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RESOURCE-BASED CAPABILITY TRAJECTORIES OF NEW VENTURES

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ABSTRACT

It is widely acknowledged that resources and capabilities are critical for a new venture's competitiveness and that early stage ventures face severe challenges to develop competitive capabilities. We conduct the first large-scale longitudinal empirical examination of this important phenomenon. We track the resource / capabilities advantages / disadvantages, measured across nine domains, as perceived by the founders of 495 Nascent Ventures and Young Firms over three annual waves. We use a novel method, latent class Markov models, to simultaneously identify four clusters of firms with similar resource configurations and track changes in these configurations over time. We find ventures with founders that engage in bricolage behaviours and high technology orientated firms exhibit the most positive resource development trajectories. Entrepreneurial experience and collaboration appear positive for Nascent Ventures, but not critical for operational Young Firms.

INTRODUCTION

It is clear from the research based view that resource-based capabilities are central to firm performance (Barney 1991, 2001; Wernerfelt, 1984). Indeed, a fundamental task of early-stage ventures is to assemble the resource-base needed to generate and appropriate rents from an opportunity (Alvarez & Barney, 2004). But how do emerging firms develop their resource-based capabilities in the first place? This is a question that has so far received surprisingly little research attention.

Drawing on case studies, Brush, Greene & Hart (2001) suggest that emerging firms must transform their initial human, social, financial capitals into organisational capabilities. Sirmon & Hitt (2003) and Sirmon, Hitt & Ireland (2007) theorise that firms must acquire, bundle and deploy resources. Important insights are also provided by complementary streams of research: how young firms attempt to attract external (primarily financial) resources (Cassar, 2004; Harrison, Mason, & Girling, 2004; Winborg & Landstrom, 2001); causal firms follow an end-means process whereas effectual firms follow a means-end process (Sarasvathy, 2001; Wiltbank et al., 2006); and bricoleurs make do by recombining resources at hand (Baker & Nelson, 2005).

Notwithstanding these valuable research contributions, we were unable to identify any large-scale empirical studies that directly examined the evolution of resource-based capabilities of early-stage ventures over time. Since many theoretical insights have been provided primarily through qualitative insights, but a mature, comprehensive theory is yet to emerge, theoretical development in this regime can be regarded as intermediate (Edmondson & McManus, 2007). Consequently we seek to provide a quantitative exploration of this theoretical and practical important question.

METHODS

Since many theoretical insights have been provided primarily through qualitative insights, but a mature, comprehensive theory is yet to emerge, theoretical development in this regime can be regarded as intermediate (Edmondson and McManus, 2007). Consequently we adopt a quantitative, exploration of the phenomenon in an effort to identify possible theoretical linkages. We conduct a large, longitudinal panel emerging ventures and young firms over three years. We track their competitive resources and capabilities over time, as well as likely antecedents. To make sense of this heterogeneity, we employ a novel technique, Markov latent-class modelling, which identifies clusters (latent classes) of ventures with similar resource configurations from the data and tracks changes in these configurations over time. Within the business literature, the technique has primarily been used to study durable goods acquisition patterns of households over time (e.g., Paas, Vermunt & Bijmolt, 2007; Prinzie & Van den Poel, 2007). In our context, the Markov chain will describe the trajectory of resource configurations over each year of data. Specifically, it will model the probability that an individual firm will transition from one resource configuration to another from year to year. We will include a range of variables drawn from various theories of resource development to act as covariates that influence these transition probabilities. We used Latent Gold 5.0 for model estimation (Vermunt & Magidson, 2007).

Data collection

Following the methods pioneered by the PSED study (Reynolds & Miller, 1992) We conducted a large scale phone survey of 30,193 randomly selected Australian adults. This process yielded 1,988 entrepreneurial start-ups. These were directed to the full length interview (50-60 minutes) either directly following the screener or later by appointment. The full length interviews were completed by 1,184 respondents in the first year, representing a response rate of 55.7 percent of the eligible cases identified in the screener. The resulting sample consisted of 594 nascent ventures (53.6% of the sample) and 514 young firms (46.4%) in wave 1 of data collection in 2007. The panel study consisted of three annual waves of data collection. Attrition due to both non-response and termination of the venture resulted in a sample of 201 nascent ventures and 294 young firms.

Measures

Competitive Resources and Capabilities: We sought to develop scales for measuring the competitive resource and capability advantages (and disadvantages) for a broad-based cohort of entrepreneurial firms. Where possible scales were based on existing scales. We used multi-item scales to increase the validity of the constructs. Exploratory and confirmatory factor analyses were conducted to establish uni-dimensionality of our scales. The resources were measured in Waves 1, 2 and 3.

The first block of the scales related to the firm's level of resource advantages and disadvantages. Respondents were asked the degree to which each resource category represented an advantage or disadvantage relative to other businesses in their industry on a 5 point response scale: Major Disadvantage, Slight Disadvantage, No Advantage or Disadvantage, Slight Advantage and Major Advantage. We measured seven types of resource-based advantage or disadvantage based on established scales where possible: *Marketing expertise Market knowledge Technical expertise Network capabilities Organizational flexibility cost advantage* and *Product (or service) uniqueness*. Each scale has between three and four items, with all Chronbach alpha above 0.7

The second block was a new scale that asked the respondent to nominate the most important resource advantage and disadvantage of the firm. For the advantage, they were then asked four questions to determine how easy it would be for other firms to imitate and/or substitute this resource on a 5 point likert

scale: It would be rather easy for other businesses to copy this advantage; It would take other businesses a long time to copy this advantage; It would be very costly for other businesses to copy this advantage; Other businesses could easily match this advantage, although perhaps in a different way ($\alpha = 0.70$). For the firm's key disadvantage, they were asked corresponding questions related to overcoming this disadvantage: It will be rather easy for us to overcome this disadvantage; It will take us a long time to overcome this disadvantage; It will be very costly for us to overcome this disadvantage; It will be fairly easy to work around this disadvantage, although perhaps in a different way ($\alpha = 0.68$).

Covariates. We included a range of variables which we could expect to act as antecedents of the resource and capability building of early-stage firms. These were all measured in Wave 1 of data collection. The variables represnting level of investment and resources: (Team size, Number of Employees, Effort (hours), Funding), entrepreneurial experience (Dummies for Parallel, Serial and Expert entrepreneurs), collaboration and networks, business model change, technological sophistication (R&D active, high tech, technology age and newness) and bricolage. Details of the measures are available from the authors.

Data Reduction

Preliminary analyses indicated that we had too many variables to either obtain meaningful clusters. Rather than reduce the numbr of variables, as a first step we applied data reduction using Principal Component Analysis (PCA) with Varimax rotation on the items that are used for charaterizing the firms. This analysis was conducted as we found that a high level of multicollinearity occurred between the mentioned items. The conducted PCA led to the following four factors that were later used for clustering the firms in our dataset: (1) Differentation capabilities; (2) Cost and flexibility capabilities; (3) Inimitibility; (4) Overcome disadvantage. Multicollinearity also accored amongst the variables that were to be incorporated as covariates in the cluster analysis. Thus, a PCA with Varimax rotation was also applied to thse items and resulted in the following factors: (1) *F_experience* (factor-score based on *Serial*, *Parallel*, *Expert* And *Portfolio*); (2) *F_Size* (factor-score based on *Teamsize*, *Employees* And *Effort*); (3) *Collaboration* loaded as a single item; (4) *F_Networks* (factor-score based on *External Change* and *Networks*); (5) *F_HiTech* (factor-score based on *R&D*, *Newness*, *Technology Age* and *Hi Tech*); (6) *Funding* loaded as a single item; (7) *Bricolage* loaded as a single item. This resulted in a dataset with four variables for clustering firms and 7 variables that will function as covariates for explaining the allocation of firms to the various clusters.

RESULTS

We only report results for nascent firms (results for young firms are available from the lead author). The minimum CAIC rule led to a four-class solution. Figure 1 displays the mean of each of the four competitive resource categories (Differentiation capabilities, Cost & Flexibility capabilities, Inimitability of key advantage and Ease to overcome key disadvantage) for each cluster. The values displayed are differenced from the overall means of all firms in the sample. We label the largest cluster *Strong* (43% of ventures). They are relatively strong across all four dimensions of competitive resources. Ventures in the *Key Advantage* cluster (19% of ventures) have high inimitability of their most important resource for competitive advantage. However, otherwise they are comparatively weak, particularly in terms of cost and flexibility capabilities. A third cluster, labelled *Weak Nimble* (28% of ventures), is relatively strong, though somewhat marginally, in cost and flexibility, but otherwise comparatively weak. The final *Weak* cluster (10% of ventures) is substantially weaker on all dimensions of competitive resources.

Cluster membership is not stable, and firms switch often between clusters in successive years. Switching probabilities between clusters for Nascent Ventures are provided in Table 1. To interpret this table consider the figure in the top-left cell, 0.410. This implies that 41.0% of the firms found in the *Weak*

Nimble cluster 1 at period t-1, are still in this cluster at period t. The 0.234 in the top-right cell implies that 23.4% of the firms in the *Strong* cluster at t-1 will be in *Weak Nimble* cluster at period t. In general, we see that the diagonal values are comparatively high. This is not surprising that firms tend to stay in the one cluster indicating a relatively stable competitive resource configuration. One exception of strong diagonal is the *Weak* cluster for nascent Ventures, with only 17.0% remaining in this cluster the following period. The most likely transition for this cluster is to the *Weak Nimble* cluster (41.8%). This is slightly positive transition for these ventures, although other than for cost and flexibility capabilities, this cluster is also relatively weak.

Our estimated LCMM models are reported in Table 2. The model incorporates two types of covariate effects: (1) Effects on initial latent class membership, which is the cluster to which firms were allocated at the first measurement occasion. These are reported on the left side of the table (2) Covariate effects on the probability to switch between clusters across consecutive measurement occasions, i.e., between t-1 and t. In both models several covariates have statistically significant effects:

- *Entrepreneurial experience*. Nascent Ventures with high entrepreneurial experience less often in the *Weak* cluster initially ($p<0.01$). They also more often switch into the *Key Advantage* cluster ($p=0.058$) and significantly less often into the *Weak* cluster ($p<0.05$) over time.
- *Bricolage*. Nascent Ventures that engage in more bricolage behaviours are relatively often in the *Strong* cluster ($p<0.01$) and less often in the *Weak Nimble* cluster ($p<0.01$). These ventures also relatively often switch into *Strong* cluster 4 ($p<0.05$) and less often into *Weak Nimble* cluster ($p<0.01$) over time.
- *High Tech Ventures*. Nascent Ventures with a high tech orientation are relative often in the *Strong* cluster 4 ($p<0.05$). These firms also relatively often switch into the *Key Advantage* cluster ($p<0.01$) and the *Strong* cluster 4 ($p<0.05$).
- *Collaboration*. Nascent ventures that collaborate with other firms are initially more often in *Key Advantage* cluster ($p<0.01$) and less often in *Weak* cluster ($p<0.01$). These ventures also more often switch into *Strong* cluster 4 ($p<0.01$) over time.
- *Networks*. Overall membership of business networks had no significant effect for Nascent Ventures.
- *Effort.* Overall person power and effort had no significant effect for Nascent Ventures.
- *Funding*. Funding had a minimal effect on resource development. Nascent Ventures with high levels of financial investment (Funding) are initially relatively less likely to be *Weak Nimble* cluster ($p<0.05$).

DISCUSSION

It is widely acknowledged that resource and capabilities are central to the competitiveness of new ventures (e.g. Barney, 1991; Alvarez & Barney, 2002) and confirmed by empirical analyses (e.g. Chandler and Hanks, 1989; Wiklund and Shepherd, 2003). Yet early-stage firms face many challenges in assembling the necessary resources and capabilities to effectively compete (Aldrich and Auster, 1986; Kim, Aldrich, & Keister, 2006; Baker and Nelson, 2005). We conduct the first large-scale, longitudinal empirical investigation of this important phenomenon: early-stage venture resource trajectories. Specifically, we measured the perceived resource and capability advantages by the founders of new ventures over three annual waves of data collection. Nine domains of the competitive resource and capability:

Marketing expertise, Market knowledge, Technical expertise, Networking capabilities, Organizational flexibility, Cost advantage, Product (or service) uniqueness, Inimitability (of key resource advantage) and

ease to Overcome (key resource disadvantage).

We introduce of a novel methodological approach of LCMM. Our results reveal four clusters (latent classes) of resource configurations for both Nascent Ventures and Young Firms. We also test various theoretical predictions of antecedents that explain differences in these resource/capability trajectories of new firms. Overall, we find that engaging in high levels of bricolage behaviour and high technology orientated firms contribute to resource development. Entrepreneurial experience and collaboration appears to be important during the nascent phase of development, but we did not find it to be important for operational young firms. Surprisingly we found the level of human effort, measured as a combination of the time invested by founders, and the number of founders and number of employees to have positive effect on resource trajectories of Young Firms, but not Nascent Ventures. The level of invested funds had minimal effect.

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Table 1: Switching probabilities between clusters

Nascent Ventures					
		Cluster (LCMM Class) at period t-1			
		Weak Nimble (1)	Weak (2)	Key Adv. (3)	Strong (4)
Cluster (LCMM Class) at period t	Weak Nimble (1)	.410	.418	.281	0.234
	Weak (2)	.132	.170	.070	0.071
	Key Adv.(3)	.247	.213	.368	0.264
	Strong (4)	.210	.198	.281	0.431
Young Firms					
		Cluster (LCMM Class) at period t-1			
		Strong (1)	Key Adv.(2)	Weak (3)	Catch-up (4)
Cluster (LCMM Class) at period t	Strong (1)	.549	.349	.033	.088
	Key Adv.(2)	.273	.486	.029	.080
	Weak (3)	.117	.119	.519	.392
	Catch-up (4)	.061	.047	.420	.440

Table 2: Effect of Covariates on Initial Cluster Membership and Switching between Clusters

	Impact on Initial Segment					Impact on Switching Segments				
Covariate	Cluster (LCMM Class) at t=0	Coeff	p	Wald	p	Switch to Cluster (LCMM Class)	Coeff	p	Wald	p
F_Experience	Weak Nimble (1)	.068	.640	11.914	.008 **	Weak Nimble (1)	.204	.130	8.104	.044 *
	Weak (2)	-.534	.001 ***			Weak (2)	-.489	.011 *		
	Key Adv. (3)	.341	.065 ^			Key Adv. (3)	.257	.058 ^		
	Strong (4)	.126	.160			Strong (4)	.029	.810		
F_Size	Weak Nimble (1)	-.137	.330	.976	.810	Weak Nimble (1)	.144	.330	4.369	.220
	Weak (2)	.048	.760			Weak (2)	.257	.180		
	Key Adv. (3)	.064	.700			Key Adv. (3)	-.300	.044 *		
	Strong (4)	.025	.790			Strong (4)	-.101	.490		
F_Collaboration	Weak Nimble (1)	-.181	.540	12.350	.006 **	Weak Nimble (1)	-.461	.140	7.855	.049 *
	Weak (2)	-1.034	.002 **			Weak (2)	-.502	.140		
	Key Adv. (3)	1.225	.002 **			Key Adv. (3)	.227	.390		
	Strong (4)	-.009	.960			Strong (4)	.736	.006 **		
F_Networks	Weak Nimble (1)	.136	.310	1.392	.710	Weak Nimble (1)	-.234	.096 ^	7.015	.071 ^
	Weak (2)	.047	.750			Weak (2)	-.106	.540		
	Key Adv. (3)	-.200	.300			Key Adv. (3)	.309	.015 *		
	Strong (4)	.017	.860			Strong (4)	.031	.820		
F_HighTech	Weak Nimble (1)	-.215	.140	7.605	.055 ^	Weak Nimble (1)	-.243	.083 ^	9.279	.026 ^
	Weak (2)	-.193	.200			Weak (2)	-.445	.037 *		
	Key Adv. (3)	.211	.220			Key Adv. (3)	.380	.008		
	Strong (4)	.197	.024 *			Strong (4)	.308	.034		
F_Funding	Weak Nimble (1)	-.076	.039 *	4.314	.230	Weak Nimble (1)	-.008	.820	2.191	.530
	Weak (2)	-.013	.750			Weak (2)	-.069	.190		
	Key Adv. (3)	.097	.160			Key Adv. (3)	.035	.420		
	Strong (4)	-.008	.780			Strong (4)	.043	.260		
Bricolage	Weak Nimble (1)	-.597	.006 **	22.942	.000 ***	Weak Nimble (1)	-.657	.012 *	28.206	.000 ***
	Weak (2)	-.192	.380			Weak (2)	-.377	.400		
	Key Adv. (3)	.084	.760			Key Adv. (3)	-.198	.480		
	Strong (4)	.706	.000 ***			Strong (4)	1.232	.000 ***		

***** p<.001; ** p<.01; * p<.05; ^p<.1**

Figure 1: Resource-based Clusters of Nascent Ventures and Young Firms