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Determinants of Corporate Entrepreneurship: A meta-analysis

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Abstract

Many scholars have enriched the corporate entrepreneurship literature by conducting empirical studies examining key research questions. There have been a few meta-analytic studies examining the impact of corporate entrepreneurship on organizational performance. However, ours is the first meta-analytic study conducting an integrative analysis of the determinants of corporate entrepreneurship. The current study therefore integrates the quantitative studies done to estimate the determinants of corporate entrepreneurship through a meta-analytic approach. We found that some meta-factors like management support, environmental dynamism and reward system contributed significantly towards corporate entrepreneurship within established firms.

Introduction

The conceptualization of 'Corporate Entrepreneurship'(CE) has travelled its journey from being described as a coping mechanism against hostile environment by mainly product innovation (Peterson & Berger, 1971), through as a diversification process(Burgelman, 1983), as an individual entrepreneurship process in a firm (Pinchot, 1985) to a process of engaging in entrepreneurial activities in an existing firm(Stopford & Baden-Fuller, 1994). These entrepreneurial activities have been recognized as four types namely sustained regeneration, organizational rejuvenation, strategic renewal, and domain redefinition (Covin & Miles, 1999). In parallel to the debate to clear the ambiguity around the construct, other attempts were made to understand the significance of CE on the financial performance of a firm(Guth & Ginsberg, 1990; Khandwalla, 1987; Lumpkin & Dess, 1996; Miller, 1983). Extensive empirical work acknowledged the positive impact of CE on firm performance(Zahra & Covin, 1995). Despite several works asserting the positive effect of CE, its role in increasing the firm performance is often questioned. The reason behind this scepticism lies in the fact that there is not any perfect recipe for CE. Not every firm is able to convert its potential towards higher firm performance. Such was the distrust that CE was started to be categorised as managerial fad(Duncan, Ginter, Rucks, & T. Douglas, 1988). Much of this dilemma can be attributed to not knowing clearly what effects CE intentions and actions. Although both qualitative and quantitative literature attempted to understand the factors responsible for CE, but an integrated view of those are still missing.

This paper therefore attempts to build a meta analytic analysis of asserted determinants of selected quantitative works on the topic. Adopting meta-analysis will help to get a clear picture of the antecedents of CE by overcoming inconsistencies of sample size, measurement methods and models used. One limitation of our study is a smaller number of quantitative studies which explored the success factors of CE and reported the correlation within them. The contributions made by this study can be listed below

- (1) The integrated analysis of the determinants of CE will contribute towards a better understanding of the CE process.
- (2) This will act as guide to implement successful CE
- (3) The integrated factors will help to give a sound base to future researchers in answering how to leverage on the benefits of CE.

The following section of the study first gives a brief introduction of the metanalytic approach and data selection method used. The next section reports and discusses the findings.

Data Collection and Methodology

Meta-analysis is a statistical technique used for research integration(Hunter & Schmidt, 1990).It is a quantitative technique of integrating research. Meta-analysis uses the finding of the previous studies as input. Meta-analysis used specific designed statistical procedures to integrate the results of primary empirical studies. Meta-analysis create a pool of existing literature on the topic of interest. Meta-analysis also allow the researcher to compensate the quality difference in the existing studies by correcting the difference in the sample and effect sizes(Hunter & Schmidt, 1990, 2004).

There are two type of meta-analysis studies exist in the current literature:

1. First type of the meta-analysis is guided by the one or two theories and focuses on either the relationship between two variable of interest or variation in the single variable across the different group of respondents(Palich, Cardinal, & Miller, 2000; Stewart Jr. & Roth, 2004).
2. Second type of the meta-analysis focus on a particular single construct of interest and its relationship with a large number of meta factors. This type of studies integrate the large number of heterogeneous theoretical grounds aiming in explaining the focal construct relationship with various meta factors(Gerwin & Barrowman, 2002; Montoya-Weiss & Calantone, 1994).

The current study focus on a single construct on interest as “Corporate Entrepreneurship” using various theoretical ground and meta factors. We have used second type of meta-analysis strategy to examine and correct the potential antecedents of corporate entrepreneurship.

This study explores and defines the means of corporate entrepreneurship in the existing literature. Primary studies use such terms as corporate venturing, innovation, strategic renewal, intrapreneurship to describe corporate entrepreneurship. One of the important criterion of selection of the studies was presence of the correlation matrix in the articles, because correlation coefficient serve as input in the statistical analysis of meta-analysis. This

allow to compare the empirical studies with the same characteristics and help to integrate the results of primary studies.

First step of the meta-analysis is to collect the relevant studies articles. We have used SCOPUS database for the search relevant articles. We have used Combination of keywords: Corporate Entrepreneurship, Intrapreneurship, Corporate Venturing, corporate strategic renewal, corporate innovation with antecedents, determinants and success factors. Figure:1, is showing the article search strategy. First, we searched the all possible combination of the above mentioned keywords in the SCOPUS and Business Source Ultimate (EBSCO) database , which results in the 368 articles. We have not limited the articles as per the ranking the journals as done in the narrative review studies but we have taken all the possible relevant articles by ignoring the journal ranking to maintain the spirit of the meta-analysis (Hunter and Schmidt, 1990). After reading the abstract, we find 67 articles relevant to the study. As correlation coefficient is the main input of the meta-analysis. We have removed the articles without reporting correlation matrix which resulted in the 39 usable primary studies. There were also measurement issue in the Corporate Entrepreneurship measure in the studies which led to a final sample of 26 studies.

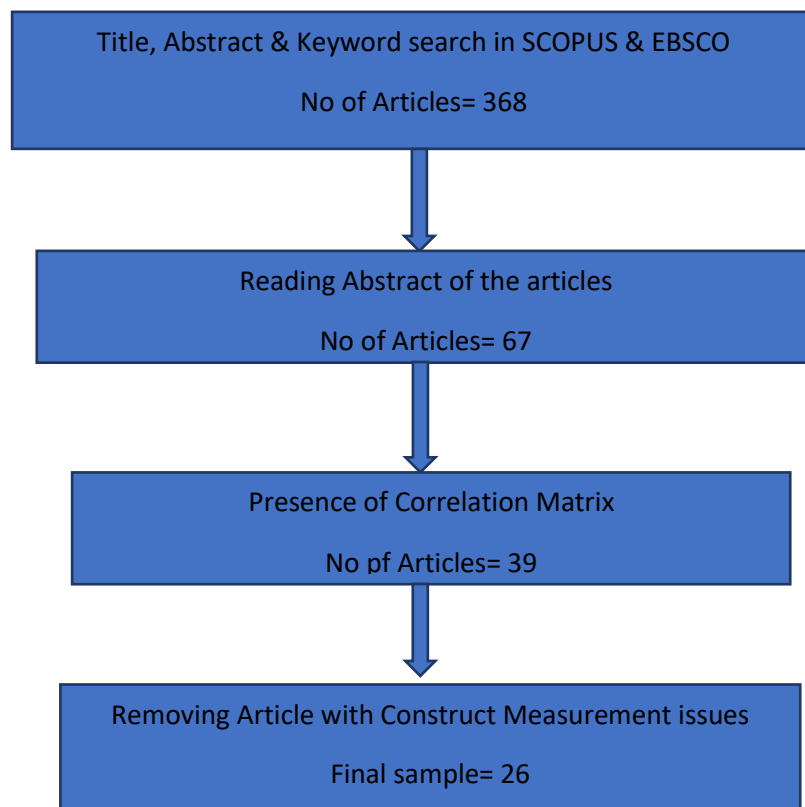


Figure:1, Flow chart of article collection for literature review

Protocol for Meta-analysis

We have used the method suggested by Hunter and Schmidt (2004) . We have used correlation coefficient from the primary studies for the correction based on the sample size and reliability. The advantage of the Hunter and Schmidt model is that it allows for the random effect model instead of the fixed effect model to analyse the meta-factors (Hunter and Schmidt, 2004). The fixed effect model assumes that the correlation between the independent variable and the dependent variable is exactly the same true correlation in the all studies used in the meta-analysis. It will cause inconsistent because the measurement of the independent and the dependent variables vary across the studies. The random effect model allow for the variation in the population parameters across the studies used in the meta-analysis(Hunter and Schmidt, 2004). The measurement and the population parameters vary across the primary studies in our sample so we have used random effect model for meta-analysis.

We have used the following steps to correct he measurement error and sample size correction across the studies ((Hunter and Schmidt, 2004)):

1. First we have collected the sample size and the correlation coefficient in all the primary studies which are having corporate entrepreneurship as the dependent variable. All the correlation coefficient related to the explanatory variables with dependent variable corporate entrepreneurship are collected.
2. We have calculated the weighted average correlation coefficient for the particular meta-factor from the primary studies. That is the sample size corrected correlation coefficient.

$$avg_r = \frac{\sum Ni * Ri}{\sum Ni}$$

Where, avg_r is sample weighted average corrected correlation coefficient, Ni is the sample size for the each meta-factor in the primary study, Ri is the Pearson correlation coefficient in the primary study.

3. Further we have calculated the sample, error and population variance. Sample variance is the variance in the correlation coefficient for the particular meta-factor from the primary studies.

$$\text{Sample Variance} = \frac{\sum Ni * (Ri - avg_r)^2}{\sum Ni}$$

$$\text{Error Variance} = \frac{(1 - avg_r)^2}{avg_Ni - 1}$$

Where, $avg_{Ni} = \frac{\sum Ni}{K}$

Where, K = number of the primary for the particular meta-factor.

Further we have calculated the population variance:

Population Variation = Sample Variance – Error Variance

4. The correlation coefficient can be corrected for the reliability of the measured used in the study. Hunter and Schmidt (2014) suggested the following relation for the correction for reliability:

$$corr_r = \frac{avg_r}{\sqrt{rel(r,y)}}$$

Where, corr_r is the corrected correlation coefficient, rel(r,y) is the reliability correction for the measurement of the dependent variable. Reliability can be estimated as:

$$rel(r,y) = \frac{\text{Population Variance}}{\text{Sample Variance}}$$

5. Further we have calculated the confidence interval for the corrected effect size at the 95% confidence interval.

Results and Discussion

Although the overall aim of the articles selected for the meta-analysis is to estimate the antecedents of Corporate Entrepreneurship, but different measures of the same construct has been used in different studies. Below is a summary of the measures used in the final list of 26

articles. Table:1, is having the details of the variable used to measure the construct corporate entrepreneurship and their respective references to adopt the measures.

Table:1, Dependent variable used to measure corporate entrepreneurship

Dependent Variable	References
Corporate Entrepreneurship	(Martín-Rojas, García-Morales, & García-Sánchez, 2011)
Entrepreneurial Intensity	(Petzer, Meyer, Svensson, & Villiers-Scheepers, 2012)
Intrapreneurship	(Woo, 2018)
Corporate Entrepreneurship	(Daryani, Karimi, & Daryani, 2012)
Organizational and individual innovativeness	(Rutherford & Holt, 2007)
Corporate Entrepreneurship	(Kakapour, Morgan, Parsinejad, & Wieland, 2016)
Corporate Entrepreneurship	(Jahanshahi, Nawaser, & Brem, 2018)
R&D intensity	(Judge, Liu-Thompkins, Brown, & Pongpatipat, 2015)
Corporate Entrepreneurship	(Eddleston, Kellermanns, & Zellweger, 2012)
Corporate Entrepreneurship	(Wood, Holt, Reed, & Hudgens, 2008)
Intrapreneurship	(Rigtering & Weitzel, 2013)
Corporate Entrepreneurship	(Kearney, Hisrich, & Antoncic, 2013)
Corporate Entrepreneurship	(Boone, Lokshin, Guenter, & Belderbos, 2019)
Corporate Entrepreneurship	(Turró, Urbano, & Peris-Ortiz, 2014)
Corporate Entrepreneurial Intention	(Fini, Grimaldi, Marzocchi, & Sobrero, 2012)
Corporate Entrepreneurship	(Kellermanns & Eddleston, 2006)
Corporate Entrepreneurship Capability	(Scheepers, Hough, & Bloom, 2008)
Innovation Performance	(Szambelan & Jiang, 2019)
Corporate Entrepreneurship	(Martin-Rojas, Garcia-Morales, & Gonzalez-Alvarez, 2019)
Corporate Entrepreneurship	(Yuan, Bao, & Olson, 2017)
Corporate Entrepreneurship	(Holt, Rutherford, & Clohessy, 2007)
Corporate Entrepreneurship	(Kemelgor, 2002)
Corporate Entrepreneurship	(Chen, Tang, Jin, Xie, & Li, 2014)
Corporate Entrepreneurship	(Martín-Rojas, García-Morales, & Bolívar-Ramos, 2013)
Corporate Entrepreneurship	(Heavey, Simsek, Roche, & Kelly, 2009)
Corporate Entrepreneurship	(An, Zhao, Cao, Zhang, & Liu, 2018)

Meta-analysis started with the collection of the correlation coefficient and the sample sizes from the primary studies. We have identified 20 meta-factors which are having more than two observations from the selected studies as per represented in the Table:2. Among these

meta-factors only seven has more than 2 observation from the primary studies. Three meta-factors as management support, environmental dynamism and reward system have more than five observations of the correlation coefficient used in the study. The correlation coefficient for the meta factors resource availability, openness, extraversion , environmental dynamism and others are having variability across the studies. The direction of the relationship for the met factors such as environmental dynamism, resource availability, neuroticism, openness and conscientiousness with corporate entrepreneurship are varying across the studies. The correlation coefficient for the meta-factors such as management support, autonomy, technological distinctiveness, learning orientation and others are almost consistent across the studies. There is a high variation in the sample size across the primary studies for all the meta-factors.

Table:2, Sample parameters from the primary studies

Meta-factors	Correlation Coefficient(Ri)	Sample Size(Ni)
Tech distinctive competency	0.639	1000
	0.547	160
Org learning	0.641	1000
	0.437	160
Management support	0.638	1000
	0.38	146
	0.65	315
	0.5	264
	0.68	113
	0.38	315
	0.63	201
	0.59	151
	0.668	160
Autonomy	0.27	146
	0.27	315
Rewards	0.27	146
	0.12	315
	0.42	264
	0.52	113

	0.27	315
	0.45	151
Time availability	0.05	146
	0.13	151
Org boundary	0.02	146
	0.02	315
Munificence	0.23	146
	0.449	51
	0.383	141
	0.247	134
Dynamism	0.23	146
	0.195	51
	0.334	141
	0.101	134
	-0.13	170
	0.42	151
	0.296	349
Technological Opportunity	0.24	146
	0.73	315
Extraversion	0.201	473
	0.06	151
Neuroticism	-0.181	473
	-0.11	151
Openness	0.203	473
	-0.01	151
Agreeableness	0.231	473
	0.08	151
Conscientiousness	0.229	473
	-0.02	151
Opportunity Recognition	0.59	240
	0.44	86
	0.4	91

	0.561	248
Learning orientation	0.66	240
	0.44	151
	0.579	248
Resource availability	0.09	113
	-0.11	176
Risk taking propensity	0.26	200
	0.415	349
Technical skills	0.05	200
	0.466	201
	0.626	160

Table:3, Meta-analysis results for the selected meta-factors

Meta-factors	ΣNi	K	Avg_r	Reliability (r,y)	Corrected correlation	Confidence Interval(95%)	Significance
Technological distinctive competency	1160	2	0.613	0.782	0.693	(0.626, 0.761)	Yes
Organisational learning	1160	2	0.613	0.948	0.630	(0.492, 0.767)	Yes
Management support	2665	9	0.581	0.943	0.599	(0.398, 0.799)	Yes
Autonomy	461	2	0.270				
Rewards	1304	6	0.307	0.875	0.328	(0.066, 0.589)	Yes
Time availability	297	2	0.091	-2.505	0.091	(-0.078, 0.078)	No
Organizational boundary	461	2	0.020				
Munificence	472	4	0.304	0.387	0.489	(0.328, 0.650)	Yes
Dynamism	1142	7	0.218	0.868	0.234	(-0.098, 0.565)	Yes
Technological opportunity	461	2	0.575	0.985	0.579	(0.132, 1.026)	Yes
Extraversion	624	2	0.167	0.388	0.268	(0.150, 0.386)	Yes
Neuroticism	624	2	-	0.164	-3.710	(-0.060, 0.060)	No
Openness	624	2	0.151	0.722	0.178	(-0.001, 0.357)	Yes

Agreeableness	624	2	0.194	0.501	0.275	(0.148, 0.401)	Yes
Conscientiousness	624	2	0.169	0.805	0.188	(-0.021, 0.397)	Yes
Opportunity recognition	665	4	0.534	0.737	0.622	(0.483, 0.760)	Yes
Learning orientation	639	3	0.577	0.880	0.615	(0.451, 0.779)	Yes
Resource availability	289	2	-	0.221	-0.068	(-0.259, 0.124)	Yes
Risk taking propensity	549	2	0.359	0.730	0.420	(0.274, 0.566)	Yes
Tech skills	561	3	0.363	0.963	0.370	(-0.104, 0.844)	Yes

Table:3, is showing the meta-analysis results for the meta-factors. First, we have calculated the sample size corrected correlation coefficient for all the meta factors. This allow to take a robust measure of the relationship among the dependent variable and the independent variable by limiting the sample variability across the studies. Neuroticism and the resource availability are having negative correlation with the corporate entrepreneurship and others are having positive correlation. Meta-factors like technological distinctiveness, organizational learning, learning orientation, management support, technology opportunity and opportunity recognition are having very strong correlation (>0.50) with corporate entrepreneurship. Further we have estimated the reliability for each meta-factor by the ration of population to sample variance as per discussed in the methodology section. Then we have found corrected correlations using the reliability estimated measures. This will give a more robust correlation coefficient by minimizing the error due the measurement errors and variability of the meta-factors across the studies. We have also calculated the 95% confidence interval for the corrected correlations. We found that the two meta-factors: neuroticism and time availability are not significant. This cannot be claimed with the reliability because the sample size used for meta-analysis of these variable is very low (2) and not acceptable to make any conclusion

Conclusions

The meta-analysis results contribute towards the Corporate Entrepreneurship literature by providing a holistic picture of the determinants of the process. This understanding has practical implications for corporate entrepreneurship practitioners by assisting them to plan successful entrepreneurial venture within the established firms. Furthermore, the clear aggregation of the antecedents of corporate entrepreneurship will help the future researchers

to come up with process models of success of different forms of corporate entrepreneurship. The study however is limited due to the non-availability of much of a quantitative study estimating the determinants of corporate entrepreneurship. Therefore, there remains a scope of improvement in future to include the forthcoming relevant studies to the meta-analysis data of the current study.

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