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New product development in new ventures: the quest for resources

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New product development in new ventures: the quest for resources

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Innovation and new product development (NPD) are becoming more important as strategic initiatives. Yet, innovation creates challenges for most existing organisations, thus leading to the emergence of new ventures (NVs) as vehicles to deliver innovation. NVs present owners and management with unique opportunities and challenges. On one hand, the NV can focus its attention on specific innovation(s) without having to compete with other goals and departments for resource access. Resources are critical to the successful development and launch of new products and can come from financial lenders and/or suppliers. However, because they are new and because their only asset of worth is the highly risky innovation, NVs are at a strong disadvantage in securing access to these resources. This study explores the effectiveness of using personal equity investments as a strategy for securing access and for enhancing NPD success. Using signalling theory as the theoretical framework and data from 745 NPD projects representing manufacturing innovations, this study finds that equity investment is particularly successful in its NPD impact although not impactful with suppliers. As a signal, it can be argued that equity is a strong, high-quality signal. Reasons for these findings and directions for future research are provided.

Keywords: new product development; equity capital; new ventures; signalling theory

1. Introduction

The strategic impact of innovation (Pink 2005) on firms' profit goals (Song and Montoya-Weiss 1998) is a recognised fact, yet innovation is not without its problems. In exchange for potential higher returns, innovation involves greater risk (Swink and Song 2007) and higher levels of environmental uncertainty (Calantone, Garcia, and Dröge 2003), making innovation less attractive to risk-averse firms. In response, new ventures (NVs) emerge, that are devoted solely to the development of risky innovations and associated new product development (NPD) activities.

NVs can exist as separate divisions within established corporations or as newly incorporated stand-alone companies, created specifically to bring new products, business ideas and initiatives to market (Bart 1988). This study focuses on the stand-alone, newly incorporated venture and the resource challenges it faces. NVs – while free of the risk aversion and structural inertia that plague larger organisations' innovation strategies (Bart 1988) – are typically resource-poor (Shrader, Mulford, and Blackburn 1989; Song, Di Benedetto, and Song 2010; Marion, Friar, and Simpson 2012). This creates a problem since innovations like NPD-associated activities depend on resources to develop, refine, launch and to follow up on market successes.

One way of dealing with this challenge is to draw on resources available from external providers, typically funding organisations and suppliers. Funding organisations provide access to financial capital (Dunkelberg and Scott 2011) while suppliers offer supplier-specific investments in terms of access to capacity and expertise (Song, Song, and Di Benedetto 2011). Unfortunately, NVs' access to these resource providers is limited as most NVs suffer a 'liability of newness' (Stinchcombe 1965), lacking any past history and credibility.

As such, we focus this study on strategies adopted by NVs to secure access to these scarce resources. Specifically, we explore how and why the direct equity investments made by NVs' founding members influence access to these external resources. Three elements distinguish this study's contributions from prior research. First, the introduction of financial capital influences to the NPD conversation that has predominantly been dominated by supplier and customer influences (e.g. Petersen, Handfield, and Ragatz 2005; Swink and Song 2007; Jayaram 2008). Given that most new

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products fail due to insufficient funding conditions (Cooper and Kleinschmidt 1988), a better understanding of how financial and non-financial resources interact to affect NV performance should offer insight on how early-stage ventures can mitigate NPD failure risk. Second, the study explores the impact of venture owners' personal equity stake on NPD performance. Third, the study draws on a theoretical framework relatively new to the OM and SCM fields – signalling theory (Connelly et al. 2011). Two questions guide this study:

- What actions can NVs take to impact their NPD performance through their potential ability to access and effectively utilise external resources?
- How important is equity capital to enhance NPD success and resource performance?

The preceding questions are addressed using data from 745 NPD projects from the US manufacturing industry. The remainder of the paper is organised as follows. The next section develops the NV context and then reviews the literature and theoretical perspectives that link specific combinations of equity and NPD resources to performance. Research design and measurement issues are then described, followed by discussions of empirical findings. The study's implications for managers and its potential for future research are presented in the final section.

2. Innovation in NVs and implications for resource availability

One of the major factors recently cited for NPD failure is under-capitalization (Berends et al. 2014; Senyard et al. 2014). By their very nature, innovations are resource-intensive. Resources are needed for innovation development; for debugging; for preparing the resulting new products for production and market launch; for dealing with product failures; and for the rapid ramp-up of production schedules for successful products.

For NVs, being innovative presents an interesting set of trade-offs. On one hand, the new venture enjoys the freedom to focus all of its attentions on developing and bringing the innovation to market. This freedom exists because NVs, developing their first new product, typically do not have to worry about the impact of the new product on existing products offered by the firm. Being new, NVs also do not suffer from the constraints of a negative history and culture (Bart 1988); they are also free to explore new, unproven markets (Gilbert 2005). On the other hand, NVs assume some critical liabilities, one of the most important being the lack of resources combined with an inability to easily secure resource access from external providers.

Resources must be acquired and accumulated from external sources where the NV has no established legitimacy (Brush, Greene, and Hart 2001). Being new, the NV lacks any history or evidence that it can deliver, or that it represents a 'sound' investment. Furthermore, since innovations in many cases are unproven and risky, resource providers must be convinced that investing in the NV makes good economic sense. One way to convince these resource providers is for the NVs' founding team members to take equity positions in the venture. Research reported in the entrepreneurship literature has found that the perceived *legitimacy* of a new venture is influenced by many factors, including founder involvement (Busenitza, Fiet, and Moesel 2005). By investing their own money, the founding team is effectively communicating certain messages to the marketplace, suppliers and lenders alike. Beyond the personal financial investment that it is, founders' equity commitment can also represent a strong, high quality signal sent by new venture founders to external resource providers.

3. Theoretical framework and research hypotheses

When there is information asymmetry between a NV and potential resource providers (Shane 2000), the NV's value (or potential value) is often ignored because resource providers have no means to evaluate its quality (Akerlof 1970). As a potential remedy, a NV can signal the quality of its resources and future prospects by committing equity investments. Consequently, we turn to signalling theory to provide an appropriate theoretical framework for this study. In signalling theory, one party – the signaller – must choose whether and how to best communicate a signal (information), while the other party – the receiver – must decide how to interpret the signal (Connelly et al. 2011). One of the goals of signalling theory is to reduce the information asymmetries between both parties (Spence 2002) and thereby influence their actions.

Signalling theory has long been accepted as a legitimate and useful theoretical framework in the fields of organisational behaviour, entrepreneurship, financial economics and strategic management (Connelly et al. 2011). It describes a process that consists of four major elements in the resulting signalling timeline: the *signaller*, defined as the person or entity sending the signal; the actual *signal* that is sent, which is then received by the *receiver*, who in turns provides *feedback* to the signaller. Signalling theory provides a unique perspective on problems dealing with multiple options selection under conditions of imperfect information (Connelly et al. 2011).

In the NV context, Hsu (2004) showed that NVs signal their prospect to prominent venture capitalists by selling their shares at a discount. NVs have also been shown to signal their self-worth and quality by engaging in their first alliance on less favourable terms (Nicholson, Danzon, and McCullough 2005), thereby facilitating the NVs' future economic exchange potential (e.g. Hsu 2004; Dewally and Ederington 2006; Pollock et al. 2010).

Signalling theory focuses on issues related to signal quality, duration and strength. Signal quality refers to the extent that the signal is believable by receivers and strength refers to its ability to serve as a quantifiable measure – signalling owners' seriousness and commitment. Consequently, we consider the NV's founding team members as the signallers, sending a signal of equity commitment to receivers (potential investors, suppliers and the general marketplace). We posit that equity investments – as signals – have two highly desirable traits: quality and strength (Lee 2001). Using this perspective, we reframe the resource challenge facing NVs as: 'What type of signal can NVs send to potential resource providers (the receivers) that will cause them to look positively upon the NV as an opportunity for investment?' And relatedly, 'As an intentional signal, does the NV's founding team's equity investments represent a credible, valid, and reliable measure of the message of commitment sent to the investors and marketplace?'

The NV is faced with certain critical considerations. First, it must offer signals that are measurable, credible, significant and observable by receivers (Johnson and Greening 1999; Certo, Daily, and Dalton 2001). Equity contributions signal to potential investors that the NV is viable, credible and that the innovation at the heart of its strategy is feasible and viable (from a market acceptance point of view) with an acceptable level of risk. Furthermore, equity contributions signal that the founding team is so committed to the venture and its innovation task that they are willing to commit their own money. These last two points are essential since most NVs adopt first-mover strategies to enter high-risk, albeit unoccupied, market niches, often relying on speed to market to ensure that competitors do not gain those first-mover advantages (Coviello and Munro 1994). This study proposes that the higher the level of equity that is invested by the founding team, the stronger and more positive is the signal sent to receivers. Ultimately, this commitment should translate into stronger performance impacts.

3.1 *Time to break even performance for NPD*

The study operationalises NPD performance outcome as time to breakeven (TTBE) or the time it takes the new product to break-even. TTBE can be a critical antecedent to financial performance because it contributes to faster opportunities to generate returns (Chen, Damanpour, and Reilly 2010). TTBE is considered even more critical when the founding team's equity is at stake, since reducing the time it takes to recover the funds invested in the NPD project can enhance both operational and business performance (Droge, Jayaram, and Vickery 2004).

3.2 *Sources of financial capital for NVs' NPD projects*

Managerial and financial resources are critical to NPD (Henderson and Cockburn 1994; Evans and Varaiya 2003; Rothaermel and Hill 2005). In NVs, managerial resources are embedded within the entrepreneurial founding team (e.g. Eisenhardt and Schoonhoven 1990; McGee, Dowling, and Megginson 1995; Jensen and Zajac 2004; Song et al. 2008). The effects of founding teams on NPD success have been extensively studied (see Klotz et al. 2014 for a recent review).

Financial resources define access to start-up capital that is essential to any business venture (Hughes and Storey 1993) but particularly critical to NVs (Evans and Leighton 1989). Traditional funding sources such as banks (loans) and venture capital investments are often denied to NVs (Riding and Swift 1990; Zimmerer and Scarborough 2008) due to the NVs' high-risk assessment and low-margin expectations (Zahra and Sharma 2004). Furthermore, some funding sources such as venture capitalists tend to support only proven-to-be-successful ventures (Amit, Brander, and Zott 1998). In the absence of established success histories, NVs often have to show 'good faith' by meeting their funding needs in a hierarchical manner – by using internal self-equity (the owners' capital input), before they can borrow from external sources (Myers 1984). In fact, higher levels of equity investment (mostly private ownership by founding teams) is replacing the dominant use of debt in NVs' financial structure as unfavourable financial markets constrain alternative lending sources (Hoskisson et al. 2013).

We consider such equity commitment – often embodied in the personal assets of founding team members (Song, Song, and Di Benedetto 2011) – to have direct causal linkages to NPD performance since equity represents an intentionally managed endeavour by these firms to reduce uncertainty and strengthen their independence from external lenders (Gilligan and Wright 2012). From a reputation perspective – for founding team members that invest their personal equity in the NV – failure of their first product introduction could affect their personal wealth status as well as future funding opportunities, as potential investors lose faith in the venture's long-term success potential (Song, Di Benedetto,

and Song 2010). The funding team's equity therefore informs the NVs' ability to establish a successful track record and influences their NPD success potential. Furthermore, recent studies linked such alternative funding sources to NPD success (Steier and Miller 2010). Thus, we hypothesise:

H1: There is a positive relationship between the founding team's equity investment and time to break-even performance of NVs' NPD.

3.3 *Equity capital interactions with supplier involvement*

Even as ventures must access financial capital to fund innovations (Dean and Giglierano 1990; Starr and MacMillan 1990), the sources of innovation are rarely ever contained within an organisation unit (Kanter 1985). Rather, greater involvement of external entities such as suppliers has been shown to enhance firms' ability to predict and withstand external environmental shocks (Bruderl, Preisendorfer, and Ziegler 1992). The OM and production innovation literature have acknowledged the value of supplier involvement efforts to NPD success (Petersen, Handfield, and Ragatz 2005; Koufteros and Marcoulides 2006; Chen, Damanpour, and Reilly 2010; Kouvelis, Chambers, and Wang 2006 for extensive reviews).

NVs have used supplier alliances to gain access to knowledge, critical resources and capabilities (Rothaermel and Deeds 2004; Arend 2006; Jayaram and Pathak 2013); obtain needed legitimacy; learn about potential future opportunities (Beekman and Robinson 2004); and enjoy the general benefit of speed to market (Miles, Preece, and Baetz 1999). Yet, as firms strive for the performance-maximising integration promise from supplier involvement efforts (Das, Narasimhan, and Talluri 2006; Feng et al. 2014), few studies have investigated this relationship in new venture settings (Song and Di Benedetto 2008 a notable exception). Unlike their established counterparts, the resource constraints facing new firms make supplier involvement efforts even more critical; yet, their lack of established credibility makes it doubtful that key suppliers will be aware of or even interested in having close involvement with the new venture.

The NV is faced by the challenge of convincing suppliers (especially the key suppliers) that it has something of value to offer in return to potential alliance partners (Moorman, Zaltman, and Deshpande 1992). Equity investments can help build such credibility since it reflects the owners' commitments (Hoskisson et al. 2013). Levels of equity financing combined with successful strategic alliances have been found to positively influence venture performance (Lerner, Shane, and Tsai 2003). Potential investors would also perceive the venture's supplier-coordination efforts as a managerial capability that can effectively combine with its financial commitment to validate the firm's success (Urbig et al. 2013). We therefore expect a positive NPD performance impact from the new venture's supplier involvement efforts interacting with its founding team equity investments, as these signal higher success probability for suppliers (Myers 1984). Thus, we hypothesise:

H2: The interaction effect between equity investments and supplier involvement efforts is positively related to time to break-even performance of NVs' NPD.

3.4 *Equity capital interactions with market orientation*

Market orientation improves NPD performance by keeping processes in line with customers' needs and enabling the sharing of technical or marketing know-how (Jaworski and Kohli 1993). By obtaining market intelligence about customers and competitors and integrating this within strategic decisions, market-oriented firms 'seek to understand customers' expressed and latent needs and develop superior solutions to those needs' (Slater and Narver 1999, 1165).

Elaborate theories and frameworks about the relationship between market orientation and NPD innovation have been proposed (e.g. Han, Kim, and Srivastava 1998; Hurley and Hult 1998; Slater and Narver 1999). Although research suggests that neither firm age nor size are indicators of a firm's market orientation potential (Pelham and Wilson 1996; Slater and Narver 1996), NVs' resource limitations certainly has consequences for market orientation (Kohli and Jaworski 1990).

Specifically, while the resources available to direct towards market information and intelligence generation in NVs are scarce, the actual market is also yet to be defined (Shane 2000). As NVs adopt first-mover strategies to enter unoccupied market niches, market orientation enhances their general awareness and understanding of external trends, allowing these firms to capture market demand, better understand what prices to charge, what markets to prioritise and how to advertise or promote initial market offerings in ways that generate demand (Han, Kim, and Srivastava 1998; De Luca and Atuahene-Gima 2007).

The potential for market orientation to deliver these successful outcomes should however be considered within the context of other resources (Hult and Ketchen 2001). Previous research recognises that being market-oriented by itself is

often insufficient to deliver NPD success (Atuahene-Gima 1996). Since equity partners and founding team members need to ensure positive returns on their investment, they are likely to desire a positive association between market orientation and performance (Narver and Slater 1990; Jaworski and Kohli 1993). Thus, we hypothesise that:

H3: The interaction effect between equity investments and a market orientation to customer is positively related to time to break-even performance of NVs' NPD.

For NVs embarking on NPD projects within a new (to the firm) industry, awareness of competitor action is important to success as ventures with greater knowledge of the competitive landscape are likely to have a better sense of their NPD's potential success (Calantone and Cooper 1979). This is especially true with NVs who function in a 'new-to-the-competitive landscape' environment to begin with. Having an awareness of and orientation towards competitor knowledge helps ensure that the ideas incorporated into the new product are current, timely and non-obsolete. Similar to its orientation to customers, a firm's orientation to competitor action is more useful when in the presence of financial resources that enables the NV to leverage such competitive intelligence. Thus, we hypothesise that:

H4: The interaction effect between equity investments and a market orientation to competitors is positively related to time to break-even performance of NVs' NPD.

3.5 Controlling for innovativeness

New products can be classified based on their degree on innovativeness (Song and Parry 1999), determined by the product's technological and market newness (Song and Montoya-Weiss 1998). We can envision NPD degree of innovation as spanning a spectrum, anchored at one end by very minor, incremental improvements to radically different/highly innovative projects at the other. Highly innovative NPD projects stimulate customer market intelligence; yet, these often run a high risk of failure (Jaworski and Kohli 1993). We therefore expect that product innovativeness will influence the hypothesised direct and interaction effects due to its established correlations with NPD performance (Swink and Song 2007; Chen, Damanpour, and Reilly 2010).

4. Methods

4.1 Sample and data collection

This study employed a retrospective methodology (performance data were collected over three years after the product launch) in keeping with previous NPD studies (Calantone, Schmidt, and Song 1996; Calantone and DiBenedetto 2012). Our data were sourced from a sample of NPD projects representing first product introductions from NVs representing US-based manufacturing firms between 2005 and 2008. The companies participating in the survey covered a range of six manufacturing sectors represented by the North American Industry Classification System (NAICS) codes listed in Table 1.

The industries selected provided an opportunity to investigate NPD projects representing manufacturing innovations. Marketing research agencies were employed to distribute the surveys to NV firms in their first year of operation and implementing their first NPD project within 6–12 months of their inception. Contact lists were purchased from list vendors, regional and university-based incubators, research institutes and e-nets. The total sample frame receiving the surveys consisted of 2950 NPD projects (a selection of 83–185 projects per industry), out of which complete survey responses were received from 745 projects (an effective response rate of 25%). All 745 observations were included in subsequent analyses procedures.

Table 1. Sample demographic information by industry (NAICS) code.

Data code	NAICS code	NAICS classification	<i>N</i> (# of projects) ($\Sigma = 745$)	Percent (%) ($\Sigma = 100.0$)
F1	333120	Construction machinery manufacturing	185	24.8
F2	333618	Engine equipment manufacturing	83	11.1
F3	333111	Farm machinery equipment manufacturing	146	19.6
F4	334511	Aeronautical instrument manufacturing	60	8.1
F5	333992	Welding equipment manufacturing	109	14.6
F6	336400	Aircraft/engine propulsion/equipment parts manufacturing	162	21.7

Out of the 745 surveys returned, 88 were for NPD projects that did not achieve a market launch; thus, we controlled for the new product's launch likelihood, in addition to the aforementioned product innovativeness as control variable. A firm's launch decisions influence its market performance (Hultink et al. 1998); yet, low launch likelihood increases the probability that NVs will be unable to recover equity and other resources invested.

4.2 Measures

In order to reduce concerns regarding validity and reliability of the constructs, measurement scales for all independent variables were adapted from existing measures in the relevant areas of literature. The study operationalised time to break-even performance [TTBE] as a continuous variable, measured as the total number of months it takes the project to break-even, using secondary and independent sources of historical financial performance.

The founding team's equity [DEQUITY] was operationalised as the percentage of venture equity which the founding team self funds. This construct was operationalised in discrete amounts, scaled as *minority* (<50%), *majority* (>50%) and *super majority* (>75%) of total equity stakeholding. Supplier involvement [SUP] was measured using an established 4-item scale (Song, Di Benedetto, and Song 2010) which assessed (a) the involvement of major suppliers in all stages of the NPD process, (b) the nature of the relationship with major suppliers and (c) the supplier involvement in developing the product concept. Market Orientation [MO] was measured as a second-order construct consisting of two elements: market orientation towards customers [MO_C] and towards competitors [MO_CT] using established scales (Saxe and Weitz 1982; Thomas, Geoffrey, and Maria 2001).

Product innovativeness [INNOV] was measured using a 4-item scale developed by Cooper and Kleinschmidt (1993), addressing the extent that the new product is (a) unique, (b) one of a kind, (c) innovative or (d) relied on state-of-science technology (Hurley and Hult 1998). Since its inception, this innovativeness construct has been used in various studies (Song and Montoya-Weiss 1998; Song and Parry 1999). Defined as the new product's go-to-market probability, product launch likelihood [Go2MKT] was measured on an established binary scale assessing the potential for taking the new product to market (Di Benedetto 1999). A full description of measurement items pertaining to individual constructs is presented in Table 2.

4.3 Scale validity and reliability

Given the retrospective nature of the survey, measures were subjected to a purification process involving a series of reliability and validity assessments. Content validation was achieved by mapping the scales to established ones from extant literature (Table 2). Several steps were also taken in the study design to avoid possible common method biases. The surveys measured only independent variables and adopted secondary sources of historical financial performance to determine the dependent variable (months to breakeven). This study was also part of a much larger NPD research study, using a counter-balanced order of questions to ensure that respondents were not able to follow a logical response sequence. This further reduced the risk of common method bias (Podsakoff et al. 2003). Respondent anonymity was also protected as the sample was requested through a national marketing research agency, thereby reducing concerns over social desirability.

Composite reliability was established through confirmatory factor analysis (CFA) using the procedures outlined by Fornell and Larcker (1981). Cronbach's α from the CFA model for each construct was over the suggested .70 threshold (Nunnally 1978) for the overall sample, indicating excellent reliability of study measures (Table 2). Fit indices and goodness-of-fit statistics indicated a strong model fit to the data. Finally, an omnibus test of the full model against the intercept-only model was statistically significant, indicating that the constructs reliably predicted according to the hypotheses. To test the interaction hypotheses and following standard guidelines for moderated regression analyses (Aiken and West 1991), interaction terms' component variables were mean-centred prior to regression analyses to minimise spurious multi-collinearity resulting from the presence of multiplicative terms in the model.

We analysed direct and interaction effects of independent variables on [TTBE] with GLM SPSS regressions. This approach was considered most appropriate because it is an effective means of determining the impact of multiple independent variables presented simultaneously (Esbensen 2001) and because the study composed categorical and continuous variables (McCullagh and Nelder 1989). The research hypotheses were tested in two sets of three independent regression models, each set testing main and interaction effects, respectively. In the baseline sets of regressions (Model 1), no control variables were included for both main and interaction effect tests. To account for project-specific heterogeneity, the second sets of regressions (Model 2) controlled for product innovativeness. In the third set (Model 3), we segmented the sample into those projects that achieved a market launch ($n = 657$) and those that did not ($n = 88$). As further tests to understand the NPD performance impact of resource interactions, regression models compared main effects for all independent variables on [TTBE].

Table 2. Study variables and measures.

Construct	Measures and item description	Source	α
[SUP]	<i>Supplier involvement – extent of supplier involvement</i> (0 = strongly disagree, 10 = strongly agree)	Song, Di Benedetto, and Song (2010)	.733
SUP1	We involved our major suppliers in every stage of development for this product		
SUP2	We did not have a good relationship with our major suppliers (R)		
SUP3	This product concept developed from frequent interactions with our major suppliers		
SUP4	Our major suppliers made financial investments in developing this product		
[MO]	<i>Market Orientation (2 sub-scales: customer & competitor)</i> (0 = strongly disagree, 10 = strongly agree)	Saxe and Weitz (1982) and Thomas, Geoffrey, and Maria (2001)	.957
[MO_C]	Market Orientation to Customers (0 = strongly disagree, 10 = strongly agree)		
MO1_C	... our marketing people met with customers frequently to find out products or services they needed		
MO6_C	... we had frequent interdepartmental meetings to discuss market trends and developments		
MO7_C	... marketing personnel in our unit spent time discussing environmental effects (e.g., regulation) on customers.		
MO8_C	... data on customer satisfaction were disseminated at all levels in this business unit frequently		
MO9_C	... we tended to ignore changes in our customer's product or service needs for one reason or another		
MO10_C	... we periodically reviewed our product development efforts to ensure that they were in line with what customers want		
MO13_C	...if we find customers were unhappy with our service quality, we would take corrective action immediately		
[MO_CT]	Market Orientation to Competitors(0 = strongly disagree, 10 = strongly agree)		
MO3_CT	... several of our departments generated competitive intelligence independently		
MO5_CT	... a lot of informal 'hall talk' in our business unit concerned our competitors' tactics or strategies		
MO11_CT	... if a major competitor had launched an intensive campaign targeted at our customers, we would have implemented a response immediately		
MO12_CT	... we were quick to respond to significant changes in our competitors' pricing structures		
[INNOV]	<i>Prod Innovativeness – overall extent of new product innovativeness</i> (0 = strongly disagree, 10 = strongly agree)	Cooper and Kleinschmidt (1993)	.916
INNOV1	This product relied on 'state of the science' technology		
INNOV2	This product was unique, really one of a kind for this market		
INNOV3	This product was highly innovative – totally new to the market		
INNOV4	This product had unique features		
[D-EQUITY]	<i>% EQUITY by team</i>	Di Benedetto (1999)	
DEQUITY = 1	(<50%)		
DEQUITY = 2	(>50%)		
DEQUITY = 3	(>75%)		
[Go2MKT]	<i>Prod Launch Likelihood</i>		
Go2MKT = 1	Mkt Launch? 1 = no		
Go2MKT = 2	Mkt Launch? 2 = yes		

4.4 Data analysis and results

Together, Tables 3 and 4 provide full descriptive statistics, bivariate correlations and relevant distribution details for all variables. Mean time to break-even for the research sample was 35.51 months. Categorical variable distribution (Table 4) shows that 93.6% of the projects sampled relied on founding team equity to fund at least 50% of their total capital investment, with more than 68% of these employing over 75% of the equity capital.

Table 3. Descriptive statistics and correlations ($N = 745$)

		Mean	S.D	Min.	Max.	1	2	3	4	5
1	[TTBE]	35.51	14.97	12	85	1				
2	[DEQUITY]	78.74	17.72			-.74**	1			
3	[SUP]	5.62	2.06	0	10	-.72	.56**	1		
4	[MO_C]	4.50	1.73	0	9	-.15**	.10**	-.06	1	
5	[MO_CT]	4.72	2.02	0	10	-.23**	.15**	-.02	.08*	1

**Correlation is significant at the .01 level (1-tailed).

*Correlation is significant at the .05 level (1-tailed).

Table 4. Distribution for categorical variables.

Variable		N	Percent
% Founding team-owned equity [DEQUITY]	1 (<50%)	48	6.40
	2 (>50%)	190	25.50
	3 (>75%)	507	68.10
	Total	745	100.00
LAUNCHED? [Go2MKT]	NO	88	11.80
	YES	657	88.20
	Total	745	100.00

In the analysis presented in Table 5, Model 1 reports the *baseline* model in which no control variables were included. Model 2 reports the *controlled* model in which product innovativeness is included as a control variable. Model 3 reports the *segmented* model where the sample was split into projects with products that launched and those that did not. Some variables did not register a significant effect in Models 2 and 3, but there are no registered marginal

Table 5. Results from generalised linear model ANCOVA for months to break even.

	Model 1 (baseline)			Model 2 (controlled)			Model 3 (segmented analysis)		
	Hypotheses tests (no controls)			Hypotheses tests (INNOV as control)			Hypotheses Tests (INNOV+Go2MKT)		
	Coefficient	S.E.	Wald χ^2	Coefficient	S.E.	Wald χ^2	Coefficient	S.E.	Wald χ^2
Direct Effects									
Intercept	42.01***	10.92	14.78	60.54***	12.63	22.97	76.49***	11.62	43.28
H1 [DEQUITY = 1]	46.42***	6.19	56.18	41.32***	6.29	43.08	34.84***	5.78	36.32
[DEQUITY = 2]	38.28***	3.28	136.00	35.46***	3.29	116.46	13.22***	3.52	14.07
[SUP]	-2.71**	.92	8.64	-1.86*	1.20	2.37	.23	1.11	.04
[MO_C]	-1.43**	.55	6.76	-2.94*	1.19	6.05	-.57	1.11	.26
[MO_CT]	1.03	.85	1.48	-.12	1.09	.01	.88	1.00	.78
Interaction effects									
H2 [DEQUITY = 1] * [SUP]	-2.77**	1.02	7.40	-2.98**	1.00	8.78	-4.01***	.92	18.82
H2 [DEQUITY = 2] * [SUP]	-2.90***	.35	68.77	-2.69***	.34	59.55	-1.01**	.34	8.48
H3 [DEQUITY = 1] * [MO_C]	-1.03	.78	1.72	-.63	.80	.62	-1.56*	.72	4.51
H3 [DEQUITY = 2] * [MO_C]	-1.59***	.33	22.17	-1.46***	.33	18.64	-.41	.32	1.65
H4 [DEQUITY = 1] * [MO_CT]	-1.62*	.71	5.20	-1.37*	.71	3.72	-1.95**	.65	8.97
H4 [DEQUITY = 2] * [MO_CT]	-.91**	.29	9.42	-.74*	.29	6.50	-.003	.27	.00
[INNOV]				-1.09***	.23	22.06	-.66**	.21	9.31
[Go2MKT]							-21.40***	1.77	145.98
Likelihood Ratio χ^2	1232.30			1257.28			1390.60		
DF	54			58			59		
Sig	.000			.000			.000		

Note: χ^2 (Two times log-likelihood difference test shows that the model fit significantly better than the intercept-only model). S.E. = Standard error; DF = degree of freedom.

* $p < .1$ two-tailed test; ** $p < .01$ two-tailed test; *** $p < .001$ two-tailed test.

differences in results between Models 1 and 2. For example, while the [DEQUITY = 1]*[MO_C] interaction effect appears insensitive to [INNOV] as a control variable ($\beta_{\text{Model1}} = -1.03$, ns; $\beta_{\text{Model2}} = -.63$, ns), it registered a significant interaction effect in the segmented model ($\beta_{\text{Model3}} = -1.56$, $p < .1$). The [DEQUITY = 2]*[MO_C] effect result was opposite ($\beta_{\text{Model1}} = -1.59$, $p < .001$; $\beta_{\text{Model2}} = -1.46$, $p < .001$; $\beta_{\text{Model3}} = -.41$, ns). Segmenting the sample thus appears to significantly affect model results. We identify these influences in our results.

By segmenting the sample in Model 3, the intercept shifts ($\beta_{\text{Model1}} = 42.01$, $p < .001$ to $\beta_{\text{Model3}} = 76.49$, $p < .001$) and we also observe a highly significant coefficient for launch likelihood ($\beta_{\text{Go2MKT}} = -21.40$, $p < .001$). In addition, the segmented model reflected a faster [TTBE] performance of [DEQUITY], implying that NPD projects that have equity invested and are launched break-even faster. Results in Model 3 also support interaction effect hypotheses, with the significance of each interaction effect pair reversed compared to the non-segmented models. For example, [DEQUITY]*[MO_C] and [DEQUITY]*[MO_CT] interaction effects in Model 3 exhibited a difference in pattern of significance at low and high equity levels (Table 6).

Overall, results indicated that four of the five independent variables – all except [MO_CT] – have significant main effects on [TTBE] in Models 1 and 2 but only [DEQUITY = 1] and [DEQUITY = 2] influence [TTBE] in Model 3. Empirical results in all three models support our first hypothesis (H1) that founding team's equity will positively influence [TTBE] performance of NVs' first NPD. Specifically, the discretized nature of the [DEQUITY] variable infer that the low equity [DEQUITY = 1] projects achieved [TTBE] from over 34 to over 40 extra months compared to those projects with >75% equity levels [DEQUITY = 3].

Comparatively, projects with high equity levels [DEQUITY = 2] achieved [TTBE] in as little as 13 months, especially for those projects that were effectively launched. The situation is not so clear-cut with the [SUP] and [MO_C] constructs as these were mostly significant in Models 1 and 2 but not in Model 3. Main effects of [MO_CT] were not significant in all three models suggesting that it is not possible to confirm the existence of a positive main effect of market orientation to competitors on [TTBE] performance. We note here that we tested all main effects even though only that with [DEQUITY] was hypothesised.

With regards to equity capital and supplier involvement, the study hypothesised that this interaction effect will positively influence [TTBE] performance (H2). Empirical results are negative and significant at all equity levels in all three models, indicating full support for H2. With regards to equity capital and market orientation to customers, H3 predicted a positive influence between their interaction effects and [TTBE]. We find support for this hypothesised interaction effect at high equity levels ($\beta_{([\text{DEQUITY}=2]*[\text{MO}_C])} = -1.59$, $p < .001$; and -1.46 , $p < .001$ respectively) in Models 1 and 2 and at low equity levels in Model 3 ($\beta_{([\text{DEQUITY}=1]*[\text{MO}_C])} = -1.56$, $p < .1$).

With regards to equity capital and market orientation to competitors, the study hypothesised in H4 that their interaction effects will positively influence [TTBE]. Findings supported this hypothesis in Models 1 and 2 ($\beta_{([\text{DEQUITY}=1]*[\text{MO}_{CT}])} = -1.62$, $p < .1$; and -1.37 , $p < .1$; $\beta_{([\text{DEQUITY}=2]*[\text{MO}_{CT}])} = -.91$, $p < .01$; and $-.74$, $p < .1$) but only at a high equity level in Model 3 ($\beta_{([\text{DEQUITY}=1]*[\text{MO}_{CT}])} = -1.95$, $p < .01$). This indicates that while H4 is fully supported in Models 1 and 2, it was not confirmed in Model 3.

Finally, in controlling for product innovativeness, results support previous research evidence. Unlike the marginal influence of market launch [Go2MKT] segmentation in Model 3, the effects of [INNOV] as control variable were as predicted and did not reflect marginal differences between Models 1 and 2. While the intercept of Model 2 was significantly higher than Model 1 ($\beta_{[\text{Intercept Model1}]} = 42.01$, $p < .001$ to $\beta_{[\text{Intercept Model2}]} = 60.54$, $p < .001$), the main effects on [TTBE] actually reduced in relative significance for all model constructs (except equity) in the presence of [INNOV] as the control variable. The interaction effects did not register a significant difference. Instead, we find more interesting results in Model 3 which we discuss next.

Table 6. Pattern of interactions: equity capital and market orientation.

Measures	β (Model 1)	β (Model 3)
[DEQUITY = 1]*[MO_C]	-1.03	-1.56*
[DEQUITY = 2]*[MO_C]	-1.59**	-.41
[DEQUITY = 1]*[MO_CT]	-1.62*	-1.95**
[DEQUITY = 2]*[MO_CT]	-.92**	-.003

* $p < .1$ two-tailed test; ** $p < .01$ two-tailed test.

Table 7. Comparing study measures between launched projects and those that did not launch^a.

	Means		Sig. level of difference, <i>t</i> -test ^e
	Project launched [Go2MKT = 1]	Project did not launch [Go2MKT = 2]	
Time to breakeven [TTBE] ^b	30.9300	69.6818	$p < .001$ (.000)
Product Innovativeness [INNOV] ^c	6.8204	5.2614	N.S. (.477)
Found team equity level [DEQUITY] ^d	82.9315	47.4773	$p < .001$ (.000)
Supplier involvement [SUP] ^c	6.0624	2.3068	$p < .1$ (.032)
Market orientation to customers [MO_C] ^c	4.6088	3.7159	N.S. (.916)
Market orientation to competitors [MO_CT] ^c	4.8813	3.5455	N.S. (.640)

^a $N = 657$ Projects that launched; $N = 88$ Projects that did not launch.

^bMean measured in months to break even.

^cMeans of 11-point Likert-type scales (0 = strongly disagree, . . . , 10 = strongly agree).

^dMean measured in discrete relative percentages.

^e* $p < .1$; ** $p < .01$; *** $p < .001$; one-tailed *t*-test.

For Model 3, an independent sample *t*-test was conducted to compare the NPD projects that launched with those that did not. Table 7 examines the similarities and differences between mean scores of these two groups on the six multi-item measures. These results indicate that the NPD projects sampled did not exhibit a significant difference between projects that launched and those that did not with regard to [MO_C], [MO_CT] and [INNOV], while they did with regard to [TTBE], [DEQUITY] and [SUP]. This indicates that project launch likelihood is strongly linked to NPD time to break-even, levels of equity invested and supplier involvement, but irrelevant for market orientation and product innovativeness. As expected, [DEQUITY] and [TTBE] have a much more prevalent effect on projects that launched compared to those that did not: these two constructs exhibited the most significant difference in their means. Projects that did not launch took over twice as long to break-even and only had half as much equity invested. Interestingly, neither group displayed significant differences in product innovativeness levels.

5. Discussion

NVs face a ‘catch-22’ situation. Being new, they do not suffer from constraints of past history and culture (Katila and Shane 2005). Yet, because they are new, they lack the performance history and credibility needed to secure requisite resources and funding. This ‘catch-22’ trait also extends to funding. TTBE performance is a measure of the successful development and timely launch of NVs’ first product and is critical to investors’ and suppliers’ perceptions of their success potential. However, investor funds and supplier resources are needed in the first place to successfully develop and launch first products. Moreover, first product launches are typically accomplished under high-risk environmental conditions. In such situations, study findings indicate that NV’s founding team equity investments positively influences TTBE performance and also signal a confidence (that the product will be successful) and a commitment (to delivering this success).

Once it has achieved its success goals through the use of equity, a NV’s TTBE performance can replace other signals in targeting patient money while attracting lenders that are potentially ‘in it for the long haul’. As a proven concept of venture success, TTBE is a credible and strong signal with widespread marketplace acceptance as a sign of venture and innovation success. In its adoption as outcome variable in all research hypotheses, the study highlights its role as a focused signal with potential amplification effects. Thus, TTBE performance serves as a *signal amplifier* which can attract the positive attention of even risk-averse lenders like banks.

In the absence of real metrics such as TTBE for NVs, the founding team’s equity investments acts as a first-order signalling mechanism representing a highly credible action that is quantifiable, externally observable and verifiable. Entrepreneurship research already recognises the importance of NVs’ founding teams (Eisenhardt and Schoonhoven 1990) to venture strategy (Sandberg and Hofer 1987). This study introduces the value of their equity contributions to this debate. While the study’s hypotheses are mostly supported, results reveal some interesting and unexpected findings: First, equity is valuable and perhaps even critical to NVs’ TTBE performance. Second, the dynamics of supplier involvement and market orientation in the NV context is not as straightforward as current literature suggest.

5.1 Impact of equity capital on NPD performance

The commitment of equity implies that the founding team is likely more willing to maximise their efforts to ensure venture success since personal capital is at stake. In accordance with our assumptions of its signalling role, the founding team's equity stake (even in minimal amounts) is revealed as a high strength and credible signal in its ability to influence NVs' NPD performance.

When we consider the direct impact findings (H1) in light of market launch likelihood (Model 3), the results suggest that NVs who successfully launch their new products and have personal equity invested increase the likelihood that the products will deliver effective TTBE performance. The timeliness and successful breakeven of new product launches can be important for attracting future external funding, thus suggesting a potential sequence of actions (Figure 1) to resolve the previously mentioned catch-22 situation. Initially, the founding team's personal equity investment positively impacts TTBE performance, jointly signalling the founding team's commitment and the NV's potential success to external investors. This should, in turn, stimulate offers of 'patient money', resulting in external validation that increases the NV's credibility, leading to more opportunities for investments and funding support from other sources.

Figure 1 thus illustrates how equity investments and related activities can create a cascading effect, addressing the low credibility issue of NVs beyond their founding. According to the study findings, the adoption of equity as a source of financial capital will yield a TTBE which in turn helps the NV to attract other sources of financial capital, for example, from private and institutional lenders. As fledgling organisations, NVs must develop formalised routines and processes to sustain changes within institutional environments. Equity acts as a signal of good faith and commitment which translates to greater support from institutional stakeholders. Thus, equity is a valid predictor of NPD success by itself, in addition to its signalling role to boost other resources. As a proven, strong and credible signal, TTBE further reinforces equity's signalling role of the NV's potential (and actual) success to the marketplace and external lenders. TTBE thus further enhances the signalling effect of equity.

5.2 Equity capital interactions with supplier involvement

Past research provides strong support for early supplier involvement and the impact of close supplier relationships on NPD speed and productivity (e.g. Ragatz, Handfield, and Peterson 2002). The study's findings did not find support for

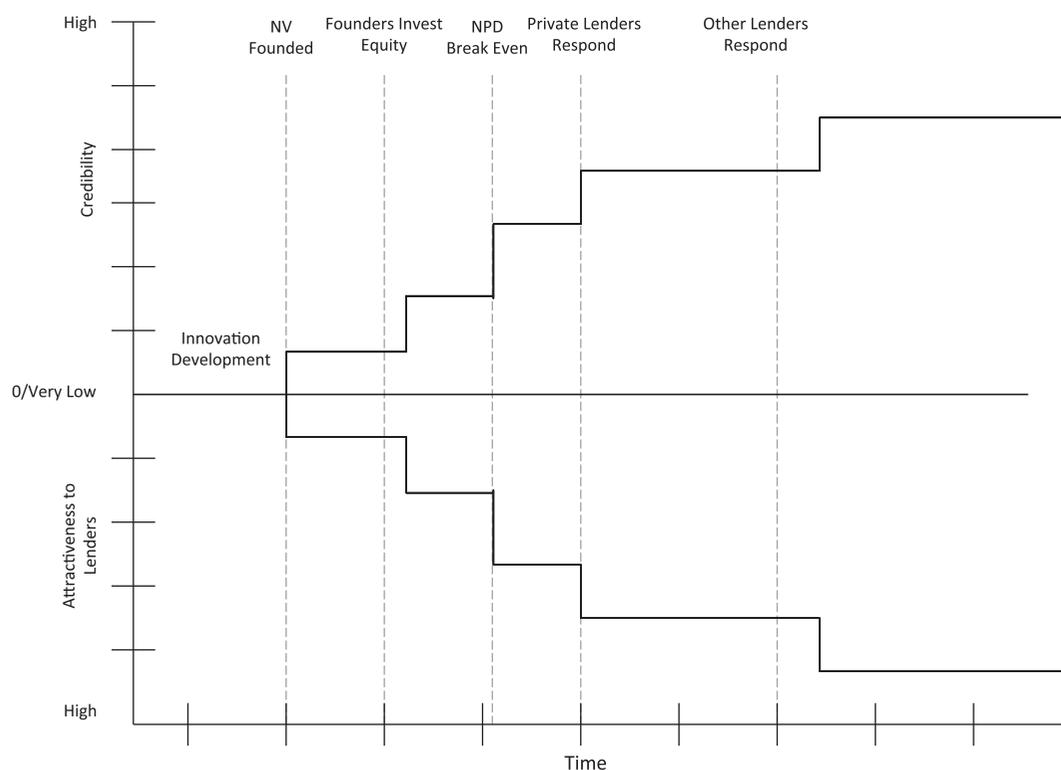


Figure 1. Equity signal and TTBE implications for new venture credibility and attractiveness.

the direct impact of supplier involvement on TTBE performance in the segmented model, but this relationship was supported in the presence of equity in all models. Although at first glance this is inconsistent with past research, this finding can be explained in several ways.

First, past research focusing on the NPD effects of supplier involvement efforts have been built on several implicit but important assumptions, a key one being that suppliers are always willing to work with firms in their NPD efforts. This implies that supplier involvement is largely firm (not supplier)-driven. This assumption is not necessarily valid in the NV context since NVs present a significant source of potential risk and investment uncertainty from the suppliers' perspective (Wathne, Biong, and Heide 2001). There is no assurance that the NVs' NPD efforts will prove feasible or acceptable to the market. Furthermore, from the suppliers' perspective, NVs lack the volume or financial stability necessary to be viable purchasing entities. Thus, suppliers may decide that the risks outweigh the benefits when dealing with NVs.

Second, the information asymmetries between suppliers and NVs may work against NVs in a number of ways. For NVs, embarking on a 'new to the market' product innovation often challenges their ability to identify, target, and effectively engage potential alliance partners. The absence of a basis for trust between the NV and suppliers might also suggest that NVs – recognising that their singular major asset of value is their product innovation – might be overly protective of it for fear that a premature exposure may lead to opportunistic takeover from suppliers or from more established competitors from within suppliers' customer networks. This implies that maintaining innovation security limit NVs' supplier involvement effectiveness, particularly in the face of suppliers' reluctance to engage with NVs in the first place.

5.3 Equity capital interactions with market orientation

Findings support the notion that equity 'boosts' the TTBE performance impact of other NPD resources. For market orientation to customers, study findings support previous research expectations that NVs' ability to capture, process and utilise market information is positively related to NPD performance as firms learn to adapt to market uncertainty (Tushman and Nadler 1978). Equity represents the critical funding required to obtain, process and use market intelligence, positively linking equity and market orientation to the NVs' TTBE performance.

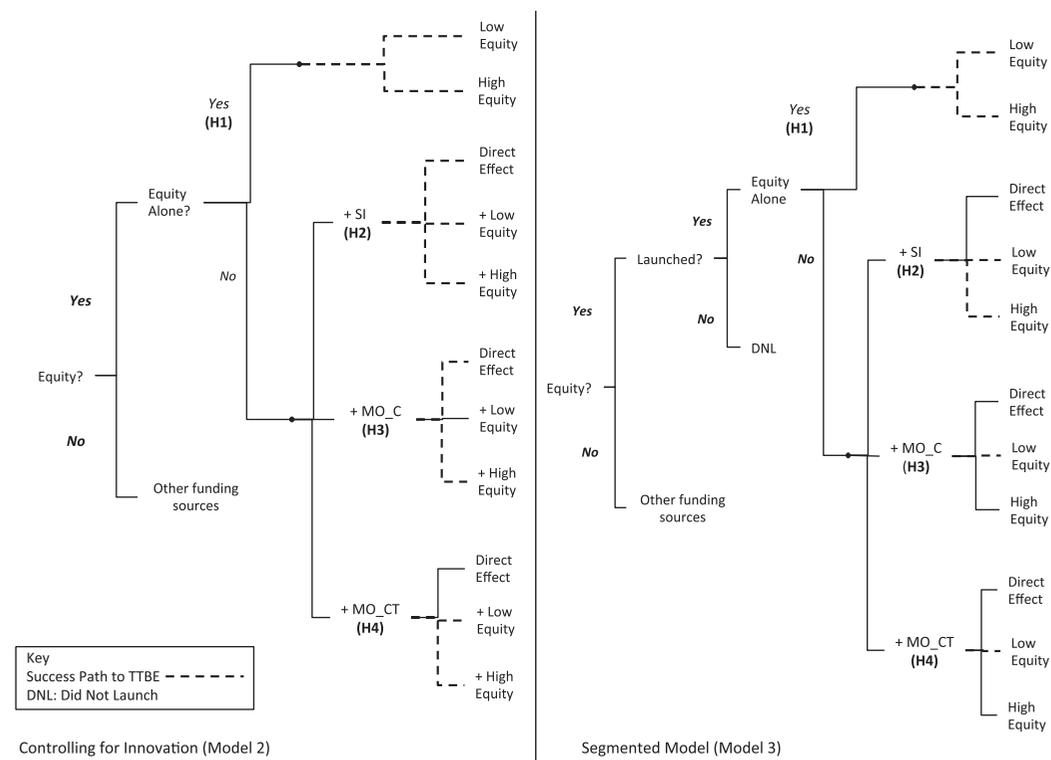


Figure 2. Success paths for equity's time to break-even impact in new product development.

By segmenting the sample, we observe significant shifts in results. Specifically when considering only projects that launched, both [MO_C] and [MO_CT] interaction effects with equity are significant at low, but not at high equity levels. Further, all interaction effects except market orientation to competitors was significant at high equity levels. These results respectively imply that even less than sufficient levels of equity are critical to a successful TTBE performance and that NVs experience equity's boosting impact on their market orientation to competitors' efforts but only when equity is present in sufficient amounts (Figure 2). In a sense, the segmented model acts as a contingency model in which market orientation interaction effects function as success predictors for those NPD projects that successfully launched.

Together, these results support the study's fundamental assumption that NVs' resources which may *struggle* alone are *assisted* in their performance impact when they are in the presence of equity. This implies equity's potential as an effective signal supporting TTBE in its role as the proven and effective signal in helping NVs identify and access opportunities that meet their cost, timing and pace of repayment needs for external resources and funding. The path diagrams depicted in Figure 2 also highlight each hypothesised equity-based success paths to TTBE.

Overall, these observations suggest that firms create innovative products by bringing together resources in new combinations (Senyard et al. 2014) whose outputs provide a means for investors to perform a viability assessment (Schumpeter 1951). However, since NVs typically have not merited an opportunity to display externally observable performance metrics, investors, customers and potential competitors have little basis to evaluate their potential. In these situations, the founding team's equity represents an effective signal impacting TTBE and is intended to create the impression that the NV and its associated new product are viable investments.

6. Conclusions

6.1 Research implications

The study's results suggest a basis to consider coherence among NPD resources specifically in the presence of equity capital. This should enhance understanding of why it is important for entrepreneurs to 'put their money where their mouth is'. This study uncovered unique inferences about the role of equity capital vis-à-vis the varied, albeit limited, NPD performance resources, and thus contributes to literature in the following ways.

First, study findings add robustness to existing wisdom that NPD success depends on a multiplicity of resources. A balanced approach is preferred in the accumulation of antecedent NPD skills, relationships and capital resources, but in NVs, the personal commitment of founding teams' equity offers significant return on expectation, particularly in its ability to function as an effective signal to external observers. In the absence of 'patient money', equity ownership introduces a level of 'vestedness' in founders' efforts to deliver successful NPD outcomes and boosts their supplier involvement and market orientation efforts. This confirmed signalling role suggests that equity is necessary and that even NVs with less than adequate amounts of equity are likely to experience a marginal gain over those with no equity invested.

Second, our study questions the implied causal path involving external funding, personal equity and NPD success. In NVs, personal equity investments imply 'skin in the game' for founding team members; yet, it has thus far been treated as a lagging indicator in most funding situations and research. That is, previous research assumes that founders will use their personal funds only when they have been repeatedly unsuccessful at securing alternative funding sources (the so-called idea of 'other people's money first'). Our study results, however, lead us to question this status quo: Can equity actually function as a leading indicator in its role as a signalling device to suggest that NV owners believe so much in their success potential, that they are willing to commit their personal assets to succeed? Third, by focusing on NVs, this study exposes a potential gap in the existing literature regarding suppliers' role in NPD as most research has focused on existing organisations that suppliers are typically willing to work with. With NVs, suppliers may decide that the high-risk and asymmetrical information conditions are not conducive to warrant their involvement. Further research can better understand mechanisms that drive supplier stance and involvement strategy when dealing with NPD activities within NVs.

Fourth and significantly, segmenting the sample by market launch likelihood offered a unique contribution to the NPD literature since most NPD research does not typically sample products that do not achieve effective market launch. This effectively censors the sample and creates a potential bias towards successfully launched products only. If sampling is not censored – by gathering data as we did on projects that launched and those that did not – this offers significant contributions since results are not based on successfully launched products alone.

6.2 Managerial implications

One of the advantages of established firms – which most NVs lack – is the ability to harness economies of reputation, scale and scope. The reported findings have implications for entrepreneurs' decisions regarding the optimal ways to

position and balance their personal equity commitments in ways that optimise what little resources are available. Understanding resource combinations can be particularly important to improving our understanding of the complex interrelationships which characterise management practice; yet, most NPD research focuses on either supply chain or financial resources. None, to our knowledge, has combined these within NVs as we have done here. Study results suggest important tensions between NPD antecedent resources, suggesting that managers need to understand the full range of resource combinations required to support NVs' NPD strategies.

From the marketplace and external investors' perspectives, venture owners are perceived to be committed to making their NPD projects succeed when they put their personal assets at stake and are thus expected to work harder to succeed. However, the criticality of such equity at stake also implies that founding team members could be so reluctant to lose their personal assets that they might 'shy away' from aggressive measures. This suggests that a curvilinear relationship might exist between equity investment levels and managers' adoption of aggressive strategies and willingness to succeed: 'too little equity and we don't care enough to be aggressive; too much and we are too afraid to be aggressive.' This relationship bears further investigation.

6.3 Future research opportunities and study limitations

Study findings provide evidence regarding the direct and interactive role of equity as a high-quality and credible signal to the marketplace and investors. As such, we extend signalling theory within an NPD context by analysing how equity represents a high strength signal of commitment which influences NPD performance and efforts. Previous research suggest that even as NVs consciously use multiple signals to disguise weaknesses such as their liability of newness (Certo 2003), these signals can gain or lose strength over time (Janney and Folta 2006). Further investigation is needed to address how NVs can maintain signal strength over time and to identify other signalling mechanisms that can be used for this purpose.

While this study has primarily focused on interaction effects, further research can address whether there are complementary or substitutive relationships between equity and NPD resources, perhaps also introducing alternative funding sources. In addition, further research can investigate the order in which external funding is secured. For example, do entrepreneurs use bank loans to fund their equity investments or do they enhance their loan qualification potential because they have equity invested in the first place? Relatedly, do external sources of equity influence entrepreneurs' commitment levels differently than if funded from personal assets?

External environmental factors play a key role in determining which signals are most effective making signals most effective when they are focused at specific market segments (Ndofor and Levitas 2004). As such, signals may be manipulated or targeted by the signaller to achieve greater or lesser environmental fit (Hochwater et al. 2007). Further research could thus investigate how NVs employ equity signals to target a sequence of focal points like venture capital or long-term investors. Securing long-term funding further validates the NV's potential since signal strength is moderated by receiver attention to the signaller and the signalling environment (Gulati and Higgins 2003). Once such credibility-enhancing investments are secured, it paves the way for the NV to secure resources from other sources.

Consistent with Chandler and Hank's (1994) observation that firms with more resources grow faster, we acknowledge two potential biases that limit the generalizability of our findings. First, by selecting founding teams' equity capital investment as the signal source, the study exhibits a bias towards ventures with personally vested founding teams which could imply the existence of a management team that seeks faster times to break-even. The relative amounts of equity invested by the founding team could also influence the way external lenders (banks, venture capitals, angel investors etc.) perceive the team's commitment to NPD and venture success, regardless of actual performance. Second, while we include and account for those projects that failed pre-launch in the segmented sample (Model 3), we acknowledge a potential survivor bias to study findings. Since we only examined study effects on projects that had established or projected time to break even records, projects for which failure was identified so early enough that the NVs did not execute a cash-flow projection would have been excluded.

In spite of these limitations, the study findings offer much needed insight into the complex interactions that exist between various NPD antecedent resources with owner equity functioning as a leading variable. NVs' quest for resources to develop and market new product innovations is constrained by their lack of verifiable performance histories, as well as resources constraints regarding timing, cost and levels available. To overcome these challenges, NVs employ strong, verifiable and targeted signals to proxy their commitment in the achievement of TTBE, thus convincing external investors to provide further resources. The study's adoption of TTBE as a dependent variable depicts NVs' reliance on verifiable indicators of performance to maintain the continued participation of these external investors. The study provides a more realistic view of management practice by reflecting the importance of NVs' ability to communicate the viability of their new products' market feasibility and that it represents an acceptable level of risk from external

investors' and stakeholders' perspectives. Equity signals that the NV presents a potential success story – one that the owners are willing to commit personal funds to its success.

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