The Promise of Corporate Entrepreneurship: A Review of Data Analytic Strategies

Deryck J van Rensburg[1]

[1] Manchester Business School, University of Manchester, United Kingdom

Correspondence: Deryck J van Rensburg, 1001 Carriage Lane SE, Smyrna, GA 30082, United States. E-mail: drensburg@aol.com

Received: January 23, 2015 Accepted: February 3, 2015 Online Published: February 5, 2015

doi:10.5430/bmr.v4n1p59 URL: http://dx.doi.org/10.5430/bmr.v4n1p59

Abstract

A burgeoning literature on corporate entrepreneurship has emerged since the early 1990s drawing on theoretical and empirical streams in strategic management and attributes of entrepreneurship such as decision-making under Knightian uncertainty, individual level theories of creativity and exploration, and Schumpeterian notions of creative destruction. The field has enticed increasing numbers of researchers to examine promised notions of competitive advantage, wealth creation, growth, innovation, and firm performance. This paper reviews the statistical micro-foundations of the domain to ascertain whether or not the conceptual and empirical interest in corporate entrepreneurship is outpacing the quality of data analytic methodologies and statistical checks for robustness and validity. The review focuses on the era of blossoming in literature growth between 2000 and 2009 and concludes that while there is always room for improvement, that the statistical and analytical health of the research being performed is headed in a promising direction. This bodes well for the future of both inquiry and practice in this domain and the realization of its espoused benefits.

Keywords: Corporate entrepreneurship, Quantitative methods, Data analytic strategies

1. Introduction

Entrepreneurship is a broad ranging topic and can be evidenced in varying contexts ranging from the most common form of the autonomous start-up entrepreneur, to entrepreneurship enacted within a corporate context, to public sector entrepreneurship, and socially motivated entrepreneurship. For instance, Drucker (1985) espouses a broad application of entrepreneurship across various forms:

> *"Entrepreneurship is based on the same principles, whether the entrepreneur is an existing large institution or an individual starting his or her new venture singlehanded. It makes little or no difference whether the entrepreneur is a business or a nonbusiness public-service organization, nor even whether the entrepreneur is a governmental or non-governmental institution"* (p. 143).

Similarly, Covin and Slevin (1991) have proposed that the entrepreneurial notions of risk taking, innovativeness and proactivity can be applied to both an independent entrepreneur and a corporation while acknowledging differences exist between them. One key difference is the challenge within the large corporate context of balancing 'existing' business requirements with the needs of 'new' business creation, sometimes referred to as 'oldstreams' and 'newstreams' (Kanter, 1989). March (1991) examined adaptive processes building on the contributions of Schumpeter (1934) and articulated this as balancing the need for exploitation of old certainties (efficiency, execution, refinement, choice, production) with the need for exploration of new possibilities (search, variation, risk taking, discovery, experimentation). How opportunity is discovered and pursued through innovative, new resource combinations within the context of a firm mainly preoccupied with exploiting existing resource combinations is thus the core focus of corporate entrepreneurship (Elfring, 2005). Since the earliest references that suggest entrepreneurial orientation and activity inside large corporations can source or stimulate new businesses (Westfall, 1969; Peterson & Berger, 1971; Shils & Zucker, 1979), a burgeoning literature on corporate entrepreneurship now exists (see Phan Wright, Ucbasaran & Tan, 2009; Kuratko & Audretsch, 2013; and Corbett, Covin, O'Connor & Tucci, 2013). Corporate entrepreneurship is typically viewed as the sum of an organization's innovation, strategic renewal, and venturing efforts (Guth & Ginsberg, 1990; Zahra 1986) and can take various forms (Morris, Kuratko & Covin, 2011) such as:

- *Strategic entrepreneurship* involves large-scale innovations of the firm's strategy, products and brands, served markets, internal organization, or business model that may or may not result in the creation of new businesses.
- *Corporate venturing* involves bringing new businesses (or brands) to the corporation via corporate venture capital , co-operative ventures with external parties, intrapreneurship, or internally generated corporate ventures.

The growing body of literature on corporate entrepreneurship promises various benefits such as inter alia, competitive advantage, wealth creation, growth, increased propensity for innovation, and firm performance. This paper will review whether corporate entrepreneurship is empirically undergirded with appropriately valid and reliable statistical analytic methods. The paper limits its inquiry to the era of literature blossoming of this domain. To address this, the paper proceeds with a selection of journals from which the review is conducted. Following this, a series of analytical considerations are enumerated against which the chosen sample set of journal articles are evaluated. The results of the analysis are expanded upon and the paper closes with conclusions relative to the health of quantitative research in the field of corporate entrepreneurship.

2. Methodology

2.1 Journal Selection

The Scopus database (Social Science & Humanities) was used to search for articles encompassing corporate entrepreneurship (CE) - alternatively referred to as, corporate venturing, intrapreneurship, and corporate venture capital. Between 1985 and 2009, a total of 273 articles were published on CE.

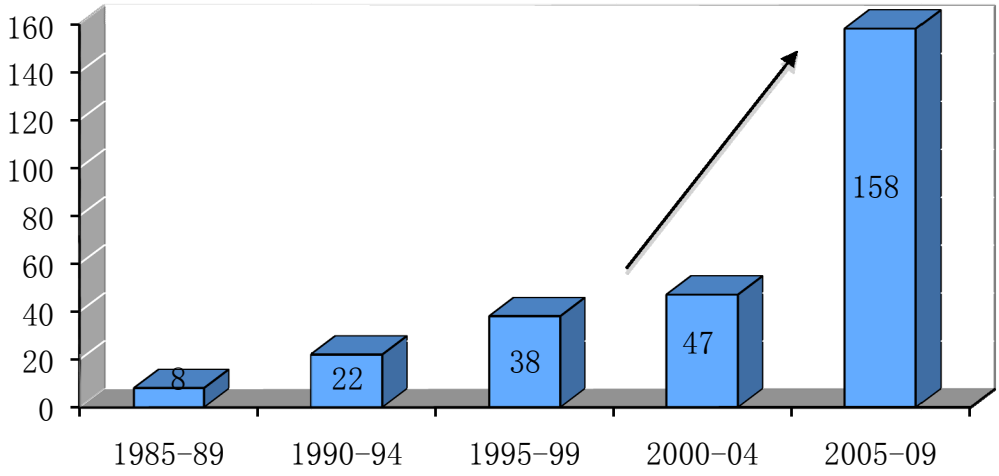

Figure 1. Number of corporate entrepreneurship articles published

The growth in CE articles in 5-year intervals is shown in Figure 1 starting with 8 during 1985-1989, rising to 158 between 2005 and 2009. Given the large number of articles, a refined Scopus search was conducted on CE articles published only during its era of research blossoming 2000-2009 making the assumption that this blossoming would signify rigorous and comprehensive efforts among the research community at validating its espoused benefits. This research effort would either further reinforce or retard continued interest in the domain. From the database search, it appears as if the era of blossoming (2000-2009) spurred even greater growth in publications during the next era (2010-2014) yielding a further 325 articles. A sample of 40 articles was therefore selected (see Appendix A for references) giving priority to higher-ranking academic journals (Note 1) and those most frequently publishing articles on corporate entrepreneurship. In a citation analysis, Ratnatunga & Romano (1996) found that *Journal of Business Venturing* (JBV) and *Entrepreneurship, Theory & Practice* (ETP) articles had more impact on the entrepreneurship field than any other journals. As such, these journals were prioritized in earmarking the 40 plus selections were also filtered through the journal ranking recommendations of Mingers and Harzing (2007). Table 1 shows the count of journal articles reviewed by journal by year.

Table 1. Count of journal articles reviewed by journal and year

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	TTL
SMJ		2								1	3
JBV	1	2	1			1	1			7	13
Tech				1					1		2
RP			1			1					2
ETP			1				2	2	1	1	7
MSc							1				1
HBR			1				1				2
JMS					2			2	1	1	6
BH										2	2
AMJ							1		1		2
Total	1	4	4	1	2	2	6	4	4	12	40

Key: SMJ – Strategic Management Journal; JBV – Journal of Business Venturing; Tech – Technovation; RP – Research Policy; ET&P – Entrepreneurship, Theory & Practice; MSc – Management Science; HBR – Harvard Business Review; JMS – Journal of Management Studies; BH – Business Horizons; AMJ – Academy of Management Journal

2.2 Analytical Considerations

Prior studies on research methods within entrepreneurship were consulted to glean insights on criteria, issues and format for use in this paper with the following being most helpful: Busenitz, West, Shepherd, Nelson, Chandler and Zacharakis (2003), Chandler and Lyon (2001), Coombs, Sadrieh and Annavarjula (2009), Crook, Shook, Morris and Madden (2010), Dean, Shook and Payne (2007), Gilmore and Coviello (1999), Gregoire, Noel, Dery and Bechard (2006), Ireland, Reutzel and Webb (2005), Johnson and Podsakoff (1994), Kanter (1988), Low and MacMillan (1988), MacMillan (1993), Ratnatunga and Romano (1997), Savage and Black (1995), Schildt, Zahra and Sillanpaa (2006), and Wortman (1987). Key analytical notions examined were:

2.2.1 Empirical vs. Conceptual

Studies were categorized depending on whether their content was empirical or conceptual in nature. Empirical articles either used qualitative research techniques or had some level of data and statistical analysis, whereas articles largely conceptual in nature, or literature reviews, or untested theoretical or mathematical models were defined as conceptual. If theory was proposed and tested empirically using data, then this was counted as an empirical study.

2.2.2 Data Sources

Studies were examined as to whether the data was primary or secondary.

2.2.3 Reliability Procedures

Each article was examined from the standpoint of consistency and stability of the scores used in measurement scales.

2.2.4 Validation Procedures

Given that measures can be reliable but not necessarily be valid, and cannot be valid without being reliable, the criteria advanced by Messick (1995) was used to evaluate articles:

- Content validity
- External validity
- The substantive and structural components of construct validity

2.2.5 Level of Analysis

Kanter (1988) and Low and MacMillan (1988) stress the value and importance of specifying the level of analysis used in research. The various levels possible for CE studies include: the individual, a group or team, a project or innovation, the firm, the industry, and the macro-environment.

2.2.6 Statistical and Analytical Strategies

Based on Field (2009), Stone-Romero, Weaver and Glenar (1995), and Chandler and Lyon (2001), the most commonly used statistical procedures were identified for each study. A simple coding system was deployed to catalog whether any of these methods were incorporated or not:

- Descriptive statistics (including sample size); Assumptions testing; Correlation analysis; Regression analysis; Logistical regression; Comparison of means using T-tests; Anova / Ancova; Non-parametric tests; Manova / Mancova; Exploratory factor analysis; Cluster analysis; Structural equation models; Discriminant analysis; Other statistical methods (e.g. multidimensional scaling).

Good and bad examples of statistical methods were identified throughout the literature review. Some prior statistical analysis was also traced in the management literature and summarized in Table 2.

Table 2. Prior studies examining use of data analytic strategies

(Percentages represent the mean usage of each procedure)

Statistical Procedures	Stone-Romero et al. (1995)	Chandler & Lyon (2001)	Dean et al. (2007)
Specification			
Time period	1975 – 1993	1989 – 1999	1976 – 2004
# Articles reviewed	1,929	416	582
# Journals	1	9	2
Subject	Org. sciences	Entrepreneurship	Entrepreneurship
Differences Univariate & Multivariate Means			
Anova / Manova	44%	9%	8%
Ancova / Mancova	4%	-	-
T-Tests	22%	13%	7%
Bivariate & Multivariate Relationships between Observed Variables			
Factor analysis	9%	17%	1%
Correlation (zero-order)	42%	20%	9%
Multiple regression analysis	22%	29%	33%
Causal Relationships between Observed or Latent Variables			
Structured equation models	5%	1%	4%
Path analysis	<6%	-	2%
Methods Accounting for Heterogeneity			
Cluster analysis	1%	6%	1%
Discrete Event Methods			
Discriminant analysis	2%	6%	3%
Logistical regression	-	7%	8%
Non-Parametric Statistics	< 9%	13%	21%

Source: Compiled by Author

For instance, the use of data analytic strategies in organizational research was investigated by Stone-Romero et al. (1995) covering 1,929 articles published between 1975-1993 within one journal from the organizational sciences. Although it is limited by being confined to articles published in one journal, its large sample size nevertheless provides an interesting reference point. A second study worth noting is the Chandler and Lyon (2001) analysis of a decade of entrepreneurship research (1989-1999) covering 416 articles in 9 journals. Finally, a more recent study by Dean et al. (2007) focused on 582 entrepreneurship articles published between 1976 and 2004 in the two top entrepreneurship journals (*JBV* and *ET&P*). Key findings for all three studies are conveniently summarized in Table 2.

2.2.7 Direct Effects vs. Contingency Models

The papers were screened based on whether they had specified or implied research models. Papers could have direct effects models, or contingency models, or a combination of both.

2.2.8 Time Dimension

The time dimension of the study was another feature sought out in the papers. Articles were then classified into either longitudinal or cross-sectional studies.

3. Results and Analysis

In assessing standards of good usage and reporting of statistical methods, the following sources were consulted: Field (2009), Publication Manual of the American Psychological Association (2009), and Huck (2007). In this section good examples are surfaced to provide an invocative account of data analytic strategies being employed by researchers.

3.1 Conceptual or Empirical

11 of the 40 CE articles (or 27.5%) examined were of a conceptual nature. This is broadly consistent with the 30% found by Chandler and Lyon (2001) in a review of 291 articles across all forms of entrepreneurship research (not just CE) published between 1989 and 1998. Of the 29 empirical articles, 23 (79.3%) used and reported statistics, while the remainder (20.7%) was qualitative studies, primarily of a case study nature. All reported analysis that now follows in this paper relates only to the 23 empirical statistical articles.

3.2 Data Sources and Sample Sizes

70% of the empirical studies used primary data sources. Within these studies, 61% used paper surveys, 30% used in-person interviews, 6% used phone interviews, and 4% used on-line methodologies. 14% of the studies used both primary and secondary sources. Table 3 contains the figures for the empirical studies that only used secondary data sources. From this we observe that Compustat (35% and VentureXpert (30%) (Note 2) were the most common sources utilized.

Table 3. Summary of data sources used

	Venture Xpert	Compustat, or Local Equivalent	U.S. Patent Data or Equiv.	Company Archives	Other	Total
Only Secondary Data	30%	35%	20%	11%	4%	100%

The value of large sample sizes (e.g. n = 1233 firms) was evidenced in the Brown, Davidsson and Wiklund (2001) study where they were also able to conduct meaningful and statistically significant sub-sample analyses, thereby testing generalizability to other industries and organizational contexts. Most studies had to cope with much smaller sample sizes due to lower response rates, or less ambitious research designs, which sometimes drove adjustments to the way final data was used. For example, Antoncic and Hisrich (2001), attempted to test a new measurement scale for intrapreneurship across two cultures, the USA and Slovenia. They received a 29% response rate for Slovenia (n = 141) but only an 11% response rate for the USA (n = 51). Their planned use of structural equation modeling however required sample sizes of 100-200 to avert errors. This prompted the researchers to "reposition" the USA sample for validation purposes whereas the Slovenia sample was used for the real empirical analysis.

3.3 Reliability Procedures

Reliability testing of various types was commonplace in the articles, for example: common method bias, social desirability bias, response and non-response bias, and single-informant bias. Some papers were silent about reliability or validity testing (e.g. Thornhill & Amit, 2000), while others gave this significant attention. Some of the better examples are now described. Burgers, Jansen, Van den Bosch and Volberda (2009) offer a good example of comprehensive reliability testing including common method bias, social desirability bias and single informant bias. Although they tested for single-informant bias by requesting one additional executive in each firm to also complete the questionnaire, they statistically evaluated this by calculating the average rwg for each firm and obtained results of .72 to .99 for independent variables and .78 to .99 for dependent variables. Their conclusion was that there was sufficient agreement within the firms on both. However, the rule of thumb that $\geq$ .70 is acceptable is challenged by Harvey and Hollander (2004) using Monte Carlo results, who advocate more stringent standards since values $\geq$.70 can routinely be obtained from totally random settings. Two other very noteworthy treatments of addressing common method bias can be found in Ling, Simsek, Lubatkin and Veiga (2008) and Simsek, Veiga, and Lubatkin (2007) who both devote an entire appendix to this. For instance, Simsek et al. (2007) include steps taken to mitigate bias through use of pre-tested, valid multi-dimensional constructs; to detect bias using several tests such as bi-variate correlations and confirmatory factor analysis; to control for bias they used multi-respondent data drawn from firms

who provided two strategies to assess responses at the item and scale levels including t-tests of items, intra-class correlations, mean differences of scales, and correlations of scales. The correlations of constructs were all high and statistically significant. In some cases reliability testing was simply claimed as having been done without providing the statistical output. Hornsby, Kuratko and Zahra (2002, p. 266) simply mention that reliability measures for a *Corporate Entrepreneurship Assessment Instrument* were assessed on the factor structures using the "Cronbach procedure available in the SPSS statistical package". It would be preferable if they quoted the actual Cronbach α (alpha) value (Note 3) and/or whether any items were removed to improve reliability, and if so, whether the factor analysis was rerun to check whether the factor structure still held. The treatment of *missing values* was not consistent across the studies. Some reported the actual statistics, others were vague about whether they existed or what percentage they were, while best practice included statements of not only what they were, but also how these were treated in the analysis (e.g. Maula, Autio & Murray, 2009, p. 279).

3.4 Validation Procedures

The excellent work of Bagozzi, Yi and Phillips (1991) on assessing construct validity in organizational research was leveraged in performing the analysis for this study. Key observations and good practices included:

- Convergent and discriminant validity was tested for in several studies using EFA and CFA (exploratory and confirmatory factor analysis). A good example was found in Maula et al. (2009) who operationalized all constructs using multi-item scales derived from prior research and tested them using CFA. Factor loadings, construct reliabilities, and average variance extracted were all well above recommended minimums and reported in the paper.
- A good example of robustness checks can be found in Wadhwa and Kotha (2006) who ran additional regression analyses using alternative measurements for one of their independent moderating variables (corporate investors involvement with its portfolio firms). They separated the 'involvement' variable into two variables and ran two distinct fixed-effects regression models: one capturing involvement through formation of alliances and the other through board seats taken. From this they found that both forms of involvement were significant, but that alliances were statistically stronger.
- An additional validation procedure employed in the Wadhwa and Kotha (2006) study comprising archival data (that clearly cannot capture all characteristics of start-up firms studied), was how they mitigated unobserved heterogeneity by using random and fixed effects models.
- A best-in-class treatment of robustness was found in the Simsek et al. (2007) paper. The authors devote an appendix to this and explain their use of three robustness tests: replicating their findings using a second measure of entrepreneurial behavior; the use of structural equation modeling (SEM); and the use of two-stage least squares regression. For the first test, the authors found another measure for corporate entrepreneurship called entrepreneurial orientation (EO), that had been empirically linked in literature ($r = 0.63$, $p < 0.001$), and replicated their findings with respect to their first four hypotheses using EO instead (alpha = 0.71) as their dependent variable.
- These authors also tested whether mediational effects were influenced by measurement error and used SEM for this using a two-step approach, such as: first, the fit of a CFA model to the observed data to assess fit of the overall measurement model (findings were greater than acceptability thresholds of 0.90 for several fit indices); and second, testing for a better fitting structural model that best accounted for the co-variances among the models constructs using chi-squared tests. A significant chi-squared difference between the fit of two models would indicate that sufficient covariance existed between the latent variables to warrant testing the hypothesized model. The authors reported evidence of a large, significant difference ($p < 0.001$).

3.5 Level of Analysis

In most cases it was evident what the level of analysis was. This seems to be an improvement since the Low and MacMillan (1988) admonition that there was a lack of specification in the level of analysis. In this project, the 23 empirical statistical articles represented the following units of analysis (in percentage breakdown):

- Individual level = 21%
- Group or team = 7%
- Project or innovation = 14%

- The firm = 58%
- Industry or macro-environment = 0%

The firm as the unit of analysis was by far the most popular choice (58% of studies), which is not surprising given the subject is entrepreneurship within the corporation/firm. There were no industry-level studies encountered in the sample selected for analysis.

3.6 Statistical and Data Analytic Strategies

The two primary data analytic methods used by entrepreneurship researchers were ANOVA and multiple regression (see Table 4). Of the 40 studies, 14 (35%) used correlation analysis, 11 (28%) used factor analysis, 8 (20%) opted for mean comparisons using T-tests, 7 (18%) used regression, and 6 (15%) employed structural equation models in their analyses. Non-parametric statistical techniques were used in 10% of studies while no other statistical technique (e.g. path analysis) was used in more than 8% of the studies. This compares with a previous finding of Dean et al. (2007) where multiple regression constituted 33% of the methods used. In the section that follows, the paper describes the findings for each of the most commonly used methods together with references to good and inadequate reporting.

Table 4. Count and percent for analytical technique used

Analytical Technique Used	Count	Percent*
Correlation analysis	14	35.0
Factor analysis	11	27.5
Mean comparison using T-tests	8	20.0
Regression analysis	7	17.5
Structural equations	6	15.0
Analysis of variance	5	12.5
Logistical regression	4	10.0
Non-parametric statistics	4	10.0
Other methods	3	7.5
Discriminant analysis	1	2.5
Cluster analysis	0	0.0

*Percents do not add to 100% as some studies used multiple techniques

It was pleasing to note that more sophisticated techniques such as structural equation modeling (SEM), path analysis, and Manova were being used in this emergent discipline often characterized in the literature as being in a pre-paradigmatic state. Forty-three percent (43%) of the empirical studies used 1 or 2 statistical techniques and although more statistical methods do not necessarily imply better quality research, the more sophisticated studies certainly did employ multiple techniques. For instance, 56% of studies employed 3 or more techniques while 13% used 4 or more. The next section describes the findings for a few of the more prominent techniques.

3.6.1 Reporting Regression

The most common (and crucial) omission was the reporting of zero-order correlations among the predictors and/or between the predictor variables and the criterion variable. This is key because multiple regression help to obtain estimates of partial associations between predictor and outcome variables and hence impacts interpretation of the research. Thus, multicollinearity is a conceptual issue affecting interpretation of regression results and is not just a statistical consideration. For a good treatment of multicollinearity within the context of regression analysis, see the Ahuja and Lampert (2001, p. 538) article. Incomplete reporting of the final regression model was another fairly common trait. In particular, the final model coefficients were omitted or it was impossible to ascertain what predictors were included in the final model. However, over-reporting is also not being advocated. For instance, when using hierarchical regression to test incremental validity of predictors, it is only necessary to report and interpret the coefficients from the final model that contains all the relevant predictors. Regression coefficients and their standard errors from previous steps may be biased and little value can be obtained from interpreting these. However, sometimes regression coefficients were presented and discussed, but it was unclear which models generated those coefficients (final, step 1, step 2?).

3.6.2 Reporting Factor Analysis

Russell (2002) provides an excellent overview of the use and abuse of factor analysis and was referred to in making the assessment for this paper. Several articles made extensive use of scale development (e.g. Brown et al., 2001; Heavy, Simsek, Roche & Kelly, 2009; Hornsby et al., 2002) and hence EFA and CFA were often deployed including the reporting out of both unstandardized and standardized coefficients. For example, Yiu and Lau (2008) provided a clear justification for the use of these techniques. They used EFA to factor analyze a 22-item scale and explained how 3 items were deleted due to cross-loadings arriving at a factor structure of 4 factors and the percentage that each of these accounted for of the variance. They then completed a CFA of the 19-items to confirm the final factor structure. Hornsby et al. (2002) also followed a similarly thorough reporting procedure. In most cases eigenvalues were reported and explanations proffered for criteria used to decide what number of factors to extract. Exclusive reliance on the common heuristic of: *'extract all factors with eigenvalues >1.0'* (Field, 2009) was commonplace, but some researchers instead used scree-plots, parallel analysis (e.g. Hornsby et al. 2002), or used maximum likelihood strategies (Maula et al., 2009) to justify their decisions. Some of the stronger studies (e.g. Brown et al., 2001) also justified the rotation procedure used (e.g. orthogonal such as varimax, or oblique rotations such as oblimin). In the case of the latter rotation, reference was made to the pattern and structure coefficients as opposed to the generic term of factor loading. On the less impressive end of the disclosure spectrum, Kellermans and Eddleston (2006, p. 817) simply report that: *"All items pertaining to the independent, moderator, and dependent variables were entered in a factor analysis and the factor analysis extracted seven factors explaining 77.6% of variance. The factors separated cleanly and the first factor explained only 28.9% of the variance and the remaining factors explained 48.7%".* No rationale and output tables were provided - just these two sentences. The researchers then proceed with a decent reporting of regression analysis. In general, it seemed that where several techniques are used in one study, researchers underestimate the importance of complete reporting for each statistical technique to enable downstream replication and engender confidence in theory building.

3.6.3 Reporting Correlation

In almost all studies this technique was well done although it was interesting to note that none made use of scatter plots to identify outliers. None of the studies that employed correlation analysis made the common mistake of confusing correlation with cause. Both parametric (Pearson's) and non-parametric (Spearman's) tests were used and also selected appropriately (e.g. variables sampled from normally distributed populations in the case of Pearson's). Given the Pearson correlation technique works best with linear relationships and less well with curvilinear relationships, it was noteworthy to find that some researchers used regression analysis instead (e.g. Wadhwa & Kotha, 2006) or structured equation modeling to cope with this. Reporting the outcome of a correlation test in the studies was a bit mixed. For instance, while most correlation tables were complete the text was rather under-nourished when reporting formal correlations. This often left the reader with the task of studying the table to draw conclusions instead of the researchers clearly citing the value of the coefficient, degrees of freedom, and significance values.

3.6.4 Reporting ANOVA

Considerable variability was evidenced in how the analyses were described. The 'best-in-class' studies introduced their analyses with:

- A summary statement describing the experimental design
- Specification of independent variables along with their levels
- Mention of which factors were between-subjects and those that were within-subjects
- Reporting of descriptive statistics such as means, standard deviations and correlations
- Whether any post-hoc tests were used in follow-up analyses
- Measures of effect size

However, most of the papers were not as thorough. One of the most common omissions was inclusion of standard deviations along with each reported mean. In certain cases, effect sizes were impossible to deduce as no estimates of variability were provided whether through error bars, standard deviations or mean squared errors. If error bars were used, labeling was missing in some cases to clarify what they signified (e.g. 95% confidence intervals or standard errors). ANOVA studies with a >1 outcome measure that also reported the correlations among the outcome measures, were rare. Finally, few authors made a point to discuss the magnitude of the effect sizes they observed or contrasted these with previously reported effects in similar research.

3.7 Direct Effects vs. Contingency Models

Some studies had fairly straightforward, direct effect conceptual models that they tested using statistical methods, while others set ambitious research designs using direct, mediating, and control variables. In fact, 69% of studies included contingency models. Most papers did not separate the results sections between findings related to direct effects versus findings related to contingency effects. A good example of this separation is Wadhwa and Kotha (2006, p. 828) who clearly delineate findings between direct and moderator effects. A common method used to test mediating relationships was through multiple regression analysis, but some studies (e.g. Yiu & Lau, 2008) preferred the more powerful structural equation model as it could test relationships simultaneously and control for all other effects of the variables. Another good example of a complex test design was found in the Simsek et al. (2007, p. 1401) paper. These authors used 5 statistical techniques (T-tests, factor analysis, correlation analysis, regression, and a structural equation model) to adequately test all the hypotheses and meet reliability and validity criteria.

3.8 Time Dimension

Only 7 (or 24%) of the empirical papers were longitudinal studies, and most of these used secondary data sources – the remaining 76% being cross-sectional studies. Given the pressures to publish, the time consuming nature of primary longitudinal studies is not conducive to this academic reality. However, for the corporate entrepreneurship field to mature in its understanding and impact more longitudinal studies will be required.

3.9 Qualitative Research

A few observations on the six qualitative empirical papers are appropriate to complete the assessment. Half of the studies were longitudinal studies, and four adopted a case study research approach using either archival data, interviews, secondary published data, or combinations of all these. A few highlights are reported below:

- Bhardwaj, Camillus and Hounshell (2006) developed new theory for the entrepreneurial search process by drawing on comprehensive internal documentation within the Du Pont Company over a 20 year period. The case research method based on archival data was defended by the authors because it was deemed to be best suited for studying processes spanning long periods and for under-researched and complex phenomenon.
- Covin and Miles (2007) developed typologies of corporate venturing strategies based on a literature review and then conducted in-depth personal interviews with executives from 15 Swedish, UK and USA firms. Although, the authors only provided a scant justification for their firm selection, rigor was evident through transcription of interviews and member checking with interviewees to ensure accuracy. Furthermore, the two researchers separately matched each firm against each strategic typology and then compared notes. Only one discrepancy was uncovered due to a change in the company's stated strategy between the time interviews were conducted and the time the results were compiled. Findings from the interviews were also corroborated with publically held sources such as published articles, the corporations web pages, annual reports, and regulatory filings. Summaries and conclusions drawn from the interviews and these public data sources were also made available to respondents for reliability and validity assessment purposes.
- Keil (2004) proposes a model that describes how corporations develop a capability to create and develop ventures through corporate venture capital, alliances, and acquisition. The model is based on two longitudinal case studies of large corporations operating in the information and communication technology sectors. While strong on theory, the criteria for firm selection and the rationale for case-based research was rather thin. However, in a related paper of five in-depth longitudinal case studies covering the same industries, Keil, Autio and George (2008) provides a more detailed discussion of these factors.
- The best paper from a methodological standpoint is the Kelley, Peters and O'Connor (2009) research on inter-organizational networking and corporate entrepreneurship. Key features being: Descriptive statistics are provided; a clear rationale for case study research method is articulated; an outline of sample selection provided; an explanation of how data was collected across 143 interviews and how NVivo was employed to code 10,000 pages of transcribed interview text; how reliability checks were performed using inter-rater methods; and how validation checks were performed (e.g. construct validity). The following quote summarizes this rigor:

  "Our approach therefore combined the examination of field notes, an inductive process of developing and refining emergent theoretical constructs through NVivio coding, cross-case

> *comparisons to understand relationships among the constructs, and interviews and a second-level data analysis to validate our findings. This, combined with frequent discussions among the researchers, contributed to the development of our theoretical framework"* (p. 227).

4. Conclusions

The key findings related to usage of statistical techniques were discussed in the main body of the paper and will not be recapitulated here. In this final section, two remaining questions are discussed:

1) What can be concluded about the health of corporate entrepreneurship research from the relevant statistical methods found in this study?
2) What other aspects were encountered pertinent to statistical reporting and research endeavor?

4.1 Health and Relevance

More than a decade ago, Busenitz et al. (2003, p. 303-4) remarked that the entrepreneurship field was young and moving through its 'emergent stage' and that in order for it to develop a 'respected and well-developed voice', it needed to approach empirical research with the same rigor as other fields. From this study on corporate entrepreneurship we can detect some encouraging signs in this regard:

- 69% of studies tested contingency frameworks indicating that increasingly sophisticated models are being applied while controlling for important variables that might affect outcomes. This compares with the 30% found by Dean et al. (2007) and the 18% found by Chandler and Lyon (2001). Perhaps the focus on corporate entrepreneurship versus general entrepreneurship helps in this regard, since publically available data are more accessible for corporations than for small, start-up entrepreneurial entities.
- It was pleasing to see the use of longitudinal studies. While perhaps not directly comparable, 24% of studies reviewed in this article were longitudinal versus the 7% found nine years earlier by Chandler and Lyon (2001).
- Research design and construct measurement practices seemed fairly sound with extensive treatment given to reliability and validity testing in some cases (e.g. Yang, Narayanan & Zahra, 2009). Perhaps more clarity and stringency should be placed on sample selection however. If samples were randomly drawn from a clearly defined sampling frame, assessments of non-response bias would not yield whether findings possess external validity.
- As noted in Table 4, a fairly wide variety of statistical techniques are being employed in the field of corporate entrepreneurship. Techniques such as correlation analysis, factor analysis, regression analysis, means comparisons, and structural equation modeling were the most frequently invoked. Extant literature also provides a few signposts as to the importance of varying statistical techniques to the furtherance of entrepreneurship research. A study by Dean et al. (2007) among entrepreneurship expert scholars (Note 4) who ranked the importance of several techniques using a 5-point Likert scale (1 = 'not at all'; and 5 = "to a great extent"), uncovered six with a mean above 4.0:
    - Multiple regression (4.55; SD = .62)
    - Hierarchical regression (4.48; SD = .79)
    - Logistical regression (4.42; SD = .72)
    - ANOVA and ANCOVA (4.19; SD = .91)
    - Correlations (4.13; SD = 1.12)
    - Event history (4.03; SD = 1.02)

  The most utilized statistical techniques used in corporate entrepreneurship research found in this study of 40 journal articles do not appear to be all that different from those espoused by the 'expert' group in the above Dean et al. (2007) study.

4.2 Other Aspects of Research Endeavor

The paper concludes with a few observations on other aspects of statistical reporting and research endeavor to complete the picture:

Quest to publish - One interesting finding was that in the quest and pressure to publish, some researchers sometimes 'milked' one piece of research several times in different journals. The consequence of this was that in order to

differentiate the papers somewhat from each other, they omitted some details in one version which could convey a (unfounded) perception that the research is poorly executed, or a (legitimate) perception that the research is 'under-reported' in the journal article.

Replication - Researchers could aim for more replicable effects. Providing enough texture in the *Methodology* sections would allow other researchers to replicate findings and thereby add/subtract to the building blocks of a cumulative science.

Statistical reporting - Providing a good balance between thorough statistical reporting and producing an engaging article seem key. Entertaining reading is helpful, but for the research to be valuable it needs to contain thorough reporting of the results of the primary analysis and the descriptive statistics. These provide the foundation for the larger story being told by the report. If word limits are a constraint, then perhaps other "nice to have" details could be expunged first before trimming the *Methods* and *Results* sections (e.g. overlapping references; pleasantries; that SPSS was used; make details of supplementary analysis available upon request instead of reporting it; etc). Also, in some instances there appeared to be a misunderstanding of null hypothesis (H_0) significance testing. For instance, the *p* value provides the probability that rejecting H_0 is the wrong decision, instead of the probability of observing a particular test value if the H_0 was indeed true.

Nomenclature – The terminology used to describe variables were quite diverse and ambiguous in some instances including terms such as: independent, explanatory, predictor, regressor, control, dependent, outcome, response, and criterion. It would seem that better practice would be to differentiate between terms for variables used in observational research versus terms used for variables in experimental research. Since the former lacks randomization and manipulation, it is suggested that predictor and criterion (or outcome) be used predominantly. For experimental research designs, it is suggested that the term 'independent variable' be used for the manipulated variable, and that the term 'dependent variable' be used for the outcome.

Electronic archiving - Perhaps in the future, journals could create and publish a data archive on the Internet as an electronic appendix for all accepted articles to facilitate replication and analysis. Apparently the *Science* journal has already led the way on this. Case in point is the meticulous creation of corporate family trees by Wadhwa and Kotha (2006) that used multiple data sources to map patents granted to subsidiaries for sample investing firms where the number of patents were used to measure the independent variable. Given the complexity of gathering such data, having this type of work available for future researchers would save significant unproductive time and undergird more expeditious endeavors to replicate studies.

4.3 Delimitations and Closing Comments

Finally, the sample size and/or the period chosen of analysis are potential delimitations of this study. It would have been preferable to statistically examine a larger sample than the 29 quantitative empirical studies earmarked. But, it is also plausible that if further analysis of publications in the last 5 years were contemplated, that even more satisfactory progress may have been evidenced in validity and reliability. This is not an unreasonable assumption, since journals are likely to enforce more rigorous publication criteria in the midst of rapid research growth in a domain and as competition for space intensifies in the top-ranked journals. Nevertheless, this paper highlights pertinent themes that any pre-paradigmatic field such as corporate entrepreneurship and venturing would need to address. This is especially the case as it seeks legitimacy among more mature scholarly domains, and as scholars endeavor to make normative recommendations pertaining to the complex set of issues implicit in large firm entrepreneurship research. In conclusion, while there is always room for improvement, data analytic strategies used within corporate entrepreneurship empirical research appear to be headed in a healthy direction and augers well for the future relevance and impact of the domain.

References

American Psychological Association. (2009). *Publication Manual of the American Psychological Association* (6th Edition). Washington, DC: American Psychological Association.

Bagozzi, R.P. Yi, Y. & Phillips, L.W. (1991). Assessing construct validity in organizational research. *Administrative Science Quarterly*, 36(3), 421-458. http://dx.doi.org/10.2307/2393203

Baruch, Y. (1999). Response rate in academic studies – A comparative analysis. *Human Relations*, 52(4), 421-438. http://dx.doi.org/10.1023/A:1016905407491

Busenitz, L.W., West, G.P., Shepherd, D., Nelson, T., Chandler, G.N. & Zacharakis, A. (2003). Entrepreneurship research in emergence: Past trends and future directions. *Journal of Management*, 29(3), 285-308. http://dx.doi.org/10.1016/S0149-2063(03)00013-8

Chandler, G.N. & Lyon, D.W. (2001). Issues of research design and construct measurement in entrepreneurship research: The past decade. *Entrepreneurship, Theory and Practice*, 25(4), 101-113.

Coombs, J.E., Sadrieh, F. & Annavarjula, M. (2009). Two decades of international entrepreneurship research: What have we learned - where do we go from here? *International Journal of Entrepreneurship*, 13, 23-64.

Corbett, A., Covin, J. G., O'Connor, G. C., and Tucci, C. L. (2013). Corporate entrepreneurship: State-of-the-art research and future research agenda. *Journal of Product Innovation Management*, 30(5), 812–820. http://dx.doi.org/10.1111/jpim.12031

Crook, T.R., Shook, C.L. Morris, M.L. & Madden, T.M. (2010). Are we there yet? An assessment of research design and construct measurement practices in entrepreneurship research. *Organizational Research Methods*, 13(1), 192-206. http://dx.doi.org/10.1177/1094428109334368

Dean, M.A., Shook, C.L. & Payne, G.T. (2007). The past, present, and future of entrepreneurship research: Data analytic trends and training. *Entrepreneurship, Theory & Practice*, 31(4), 601-618. http://dx.doi.org/10.1111/j.1540-6520.2007.00190.x

Drucker, P. (1985). *Innovation and Entrepreneurship*. New York: Harper and Row.

Elfring, T. (Ed.). (2005). *Corporate Entrepreneurship and Venturing*. New York: Springer Science and Business Media, Inc. http://dx.doi.org/10.1007/b106351

Field, A. (2009). *Discovering Statistics using SPSS*. (3rd Edition). London: SAGE Publications.

Gilmore, A. & Coviello, N. (1999). Methodologies for research at the marketing / entrepreneurship interface. *Journal of Research in Marketing & Entrepreneurship*, 1(1), 41-53. http://dx.doi.org/10.1108/14715209980001555

Gregoire, D.A., Noel, M.X., Dery, R. & Bechard, J-P. (2006). Is there conceptual convergence in entrepreneurship research? A co-citation analysis of *Frontiers of Entrepreneurship Research, 1981-2004. Entrepreneurship, Theory and Practice*, 30(3), 333-373. http://dx.doi.org/10.1111/j.1540-6520.2006.00124.x

Guth, W.D. and Ginsberg, A. (1990). Guest editors' introduction: Corporate entrepreneurship. *Strategic Management Journal*, 11(4), 5-15.

Harvey, R. J., & Hollander, E. (2004). *Benchmarking rWG Interrater Agreement Indices: Let's drop the .70 rule-of-thumb*. Paper presented at the Annual Conference of the Society for Industrial and Organizational Psychology, Chicago, April.

Huck, S.W. (2007). *Reading Statistics and Research* (5th Edition). Boston: Allyn & Bacon.

Ireland, R.D., Reutzel, C.R. & Webb, J.W. (2005). Entrepreneurship research in AMJ: What has been published, and what might the future hold? *Academy of Management Journal,* 48(4), 556-564. http://dx.doi.org/10.5465/AMJ.2005.17843937

Johnson, J.L. & Podsakoff, P.M. (1994). Journal influence in the field of management: An analysis using Salancik's index in a dependency network. *Academy of Management Journal*, 37(5), 1392-1407. http://dx.doi.org/10.2307/256679

Kanter, R.M. (1988). Three tiers for innovation research. *Communication Research*, 15(5), 509-523. http://dx.doi.org/10.1177/009365088015005001

Kanter, R.M. (1989). Swimming in newstreams: Mastering innovation dilemmas. *California Management Review*, 31(4), 45-69.

Kashy, D.A., et al. (2009). Reporting and interpreting research in PSPB: Practices, principles, and pragmatics. *Personality and Social Psychology Bulletin*, 35(9): 1131-1142. http://dx.doi.org/10.1177/0146167208331253

Kuratko. D.F. and Audretsch, D.B. (2013). Clarifying the domains of corporate entrepreneurship. *International Entrepreneurship and Management Journal,* 9(3), 323-335. http://dx.doi.org/10.1007/s11365-013-0257-4

Low, M.B. & MacMillan, I.C. (1988). Entrepreneurship: Past research and future challenges. *Journal of Management*, 14(2), 139-161. http://dx.doi.org/10.1177/014920638801400202

MacKinnon, D.P. et al. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, 7, 83-104. http://dx.doi.org/10.1037/1082-989X.7.1.83

MacMillan, I.C. (1993). The emerging forum for entrepreneurship scholars. *Journal of Business Venturing*, 8(5), 377-381. http://dx.doi.org/10.1016/0883-9026(93)90019-2

March, J.G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71-87. http://dx.doi.org/10.1287/orsc.2.1.71

Messick, S. (1995). Validity of psychological assessment. *American Psychologist*, 50(9), 741-749. http://dx.doi.org/10.1037/0003-066X.50.9.741

Mingers, J. & Harzing, A-W. (2007). Ranking journals in business and management: A statistical analysis of the Harzing data set. *European Journal of Information Systems*, 16, 303-316. http://dx.doi.org/10.1057/palgrave.ejis.3000696

Morris, M.H., Kuratko, D.F. and Covin, J.G. (2011). *Corporate Entrepreneurship and Innovation: Entrepreneurial Development within Organizations*. Ohio: Thomson South-Western.

Peterson, R.A. and Berger, D.G. (1971). Entrepreneurship in organizations: Evidence from the popular music industry. *Administrative Science Quarterly*, 16(1), 97-107. http://dx.doi.org/10.2307/2391293

Phan, P.H., Wright, M., Ucbasaran, D. and Tan, W.L. (2009). Corporate entrepreneurship: Current research and future direction. *Journal of Business Venturing*, 24(3), 197-205. http://dx.doi.org/10.1016/j.jbusvent.2009.01.007

Podsakoff, P.M. et al. (2003). Common method bias in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903. http://dx.doi.org/10.1037/0021-9010.88.5.879

Ratnatunga, J. & Romano, C. (1997). A "citation classics" analysis of articles in contemporary small enterprise research. *Journal of Business Venturing*, 12(3), 531-545. http://dx.doi.org/10.1016/S0883-9026(96)00062-6

Russell, D.W. (2002). In search of underlying dimensions: The use (and abuse) of factor analysis in Personality and Social Psychology Bulletin. *Personality & Social Psychology Bulletin*, 28(12), 1629-1646. http://dx.doi.org/10.1177/014616702237645

Savage, G.T. & Black, J.A. (1995). Firm-level entrepreneurship and field research: The studies in their methodological context. *Entrepreneurship, Theory & Practice*, 19(3), 25-34.

Schildt, H.A., Zahra, S.A. & Sillanpaa, A. (2006). Scholarly communities in entrepreneurship research: A co-citation analysis. *Entrepreneurship, Theory and Practice*, 30(3), 399-415. http://dx.doi.org/10.1111/j.1540-6520.2006.00126.x

Schumpeter, J.A. (1934). *The Theory of Economic Development*. Cambridge: Harvard Business Press.

Shaver, J.M. (2005). Testing for mediating variables in management research: Concerns, implications, and alternative strategies. *Journal of Management*, 31(3), 330-353. http://dx.doi.org/10.1177/0149206304272149

Shils, E.B. and Zucker, W. (1979). Developing a model for internal corporate entrepreneurship. *Social Science*, 54(4), 195-203.

Stone-Romero, E.F., Weaver, A.E. & Glenar, J.L. (1995). Trends in research design and data analytic strategies in organizational research. *Journal of Management*, 21(1), 141-157. http://dx.doi.org/10.1016/0149-2063(95)90039-X

Westfall, S.L. (1969). Stimulating corporate entrepreneurship in U.S. industry. *Academy of Management Journal*, 12(2), 235-246. http://dx.doi.org/10.2307/254819

Wilkinson, L., & Task Force on Statistical Inference. (1999). Statistical methods in psychology journals: Guidelines and explanations. *American Psychologist*, 54(8), 594-604. http://dx.doi.org/10.1037/0003-066X.54.8.594

Wortman, M.S. (1987). Entrepreneurship: An integrating typology and evaluation of the empirical research in the field. *Journal of Management*, 13(2), 259-279. http://dx.doi.org/10.1177/014920638701300205

Zahra, S.A. (1986). A canonical analysis of corporate entrepreneurship antecedents and impact on performance. *Academy of Management Best Papers Proceedings*, 46th Annual Meeting, 71-75.

Appendix A – Corporate Entrepreneurship Articles Selected

ES = Empirical; Statistical EQ = Empirical; Qualitative CP = Conceptual Paper

No.	Type	Article Reference
1	ES	Ahuja, G. & Lampert, C.M. (2001). Entrepreneurship in the Large Corporation: A Longitudinal Study of How Established Firms Create Breakthrough Inventions. *Strategic Management Journal*, 22(6-7), 521-543.
2	ES	Antoncic, B. & Hisrich, R.D. (2001). Intrapreneurship: Construct Refinement and Cross-Cultural Validation. *Journal of Business Venturing*, 16(5), 495-527.
3	ES	Antoncic, B. & Prodan, I. (2008). Alliances, Corporate Technological Entrepreneurship and Firm Performance: Testing a Model of Manufacturing Firms. *Technovation,* 28(5), 257-265.
4	ES	Azulay, I., Lerner, M. & Tishler, A. (2002). Converting Military Technology through Corporate Entrepreneurship. *Research Policy*, 31(3), 419-435.
5	EQ	Bhardwaj, G., Camillus, J.C. & Hounshell, D.A. (2006). Continual Corporate Entrepreneurship Search for Long Term growth. *Management Science*, 52(2), 248-261.
6	ES	Brown, T.E., Davidsson, P. & Wiklund, J. (2001). An Operationalization of Stevenson's Conceptualization of Entrepreneurship as Opportunity-Based Firm Behavior. *Strategic Management Journal*, 22(10), 953-968.
7	ES	Burgers, J.H., Jansen, J.J.P., Van den Bosch, F.A.J. & Volberda, H.W. (2009). Structural Differentiation and Corporate Venturing: The Moderating Role of Formal and Informal Integration Mechanisms. *Journal of Business Venturing*, 24(3), 206-220.
8	CP	Chesbrough, H. W. (2002). Making Sense of Corporate Venture Capital. *Harvard Business Review*, 80(3), 4-11.
9	EQ	Covin, J.G. & Miles, M.P. (2007). Strategic Use of Corporate Venturing. *Entrepreneurship, Theory and Practice*, 31(2), 183-207.
10	CP	Doh, J.P. & Pearce, J.A. (2004). Corporate Entrepreneurship and Real Options in Transitional Policy Environments: Theory Development. *Journal of Management Studies*, 41(4), 645-664.
11	ES	Dushnitzky, G. & Lenox, M.J. (2005). When do Incumbents Learn from Entrepreneurial Ventures? Corporate Venture Capital and Investing Firm Innovation Rates. *Research Policy*, 34(5), 615-639.
12	ES	Dushnitsky, G. & Lenox, M.J. (2006). When Does Corporate Venture Capital Investment Create Firm Value? *Journal of Business Venturing*, 21(6), 753-772.
13	ES	Dushnitsky, G. & Shaver, J.M. (2009). Limitations to Inter-organizational Knowledge Acquisition: The Paradox of Corporate Venture Capital. *Strategic Management Journal*, 30(10), 1045-1064.
14	CP	Garvin, D.A. & Levesque, L.C. (2006). Meeting the Challenge of Corporate Entrepreneurship. *Harvard Business Review*, 84(10), 102-112.
15	ES	Heavy, C., Simsek, Z., Roche, F. & Kelly, A. (2009). Decision Comprehensiveness and Corporate Entrepreneurship: The Moderating Role of managerial Uncertainty Preferences and Environmental Dynamism. *Journal of Management Studies*, 46(8), 1289-1314.
16	ES	Hornsby, J.S., Kuratko, D.F. & Zahra, S.A. (2002). Middle Managers' Perception of the Internal Environment for Corporate Entrepreneurship: Assessing a Measurement Scale. *Journal of Business Venturing*, 17(3), 253-273.
17	CP	Hoy, F. (2006). The Complicating Factor of Life Cycles in Corporate Venturing. *Entrepreneurship, Theory and Practice*, 30(6), 831-836.
18	CP	Ireland, R.D., Covin, J.G. & Kuratko, D.F. (2009). Conceptualizing Corporate Entrepreneurship Strategy. *Entrepreneurship, Theory and Practice*, 33(1), 19-46.
19	EQ	Keil, T. (2004). Building External Corporate Venturing Capability. *Journal of Management Studies,* 41(5), 799-825.
20	EQ	Keil, T., Autio, E. & George, G. (2008). Corporate Venture Capital, Disembodied Experimentation and Capability Development. *Journal of Management Studies*, 45(8), 1475-1505.
21	ES	Kellermanns, F.W. & Eddleston, K.A. (2006). Corporate Entrepreneurship in Family Firms: A Family Perspective. *Entrepreneurship, Theory and Practice*, 30(6), 809-830.
22	EQ	Kelley, D.J., Peters, L. & O'Connor, G.C. (2009). Intra-Organizational Networking for Innovation-Based Corporate Entrepreneurship. *Journal of Business Venturing*, 24(3), 221-235.
23	ES	Kuratko, D.F., Covin, J.G. & Garrett, R.P. (2009). Corporate Venturing: Insights from Actual Performance. *Business Horizons*, 52(5), 459-467.

24	ES	Ling, Y., Simsek, Z., Lubatkin, M.H. & Veiga, J.F. (2008). Transformational Leadership's Role in Promoting Corporate Entrepreneurship: Examining the CEO-TMT Interface. *Academy of Management Journal*, 51(3), 557-576.
25	ES	Maula, M.V.J., Autio, E. & Murray, G.C. (2009). Corporate Venture Capital and the Balance of Risks and Rewards for Portfolio Companies. *Journal of Business Venturing*, 24(3), 274-286.
26	EQ	Miles, M.P. & Covin, J.G. (2002). Exploring the Practice of Corporate Venturing: Some Common Forms and their Organizational Implications. *Entrepreneurship, Theory and Practice*, 26(3), 21-40.
27	ES	Miles, M.P., Paul, C.W. & Wilhite, A. (2003). Modeling Corporate Entrepreneurship as Rent-Seeking Competition. *Technovation*, 23(5), 393-400.
28	CP	Morris, M.H., van Vuuren, J., Cornwall, J.R. & Scheepers, R. (2009). Properties of Balance: A Pendulum Effect in Corporate Entrepreneurship. *Business Horizons*, 52(5), 429-440.
29	CP	Phan, P.H., Wright, M., Ucbasaran, D. & Tan, W.L. (2009). Corporate Entrepreneurship: Current Research and Future Direction. *Journal of Business Venturing*, 24(3), 197-205.
30	CP	Shepherd, D.A., Covin, J.G. & Kuratko, D.F. (2009). Project Failure from Corporate Entrepreneurship: Managing the Grief Process. *Journal of Business Venturing*, 24(6), 588-600
31	ES	Simsek, Z., Veiga, J.F. & Lubatkin, M.H. (2007). The Impact of Managerial Environmental Perceptions on Corporate Entrepreneurship: Towards Understanding Discretionary Slack's Pivotal Role. *Journal of Management Studies*, 44(8), 1398-1424.
32	ES	Srivastava, A. & Lee, H. (2005). Predicting Order and Timing of New Product Moves: The Role of Boards and Absorptive Capacity. *Journal of Business Venturing*, 20(4), 459-481.
33	CP	Teng, B-S. (2007). Corporate Entrepreneurship Activities through Strategic Alliances: A resource-based approach toward competitive advantage. *Journal of Management Studies*, 44(1), 119-142.
34	ES	Thornhill, S. & Amit, R. (2001). A Dynamic Perspective of Internal Fit in Corporate Venturing. *Journal of Business Venturing*, 16(1), 25-50.
35	CP	Verbeke, A., Chrisman, J.J. & Yuan, W. (2007). A Note on Strategic Renewal and Corporate Venturing in the Subsidiaries of Multinational Enterprises. *Entrepreneurship, Theory and Practice*, 31(4), 585-600.
36	ES	Wadhwa, A. & Kotha, S. (2006). Knowledge Creation through External Venturing: Evidence from the Telecommunications Equipment Manufacturing Industry. *Academy of Management Journal*, 49(4), 819-835.
37	ES	Yang, Y., Narayanan, V.K. & Zahra, S. (2009). Developing the Selection and Valuation Capabilities through Learning: The Case of Corporate Venture Capital. *Journal of Business Venturing*, 24(3), 261-273.
38	ES	Yiu, D.W. & Lau, C-M. (2008). Corporate Entrepreneurship as Resource Capital Configuration in Emerging Markets. *Entrepreneurship, Theory and Practice*, 32(1), 37-57.
39	CP	Zahra, S.A., Filatotchev, I. & Wright, M. (2009). How Do Threshold Firms Sustain Corporate Entrepreneurship? The Role of Boards and Absorptive Capacity. *Journal of Business Venturing*, 24(3), 248-260.
40	ES	Zahra, S.A. & Garvis, D.M. (2000). International Corporate Entrepreneurship and Firm Performance. *Journal of Business Venturing*, 15(5-6), 469-492.

Notes

Note 1. *Strategic Management Journal; Journal of Business Venturing; Entrepreneurship, Theory & Practice; Technovation; Research Policy; Management Science; Harvard Business Review; Journal of Management Studies; Business Horizons; Academy of Management Journal.*

Note 2. Compustat is the leading U.S. provider of corporate and industry financial intelligence; VentureXpert is the single source for comprehensive data covering ventures, buyouts, funds, private equity firms, etc.

Note 3. Field (2009, p. 679) suggests an α (alpha) value in the range of 0.7 to 0.8 as a good overall indicator of reliability and any alpha value below 0.3 should be deleted.

Note 4. 'Expert' being defined as established researchers who had served on editorial boards of *Entrepreneurship, Theory & Practice (ETP)* or *Journal of Business Venturing (JBV)* in 2003, and, who had demonstrated success publishing in these journals on multiple occasions between 1999 and 2003.