Different Lessons from The Past: Entrepreneurs' Experience as The Genesis of Product Market Diversification

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ABSTRACT

Founders' strategic choices on product market scope play a crucial role in new venture survival. Yet, little is known about how founders' pre-entry experience influences such choices. The study fills this gap by examining how the various features of founder experience before entry into a focal industry affect the market scope trajectories of new ventures in the early phases of an industry's life cycle. The central argument of the study is that while founder pre-entry experience in product development fosters broader product market scope of new ventures, founder marketing experience constrains their product market scope. Another interesting argument is that the negative effect between marketing experience and product market scope is weakened when new ventures get funded by venture capital (VC) firms. The study investigates the hypotheses in the context of nascent high-tech industry – Lithium-Ion Battery industry.

Keywords **-** Product Market Strategy, Entrepreneurship, Founder Prior Experiences, Venture Capital Firms, and Nascent Industries.

INTRODUCTION

As it becomes prevalent that young firms tend to diversify within a single industry by *"extending existing product lines and expanding into new niches"* (Stern and Henderson, 2004), firms' decision on market expansion within an industry has been received significant scholarly attention. In responding to this call, scholars in the realm of corporate diversification have begun to extend their research by investigating systematic link between a firm's intra-industry diversification and its performance implication (Stern and Henderson, 2004; Wu, 2013; Zahavi and Lavie, 2013). Missing in this conversation, however, is an understanding of antecedents that lead some new ventures to intra-industry product market diversification, while others to stay focused with one market.

Meanwhile, a significant body of entrepreneurship literature has related the 'pre-entry' experience, namely a founder's prior professional career experience, both as an employee and as an entrepreneur, to the propensity to founding new ventures (Gompers el al, 2005; Dobrev and Barnett, 2005; Elfenbein et al, 2010). For example, one stream of research suggests that serial entrepreneurs are more likely to found new ventures (Wright et al, 1997), while another posits that entrepreneurs with prior work experience prosper (Baron and Ensley, 2006). Furthermore, the founder imprinting literature (Baron, Burton, and Hannan, 1996; Burton and Beckman, 2007; Beckman and Burton, 2008) posits that founders' prior experience have not only profound influence on strategic choice at their new venture inception, but also have long-lasting influence on subsequent strategies at growth phase. Given a rich body of research investigating the factors that affect new ventures' various strategic choices from lens of founders' prior career experiences, it is noteworthy that relatively scant attention has been paid to one of the most widely researched areas in strategy – product market diversification.

Addressing these gaps is important to develop a clearer picture of how the genesis of a new venture impacts the strategic trajectory it may take over time. Investigating how founders' difference in prior experience influences product market diversification enriches entrepreneurship research in a sense that it can show the mechanism through which founders' prior experience enhances/hampers the performance of their new ventures. For diversification literature, understanding individual different working trajectories as one of key antecedents enable connecting firm origin to strategic choice and thus to performance in the end. Integrating literature of both theoretical streams, the paper attempts to shed light on two related questions: *What is the genesis of product market diversification choice for new ventures? What are boundary conditions that impinge on this relationship?*

Given that each founders' career experience provides a particular type of skill sets that cannot be acquired through others (Brüderl, Preisendörfer and Ziegler, 1992), the content and quality difference in various types of founder prior experience will form a unique type of attention base, thus affecting new venture strategies of allocating firm resources(Ocasio, 1997). In formulating new ventures' product market strategy, extant literature posits that both technology and market knowledge are key determinants for shaping their product market strategy (Mosakowski, 1997). This study investigates two major types of founder pre-entry working experience – *product development* and *marketing* experiences. The central argument of the study is that while new ventures with founder pre-entry experience in product development foster product market scope expansion, founders with marketing experience constrain their product market scope. Another interesting argument is that the negative effect between marketing experience and product market scope is weakened when new ventures get funded by venture

capital (VC) firms. Following Li and Greenwood (2004), the study defines product market scope strategy as the decision to expand a firm's operation into more than one application market within a focal industry. Thus, the study does not consider its inter-industry diversification.

THEORY AND HYPOTHESIS

Prior product development experience

After founders exit from the industries with knowledge that is product specific in entering a new industry, they can enjoy several benefits that those lacking this type of knowledge cannot. First, prior work experience in product development can provide a tacit understanding of the products, processes, and technologies used in a focal industry as well as technological specifications of the products and technologies. Second, rich knowledge about technological specifications of the product is a key advantage when allocating resources since it is easier to understand the content of knowledge as well as the interrelatedness between knowledge components. Moreover, given the limited time and sparse resources for new ventures, through less "trial and error" learning processes, they can efficiently use slack resources and time to recognize potential new market opportunities in the industry than those without such experience (Brüderl et al, 1992). Thus,

Hypothesis 1: There is a positive relationship between founders' prior product & development work experience and the degree of new ventures' product market scope.

Prior marketing experience

Skills and a set of knowledge acquired from marketing work experience are distinctive. First, prior marketing work experience can increase access to non-technological knowledge, thus enabling founders to establish broader network channels with various types of stakeholders (Shane and Khurana, 2003; Gompers et al, 2005). For example, workers can encompass experience with distribution networks, industry associations, and marketing networks through marketing work experience. Moreover, founders with marketing experience can enjoy the opportunity to accumulate regulatory knowledge (i.e. Battery safety requirements) made by regulatory entities, thus better and in-depth understanding about specific market segments. Since knowledge gained from founders' marketing experience is related to specific application of products, this type of knowledge can be well applied to a specific application area but may not necessarily be used across heterogeneous market applications. Thus,

Hypothesis 2a: There is a negative relationship between founders' prior marketing work experience and the degree of new ventures' product market scope.

Moderating effect of VC funding

Given that founders' with prior marketing work experience tend to be conservative in making decisions about product scope expansion within an industry due to the meager financial resources available to new ventures in their ventures' early stages, acquiring significant financial resources from outside enable them to enjoy, to some extent, leeway on decision making.

Moreover, when new ventures get funded by Venture Capital (VC) firms , they tend to exert influence on the new ventures by monitoring whether the growth path of new ventures is on the right directions. For new ventures with significant level of pressure to meet VCs' evaluation yardsticks, presenting visible attributes of new ventures can be an effective way for positively signaling to VCs. Product market expansion as a symbolic action, can be one of plausible actions to consider for managing new ventures' impression. Thus,

Hypothesis 2b: The negative relationship between founders' prior marketing work experience and the degree of new ventures' product market scope is weakened when new ventures receive fund from VC firms.

METHODS

Industry setting

The global lithium-ion battery industry is an ideal setting to study above questions for several reasons. First, intra-industry diversification has often been observed in the global lithium-ion battery industry (Business Week, 2009). Second, this industry has clear-cut market application categories – Consumer Electronics, Medical,Military,Aerospace,Marine,Industrial,Automotive,Storage,UPS. These market categories allows the study to depict firms' trajectories of product scope expansion over time. In addition, as the high level of technological intensity in the industry opens up tremendous opportunities for young firms to penetrate these markets, the study can collect relatively a number of privately-held firms.

Sample and Data

The study comprehensively searched for various sources to list up the estimated sample. First, the study included firms listed in major battery conferences (i.e. Advanced Automotive Batteries Conference). Second, by seeking firms mentioned in major industry trade journals of lithium-ion battery and research institutes (i.e Batterypoweronline; Navigant research), and through web-based search (i.e. energy.sourceguide.com), the study consolidated sample size. Later on, the study used SIC code-based approach as a supplementary approach to check if there are some firms not captured from previous two sources. As a result, the data includes 112 global lithium-ion cell manufacturers founded from 1989 to 2010.

Then, the study collected founder's trajectories of careers through reliable web - based sources. These include 'Bloomberg businessweek news' 'Zoominfo', and 'Crunchbase'. For product expansion data, the study used 'batterypowerresource' data as a basis where they trace market expansion trajectory starting from 2006. However, most sample founding years are earlier than 2006, the study searched for each companies' product expansion announcement from its founding to 7th year from website, and archive news (i.e. gigaom; LexisNexis), or through direct contact to company. The study counts total number of product expansion up to 7th year after founding, if any. To capture firms' knowledge capabilities, the performance criteria of battery products (i.e. energy density, life cycle), their chemistry combinations (i.e. Cobalt based, Manganese based, or Iron based cathode), and the battery cell shape (i.e. cylinder; prismatic; pouch) have been acquired through three sources - one of Lithium-ion research institutes -

Shmeul de Lion, company websites, and firm product brochures after email requests. The final data set is unbalanced panel data with 337 observations of 68 Lithium-Ion battery new ventures.

Measures

Dependent Variable: Production market scope up to 7th year after inception

This is a count variable capturing how many product expansion news has been announced within 7 year life span of the each company.

Independent Variables:

Founders' prior working experience – This is a dummy variable. Dividing their prior working experience by their expertise, the study generated 2 binary variables – 1) founder product development experience, and 2) founder marketing experience, and count each of them as 1 if founders' working experience is related to product development or marketing, respectively. ***Moderator*** – VC funding: if new ventures get funded by venture capital firms, it was counted as 1, 0 otherwise.

Control Variables:

The study controlled for individual-, organizational-, and location-specific variables relevant for the purpose of this study. Founders' prior founding experience is a dummy variable. If founders established a new venture before founding a lithium-ion cell new venture, it is counted as 1; otherwise, 0. Firm technological capabilities, time-lagged variable, are captured by counting the total number of Lithium-ion battery cell products over 7 years. The U.S.-based ventures are counted as 1, otherwise 0. A series of seven-year period dummies was included to control for any unobserved factors.

MODEL SPECIFICATION

Since dependent variable relies on a count of a firm's product market expansion as indicators of intra-industry diversification, I use negative binomial model with robust standard error.

RESULTS

Table 1 displays descriptive statistics and a correlation matrix for the variables in the analysis. While numerous variable pairs exhibit significant correlations, these correlations are generally moderate. Importantly, the models are not affected by multicollinearity problems, evidenced by the variance inflation factor (VIF) for Year Dummy which falls below the recommended threshold of 10 (Neter *et al.*, 1996). All models utilize robust standard errors, and significance levels are based on two-tailed tests. Table 2 presents results from a Negative Binomial regression analysis of new venture product market diversification. From model (2) in Table 2, supporting Hypothesis 1, founder product development experience is positively related to the degree of product scope expansion ($\beta = 0.19$, $p < 0.01$). In addition, from full-model (4) in

Table 2, Hypothesis 1 was again marginally supported ($\beta = 0.09$, $p < 0.1$). As postulated in hypothesis 2, founder prior marketing work experience is negatively related to the degree of product scope expansion from model (3) ($\beta = -0.58$, $p < .01$), and full model (4) in Table 2. ($\beta = -0.58$, $p < .01$). The hypothesis 3 - VC funding source positively moderates the relationship between founder prior marketing work experience and the degree of product scope expansion was not supported ($\beta = 0.12$, $p = 0.18$). Interestingly, there exists negative interaction effect between founder's product development experience and new ventures' product market scope. This result implies that VC's monitoring mechanism explained in Hypothesis 2b, may be effective in restricting new ventures' degree of navigating to new product market applications when founders have prior product development work experience.

DISCUSSION

In response to the need for a systematic understanding of the determinants guiding new ventures in shaping distinct market scope within a high-tech industry characterized by intense volatility and turbulence, this study makes significant strides. It contributes to the existing literature by exploring how individual-level factors intricately mold the manner in which new ventures carve out their market scope trajectories. The nuanced exploration of founder prior work experience in this context provides valuable insights into the underlying dynamics of market scope strategies within emerging ventures. This way, this research significantly advances dialogues around entrepreneurship and strategy literature. First, the study advances entrepreneurship literature by explaining why founders conceive of decision making differently within the same environment. Second, the study advances strategy research that has largely examined the antecedents of changes in market scope by introducing founders' prior experience as a key driver of market scope of new ventures.

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TABLES

Table 1 Descriptive Statistics and Correlations

Variables	Mean	S.D.	1	2	3	4	5	6	7	8
Product Market Scope	2.03	1.27	1							
Product Development Exp.	0.53	0.50	0.1013*	1						
Marketing Exp.	0.19	0.40	-0.1578*	-0.4358*	1					
VC Backed	0.53	0.50	-0.0364	-0.0582	0.1322*	1				
Founding Exp.	0.19	0.40	-0.0298	-0.1319*	0.3319*	0.1060*	1			
Firm size	679.52	2264.86	-0.0518	0.1212*	-0.0295	-0.1000*	-0.0628	1		
Firm Tech Capabilities	1.52	0.74	-0.1062*	0.0286	0.0679	0.0205	0.0221	0.0578	1	
Location	0.45	0.50	0.1148*	-0.0807	0.2639*	0.0885*	0.1263*	-0.1411*	-0.0711	1

Table 2 Panel Negative Binomial regression results

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Product Market Scope	Product Market Scope	Product Market Scope	Product Market Scope	Product Market Scope	Product Market Scope
Product Development Exp.		0.184***		0.0949*	0.0931*	0.366***
		(0.0526)		(0.0540)	(0.0539)	(0.0886)
Marketing Exp.			-0.580***	-0.540***	-0.639***	
			(0.0638)	(0.0544)	(0.0713)	
VC Backed	-0.262***	-0.315***	-0.288***	-0.285***	-0.294***	-0.0501
	(0.0631)	(0.0573)	(0.0558)	(0.0544)	(0.0585)	(0.0739)
Marketing Exp. * VC Backed					0.120	
					(0.0897)	
ProductDevelopmentExp.*VC Backed						-0.410***
						(0.111)
Founding Exp.	-0.175**	0.00801	0.211***	0.225***	0.230***	0.311***
	(0.0712)	(0.0602)	(0.0507)	(0.0496)	(0.0490)	(0.0573)
Firm size	3.30e-05	5.55e-05**	8.69e-05***	8.64e-05***	8.58e-05***	5.09e-05**
	(2.56e-05)	(2.24e-05)	(1.95e-05)	(1.94e-05)	(1.93e-05)	(2.05e-05)
Firm Tech Capabilities$_{(t-1)}$	-0.104***	-0.136***	-0.109***	-0.116***	-0.118***	-0.0524
	(0.0373)	(0.0350)	(0.0393)	(0.0385)	(0.0389)	(0.0331)
Location (U.S.)	-0.0117	-0.150**	-0.0476	-0.0788	-0.0782	-0.131**
	(0.0754)	(0.0709)	(0.0629)	(0.0645)	(0.0645)	(0.0644)
Year Dummy	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
Constant	0.306***	0.206**	0.244***	0.177*	0.184**	-0.0531
	(0.0952)	(0.0971)	(0.0902)	(0.0914)	(0.0923)	(0.0965)
Observations	345	337	337	337	337	337
No. of Firms	70	68	68	68	68	68

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1