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The EO-as-Experimentation Perspective: The Examination of the Entrepreneurial Orientation and Firm Performance/Survival Relationship

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The implications of entrepreneurial orientation (EO) on firm performance have been extensively examined in the literature. However, limited attention has been given to the wide range of performance implications EO may have on shareholder value and financial performance; and the risk of failure created by EO. Instead, current studies have relied on short-term measures of firm performance and focused on a sample of active firms, revealing only the advantageous effects of EO on a firm's performance as a consequence. This research aims to advance research on EO by examining the effects of EO on firm performance and survival on a separate sample of active and inactive firms in a longitudinal timeframe from the pre-financial crisis period to the post-crisis period. The research aims to reveal new insights into the EO–performance relationship by utilising the EO-as-experimentation perspective.

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1. Introduction

Entrepreneurial orientation (EO) is considered a fundamental concept in the entrepreneurship and strategic management literatures, within which studies have centered upon the importance of EO in achieving higher firm performance (Gupta et al., 2016; Rauch et al., 2009). The focus of this paper is also on the performance implications of EO, but it seeks to transcend existing studies by treating two hitherto ignored aspects of the EO–performance debate: its longer-term effects on wider measures of firm performance, and the hazards EO may present to firm survival.

The meta-analysis by Rauch et al. (2009) revealed that there is a strong correlation between EO and firm performance and this explains the increasing interest of researchers in studying this relationship (Gupta et al., 2016). Thus, firm performance is the most important dependent variable in EO research (Wales et al., 2013).

The EO-as-advantage perspective considers that it is beneficial for firms to pursue EO and has been the majority of the stance of research on the EO-firm performance relationship (Wiklund and Shepherd, 2011). Wiklund and Shepherd (2011) considered an alternative understanding of the EO-performance relationship described as an EO-as-experimentation perspective. Since EO encompasses a risk-taking component, it could lead to a variance in the performance of different firms. Thus, the nature of risk taking could possibly materialise in performance extremes, and is characterised by high performance returns in surviving firms, yet higher rates of business failures among other firms. This emphasises the fact that prior research has been affected by a selection bias (i.e. surviving firms) (Rauch et al., 2009). In accordance with the EO-as-advantage perspective, EO has a positive effect on firm performance as well as firm survival, whereas the EO-as-experimentation considers that EO has a positive effect on firm performance and a negative effect on firm survival because of the likelihood that such experimentation generates a high degree of variance and fluctuation in its success.

This present study considers the EO-as-experimentation perspective (Wiklund and Shepherd, 2011). Few researchers have questioned or challenged the notion that EO leads to performance benefits. The majority of researchers universally accept that EO is advantageous to firm performance (Anderson et al., 2012). Thus, as Gupta and Dutta (2016) noted, EO research has reached a saturated mature stage with the same logic being reiterated and adopted among EO researchers.

In order to unravel the constituents of EO, this study deconstructs the EO latent construct into its three main components of proactiveness, risk taking, and innovativeness. The deconstruction of the EO dimensions has been largely ignored in the literature. Rauch et al. (2009) meta-analysis confirmed that most of the studies considered EO as a unidimensional construct as initially proposed by Miller (1983) with only 13 studies out of the 51 considering the EO dimensions separately. Thereby, the multidimensional construct proposition by Lumpkin and Dess (1996) has been neglected. Yet following the Rauch et al. (2009) meta-analysis, most of the studies accepted for granted that EO as a gestalt construct enhances firm performance, even though studies have shown that each of the EO dimensions have differential effects on a firm's performance, with some detrimental impact also possible (e.g. Hughes and Morgan, 2007; Kreiser et al., 2013).

The long-term effects of EO on firm performance were studied utilising objective measures of both EO and firm performance. The EO literature has become stagnant in terms of developing new measures of EO (Gupta and Dutta, 2016; Gupta and Wales, 2017) that would revitalise EO research and challenge the dominating EO-as-advantage perspective.

The measures developed for each of the EO dimensions are constructed using objective proxies in response to the recommendation of Miller (2011) in order to be able to examine the longitudinal effect of each of the different dimensions of EO on firm performance. The majority of the EO research has utilised the Miller (1983)/Covin and Slevin (1989) scales in order to measure EO. Such summated scales align with the unidimensional conceptualisation of EO posited by Miller (1983). However, the secondary measures of EO were developed in line with the conceptualisation of EO by Lumpkin and Dess (1996).

This study aims to examine the effects of each of the EO dimensions on various forms of firm performance along a longitudinal timeframe. A panel data analysis is more reliable than a cross-sectional snapshot examination (Hsiao, 2007). Few researchers have considered the panel effect of EO on firm value over time (Gupta et al., 2016). Most of the research has been in the form of cross-sectional studies that focus on accounting measures of firm performance (Gupta et al., 2016; Miller, 2011). Thus, the effect of EO on a long-term performance indicator (in the form of Tobin's Q) is examined similar to few researchers (e.g. Miller and Le-Breton Miller, 2011). Yet, in order to have a multidimensional aspect of firm performance, then an accounting measure of firm performance is also included (in the form of Return on Assets, or ROA) (Wiklund and Shepherd, 2005).

2. Method

2.1 Sample

The sample consisted of high-tech large firms (>500 employees) that belong to the high-tech industry at the 4-digit Standard Industrial classification code in accordance to Loughran and Ritter (2004) classification. The secondary data was obtained from Wharton Research Data Services, specifically from Compustat-North America dataset, which contains financial data and Center for Research in Security Prices (CRSP), which contains market data and share prices. The data was collected from 2000 until 2014. The data was coded in the Statistical Analysis software and the regressions were run in STATA. The final dataset contains 742 firms (342 active and 401 inactive firms) and 5,011 observations.

2.2 Measures

2.2.1 Dependent Variables: Firm Performance

Tobin's Q: A long-term measure of firm performance, which assesses the valuation of the firm's market value with relativity to the replacement cost of its assets. It was computed using Compustat items as such: $\{(\text{common shares outstanding} \times \text{calendar year closing price}) + (\text{current liabilities} - \text{current assets}) + \text{long term debt} + \text{liquidating value of preferred stock}\} /$ by total assets (Miller and Le-Breton Miller, 2011).

ROA: A profitability accounting based measure of a firm's financial performance and an indicator of the firm's degree of efficiency in utilising its current assets. It was computed as net income/total assets (Haynes et al., 2014) from Compustat.

2.2.2. Predictor Variables: EO dimensions

Innovativeness: computed as R&D expenditure divided by total assets. The data was obtained from Compustat (Miller and Le-Breton Miller, 2011).

Proactiveness: calculated as the percentage of annual earnings reinvested in the company, which is retained earnings divided by total assets. The data was obtained from Compustat (Hall et al., 2005).

Risk taking: the firm-specific unsystematic risk (portion unattributed or unexplained by the industry) of the firm. The daily stock return file was used from CRSP when computing risk taking. It was measured as the standard deviation of residuals from the regression of running the daily stock returns on the value weighted market returns (Hoberg and Parabhala, 2009; Miller and Le-Breton Miller, 2011).

2.2.3 Control Variables

Investment opportunity: calculated as capital expenditures divided by beginning of year long-term assets (equipment, property, and plant) (Campbell et al., 2011). The source was from Compustat.

Firm age: computed as the difference between the Study's given year and the firm's listing year in CRSP (Bebchuk et al., 2011).

Firm size: computed as the log of the number of employees, which is in line with the definition of study's firm size (Rauch et al., 2009). The source of firm size was through Compustat.

Liquidity: computed as cash and short term investments divided by total assets (Harford et al., 2008). The source was from Compustat

Leverage: computed as short term and long term debt divided by total assets (Harford et al., 2008). The source was from Compustat.

Systematic risk: computed as the average weighted market returns (Miller and Le-Breton Miller, 2011). The source was from CRSP.

3. Analysis Procedure

The panel regressions were used to run the analysis. The fixed effect regression was chosen since the robust Hausman test rejected the null hypothesis and indicated that a random-effect estimator was inconsistent. The fixed effect regression helps to control for all variables that are unobserved and time-constant. The robust clustered standard errors were used in all regressions to account for within-firm autocorrelation. Time dummies were included in the regressions in order to control for the time effect. No issues of multicollinearity were found by the VIF and the regression coefficients. All variables were winsorised at the 1st and 99th percentiles and standardised.

4. Summary of Results

4.1 Panel data Results

4.1.1 Active firms

Tables 1 and 2 show the results of the fixed effect panel regressions in the active dataset. All models have included time dummies. In each of the tables below, model 1 focuses on EO, model 2 on innovativeness, model 3 on proactiveness, and model 4 on risk taking dimension of EO. It was revealed that the EO dimensions have different effects on each of the firm performance measures. Innovativeness revealed that it has a significant positive effect on Tobin's Q ($p < 0.05$), whereas a significant negative effect on ROA ($p < 0.001$). Proactiveness revealed an insignificant effect on Tobin's Q whereas a significant positive effect on ROA ($p < 0.001$). Risk taking showed a significant negative effect on Tobin's Q ($p < 0.05$) and a significant inverse U-shaped relationship with ROA ($p < 0.001$) by the U-test in STATA (Haans et al., 2016). EO showed a significant inverse U-shaped relationship on both Tobin's Q ($p < 0.05$) and ROA ($p < 0.001$). The effects of different values of EO on firm performance

also revealed that higher values of EO have a significant negative effect on both measure of firm performance ($p < 0.01$).

Table 1

Tobin's Q	Model 1	Model 2	Model 3	Model 4
EO	-0.0072222			
EO squared	-0.0028289*			
Innovativeness		0.1158764*		
Proactiveness			-0.0545651	
Risk taking				-0.074549*
Systematic risk	0.1261937***	0.1268441***	0.1226804***	0.1448835***
Investment	0.0739886**	0.0811866***	0.080257***	0.0705814**
Firm size	-0.2652654**	-0.2129516*	-0.2206653**	-0.2761692**
Firm age	-0.0278442	-0.0358786	-0.0255746	-0.0494722
Leverage	-0.1132011***	-0.1089845***	-0.1204313***	-0.106229**
Liquidity	0.0631336	0.078567*	0.0715381	0.057484
Constant	0.3001748**	0.2639838**	0.2827088***	0.3550232***
Adj. R-squared	0.677	0.679	0.677	0.678
N (number of observations)	2504 (292 cluster of firms)	2545 (295 cluster of firms)	2544 (294 cluster of firms)	2505 (293 cluster of firms)

$p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 2

ROA	Model 1	Model 2	Model 3	Model 4
EO	-0.3255419***			
EO squared	-0.0133611***			
Innovativeness		-0.460747***		
Proactiveness			0.4356527***	
Risk taking				-0.1016783*
Risk taking squared				-642.0923***
Systematic risk	-0.0128226	-0.095117**	-0.0794591*	-0.0129684
Investment	0.180289***	0.1895037***	0.1712518***	0.1620118***
Firm size	-0.2006199*	-0.3061628**	-0.3961045***	-0.2039545*
Firm age	0.2118558**	0.3474102***	0.2921369**	0.1275206
Leverage	-0.1404**	-0.1670195**	-0.0947908*	-0.1052929*
Liquidity	0.1000116*	0.1089404**	0.1233047**	0.1173077**
Constant	0.1670085	-0.2649947**	-0.3871877***	-.0003311
Adj. R-squared	0.499	0.492	0.475	0.4959
N (number of observations)	2507 (292 cluster of firms)	2548 (295 cluster of firms)	2547 (294 cluster of firms)	2508 (293 cluster of firms)

$p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

4.1.2 Inactive firms

Tables 3 and 4 show the results of the fixed effect panel regressions in the inactive dataset. Innovativeness revealed a significant positive effect on Tobin's Q ($p < 0.05$) and a significant negative effect on ROA ($p < 0.001$). Proactiveness revealed a significant negative effect on Tobin's Q ($p < 0.01$) and a significant positive effect on ROA ($p < 0.001$). Risk taking revealed a significant negative effect on Tobin's Q ($p < 0.001$) without the time dummies and a significant inverse U shaped relationship with ROA ($p < 0.01$). EO revealed a significant negative effect on Tobin's Q ($p < 0.05$) and a significant negative effect on ROA ($p < 0.001$).

Table 3

Tobin's Q	Model 1	Model 2	Model 3	Model 4
EO	-0.0297814*			
Innovativeness		0.1029751*		
Proactiveness			-0.1851161**	
Risk taking				-0.0571073
Systematic risk	0.096664**	0.0863944**	0.0868787**	0.0977505**
Investment	0.0823863***	0.0852525***	0.0841024***	0.0845298***
Firm size	-0.1310325	-0.1354818	-0.0321546	-0.1720803
Firm age	0.0440822	0.0892639	0.0334519	0.0524799
Leverage	-0.0544919	-0.049797	-0.0935461**	-0.042331
Liquidity	-0.0135137	-0.0031266	-0.0071453	-0.0144357
Constant	0.2849012**	0.1489984**	0.2372433**	.2965475**
R-squared	0.57736513	0.57805172	0.58497604	0.57422696
N (number of observations)	1389 (300 cluster of firms)	1430 (301 cluster of firms)	1423 (301 cluster of firms)	1396 (300 cluster of firms)

$p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 4

ROA	Model 1	Model 2	Model 3	Model 4
EO	-0.2800513***			
Innovativeness		-0.7457155***		
Proactiveness			0.7901908***	
Risk taking				-0.1972188**
Risk taking squared				-305.8104**
Systematic risk	0.0124153	-0.1086033*	-0.0969505*	-0.0461236
Investment	0.1114305***	0.1031699***	0.1098088***	0.1101051***
Firm size	0.0624676	-0.3470097**	-0.6287895***	-0.1799772
Firm age	0.3255535**	0.6004714***	0.6681819***	0.4163967**
Leverage	-0.2015686***	-0.2753179***	-0.0693555	-0.1335269*
Liquidity	0.096352	0.045664	0.0816106	0.1267185*
Constant	0.3907433**	0.0233815	-0.0960138	0.219171*
R-squared	0.57194156	0.58307114	0.55007448	0.51373005
N (number of observations)	1393 (300 cluster of firms)	1434 (301 cluster of firms)	1427 (301 cluster of firms)	1400 (300 cluster of firms)

	firms)	firms)		firms)
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$p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

4.2 Survival Analysis Results

Table 5 shows the results of the survival analysis. The survival analysis revealed that EO increases risk of firm failure by 67.8 % ($P < 0.0001$). Proactiveness increases the risk of firm failure by 54.7% ($P < 0.001$). Risk taking increases the risk of firm failure by 79.8 % ($P < 0.0001$). Innovation decreases the risk of firm failure by 7.3 % ($P < 0.01$).

Table 5

	Model 1	Model 2	Model 3	Model 4
Covariates				
EO	0.51755*** (1.678)			
Innovativeness		-0.07530** (0.927)		
Proactiveness			0.43605*** (1.547)	
Risk taking				1.02883*** (2.798)
Systematic Risk	0.12151***	0.13268***	0.14523***	0.05873
Firm size	-0.42261***	-0.47320***	-0.46758***	-0.36939***
Firm age	-0.56257***	-0.53917***	-0.57670***	-0.48153***
Firm age squared	0.11497***	0.11061***	0.09279***	0.09625***
Leverage	-0.15131***	-0.18220***	-0.16038***	-0.19686***
Leverage Squared	2.74732***	3.07638***	3.12423***	2.09075**
Organisational Slack	0.51054***	0.41442**	0.36927**	0.56316***
ROA	0.04075	-0.03830	-0.06506*	0.10228***
Tobin's Q	-0.17740***	-0.13385***	-0.15524***	-0.09820**

$p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Note: Hazard ratios of main variables are in parentheses and high tech dummies included in all regressions

5. Summary and Conclusions

The results of this study challenge the EO-as-advantage perspective and reveal that EO increases the risk of firm failure and has a significant negative effect on both measures of firm performance in the dataset of failed firms. It was revealed that, in line with Lumpkin and Dess (1996), each of the EO dimensions has a different effect on each of the measures of firm performance among the active and inactive firms.

Innovativeness revealed a positive effect on Tobin's Q (long-term performance), however since it is resource intensive, it has a negative effect on ROA (Wiklund and Shepherd, 2005). The lagged effects confirm this considering that the lagged value of innovativeness has a significant positive effect on ROA. Proactiveness revealed a negative effect on long-term performance, however a positive effect on ROA. It was revealed that being proactive and anticipating future demand can be beneficial for a firm in the short-run, however it has counteractive effects on the long-run and the lagged effects of proactiveness on short-term performance provide further evidence for this. As for risk taking, it revealed to have significant negative effects on both ROA and Tobin's Q. EO also showed significant negative

effects on firm performance. The survival analysis shows that being innovative contributes to lower rates of firm failure and being more proactive leads to higher rates of firm failure. Risk taking and being entrepreneurially oriented lead to higher rates of firm failure.

Author Comments: Please note that this a developmental paper, in which I plan to develop the paper by further discussing the results which align with the study's hypotheses, and their implications to the EO research. This paper only gives an outline to the results.

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