responses due to respondent inconsistency. The final list of responses amounted to 141 sets of data. Using the 'LINEST' function in Excel, each response received a multiple regression coefficient. Using these coefficients, the part-worth utilities of the conjoint data were calculated. Using this method, each attribute with a low level of intensity acquires a '0' utility score, while the high level intensity level has either a positive or a negative value depending on the effect that this particular attribute had on the overall regression equation.

The researcher calculated the part worth utilities of each respondent, the average part worth utilities for the whole sample group, as well as the utilities for the different demographic characteristics, by calculating attribute importances for each respondent individually and then averaging, rather than calculating them from the averaged attribute utilities. These calculated utilities and importances represent the final data used to test the hypotheses.

A major concern with respect to the validity of conjoint data is the very low degrees of freedom typically used in conjoint studies (Green, Srinivasan 1978, 1990). Employing the formula 'Degrees of Freedom = # Profiles (n) – # Parameters (T)' 10 degrees of freedom were obtained, reflecting the study's six parameters and 16 profiles. In order to ensure internal data validity and that correct analytical procedures were being followed the researcher employed several tests for robustness. An Excel based Visual Basic for Applications (VBA) extracted all the required data to employ Pearson's correlation where each respondent received a multiple

linear regression. Separate regressions ran for each respondent, and the coefficient mean for estimation of the overall attribute utility calculated. Running a single regression would have produced very high t-values and extremely low p-values due to serially correlated independent variables. By running separate regressions, an additional benefit was the calculation of individual t-values for each respondent's attributes. In order to establish whether the individual attributes are significant for the regression equations used by the sample, the aggregation of t-values across all participants formed a Z score (Dechow *et al.* 1994; Douglas, Shepherd 2002). The formula used for the aggregation method is:

$$Z = \frac{1}{\sqrt{N}} \sum_{j=1}^{N} \frac{t_j}{\sqrt{k_j / (k_j - 2)}} / \sqrt{1 + (N-1)r} \,,$$

where: t_j = t-value for individual j; k_j = 10 = degrees of freedom in regression for individual j; N = number of responses in the sample. The Z-statistic is distributed asymptotically as a standard normal variate (Dechow *et al.* 1994) and computed under the assumption of independence among individuals, that is, $r = 0$ (Douglas, Shepherd 2002).

4. Results

4.1. Conjoint part worth utilities

The final set of data for 141 participants had individual linear regressions carried out. The average R squared value for the data is 0.80 with a standard deviation of 0.087 and with a minimum and maximum value of 0.63 and 0.98 respectively. The p-values of the data have a mean of 0.0078 with a standard deviation of 0.01. As mentioned previously, an attribute (dependent variable) in the conjoint study will have a utility of zero when it is at the low level of intensity, therefore only high levels of intensity will have associated utilities. Depending on the relationship (positive or negative) that the attributes have to the independent variable (willingness of participation), these utilities will have a positive or a negative value associated with them. The equation below is a representation of the average linear regression line used for the data set.

Y (Willingness of Participation) = 2.80 – 1.06*(Employment Risk) – 0.31*(Pay Risk) – 0.45*(Exerted Effort) +2.02*(Success Probability) + 1.74*(Financial Reward)

The use of this equation for modelling the probability of CE participation required substitutions, depending on particular circumstances. For a high level of intensity on an attribute, '1' substitutes that specific attribute. If the attribute were at a low level of intensity, '0' would substitute. Therefore, based on the above equation the lowest possible Y score achieved if employment risk, pay risk and exerted effort were high, while success probability and financial reward were low, was Y = to 0.98. Similarly the highest result of Y = 6.56 was achieved with the same levels switched so that employment risk, pay risk, and exerted effort are low, while success probability and financial reward are high. These results then corresponded with our instrument in terms of obtaining a qualified no or yes for a response respectively. Figure 2 graphically represents the calculated utilities of the five attributes. It is important to note that the magnitude of each attribute is directly proportional to the effect that it has on the participation equation.
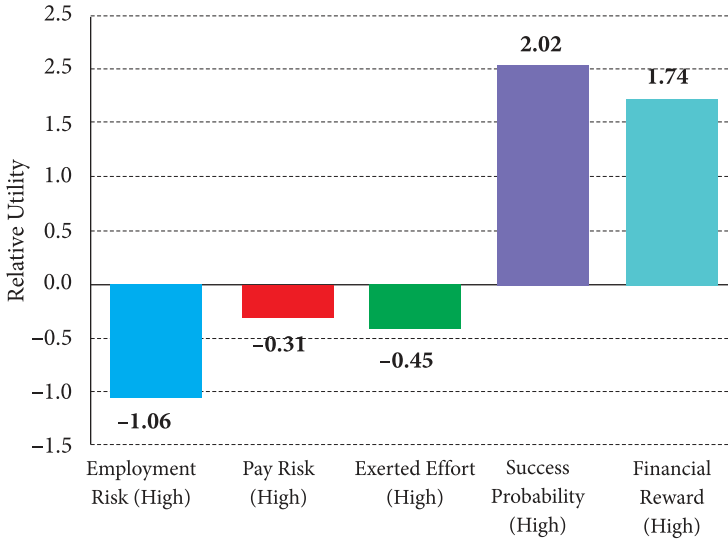
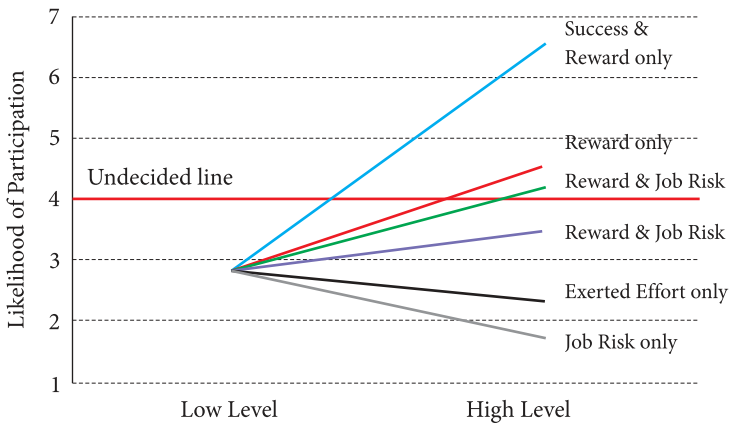Fig. 2. Part-worth utilities for each attribute

Fig. 3. Likelihood of CE participation based on level of intensity

In order to understand further how these attributes influence the decision to participate in CE initiatives, Figure 3 illustrates what occurs to a participant's decision as attributes are varied. If all attributes present at the low level of intensity, then the employee likelihood of participation would be at 2.8, which appear below the 'undecided line'. On the 'high level' side of the chart, several combinations demonstrate the potential uptake of a CE venturing.

4.2. Conjoint importances

In order to calculate conjoint importances, the sum of the ranges of each attribute's utility was proportionally divided into one hundred (Orme 2009; Urban, Stacey 2010). While

importances are ratio-scaled, they are also specific to each study, therefore one cannot compare importances from one study to another, but an attribute with an importance of 20% is twice as important as an attribute with a 10% importance.

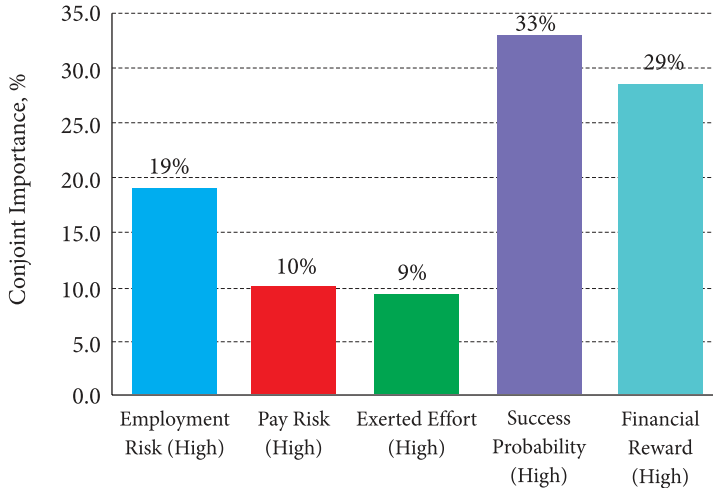Figure 4 presents the calculated conjoint importances.

Fig. 4. Conjoint importances for each attribute

4.3. Regression values

In order to assess the statistical validity of the five attributes, calculated through the individual regressions, the researcher examined the aggregate t-values represented by the Z score as per the previously stated equation. The calculation of these parameters employed the used of the previously formulated 10 degrees of freedom. The Z scores calculated from the aggregated t-values (Dechow *et al.* 1994), enabled the calculation of the corresponding p-values (all attributes of the regression are significant at the 99% level).

Table 2 shows the Z scores on each attribute for the 141 individual regressions.

Table 2. Z scores and significance of regression coefficients

	Employment Risk	Pay Risk	Exerted Effort	Success Probability	Financial Reward
Mean Coefficient	−1.06	−0.31	−0.45	2.02	1.74
Regression Z score	−23.00	−6.54	−9.39	45.71	36.86
p-value	$p < 0.01$	$p < 0.01$	$p < 0.01$	$p < 0.01$	$p < 0.01$

4.4. Hypotheses outcomes

For Hypotheses 1 and 2 there is a positive relationship between the attributes of likelihood of participation and financial reward, as well as for the attribute – probability of success of venture. A negative relationship exists between the attributes of likelihood of participation and job risk, as well as between pay risk and exerted effort.

Table 3 presents the hypotheses outcomes, where at the 99% confidence interval; we reject the null hypotheses in favour of the alternate hypotheses.

Table 3. Hypothesis 1 and 2 outcomes

Hypo-thesis		Hypotheses based on mean part-worth utilities at a 99% confidence interval			Outcome
1a	Ho:	Mean utility of "Financial Reward" ≤ 0	Ha:	Mean utility of "Financial Reward" > 0	Reject Ho
1b	Ho:	Mean utility of "Success probability" ≤ 0	Ha:	Mean utility of "Success probability" > 0	Reject Ho
2a	Ho:	Mean utility of "Job Risk" ≥ 0	Ha:	Mean utility of "Job Risk" < 0	Reject Ho
2b	Ho:	Mean utility of "Pay Risk" ≥ 0	Ha:	Mean utility of "Pay Risk" < 0	Reject Ho
2c	Ho:	Mean utility of "Exerted Effort" ≥ 0	Ha:	Mean utility of "Exerted Effort" < 0	Reject Ho

For hypothesis 3, there is a significant difference in part-worth utility and importance means based on the attributes of gender, past entrepreneurial experience, and number of years of work experience. In the case of work experience, there is a distinction between respondents with more, and less than 12 years of work experience respectively.

Excel statistical formulas estimated p-values for two-sample analysis of population means for all the cases. As this was a two-tailed hypothesis test at 95% confidence, *p*-values smaller, or near $p = 0.05$ were investigated further. For hypothesis 3a with combination a2 and for hypothesis 3a with combination e3 the researcher rejected the null hypotheses; see Table 4. This means that there is a significant difference between the mean utilities for the attribute job risk, where respondents with past entrepreneurial experience are less negatively affected by job risk compared to respondents without prior entrepreneurial experience (the corresponding p-value calculated for the difference of the two means is at p = 0.036).

Table 4. Hypothesis 3a outcomes

Hypo-thesis #	Comb #	Comparison of Statistical Means for Part – Worth Utilities, based on select Demographics at 95% confidence interval				Outcome
3a	a1	Ho:	μ1 "Job Risk" (male) – μ2 "Job Risk" (female) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	a2	Ho:	μ1 "Job Risk" (Entrepreneurial Experience) – 0 μ2 "Job Risk" (No Entrepreneurial Experience) = 0	Ha:	μ1– μ2 ≠ 0	Reject Ho

Hypo-thesis #	Comb #	Comparison of Statistical Means for Part – Worth Utilities, based on select Demographics at 95% confidence interval				Outcome
3a	a3	Ho:	μ1 "Job Risk" (Work Experience < 12 y) – μ2 "Job Risk" (Work Experience > 12 y) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	b1	Ho:	μ1 "Pay Risk" (male) – μ2 "Pay Risk" (female) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	b2	Ho:	μ1 "Pay Risk" (Entrepreneurial Experience) – μ2 "Pay Risk" (No Entrepreneurial Experience) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	b3	Ho:	μ1 "Pay Risk" (Work Experience < 12 y) – μ2 "Pay Risk" (Work Experience > 12 y) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	c1	Ho:	μ1 "Exerted Effort" (male) – μ2 "Exerted Effort" (female) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	c2	Ho:	μ1 "Exerted Effort" (Entrepreneurial Experience) – μ2 "Exerted Effort" (No Entrepreneurial Experience) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	c3	Ho:	μ1 "Exerted Effort" (Work Experience < 12 y) – μ2 "Exerted Effort" (Work Experience > 12 y) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	d1	Ho:	μ1 "Success Probability" (male) – μ2 "Success Probability" (female) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	d2	Ho:	μ1 "Success Probability" (Entrepreneurial Experience) – μ2 "Success Probability" (No Entrepreneurial Experience) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	d3	Ho:	μ1 "Success Probability" (Work Experience < 12 y) – μ2 "Success Probability" (Work Experience > 12 y) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	e1	Ho:	μ1 "Financial Reward" (male) – μ2 "Financial Reward" (female) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	e2	Ho:	μ1 "Financial Reward" (Entrepreneurial Experience) – μ2 "Financial Reward" (No Entrepreneurial Experience) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3a	e3	Ho:	μ1 "Financial Reward" (Work Experience < 12 y) – μ2 "Financial Reward" (Work Experience > 12 y) = 0	Ha:	μ1– μ2 ≠ 0	Reject Ho

For hypothesis 3b with combination a2, and 3b with combination d2, the researcher detected significant differences between the means of the attribute importances; see Table 5. The results indicate that the sub-group of respondents with past entrepreneurship experience perceive the attribute job risk as less important in comparison to their co-workers with no prior entrepreneurial experience. The researcher estimated this difference in mean importance at the 95% confidence interval with a p-value equal to 0.012. The attribute; probability of venture success was the only other significant difference observed in the mean utility score between the groups, with and without prior entrepreneurial experience. However, in terms of the two-gender subset groups, the researcher detected no significant differences in the mean utilities and importances of the attributes, suggesting that gender is not a likely determinant of employee participation in CE initiatives.

Table 5. Hypothesis 3b outcomes

Hypo-thesis #	Comb #	Comparison of Statistical Means for Conjoint importances, based on select Demographics at 95% confidence interval			Outcome
3b	a1	Ho:	$\mu 1$ "Job Risk" (male) – $\mu 2$ "Job Risk" (female) = 0	Ha: $\mu 1 - \mu 2 \neq 0$	Do not Reject Ho
3b	a2	Ho:	$\mu 1$ "Job Risk" (Entrepreneurial Experience) – $\mu 2$ "Job Risk" (No Entrepreneurial Experience) = 0	Ha: $\mu 1 - \mu 2 \neq 0$	Reject Ho
3b	a3	Ho:	$\mu 1$ "Job Risk" (Work Experience < 12 y) – $\mu 2$ "Job Risk" (Work Experience > 12 y) = 0	Ha: $\mu 1 - \mu 2 \neq 0$	Do not Reject Ho
3b	b1	Ho:	$\mu 1$ "Pay Risk" (male) – $\mu 2$ "Pay Risk" (female) = 0	Ha: $\mu 1 - \mu 2 \neq 0$	Do not Reject Ho
3b	b2	Ho:	$\mu 1$ "Pay Risk" (Entrepreneurial Experience) – $\mu 2$ "Pay Risk" (No Entrepreneurial Experience) = 0	Ha: $\mu 1 - \mu 2 \neq 0$	Do not Re-ject Ho
3b	b3	Ho:	$\mu 1$ "Pay Risk" (Work Experience < 12 y) – $\mu 2$ "Pay Risk" (Work Experience > 12 y) = 0	Ha: $\mu 1 - \mu 2 \neq 0$	Do not Reject Ho
3b	c1	Ho:	$\mu 1$ "Exerted Effort" (male) – $\mu 2$ "Exerted Effort" (female) = 0	Ha: $\mu 1 - \mu 2 \neq 0$	Do not Reject Ho
3b	c2	Ho:	$\mu 1$ "Exerted Effort" (Entrepreneurial Experience) – $\mu 2$ "Exerted Effort" (No Entrepreneurial Experience) = 0	Ha: $\mu 1 - \mu 2 \neq 0$	Do not Reject Ho
3b	c3	Ho:	$\mu 1$ "Exerted Effort" (Work Experience < 12 y) – $\mu 2$ "Exerted Effort" (Work Experience > 12 y) = 0	Ha: $\mu 1 - \mu 2 \neq 0$	Do not Reject Ho
3b	d1	Ho:	$\mu 1$ "Success Probability" (male) – $\mu 2$ "Success Probability" (female) = 0	Ha: $\mu 1 - \mu 2 \neq 0$	Do not Reject Ho

Hypo-thesis #	Comb #	Comparison of Statistical Means for Conjoint importances, based on select Demographics at 95% confidence interval			Outcome
3b	d2	Ho: μ1 "Success Probability" (Entrepreneurial Experience) – μ2 "Success Probability" (No Entrepreneurial Experience) = 0	Ha:	μ1– μ2 ≠ 0	Reject at 90%
3b	d3	Ho: μ1 "Success Probability" (Work Experience < 12 y) – μ2 "Success Probability" (Work Experience > 12 y) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3b	e1	Ho: μ1 "Financial Reward" (male) – μ2 "Financial Reward" (female) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3b	e2	Ho: μ1 "Financial Reward" (Entrepreneurial Experience) – μ2 "Financial Reward" (No Entrepreneurial Experience) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho
3b	e3	Ho: μ1 "Financial Reward" (Work Experience < 12 y) – μ2 "Financial Reward" (Work Experience > 12 y) = 0	Ha:	μ1– μ2 ≠ 0	Do not Reject Ho

Table 6 provides a summary of part-worth utilities and conjoint importances for all the attributes in terms of entrepreneurial experience and work experience.

Table 6. Summary of results

Attribute part-worth utility values					
	Total data	Entrep Exp	No Entrep Exp	Exp < 12 Years	Exp > 12 Years
n = Number of respondents	$n = 141$	$n = 75$	$n = 66$	$n = 72$	$n = 69$
Employment risk	–1.06	**–0.90**	**–1.25**	–1.06	–1.07
Pay risk	–0.31	–0.36	–0.25	–0.32	–0.30
Required effort	–0.45	–0.47	–0.42	–0.55	–0.34
Success probability	2.02	2.16	1.85	2.08	1.95
Financial Reward	1.74	1.78	1.69	**1.97**	**1.49**
Attribute Importances					
	Total data	Entrep Exp	No Entrep Exp	Exp < 12 Years	Exp > 12 Years
Employment risk	19%	**16%**	**22%**	18%	20%
Pay risk	10%	9%	10%	10%	10%
Required effort	9%	9%	10%	10%	9%
Success probability	33%	**36%**	**30%**	32%	34%
Financial Reward	29%	30%	28%	31%	27%

Discussion

Both rewards and deterrents influence the decision to participate in CE initiatives. By presenting various scenarios to respondents, several attributes were analysed in different combinations in terms of their intensity levels by relying on dichotomous manipulations. Using conjoint analysis, this study was able to mimic a real life situation more closely than questionnaires or interviews would have allowed. The interpretation of the utilities calculated on each of the five attributes (Table 7), were in relation to similar studies employing similar methods. The first line in Table 7 shows the utility values that represent negative values for 'employment risk', 'pay risk', and 'exerted effort', which supports our hypotheses of a negative relationship in terms of the decision to participate in CE ventures. This means that having a high level of intensity for these attributes would make an individual less likely to participate in CE initiatives. The opposite holds true for the positive attributes, 'success probability' and financial reward'.

Table 7. Comparison of results to international studies

	Employ-ment Risk (High)	Pay Risk (High)	Exerted Effort (High)	Success Probability (High)	Financial Reward (High)
Present study	−1.06	−0.31	−0.45	2.02	1.74
Monsen *et al.* (2010)	−1.35	0.174	−0.53	1.707	1.47
Douglas and Shepherd (2002)	0.87		0.008		3.97
Douglas and Shepherd (2000)	Yes		Yes		Yes

To elucidate the results further the research compares the utility values with three other international studies with attributes similar to those used in our study. Table 7 reveals that when compared to the Monsen *et al.* (2010) study, several similarities emerge. The only difference is that the 'pay risk' attribute plays a non-significant role in CE participation in their study, even though a relationship was expected. Compared to two separate Douglas and Shepherd (2000, 2002) studies, the present study results are very much in line with their findings on most attributes, even though the focus of their studies was not strictly on CE, but entrepreneurship in general.

More specifically, the empirical evidence emanating from this study finds that the most important attribute is the 'probability of venture success' followed closely by 'financial reward' as the second most important attribute. As expected, the attributes 'job risk and pay risk' were found to be deterrents to CE participation. The importance of the first attribute 'probability of venture success', with a utility value of 2.02 and importance level of 33%, suggests that it determines the decision to participate above all the other attributes. The second most important attribute 'financial reward' with a utility value of 1.74 and importance level of 29%, is supported by existing literature where individualised performance assessment and compensation is deemed to be critical for CE participation (Kuratko *et al.* 2011).

The remaining attributes 'job risk', which ranked third in terms of importance, with a utility value of negative 1.06 and a importance level of 19%, and 'pay risk' and 'exerted effort' were respectively the lowest ranked attributes. This indicates that employees are reluctant to risk a portion of their pay and work extra hard; even if they believe that there is a chance to be involved in a successful CE venture and that the pay-out will be fair.

The study also demonstrates that prior entrepreneurial experience plays a significant role on several attributes. For the attribute 'job risk' there are significant differences based on both utilities and importances. There was a significant difference in mean score found at the 90% confidence level for the attribute 'probability of success' in terms of importance. These findings suggest that individuals with past entrepreneurial experience are less concerned about 'job risk' and have a higher positive perception regarding 'probability of venture success', when it comes to CE participation. Perhaps employees with prior entrepreneurial experience are more confident in their ability to successfully navigate the entrepreneurial process, particularly as research indicates that experience in the entrepreneurship domain includes having dealt with start-up problems such as generating sales, developing marketing avenues and tactics, obtaining external financing, and dealing with internal financial and general management issues (Wiklund 1999).

The present study only focused on individual financial reward and did not take into account different types of rewards, such as group rewards or organisation level rewards and their effect on CE participation (Gomez-Mejia *et al.* 2000). Moreover, the study does not consider interaction effects, where more profiles would be required. The study only considered dichotomous (high/low) type manipulators. The use of trichotomous (high/medium/low) type manipulators could produce more comprehensive sets of data than presently exist (Zenger, Marshall 2000).

Essentially the results also have contextual relevance, where knowledge is limited around CE participation or indeed CE in emerging economies (Luo *et al.* 2005; Bruton *et al.* 2008; Urban 2008). Emerging economies differ from Western economies in that they are characterised by rapid change and have an institutional and market environment quite different to those in Western economies (Batra 1997; Liu *et al.* 2003; Zahra *et al.* 2000; Yiu *et al.* 2007). For firms in emerging economies, the challenge to participate in the global economy of the 21st century will be to compete as world-class businesses where the focus is on high-value added human capital based on creativity and innovation producing high-growth corporate ventures (Luiz 2006).

Relevant to emerging economies is that recent research finds that intrapreneurship and independent entrepreneurship seem to be substitutes at the macro level. Large firms in high-income countries tend to display more entrepreneurial behaviour than large firms in low-income countries do (Bosma *et al.* 2010). Much CE research focuses on large corporations and upon the manufacturing sector, particularly in relation to high technology sectors. Yet, smaller firms may also involve scope for significant CE activity. There is a need for further theorization and empirical analysis of these different contexts.

The study provides guidance to corporate managers and leaders interested in incentivising their employees to undertake CE activities. Correspondingly, the result provides direction to employees seeking to undertake CE ventures and gives them a fair indication of what the maximum incentive is that they could expect, while considering commensurate risks.

Considering that CE sustainability is contingent upon individual members undertaking innovative activities (Hornsby *et al.* 2009), management must design incentive contracts that consider both the motivating attributes and the deterrents. Senior management should attempt to mitigate and manage potential risks of participation, as well as allow for increased employee independence for participating in CE activities (Douglas, Shepherd 2000).

The present study's design, in terms of conjoint analysis, provides firms with a dashboard of possible attributes, according to which they can devise an optimal CE incentive strategy. Furthermore, based on the findings an optimum design for an incentive system can maximise the probability of employee participation, while simultaneously minimising the company's financial costs and risks associated with CE venturing.

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