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The origins of capabilities: Resource allocation strategies, capability development, and the performance of new firms

Executive Summary

Early-stage ventures need to decide how to allocate their scarce resources to develop internal functional capabilities in order to survive and grow. However, in allocating resources to the development of functional capabilities, resource-constrained new ventures face a dilemma: should they initially seek to develop a *broad* set of internal functional capabilities by building R&D, production, and marketing capabilities simultaneously, or should they rather develop a single internal functional capability? The firm-level implications of broad versus narrow scope in functional capability development are poorly understood, and extant research highlights both potential benefits and drawbacks of each strategy. Furthermore, much previous research on resource allocation strategies for capability development is of little relevance to new ventures that may suffer from liabilities of newness and have only limited time to prove themselves. In addition, because early capability development decisions tend to be reinforced by path-dependent learning, their consequences may be long-lasting. Therefore, we ask: should new ventures pursue a broad or a narrow range of functional capabilities, and what factors influence this choice?

In this paper we explore the performance implications of a broad versus a narrow scope in new firms' functional capability development. We build on recent developments in the dynamic capabilities and resource allocation theories to explore how breadth of scope in functional capability development influences new firm sales growth. We test our hypotheses using longitudinal data from new ventures in the US. First, we find that focusing on *any* single functional capability (R&D, production, or marketing) is more conducive to new venture sales growth than simultaneous and balanced development of multiple functional capabilities. We argue that the positive effects of focused capability development for new ventures stem from (a) more efficient learning, (b) lower coordination costs, and (c) greater legitimacy.

Second, we highlight the moderating effects of the founder's experience and access to financing, which attenuate the negative effect of a broad scope of resource allocation on sales growth. We find that new ventures with experienced founders suffer less than other ventures from adopting a broad capability development strategy. Access to the founder's entrepreneurial knowledge may compensate for slower learning of a broader set of functional capabilities, making this strategy less risky. Ventures with external financing may even benefit from a broad capability strategy.

Taken together, our results contribute to the entrepreneurship literature by advancing a resource orchestration approach to functional capability development in new ventures. In addition, by investigating the moderating effects of entrepreneurial experience and access to external financing, we highlight the contingencies and performance implications of broad versus narrow scope in functional capability development when resources are limited. In doing so, we contribute to the literature on resource management in new ventures. Our findings provide strategic guidance for entrepreneurs building internal functional capabilities in new ventures.

1. Introduction

New ventures face a dilemma: to access resources to build their operation, they need legitimacy; but to gain legitimacy, they need a credible operation (Zimmerman and Zeitz, 2002). How should new ventures invest their scarce initial resources when building up their operation, such that they reach the legitimacy threshold required to attract external resources before they run out of money? In this paper we explore the implications for sales growth of allocating human resources to the development of functional capabilities when building a new business organization. We argue that early-stage resource allocation strategies have long-term implications for competitive advantage and survival because they influence the firm's capability development and external legitimation processes. Specifically, we explore whether it is better for new ventures to seek to build a broad range of functional capabilities, such as R&D, production, and marketing, or to allocate early resources to building a single functional capability.

An extensive body of literature has explored capability decisions in established organizations (Grant, 2002; Helfat et al., 2007; Teece et al., 1997) and the behavioral, social, and political antecedents of firms' resource allocations (Bower and Gilbert 2005; Chandler, 1962). However, these do not directly inform new firms' resource allocation decisions in early capability development (Zahra et al., 2006). Whereas established firms can draw on existing capabilities when shaping new ones, most de novo new firms must build capabilities from scratch. Specifically, insight is lacking into how new ventures should approach the early development of internal functional capabilities when seeking to grow their sales. In allocating resources to developing capabilities, should they initially seek to develop a broad range of internal functional capabilities that will enable them to capitalize on a broader range of opportunities (*breadth*), or should they instead develop a single capability (*focus*)? In this paper, we explore the implications for sales growth of a broad versus narrow scope of resource

allocation in functional capability development in new ventures. We use the term “functional capability” to refer to “discrete processes within particular areas in a firm” that enable the firm to perform a given function (Fortune and Mitchell, 2012, p.798), and focus on three functional capabilities—R&D, production, and marketing—that research suggests are important activities (Verona, 1999; Fortune and Mitchell, 2012) and are particularly applicable to new ventures (Kazanjian and Drazin, 1990; Hanks and Chandler, 1994).

The question of a broad versus a narrow scope of new firms’ functional capability development is of major theoretical and practical importance. Since the early 2000s, business process outsourcing has become increasingly available to newer and smaller firms, affording them ever greater flexibility in configuring their business models. New ventures can choose to organize business functions internally; or they may outsource some activities to external parties; or they may skip some activities altogether (Afuah, 2001; Nason et al., 2019; Zott and Amit, 2007). For example, a new venture may eschew a traditional product-based business model in favor of a technology licensing model that does not necessitate building or outsourcing production and marketing capabilities, allowing it to build stronger R&D capabilities instead (Arora et al., 2001; Gans and Stern, 2003). A product business may use Alibaba to outsource manufacturing to a Chinese supplier and only develop sales and marketing capabilities internally. While greater capability outsourcing may allow new ventures greater specialization, it may also expose them to greater external dependencies (Haeussler et al., 2012) and negatively impact their ability to appropriate value from their operations (Gans and Stern, 2003). By exploring the implications of the breadth of new ventures’ functional capability development for the ability of new firms to grow their sales more quickly, our research helps guide such business model decisions.

We test our hypotheses using an eight-year panel of new US ventures established in 2004. We find that a *focused* resource allocation strategy, whereby new ventures allocate employees

primarily to building a single functional capability (either R&D, production, or marketing, but not all simultaneously) enhances sales growth, whereas a *broad* resource allocation strategy (balanced simultaneous development of R&D, production, and marketing capabilities) has negative implications for sales growth. This negative effect is weaker when the founder has significant entrepreneurial experience and when the firm has received external financing, or in other words, when the firm has access to knowledge and financial resources.

This study contributes to the entrepreneurship literature by highlighting the importance of early focus in functional capability development. We develop a theoretical framework that links early resource allocation with capability development and subsequent sales growth. By identifying breadth in functional capability development as an important factor influencing sales growth, we illuminate the performance implications of early functional capability development decisions in new ventures. We investigate the moderating effects of entrepreneurial experience and access to external financing, illuminate resource contingencies (Busenbark et al., 2017) and highlight implications of functional capability development choices when resources are limited. In doing so, we contribute to the literature on resource orchestration and dynamic managerial capabilities in new ventures (Sirmon et al., 2007; Zahra et al., 2006).

This paper is organized as follows. In Section 2, we describe key theories of resource allocation and develop a capability framework to explain how resource allocation strategies for functional capability development influence new venture performance. Sections 3 and 4 present our analytical methods, operationalization of constructs, and empirical results. In Section 5 we discuss our contributions to theory and practice and suggest future research directions, and in Section 6 we explain the limitations of our study.

2. Theoretical background and hypotheses

In this paper, our focus is on new firms, who are likely to suffer from a ‘liability of

newness' (Stinchcombe, 1965; Aldrich and Fiol, 1994). The liability of newness argument contends that new firms suffer from a 'legitimacy deficit': because they have limited history and reputation in their sectors, they have yet to prove themselves in the eyes of prospective buyers, who therefore hesitate to buy their products and services. To overcome this legitimacy deficit, new firms have to build sufficient capabilities to convince prospective buyers that they have what it takes to operate as credible entities who are able to deliver on their promises. In other words, to reach the critical legitimacy threshold, the new firm needs to build sufficient capabilities to convince prospective buyers.

Investment in resources and capabilities is critical for new ventures' survival and growth (Dencker et al., 2009; Sapienza et al., 2006; Sirmon et al., 2010; Zahra et al., 2006). To survive and succeed, new ventures' early strategies must be founded on unique capabilities rooted in innovative combinations of resources (Brush et al., 2001). Capabilities are collections of routines that enable an organization to "perform a coordinated set of tasks, utilizing organizational resources, for the purpose of achieving a particular end result" (Helfat and Peteraf, 2003, p.999). In short, capabilities allow the firm to 'do' things and successfully deliver products and services to customers. Firms build functional capabilities by allocating human and physical resources to a given function to perform coordinated tasks. The investment in resources contributes to an organizational capability (Maritan & Lee, 2017).

The primary resource challenge for new ventures is to develop functional capabilities in production, marketing, or R&D (Kazanjian and Drazin, 1990), to enable them to perform desired activities reliably and efficiently (Stinchcombe, 1965). Functional capabilities embody the abilities, resources, and knowledge required to perform specific functions (Collis, 1994; Verona, 1999) and execute the firm's day-to-day activities (Amit and Schoemaker, 1993; Fortune and Mitchell, 2012; Henderson and Cockburn, 1994). They are first-order capabilities that enable the firm to deepen its technical knowledge (Amit and Schoemaker, 1993), achieve

technical efficiency, and perform its core business functions effectively and reliably (Teece, 2014). Distinct from functional capabilities, managerial capabilities are second-order capabilities that continually adjust the first-order capabilities by coordinating, integrating, and directing the firm's activities across functions (Collis, 1994; Fortune and Mitchell, 2012).

Given their resource constraints (Lichtenstein and Brush, 2001; Sirmon et al., 2007), new ventures must make trade-offs between breadth and focus in resource allocation. With a "broad" resource allocation strategy, the new firm simultaneously builds functional capabilities in R&D, production, and marketing, whereas with a "focused" strategy, it initially builds only one functional capability (Haeussler et al., 2012; Giustiziero et al., 2020). Both strategies have potential benefits and drawbacks. On the one hand, increasing functional breadth is useful when value can be gained from complementarities across functions, where "doing more of any subgroup of activities raises the marginal return to the other activities" (Milgrom and Roberts, 1990, p.514; Leiponen, 2005; Collis and Montgomery, 1997). On the other hand, the complexity of managing a broad range of functional capabilities increases coordination costs across functions (Leiponen and Helfat, 2010; Oxley and Sampson, 2004). In contrast, a narrow functional scope may enable the new venture to achieve economies of scale in a chosen function more rapidly (Giustiziero et al., 2020; Collis and Montgomery, 1997). However, specialization may decrease its flexibility to adapt to environmental changes, compromising its survival (Burns and Stalker, 1961; Sine et al., 2006). Although developing a broad set of capabilities is "a time consuming and costly task that requires coordination in the use of these capabilities" (Haeussler et al., 2012, p.220), significant evidence suggests that, in dynamic environments, firms need to maintain a broad portfolio of capabilities to take advantage of unforeseen opportunities and adjust to changing development paths (Klingebiel and Rammer, 2013; Leiponen and Helfat, 2010; Beckman et al., 2007).

In summary, new ventures must resolve a dilemma in their early capability development:

they need resources such as financial capital, managers, and competent employees to build legitimacy and succeed (Brush et al., 2001), but their very lack of legitimacy constrains their ability to access those resources in the first place and build the capabilities required for legitimacy (Stinchcombe, 1965; Zimmerman and Zeitz, 2002). To achieve a certain “threshold of legitimacy” (Zimmerman and Zeitz, 2002, p.427), a new venture must signal its quality by demonstrating its ability to execute business functions reliably (Sapienza et al., 2006). Once it passes the legitimacy threshold, it can acquire more resources to reinforce its functional capabilities. But should the new venture initially develop a broad or narrow range of functional capabilities to reach this legitimacy threshold more quickly? We adopt a resource orchestration and capability development lens to explore the performance implications of resource allocation breadth and focus in functional capability development in new firms.

2.1 Functional capability development in new firms

The literature articulates four characteristics of the resource accumulation process that may affect new ventures’ resource allocation and capability development decisions: path dependence, time dependence, asset mass efficiency, and asset interconnectedness (Dierickx and Cool, 1989; Maritan and Lee, 2017). First, path dependence in functional capability learning tends to reinforce commitment to previously established resource positions. Early resource allocation decisions are therefore particularly consequential, as the new firm may later find it difficult to re-orient its capability trajectory without significant loss of sunk investment. Second, time compression diseconomies may reinforce this path dependence by making it difficult for rivals to catch up (Dierickx and Cool, 1989; Maritan and Lee, 2017). Third, asset mass efficiencies, or enhanced learning economies at high levels of a capability stock (Dierickx and Cool, 1989), may further reinforce path dependence in capability learning. Finally, asset interconnectedness means that the returns from building a capability also depend on the levels of other, complementary, capability stocks. This implies that the value of a given capability is

greater in the presence of complementary capabilities (Maritan and Lee, 2017), making it beneficial to build synergistic bundles of capabilities. We next elaborate our theoretical model of the performance implications of new ventures' breadth of functional capability development.

2.2 Breadth of functional capability development and new venture growth

We contend that, on balance, narrowly focused functional capability development leads to higher growth in early-stage new ventures. This is for two reasons. First, capability learning is more efficient when specializing in a single functional capability, because the venture benefits more quickly from path dependence in capability learning and asset mass efficiencies (Dierickx and Cool, 1989; Collis and Montgomery, 1997; Giustiziero et al., 2020). Second, specialization enables the new venture to gain recognition for its distinctive strengths (Echols and Tsai, 2005) and to more rapidly reach the legitimacy threshold required to ensure further resource acquisition (Zimmerman and Zeitz, 2002).

Narrowly focused capability development supports more efficient learning for three reasons. First, focused investment in a single functional capability helps new ventures reach a sufficient level of competence more quickly, enabling them to start exploiting asset mass efficiencies early on (Dierickx and Cool, 1989). Capability learning can be accelerated when carried out in a systematic and cumulative manner (Collis and Montgomery, 1997). Organizational scholars have long argued that functional specialization improves employees' ability to complete sophisticated and complex tasks and supports greater efficiency, increased expertise, and reduced training costs (Sine et al., 2006; Kazanjian and Drazin, 1990; Hanks and Chandler, 1994; Pugh et al., 1963).

Second, a *broad* capability development strategy is particularly *inefficient* in new ventures, because developing multiple functional capabilities simultaneously necessitates the development of additional managerial capabilities to coordinate functional ones (Haeussler et al., 2012; Leiponen and Helfat, 2010), straining the firm's scarce resources. The greater the

number of routines to be combined, the greater the need for coordination routines to ensure their efficient execution (Helfat and Peteraf, 2003). If scarce resources are stretched too thin, coordination resources will be poorly developed, hampering the new venture's ability to benefit from asset interconnectedness. This hampers the new firm's ability to convince prospective customers, causing the firm to reach the legitimacy threshold more slowly.

Third, coordination complexity rises particularly steeply when organizational routines transcend the boundaries of specialist expertise, for example, when coordination requires both engineering and marketing insights (Prashantham and Floyd, 2012). This is not so much because of the sheer number of routines, but because of the need to combine different specialist perspectives (Jarzabkowski et al., 2012). In other words, the coordination costs of building multiple capabilities in new firms relate less to the need to build routines to coordinate individual employees, as in large firms, but rather to the entrepreneur's unfamiliarity with the different specialist perspectives. Such challenges are particularly likely to stretch the new venture's limited managerial resources and constrain its effective development of a broad range of functional capabilities simultaneously.

There are also external reasons why a narrow focus on functional capability development should improve new venture sales growth. Resource-poor new ventures have only limited time to build sufficient legitimacy to secure additional resources before their initial resource endowment runs out (Zimmerman and Zeitz, 2002). A key mechanism for building legitimacy is reaching important milestones or "proofpoints" to demonstrate the firm's ability to deliver on its commitments (Hallen and Eisenhardt, 2012, p.46). Accomplishing critical milestones will be more difficult if the new venture allocates resources to multiple functional capabilities simultaneously, because coordinating across capabilities is complex (Haeussler et al., 2012) and achieving proofpoints is inherently less certain and slower than when focusing on a single

functional capability (Hallen and Eisenhardt, 2012).¹ Specialization in a single functional capability also allows the new venture to be recognized for performing one function well rather than performing many functions in a mediocre fashion, so a narrow focus should offer a quicker route to legitimacy (Echols and Tsai, 2005).

In summary, early specialization in a narrow range of functional capabilities allows new ventures to learn more efficiently and rapidly and reach important milestones more quickly than if it were to invest initially in a broad range of functional capabilities. Having achieved greater legitimacy, the new venture can obtain additional resources from external partners and develop other functional capabilities with less risk. Greater learning efficiencies and legitimacy translate into more resources and stronger sales growth. Therefore, we hypothesize:

Hypothesis 1 (H1). Greater focus in functional capability development is positively associated with new venture sales growth.

Next, we examine factors that moderate the effect of a focused capability development strategy on new venture sales growth. The arguments above highlight that the cost and difficulty of coordinating multiple capabilities hamper the performance of new ventures that choose a *broad* capability building strategy, as these inhibit its ability to achieve learning efficiencies and reach the legitimacy threshold. We identify two key resources that mitigate this effect: prior entrepreneurial experience and external funding. Both moderators have the effect of alleviating entrepreneurs' resource constraints that make it difficult for them to successfully pursue a broad capability strategy. Founders with prior entrepreneurial experience are more likely to be familiar with multiple different functions, making them more effective in developing and coordinating multiple functional capabilities simultaneously. External financing naturally alleviates new ventures' resource constraints, enabling them to withstand

¹ Specific proofpoints depend on the new venture context. Our interviews with entrepreneurs and VCs suggest that capability development in the early years is aimed at reaching specific milestones such as proving the feasibility of a technical solution to potential stakeholders, building a working prototype to show to first customers, or proving that a chemical process works.

the increased cost of simultaneously developing multiple functional capabilities.

2.3 Moderating effect of entrepreneurial experience

Previous studies have demonstrated the importance of entrepreneurs' knowledge and prior experience for capability development (Coen and Maritan, 2011; Dencker et al., 2009). During the early days of the new firm, its founders' capabilities and experience constitute an important share of its total capability stock (Helfat and Lieberman, 2002; Mosakowski, 1998). Founders with previous entrepreneurial experience will have been exposed to the task of coordinating multiple capabilities, and they will have acquired experiential organizing knowledge. Experienced founders may therefore be more likely to monitor allocation decisions more carefully and be less likely to make resource-draining mistakes when building early functional capabilities (Kuemmerle, 2005; Zimmerman and Zeitz, 2002; Bazeman, 1990).

Compared with serial entrepreneurs with experience from previous startups, novice entrepreneurs are less likely to be familiar with multiple different functions, making them less effective in developing and coordinating multiple functional capabilities simultaneously. There is evidence that performance penalties exist for firms with a broad scope but who possess relatively little experience in any one particular area (Macher and Boerner, 2006). Evidence also suggests that novice entrepreneurs search less extensively than experienced entrepreneurs in unfamiliar domains, which negatively affects firm performance (Cooper et al., 1995). Furthermore, entrepreneurial experience provides the entrepreneur with knowledge of the types of resources needed to perform desired functions and how these resources should be combined (Kotha and George, 2012). Thus, both the cost and difficulty of coordinating multiple capabilities should hamper experienced entrepreneurs less than novice entrepreneurs. As an additional advantage, experienced entrepreneurs will have developed reputation and networks of contacts through their previous startups, enabling them to signal quality to external resource providers and achieve the legitimacy threshold more quickly (Hellman and Puri, 2002). Thus,

we hypothesize that:

Hypothesis 2 (H2). The positive relationship between focus in functional capability development and new venture sales growth is less pronounced when entrepreneurial experience is high.

2.4 Moderating effect of external financing

Attracting external seed investors or other external funding naturally alleviates new ventures' early resource constraints (George, 2005), enabling them to withstand the increased cost of simultaneously developing multiple functional capabilities and to achieve learning efficiencies across these more rapidly (Rosenbusch et al., 2013; Sapienza et al., 2006). In addition to funding, external investors may also offer guidance and support, such as knowledge about different functional capabilities and advice on how the entrepreneur should coordinate them (Katila and Chen, 2005; Park and Steensma, 2012).

External funding is also a strong signal of firm quality in its own right (Davila et al., 2003), which may help new firms to attract more external resources, including customers and strategic partners (e.g., Ozmel et al., 2012). Thus, two effects of external financing—resource constraint mitigation and signaling—should mitigate the negative implications of a broad early capability development strategy. We hypothesize that:

Hypothesis 3 (H3). The positive relationship between focus in functional capability development and new venture sales growth is less pronounced when external financing is present.

Concluding, our theoretical model articulates implications of internal functional capability development for sales growth in new firms. As such, functional capability development decisions reflect business model choices, as a business model is the configuration of the firm's operations for value creation, delivery, and capture (Zott & Amit, 2007). Note that our model makes no assumptions regarding *why* the entrepreneur chooses a broad or a narrow early capability development strategy: our focus is strictly on explaining the sales performance consequences of such choices. We next describe our empirical methodology.

3. Empirical methodology

3.1 Sample

To test the effect of the breadth of functional capability development on new venture sales growth, we had to overcome two empirical challenges. First, to generalize our results to the population of new ventures, we needed to obtain a sample representative of that population (Delmar and Shane, 2006). Second, the potential endogeneity of the functional focus variable might distort the results, so we needed a dataset that would allow us to address this potential bias. Endogeneity and omitted variable biases are common in strategy and entrepreneurship research because firms choose to develop functional capabilities based on their attributes and industry conditions, only some of which are observable to the analyst (Hamilton and Nickerson, 2003).

The longitudinal Kauffman Firm Survey (KFS), and specifically the proprietary dataset of US startups, enabled us to test our hypotheses and overcome these challenges. The panel was formed from a random sample of 32,469 firms from Dun & Bradstreet's database of all startups formed in the US in 2004, excluding non-profit firms, those owned by an existing business, and firms inherited by another entity (DesRoches et al., 2010).² For the study population, a business established in 2004 was defined as new if it was an independent business created by a single person or a team of people. This broad definition included various types of new businesses in different sectors, but the sample consisted only of independent new businesses, not divisions of existing corporations (Delmar and Shane, 2006). The KFS team surveyed these new ventures annually for eight years to create a consistent and representative panel of businesses starting operations in 2004 (DesRoches et al., 2010). It interviewed the founders of 4,928 startups (sample for the baseline survey). A web survey and telephone interviews were

² Dun & Bradstreet provides data on commercial credit and businesses taken from public records and vendors' and agencies' reports, showing businesses' overall health and status.

used for data collection, and respondents were paid \$50 to complete the interview. The follow-up surveys were refined and shortened to achieve high response rates (at least 82% for all surveys). Non-response adjustments were made using logistic propensity modeling to examine the potential for non-response bias and verify the quality of the survey (see DesRoches et al., 2010 for further information).

We used all available observations in our analysis and ended up with 2,356 startups (6,748 firm-year observations). The dataset provides longitudinal and uninterrupted information on the sampled firms from their year of founding, allowing us to study the effect of initial capability strategies on subsequent growth. Independently operating new ventures build entirely new capabilities since they have no prior routines on which to draw. Therefore, observing the allocation of resources to capability development during the first eight years of a firm allowed us to examine the performance effect of capability development when it was likely to be strongest (Autio et al., 2011). Furthermore, this dataset tracks new ventures in a variety of industries, enabling us to estimate the average effect of functional capability development on performance in different sectors, and to explore sector specificities (Gruber et al., 2010). Finally, the KFS provides detailed information on the entrepreneurs, the firms themselves, and the industries in which they operate, allowing us to control for many key correlates and to address the potential endogeneity of functional focus using the instrumental variable (IV) method. Thus, our dataset enabled us to test more accurately the effects of functional focus on new venture performance. We introduce and justify our instrumental variable for the IV regression in Section 4.2.

3.2 Dependent variable

Performance. We measured the performance of new ventures by taking the natural logarithm of annual sales revenue (Baum et al., 2001; Delmar and Shane, 2006). The log transformation was used to reduce dispersion. Sales revenue is a key performance indicator

that is widely used in previous studies (Autio et al., 2000; Davidsson, 2006; Kor and Mahoney, 2003; Penrose, 1959). Sales revenue is a particularly appropriate performance indicator for new entrepreneurial firms (Delmar, Davidsson, and Gartner, 2003; Hmieleski and Baron, 2009), who often suffer from a legitimacy deficit due to their lack of previous business history and reputation. Particularly during the early years, entrepreneurial businesses often need to operate at a loss before they manage to build a reputation as a legitimate business entity and convince potential customers to trade with them (Stinchcombe, 1965). As an extreme example, it took Amazon nine years from founding and seven years from public listing to report its first annual profit. To build momentum and market share, many startups need to sell at a discount, which reduces the applicability of profit margin as a performance measure in entrepreneurial firms. In contrast, and resonating with the legitimacy arguments central to our theory, sales revenue indicates a tangible commitment by customers towards the entrepreneurial firm, signaling that the firm's customers believe that it can deliver on its promises.

We argue that the decision to buy a product or service from a new firm depends on two factors: first, how well the product or service features meet customer needs, and second, whether the buyer believes that the new firm is able to deliver the promised product or service features to required specification. The first factor emphasizes the match between the new firm's offering and customer needs (i.e., the product-market fit). The second factor emphasizes the ability of the new firm to convince the prospective buyer that it has developed a credible capability to deliver on its promise (i.e., it has reached legitimacy). Firms need to achieve both product-market fit and legitimacy to begin to grow their sales revenue. Our theory suggests that a narrower functional focus will accelerate the firm reaching legitimacy and thus its sales revenue growth, whereas we assume that the firm's functional focus is uncorrelated with its product-market fit. Therefore, we can consistently estimate the effect of focus on sales revenue, and under our theory, interpret the effect as a reflection of a firm's legitimacy. However, we

assess our assumption regarding product-market fit with an instrumental-variable approach where we first estimate the impact of the product market conditions on the focal firm's focus and use the predicted focus to estimate sales revenue. This model allows us to control for the market environment while analysing the effects of focus.

There are also additional reasons why we focus on sales revenue. First, sales measures are the most widely used in empirical growth research (Delmar et al. 2003). Second, the early years are a critical period in the development of a firm within which to consider objective performance outcomes such as revenue growth (Hmieleski and Baron, 2009). For example, employment growth may reflect the firm's investment in building future products and services rather than its capability to deliver on its promises. Third, this indicator is available in the present study for all firms of interest, whereas profits were less likely to be reported. Because firms in our sample were privately held, they are under no obligation to reveal profit data. Finally, while profit is an important indicator of success, the relationship of profits to size is only evident in aggregates of firms or over long periods for individual firms (Delmar et al. 2003). There is an emerging consensus that if only one indicator is to be chosen as a measure of firm growth, the preferred measure should be sales because it applies to (almost) all sorts of firms, it is easily accessible, and it is relatively insensitive to capital intensity and degree of integration; it is also the indicator favored by entrepreneurs themselves which relates to another argument, namely that sales is a precursor of growth in other indicators (Delmar et al. 2003). Because no universally superior growth measure for new firms seems to exist, some scholars advocate using several growth measures (Delmar et al. 2003). Thus, in our robustness tests, we also report results using the alternative indicators of firm survival, profits, and employment growth (Audretsch and Mahmood, 1995; Dencker et al., 2009; Geroski et al., 2010; Gimeno et al., 1997).

3.3 Independent and moderating variables

Focus 1. To operationalize focus in functional capability development we build on prior literature which suggests that locally-embedded knowledge and skills may comprise a capability and a source of competitive advantage (Henderson and Cockburn 1994; Kogut and Zander, 1992). A number of researchers have argued that capabilities refer to the firm's ability to perform its basic functional activities more efficiently and effectively than its competitors (Collis, 1994; Amit and Schoemaker, 1993). Kogut and Zander (1992) discuss how routines emerge within functional groups to enable the institutionalization of functional-based knowledge, forming the basis for capabilities. Amit and Schoemaker (1993, p.35) argue that capabilities are often developed in functional areas and "are based on developing, carrying and exchanging information through the firm's human capital." According to Leonard-Barton (1992) and Teece et al. (1992), engineering and design specializations developed over time and embedded within the organization may well comprise such capabilities. The academic literature thus suggests that the roots of functional capability reside in functional areas of firms, typically within employees' activities (Teece et al., 1997). Moreover, empirical work has demonstrated that counts of organizational positions are valid measures of functional specialization (Inkson et al., 1970). Kazanjian and Rao (1999) used a count of job positions as a measure of engineering- and technology-based capabilities, and more recently, Fortune and Mitchell (2012) measured functional capabilities in R&D, production, and marketing by the number of executive positions in those specialisms. These studies all substantiate a link between allocations of employees to the different functions and underlying functional capabilities.

Consistent with this literature, we argue that knowledge and capabilities relevant to the startup's competitive advantage will reside in the R&D, production, and marketing functions, and specifically its employees. The allocation of human resources to a function reflects a firm's

activities and processes in that function, and is thus a valid measure of its functional capabilities. More specifically, we operationalize “focus” as the relative allocation of employees to R&D, production, and marketing. A larger proportion of employees in R&D would indicate a firm with more established functional processes or routines in R&D, whereas a production or marketing focus would be reflected in firm routines and processes in production and marketing respectively.

Our dataset provided additional support for the relationship between the proportion of employees in a function and underlying capabilities. We investigated the characteristics of startups with a higher proportion of R&D employees, and found that the latter had a competitive advantage in *technical expertise* and *intellectual property* (see Table 4), thus confirming that the relative allocation of employees to R&D is an appropriate measure of R&D capability, reflecting not only what the startup does but also how well it does it. Similarly, we found that startups with a higher proportion of employees in production had a competitive advantage in *product price*, *speed* and *product design*, while startups with a higher proportion of employees in marketing had a competitive advantage in *marketing*, again supporting the idea that the relative allocation of employees to the different functions reflects underlying functional capabilities.

Thus, we proxied new ventures’ focus in functional capability development by their relative allocations of employees and owners to three functional areas: R&D, production, and marketing (Kor and Leblebici, 2005; Lichtenstein and Brush, 2001; Snow and Hrebiniak, 1980).³ To avoid implying a link between sheer resource quantity and resulting capability, we measured *relative* allocations of employees and owners to different functions as a percentage

³ The KFS asked entrepreneurs how many employees and owners were primarily responsible for 1) conducting R&D on new products and services, 2) production activities such as producing materials and products, production planning, production control, quality control, and storage, and 3) sales and marketing activities such as sales, market research, customer analysis, and promotional activities.

of total employees and owners. To measure startups' functional focus in the three capabilities, we created a continuous variable using the Herfindahl index. The following formula, an adaptation of the Herfindahl index, was used to measure functional focus (F) for a given firm in a given year:

$$F = P_r^2 + P_p^2 + P_m^2$$

where P_r , P_p , and P_m are the proportions of employees and owners in the R&D, production, and marketing functions respectively. This variable ranges from 0.333 to 1. If $F = 1$, the firm is fully focused on either R&D, production, or marketing, whereas a value of 0.333 means that a firm has a perfectly balanced portfolio of functional capabilities. We used focus lagged by one period (using the above formula) as the key explanatory variable to test H1, which predicts that new venture growth will increase with focus. Therefore, we included this variable in the performance models and expected its coefficient to be positive. In our robustness tests, we also report results using the alternative indicator of deviation in focus relative to rivals. In a given year, the functional focus of each firm was compared with the average functional focus in its industry (three-digit mean).

Entrepreneurial experience $t-1$. Founders' prior startup experience may also enhance performance (Shane and Stuart, 2002). Serial entrepreneurs have gained knowledge about starting a new business, developing and marketing new products and services, and managing early-stage organizations (Ucbasaran et al., 2008). H2 predicts that entrepreneurial experience alleviates the need for focus. We measured startup experience by the logarithm of the number of prior businesses created by all founders of the new venture. The log transformation was used to reduce dispersion.

External financing $t-1$. We controlled for access to external financing with a binary variable equaling one if the new venture had received VC or angel investment, and zero otherwise (Stuart et al., 1999). Access to financing is expected to improve performance.

According to H3, we expected external financing to attenuate the necessity for functional focus.

3.4 Control variables

Consistent with previous research, we controlled for founder, firm, and industry characteristics when analyzing the effect of functional focus on new venture performance.

Performance $t-1$. We included past performance in the model to control for unobserved factors that may have influenced both focus and performance.

Intellectual property $t-1$. We controlled for the firm's intellectual property, as this may positively influence startups' performance (Shane and Stuart, 2002). Intellectual property was operationalized as a dummy equaling zero when the firm had no patents, copyrights, or trademarks, and one when the firm reported at least one of these.

Owner education $t-1$. We controlled for the owner's education with a binary variable equaling one when the owner had a college degree or higher, and zero otherwise. Owner education was expected to enhance firm performance (Geroski et al., 2010).

Number of employees $t-1$. We controlled for the size of the firm because larger firms have more production capacity and sales than smaller ones (Delmar and Shane, 2006). We corrected for skewness by using the log transformation.

Industry experience $t-1$. Companies founded by individuals with previous startup experience in the same industry may positively influence performance (Shane and Stuart, 2002). We controlled for industry-specific experience with a binary variable equaling one when the founder had prior startup experience in the industry, and zero otherwise.

Number of owners $t-1$. We controlled for the size of the entrepreneurial team with a continuous variable that measured the number of entrepreneurs who owned shares in the business (Kulchina, 2016). A large venture team can obtain more resources than a smaller team and can accomplish tasks more quickly (Delmar and Shane, 2006).

Alliances $t-1$. We controlled for competitive advantage from alliances, which enhances new

venture firms' performance (Stuart, 2000). We created a dummy variable equaling one if the new venture had a competitive advantage from alliances (i.e., from teaming up with other firms, universities, or government), and zero otherwise.

Regional infrastructure *t-1*. We created a dummy variable indicating whether the startup was located in a US state ranked in the top ten for technology and science assets, using the Milken State Technology and Science Index (O'Shea et al., 2005).⁴ This measure captured the availability of technological opportunities and resources.

High-tech *t-1*. Our measure for high-technology industry was a dummy variable adapted from Hecker (2005).⁵

Industry and year controls. The following industry dummies were included: manufacturing (NAICS 31–33), finance and insurance (NAICS 52), scientific services (NAICS 54), wholesale trade (NAICS 42), retail trade (NAICS 44–45), information (NAICS 51), administration and support services (NAICS 56), real estate (NAICS 53), healthcare (NAICS 62), arts and entertainment (NAICS 71), accommodation and food services (NAICS 72) and other services (NAICS 81). All models also included year dummies.

3.5 Model and econometric approach

We examined the effect of functional focus on the sales growth of new ventures (H1) and tested whether this effect was moderated by prior entrepreneurial experience (H2) and access to external financing (H3). Our main models were estimated with linear random-effects panel

⁴ This index ranks US states based on high-tech growth indicators such as R&D expenditure, percentage of the population with postgraduate degrees, VC investment, and number of patents issued.

⁵ High-tech sectors are NAICS 3345 (Navigational, measuring, electromedical and control instruments), NAICS 3254 (Pharmaceutical and medicine manufacturing), NAICS 3341 (Computer and peripheral equipment manufacturing), NAICS 3342 (Communications equipment manufacturing), NAICS 3344 (Semiconductor and other electronic component manufacturing), NAICS 3332 (Industrial machinery manufacturing), NAICS 3335 (Metalworking machinery manufacturing), NAICS 5417 (Scientific research and development services), NAICS 5415 (Computer systems design and related services), NAICS 5112 (Software publishers), NAICS 3346 (Manufacturing and reproducing magnetic and optical media), NAICS 3359 (Other electrical equipment and component manufacturing), NAICS 3364 (Aerospace product and parts manufacturing), NAICS 3329 (Other fabricated metal product manufacturing), and NAICS 3251 (Basic chemical manufacturing).

regressions, and we evaluated empirical identification of the hypothesized effects using an instrument. We also ran survival models in our robustness checks. In all models we included the lagged dependent variable as an additional control variable. Past performance captures unobserved factors that may influence focus (Leiponen and Helfat, 2011). In other words, by including past performance in the model, we controlled for unobserved factors that may have influenced both lagged focus and lagged performance. The disadvantage of the lagged dependent variable in a random-effects panel regression model is that its coefficient is likely to be inflated, and its inclusion may artificially deflate the coefficients of other variables (Achen, 2001; Powell, 2012). However, this meant that our estimates of the impact of focus were conservative, as we made it more difficult to obtain economically and statistically significant results for our main explanatory variables of interest. Our results can thus be viewed as a lower bound for the true effect. We also examined our model using the IV approach to triangulate the sources and severity of potential endogeneity in focus. The performance regression model for startup i and time t takes the form:

$$\begin{aligned}
Performance_{it} = & \alpha_0 + \alpha_1 * Focus_{it-1} + \alpha_2 * Entrepreneurial\ experience_{it-1} + \alpha_3 * \\
& Entrepreneurial\ experience_{it-1} * Focus_{it-1} + \alpha_4 * External\ financing_{it-1} + \alpha_5 * External \\
& financing_{it-1} * Focus_{it-1} + \alpha_6 * Industry\ experience_{it-1} + \alpha_7 * Performance_{it-1} + \alpha_8 * \\
& Number\ of\ owners_{it-1} + \alpha_9 * Intellectual\ property_{it-1} + \alpha_{10} * High-tech_{it-1} + \alpha_{11} * \\
& Regional\ infrastructure_{it-1} + \alpha_{12} * College\ degree_{it-1} + \alpha_{13} * Alliances_{it-1} + \alpha_{14} * \\
& Number\ of\ employees_{it-1} + \alpha_{15} * Year + \alpha_{16} * Industry + u_{it}
\end{aligned}$$

where u_{it} is the error which includes the unobservable firm-specific effect and i.i.d. disturbance. To minimize issues of simultaneity, we used values lagged by one year for all independent variables (Hoehn-Weiss and Karim, 2014).

4. Results

Table 1 presents descriptive statistics and pairwise correlations. Calculation of the variance inflation factor (VIF) suggests no multicollinearity problems, as the value of 1.86 is well below the threshold level of 10. Table 2 presents the regression results. The first model in Table 2

includes the control variables. In Models 2 to 4 of Table 2, we introduce the functional focus variable and the interactions with entrepreneurial experience and external financing to examine hypotheses H1, H2 and H3, respectively. Among our control variables, we find that both past performance and the number of employees very strongly explain current performance. In addition, the number of founders and their industry experience and education levels positively influence startups' performance. Finally, firms in high-tech industries tend to perform better than those in lower-tech industries. Alliances also positively influence performance. Overall, our control variables are reasonably stable and account well for the key characteristics of startups' performance.

In H1, we proposed that focus on a functional capability (R&D, production, or marketing) would be positively related to new venture growth. In Model 2 of Table 2, the coefficient of focus is positive and significant ($p < 0.001$), supporting the hypothesis. Because one standard deviation of focus is 0.26, if focus increases by 0.26 then the change in revenue is $0.26 * 0.38 = 0.0988$ or 9.8%.

– INSERT TABLES 1 AND 2 ABOUT HERE –

In H2, we predicted that the positive relationship between focus and revenue growth would be less pronounced when the founder's prior entrepreneurial experience is high. We thus expected a negative interaction effect between focus and startup experience. This hypothesis is supported (model 3), since the interaction effect between focus and entrepreneurial experience is negative and significant ($p < 0.05$; two-tailed test). The partial effect of focus on the log of revenues in Model 3 is $0.518 + (-0.209) * \text{experience}$. When entrepreneurial experience is at the mean of 0.68, then the effect of focus on log(revenue) is $0.518 + (-0.209) * 0.68 = 0.376$. If entrepreneurial experience is higher, say equal to 1.00, then the effect of focus on log(revenue) is smaller, at $0.518 + (-0.209) * 1.00 = 0.309$. This provides evidence that startups with experienced founding teams are better able to manage a broad portfolio of functional

capabilities.

H3 proposed that the positive relationship between focus and growth would be less pronounced when external financing is present. We thus expected a negative interaction effect between focus and external financing. The coefficient of the interaction effect between focus and external financing is negative and significant ($p < 0.05$), supporting H3 (model 4). To further interpret this finding, we compared the effect of a one-standard-deviation increase in focus on firm performance between firms with and without external financing. For firms without external financing, a one-standard-deviation increase in focus leads to a 10.5 percent increase in revenues, whereas for firms with external financing, a one-standard-deviation increase in focus leads to a 13.5 percent decrease in revenues.⁶ This shows that external financing is an important complement to a balanced strategy: when new ventures have external financing (which is relatively rare), there are strong incentives to develop functional capabilities in a balanced fashion. These estimation results also suggest that the model has excellent explanatory power and fits the data well, with an R-squared of 0.7283. The full model can be found in column 5 of Table 2.

To facilitate interpretation, in Figures 1 and 2 we illustrate the significant interaction effects between the founder's prior entrepreneurial experience and focus, and external financing and focus, respectively. Figure 1 shows that the benefits of focus for new ventures' performance decrease at higher levels of entrepreneurial experience. Figure 2 shows that the relationship between focus and performance has a positive slope when external financing is absent, and becomes negative when external financing is present.

– INSERT FIGURES 1 AND 2 ABOUT HERE –

⁶ With one s.d. of focus equal to 0.26, if focus increases by one s.d. then the change in revenues is $0.26 * 0.4051$ when external financing = 0, and $0.26 * 0.4051 - 0.26 * 0.925$ when external financing = 1, ceteris paribus.

4.1 Robustness checks⁷

We ran several robustness checks to examine the consistency of our results. First, we tested our hypotheses by employing an alternative dependent variable—exit—rather than revenues, using a Cox survival model with robust errors clustered on the firm. Our results suggest that greater focus is associated with a lower incidence of exit, lending additional support to our findings. To examine alternative exit outcomes, specifically mergers and acquisitions (i.e., “good” exits), we ran a competing risks model to test whether the estimated effects differed for desirable versus undesirable exits (Shah and Winston Smith, 2010). The results for the competing risks model with “bad” exits (failure) as the event of interest and “good” exits as a competing event indicate that new ventures with more focused functional capability have a lower incidence of “bad” exits, when controlling for covariates and the fact that “good” exits may occur. Our results were also consistent when we used employment growth and profits as alternative indicators of performance.

Second, we compared the general characteristics of firms focused on R&D versus production versus marketing, as reported in Table 4. We find that the initial competitive advantages of focused firms tend to be concentrated in their area of focus—technical expertise, intellectual property, and alliances for R&D-focused firms; product price, speed, and product design for production-focused firms; and marketing for marketing-focused firms—rather than in more general competitive advantages such as cost and reputation. These early differences between R&D, production, and marketing focus suggest that firms’ functional focus arises from a thoughtful articulation of their unique knowledge base and strategic advantage.

Third, we assessed industry differences by creating a new variable to measure the deviation in focus between firms and the industry (three-digit) mean. In a given year, the functional focus

⁷ Analyses available from the corresponding author on request.

of each firm was compared with the average functional focus for its industry. The results with this specification were consistent with those reported above: focus above the industry mean is positively related to new venture performance.

Fourth, we explored our results' dependence on our operationalization of the focus variable. We created and tested an alternative formulation of functional focus, the normalized Herfindahl index, which ranges from 0 to 1. Again, the results with this alternative variable were consistent with those reported above. We also used an alternative binary operationalization for focus and balance by creating separate dummy variables for functional focus on R&D, production, and marketing, as well as balance. Our results with the binary operationalization were consistent with those reported here.

4.2 Accounting for alternative mechanisms

In this section, we conduct robustness checks that address alternative explanations. First, we consider whether focus might be valuable because it is associated with a better product-market fit, rather than because it offers an accelerated route to legitimacy. Although we do not have direct measures of product-market fit, we can account for some external conditions in our models through an instrumental-variable (IV) analysis⁸. To address this alternative explanation, we followed two approaches. First, we applied IV methods in the performance models to check whether we properly identify the effect of functional focus on performance. Second, we examined possible confounding factors that might affect both functional focus and firm performance. We describe these next.

In models 6 and 7 of Table 2 we estimated two-stage least squares regression models with heteroskedasticity-robust standard errors, instrumenting the focus variable. Our instrument is

⁸ We should also note that product-market fit is typically operationalized in the literature in post-hoc manner – for example, as sales growth (see, e.g., Gimmon and Levie, 2021). As our dependent variable is sales growth, this rules out the use of conventional measures of product-market fit in our study.

the average functional focus in the firm's four-digit industry, which is an industry-level variable calculated using the *average functional focus* of firms in the relevant four-digit *industry*. The rationale is that other firms in the same industry may influence the firm's functional focus. Firms may imitate functional configurations of other firms in their industry, but other firms' configurations do not directly influence the focal firm's sales growth. Previous papers have also used the industry mean of the independent variable as an instrument (Cheng et al., 2014; Friedberg, 2003; Hanlon et al., 2003; Leiponen and Poczter, 2016; Nevo, 2000).

We also ran the first-stage estimates to directly evaluate instrument strength, revealing that our instrument is a very strong predictor of focus. Notably, this instrument already controls for industry factors because the first stage regression of the IV model predicts how much variance in a firm's degree of focus is explained by the *industry* level focus. In the second stage IV regression we find that even within markets where firms are pushed toward focus, greater focus is better for growth. The predicted focus from the IV analysis thus excludes any firm-level idiosyncratic aspects of focus and *reflects industry-level determinants* of focus – thereby capturing features of the external opportunity environment within which the firm might be able to achieve product-market fit. In addition, we control for previous year's performance, which is a strong test for the additional explanatory power of focus. The lagged performance variable absorbs everything about the firm (including both permanent firm- and industry-level factors and time-varying characteristics) that influenced its performance up to the previous year. Using these tests, we still find that both raw firm-level focus (OLS) and predicted focus (that reflects the industry-level drivers of focus in the IV regression) significantly explain performance.

We also tested for the potential endogeneity of functional focus with the Durbin-Wu-Hausman test. This test for exogeneity of the (presumed) endogenous variable was not significant, indicating that the null hypothesis of exogeneity could not be rejected. This implies that our estimates of the non-instrumented regression reported in Table 2 (models 1-5) are more

appropriate than the instrumented variable regression (Hausman, 1978). Thus, we use models 1-5 to test our hypotheses. This is primarily due to the lagged dependent variable included in the models which effectively controls for the drivers of past performance, including any firm- and industry-specific factors influencing both focus and performance. Thus, when the lagged dependent variable is included, our specification adequately controls for unobservable firm-specific effects. Nevertheless, we note that the random-effects coefficients of the direct effect of focus (0.38–0.53) are comparable with the IV estimate for the same coefficient (0.53), suggesting that the inclusion of external industry conditions (through the IV model) does not weaken our estimated effect.

A second alternative explanation is that technology startups in the ‘market for ideas’ might drive our effects (Gans and Stern, 2003). Under certain conditions⁹, startups benefit from adopting focused R&D strategies and licensing-out their technologies as a result of high barriers to entry in other parts of the value chain. We tested whether our argument was confounded by R&D-focused firms relying on patents to commercialize ideas through the technology market. If mainly R&D-focused firms in the market for ideas drove our results, then we should find evidence that R&D focus is particularly beneficial for sales growth. In Table 3 we ran the analysis separately for manufacturing and service industries and for high-tech and low-tech samples. We also broke down focus to R&D, production, and marketing components. Our findings show that production and marketing focus strongly predict subsequent revenues across many industries, whereas R&D focus is not very helpful in any of the industries in explaining sales growth. Thus, the benefits of focus in our analysis are not driven by R&D-intensive high-tech startups. In addition, in Table 2 model 6 we see that firms with formal intellectual property rights (IPRs) tend to be *less* focused, further validating our

⁹ Gans and Stern (2003) analyze the external conditions for the market for ideas which influence startups’ returns to collaboration. These are the: (1) patent regime in the industry, (2) availability of external finance in the industry and (3) access to complementary assets.

argument that our findings are not caused by high-tech firms in our sample operating in the market for ideas. These results lend further support to our proposed mechanism, as it is unlikely, based on the estimates above, that R&D focus would drive our results.

Third, we tested whether other confounding factors might affect both focus and firm performance. We were concerned that firms with better access to information or strategic factor markets might be more inclined to pursue greater focus in their functional capability development, in which case the effect of focus might be inflated. To assess this concern, we split the sample into firms in states with and without rich regional infrastructure (entrepreneurial hotspots) and tested whether the effect of focus on firm performance was influenced by access to the resources available in hotspots. The coefficients of focus were virtually identical in the two samples, and slightly more significant in the sample without regional infrastructure. Thus, the impact of focus on performance was not limited to munificent environments that might offer more information and funding and better startup ideas and skills. Focus does not appear to be simply a side-effect of information and skills, but rather is likely to be a causal factor in itself.

Fourth, to confirm that our measure of ‘focus’ captured functional capability development rather than *other* business model choices, we examined the extent of correlation between focus and firm alliances. Based on the data available in the KFS, we created a new variable equal to 1 if the firm had self-reported a competitive advantage from alliances (i.e., from teaming up with other firms, universities, or government), and 0 otherwise. The correlation between focus and competitive advantage from alliances was very low and not significant (0.01), providing further evidence that our measure did not reflect *other* business model choices¹⁰. We follow Zott and Amit (2007) in conceptualizing a business model as the configuration of how a given

¹⁰ We thank an anonymous reviewer for this suggestion.

business organizes its activities for value creation, delivery, and capture. The business model describes what resources the firm develops itself, what activities it undertakes itself, and which resources and activities are performed by partners. In this conceptualization, our empirical operationalization measures business model decisions – i.e., activities that the firm chooses to perform itself (and the related capabilities it develops).

Our final robustness test explores the different pathways that new ventures use to reach high performance by looking at variations in the three functional areas (R&D, production and marketing). We employ the Fuzzy Set Qualitative Comparative Analysis (fsQCA) and specifically the fuzzy program in STATA 15. We find that although there are different pathways to rapid sales growth in new ventures, successful firms are characterized by a focus on a primary area of attention and learning, as opposed to broad and balanced engagement in different areas.

5. Discussion

Despite the importance of capability development for competitive advantage, previous research has not extensively explored how new entrepreneurial firms should allocate resources to develop internal functional capabilities early on. In this paper, we build on recent developments in dynamic capabilities and resource orchestration theories (Bardolet et al., 2013; Helfat et al., 2007; Maritan and Lee, 2017; Sirmon et al., 2007, 2010; Zahra et al., 2006) to explore how the breadth of functional capability development influences new venture sales growth.

We find that focusing on *any* single functional capability (R&D, production, or marketing) is more conducive to sales growth in new ventures than simultaneously developing a range of functional capabilities. When new ventures are seeking to establish themselves as legitimate business entities under substantial time and resource constraints, it is more efficient to focus on learning one capability rapidly than to attempt to learn multiple functional capabilities

simultaneously. We highlight the important moderating effects of the founder's experience and early external funding, which attenuate and may even reverse the negative effect of a broad functional capability development strategy on sales growth. New ventures with experienced founders or external funding may be able to mitigate the cost of coordinating multiple functional capabilities.

We advance a capabilities approach to resource orchestration research, which has so far focused only on the drivers of resource allocation (Maritan and Lee, 2017; Bower and Gilbert, 2005). We extend this research by connecting resource allocation with capability development and sales growth. Models of resource allocation do not typically address performance implications in the new firm. Instead, the focal outcome in received studies has typically been an investment or other resource commitment (Maritan and Lee, 2017). We show that resource allocation decisions can have important performance consequences for new firms in terms of sales growth and survival, and that this mechanism operates through functional capability development.

More specifically, building on Kazanjian and Rao (1999) and Fortune and Mitchell (2012), we explicate the performance implications of a broad versus focused capability development strategy. Although capability development breadth has frequently been examined in studies of innovation (Klingebiel and Rammer, 2013; Laursen and Salter, 2006; Leiponen and Helfat, 2010), no studies (to our knowledge) have directly addressed trade-offs relating to broad versus narrow scope in new ventures' functional capability development. This is surprising, since such resource allocation decisions have important implications for new venture survival and growth (Sapienza et al., 2006; Zahra et al., 2006). We contribute to understanding new ventures' capability development by identifying the breadth of functional capability development as an important regulator of subsequent sales growth.

Our work responds to calls to investigate the role of resource accumulation early in the

firm's lifecycle (Sirmon et al., 2010, 2007). Previous studies of resource allocation have focused mainly on capital allocation in established and multidivisional firms (Bardolet et al., 2013; Busenbark et al., 2017), and much research has explored capability decisions in established organizations (Grant, 2002; Helfat et al., 2007; Teece et al., 1997). Such studies cannot directly inform resource allocation decisions relating to new firms' capability development (Zahra et al., 2006). We propose that, owing to time and resource constraints and the importance of specialization for effective learning, concentrating learning effort on one functional capability is more conducive to new venture sales growth than distributing such effort across multiple functional capabilities.

By viewing breadth as the simultaneous development of different functional capabilities in new ventures, we help reconcile a controversy arising from previous research. Capability breadth has been argued to mitigate the risk of market shifts, as it gives firms the capacity to adopt different strategies to address emerging opportunities (Leiponen and Helfat, 2010). However, this depiction does not account for new ventures that suffer from liabilities of newness (Stinchcombe, 1965). Although it may be preferable for established firms with less pressing resource constraints to build multiple capabilities, such a strategy appears to be excessively costly for firms with limited resource availability, in terms of both sales growth and survival. Thus, despite the oft-cited advantages of breadth (Klingebiel and Rammer, 2013; Laursen and Salter, 2006; Leiponen and Helfat, 2010), we argue that the costs of simultaneously developing and managing different functional capabilities outweigh the benefits of breadth in the new venture context. Focusing on new ventures, our study shows that the breadth of functional capability development is indeed a critical concern because new firms are resource-constrained. In contrast to received wisdom, under these circumstances, firms benefit from a focused strategy that enables them to reach milestones and legitimation proofpoints more quickly before running out of money (Zimmerman and Zeitz, 2002).

Finally, we respond to Busenbark et al.'s (2017, p. 2451) call to "examine how different [resource] allocation outcomes may be differentially affected by intervening factors." In investigating the contingencies that affect resource allocations to functional capability development, we contribute to the literature on resource management (Sirmon et al., 2007) and demonstrate that, for new ventures, key resource constraints include entrepreneurial knowledge and funding. The benefits of a broad capability strategy cannot be realized without sufficient entrepreneurial knowledge and funding.

We highlight these previously ignored enabling factors of breadth in firms' resource allocation and functional capability development strategies. Specifically, we examine the interaction effects of entrepreneurial experience, access to external funding, and resource allocation breadth on sales growth. In doing so, we contribute to understanding of the conditions under which a broad functional capability development strategy becomes favorable. Access to knowledge and financial resources may (a) mitigate the constraints imposed by limited managerial capability to coordinate multiple functional capabilities, (b) thereby mitigating the negative effect of a broad capability development strategy on learning efficiencies, and (c) mitigating the relative disadvantage (compared with narrowly-focused competitors) in accomplishing proofpoints, thereby making a broad capability strategy less risky. Our finding that breadth in functional capability development decreases new venture sales growth when resources are limited underlines the performance implications of a broad strategy. These results are consistent with the view that efficient organizational learning is critical when resources are limited (Sirmon et al., 2007).

Our finding that focused capability development leads to faster sales growth when knowledge and financial resources are limited is especially important for new ventures. Most new ventures are financially constrained and only have limited time to prove themselves. Achieving a certain 'threshold of legitimacy' (Zimmerman and Zeitz, 2002) is a necessary

precondition for obtaining resources for new venture survival and growth (Delmar and Shane, 2004). Specialization in a single functional capability enables the new venture to gain recognition for its distinctive strengths and more rapidly reach the legitimacy threshold required to ensure further resource acquisition for capability building (Zimmerman and Zeitz, 2002). For new ventures, early resource accumulation and capability building is an iterative cycle of capability building, legitimacy, resources, and growth. We argue that in the early years of their existence, (1) new ventures need to start with focused capability development by specializing in one specific functional capability; (2) such specialization enhances learning efficiencies and venture legitimacy; (3) legitimacy is important for acquiring other resources and achieving critical milestones crucial for new venture survival and growth; and (4) greater learning efficiencies and legitimacy lead to stronger performance and more resources. Once the new venture has achieved a certain threshold of legitimacy, it can obtain additional resources from external partners, and can then proceed to develop other functional capabilities with less risk. However, for new firms *with* external financing (which is relatively rare), we find that there are strong incentives to develop a broad set of functional capabilities. This shows that external financing is an important complement to a balanced strategy, as the benefits of accessing financial resources fully mitigate the negative effects of building a broad set of functional capabilities. The new venture can then benefit from the flexibility associated with a broad portfolio of functional capabilities.

Advances might be made in new venture capability development research by taking more explicit account of the allocation of resources to the development of functional capabilities, and the learning implications of resource accumulation for the process of capability development. For example, although specialist firms (focusing on a single functional capability) may benefit from depth of knowledge in their domain and learning efficiencies, their narrow focus in that area may eventually lead to inertia (Cohen and Levinthal, 1990; Zahra

and George, 2002). Thus, although focus may improve growth and survival chances in the short term, over time it may reduce capacity to adapt to environmental changes, unless such start-ups manage to broaden their focus as they grow. In contrast, firms starting with a broader but shallower focus on various functional capabilities may initially find it difficult to manage these, but they may enhance long-term sales growth by introducing more structured and focused learning. Investigating the learning implications and temporal dynamics of resource allocation might shed light on the long-term evolution of capabilities in new ventures.

Similarly, advances might be made in understanding the antecedents of focus in resource allocation. Because learning is a path-dependent process, in the sense that what firms learn depends on what they already know (Cohen and Levinthal, 1990; Zahra and George, 2002), how they learn and how they change their resource allocation configurations depend partly on their history, the entrepreneur's background and experience, and the development stage of organizational routines (Autio et al., 2000). Our finding that the negative effect of a balanced capability portfolio on sales growth is weaker for firms with highly experienced founders has important implications for future research on capability development. Because focusing on a specific functional capability may induce firms to exercise this capability repeatedly, at the expense of developing new or dynamic capabilities, it would be worth examining what types of experience might support a capacity to reconfigure allocations that do not appear successful. Future research might also investigate the performance implications of parallel capability building in firms with slack resources (George, 2005) or in unusually munificent environments (Sirmon et al., 2007).

Furthermore, it would be interesting to examine whether failure with current capability portfolios spurs firms to change in order to seek new ways to compete. Using the behavioral theory of the firm, future research might examine whether lower than expected performance induces a switch from broad capability investments to more focused ones, and whether higher

than expected performance further favors the firm's continued investment in its existing capability portfolio. Exploring whether firm performance may serve as a feedback mechanism¹¹ for resource allocation strategy is a fruitful avenue for future research. Entrepreneurs who choose a focused strategy in functional capability development will enjoy higher performance, which in turn, may encourage continued investments in this strategy. Conversely, entrepreneurs adopting a broad strategy in functional capability development will perform worse, which, in turn, may trigger a change of strategy. Building on this, future research may explore how performance feedback, as an outcome of a selected resource allocation strategy, may explain how capability portfolios change over time.

Our findings have implications for practitioners. Entrepreneurs play a key role in allocating new ventures' investments to different capabilities. They must be aware that different resource allocation strategies carry their own risks and benefits. They must also be conscious of possible trade-offs between capability configurations, especially in terms of learning and coordination, and must consider both internal and external conditions when choosing their capability development strategies. Entrepreneurs should ultimately consider whether they are able to build all functional capabilities simultaneously, or whether they should rather develop capabilities sequentially to mitigate risk, gain legitimacy, and accelerate specialized learning.

6. Limitations

Our study is subject to certain limitations that could provide additional fruitful directions for future research. First, it is possible that other influences, such as business model choices that lead to a better product-market fit with the firm's environment, might affect resource allocation strategies and sales growth. Focused capability development might not be valuable only because it is a quicker way to reach the legitimacy threshold, but also because it is

¹¹ We thank an anonymous reviewer for this point.

associated with a better ‘market fit’. While the above two theoretical paths are quite different, they are not mutually exclusive, thus it is possible that both might contribute to improved performance. In this study, we have argued that the product-market fit does not influence the firm’s degree of focus, and thus emphasized the importance of reaching a legitimacy threshold through focused internal capability development as the critical trigger of sales. Although we do not have direct measures of market fit, we account for industry-level external conditions in our models through our IV analysis. However, internal capability development is still only one of many paths through which startups allocate resources for growth, and more research is required to relate differences in startups’ resource allocation strategies to performance trade-offs.

Second, although the KFS dataset provides unique advantages for a study of startup capability configurations and performance, it does not contain measures of the quality of the original business idea. Hence, the strong conceptual and empirical relationship we identify between functional focus and firm performance may be confounded by knowledge-based advantages that might be more likely observed in focused firms. To address this issue, we controlled for past performance in all of our models. In addition, we ran IV regressions to address the potential endogeneity of a functional capability focus, and ran our analyses separately in sub-samples from munificent and non-munificent environments. Future research should control for such knowledge-based advantages.

Third, our findings on the effects of focus on sales performance apply only to surviving firms. Future research might correct for survivorship bias by using Heckman’s (1979) selection model. To avoid selection bias, future studies will need a sample of new ventures with information on both surviving and failed ventures, as well as a valid instrument that influences survival but not sales performance. Our tests using exit as the dependent variable suggest that greater focus is also associated with a lower incidence of exit (Cox models are available from

the authors on request).

Fourth, we do not have information on the product lines of the new ventures, and focus only on three functional areas (R&D, production and marketing). Thus, our measure of focus is limited to these specific functions within the firm and does not capture other aspects of focus, such as how many product lines the firm may have. Future research might explore how those two distinctive aspects of focus (capability and product line focus) could jointly and independently influence sales performance in new ventures.

While beyond the scope of this study, future research may examine whether the environment in which new ventures operate affects the specific type of focus (R&D, production, or marketing). Our additional analysis using fsQCA suggests that there is a relationship between the environment and the type of focus in capability development. Future research may adopt a contingency perspective to study this relationship in greater detail. In addition, we acknowledge the potential endogeneity of entrepreneurial experience, which may affect resource assembly (Kotha and George, 2012) and sales performance. We also acknowledge the potential endogeneity of external funding, which may depend on the quality of the firm, and thus its growth and revenue potential. We included lagged performance variables in all models to mitigate the risk of inflating the coefficients of explanatory variables; however, we were only interested in the moderating effects of entrepreneurial experience and external finance. Our results suggest that for the small group of high-potential firms that receive external funding, focused resource allocation strategies may not help; whereas for most other firms (including those with limited entrepreneurial experience), focused strategies tend to be associated with improved performance. We hope these results encourage new research on how new ventures' resource allocation strategies influence their performance.

7. Conclusion

This study has implications for new ventures' capability development and resource

allocation strategies. New ventures should pursue focus (or specialization) in capability development by primarily developing a single functional capability, rather than attempting to develop all functions in parallel. A broad resource allocation strategy of developing R&D, production, and marketing capabilities simultaneously may be risky if new ventures lack the ability to fully develop and integrate multiple capabilities. However, a broad portfolio of capabilities is less damaging (or even beneficial) to firms with abundant resources, such as experienced founders with prior experience of starting and running an early-stage organization, or access to external financing that alleviates financial pressures. Focusing on a single functional capability may thus compensate for resource access by enabling the firm to accelerate learning to build valuable capabilities.

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Table 1
Descriptive statistics and pairwise correlations

	Mean	s.d.	Performance	Focus	Entrepreneurial experience	External financing	High-tech	No. of owners	Intellectual property	College degree	Regional infrastructure	Industry experience	Performance t-1	No. of employees	Alliances
Performance	12.3	2.06	1.00												
Focus	0.58	0.26	0.07*	1.00											
Entrepreneurial experience	0.68	0.73	0.15*	-0.01	1.00										
External financing	0.03	0.17	0.04*	-0.01	0.07*	1.00									
High-tech	0.15	0.36	0.08*	-0.02	0.05*	0.05*	1.00								
No. of owners	2.63	7.17	0.26*	-0.03*	0.28*	0.09*	0.12*	1.00							
Intellectual property	0.28	0.45	0.06*	-0.10*	0.14*	0.08*	0.13*	0.18*	1.00						
College degree	0.59	0.50	0.06*	0.09*	0.07*	0.03*	0.09*	0.09*	0.15*	1.00					
Regional infrastructure	0.33	0.47	0.05*	0.01	0.01	0.01	0.07*	0.04*	0.05*	0.03*	1.00				
Industry experience	0.27	0.44	0.17*	0.01	0.50*	0.06*	0.07*	0.16*	0.10*	0.04*	0.02	1.00			
Performance t-1	12.1	2.05	0.84*	0.07*	0.14*	0.04*	0.07*	0.22*	0.04*	0.04*	0.05*	0.16*	1.00		
No. of employees	2.01	0.65	0.33*	-0.43*	0.13*	0.06*	0.01	0.27*	0.08*	-0.06*	-0.02	0.09*	0.32*	1.00	
Alliances	0.14	0.35	0.07*	0.01	0.05*	0.04*	0.10*	0.09*	0.09*	0.11*	0.02*	0.04*	0.07*	0.04*	1.00

N = 6,748. Minimum and maximum values for each variable are not provided due to confidentiality constraints associated with the confidential KFS microdata. Industry dummies are omitted owing to space constraints. * Denotes correlation significant at the 5% level.

Table 2

Performance models (including IV regression)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Controls	Direct effect	Moderation	Moderation	Full model	First-stage	Second-stage
	Performance	Performance	Performance	Performance		Focus	Performance
Average functional focus						0.7633*** (0.0286)	
Focus t-1		0.3826*** (0.0708)	0.5183*** (0.0811)	0.4051*** (0.0703)	0.5254*** (0.0812)		0.5372** (0.1869)
Alliances t-1	0.1033* (0.0442)	0.1029* (0.0441)	0.1020* (0.0439)	0.1025* (0.0439)	0.1017* (0.0438)	0.0017 (0.0080)	0.0981+ (0.0399)
Focus t-1 X entrepreneurial experience t-1			-0.2091* (0.0980)		-0.1886* (0.0943)		
Focus t-1 X external financing t-1				-0.9250* (0.4348)	-0.8356* (0.4185)		
Entrepreneurial experience t-1	0.0112 (0.0300)	0.0083 (0.0297)	0.1303+ (0.0685)	0.0084 (0.0298)	0.1184+ (0.0665)	0.0075+ (0.0042)	-0.0068 (0.0212)
External financing t-1	0.0363 (0.0861)	0.0368 (0.0864)	0.0382 (0.0851)	0.5585* (0.2346)	0.5094* (0.2282)	-0.0137 (0.0167)	0.0021 (0.0832)
No. of employees	0.1681*** (0.0284)	0.2497*** (0.0342)	0.2530*** (0.0342)	0.2507*** (0.0342)	0.2537*** (0.0342)	-0.1904*** (0.0044)	0.2565*** (0.0444)
Performance t-1	0.6695*** (0.0199)	0.6608*** (0.0203)	0.6605*** (0.0203)	0.6611*** (0.0203)	0.6608*** (0.0203)	0.0253*** (0.0014)	0.8125*** (0.0090)
Industry experience t-1	0.1758*** (0.0482)	0.1736*** (0.0480)	0.1736*** (0.0480)	0.1746*** (0.0480)	0.1745*** (0.0480)	0.0008 (0.0068)	0.0983** (0.0341)
Intellectual property t-1	0.0245 (0.0346)	0.0396 (0.0345)	0.0374 (0.0346)	0.0409 (0.0345)	0.0388 (0.0346)	-0.0394*** (0.0062)	0.0688* (0.0320)
College degree t-1	0.1257*** (0.0383)	0.1171** (0.0381)	0.1159** (0.0381)	0.1176** (0.0381)	0.1164** (0.0381)	0.0128* (0.0056)	0.0688* (0.0285)
Regional infrastructure t-1	0.0306 (0.0321)	0.0301 (0.0370)	0.0301 (0.0370)	0.0294 (0.0371)	0.0296 (0.0371)	-0.0051 (0.0056)	0.0288 (0.0278)

No. of owners t-1	0.1877*** (0.0321)	0.1755*** (0.0318)	0.1736*** (0.0318)	0.1724*** (0.0318)	0.1709*** (0.0318)	0.0276*** (0.0048)	0.1183*** (0.0249)
High-tech t-1	0.1191* (0.0550)	0.1195* (0.0546)	0.1199* (0.0546)	0.1192* (0.0547)	0.1196* (0.0546)	-0.0103 (0.0082)	0.0764+ (0.0411)
Year and industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.9948*** (0.2075)	3.7305*** (0.1984)	3.6493*** (0.2156)	3.7134*** (0.1978)	3.6416*** (0.1986)	0.2086*** (0.0266)	1.4541*** (0.1596)
Observations	6,748	6,748	6,748	6,748	6,748	6,748	6,748
Number of firms	2,356	2,356	2,356	2,356	2,356	2,356	2,356
R-squared	0.7266	0.7281	0.7283	0.7283	0.7284	0.3417	0.7319
x2	4112.30	4457.90	4479.53	4517.95	4521.06	116.19	18398
Durbin						p-value 0.2963	
Wu-Hausman						p-value 0.2974	

Robust standard errors clustered on the firm in parentheses; two-tailed tests

*** p < 0.001, ** p < 0.01, * p < 0.05, + p < 0.1.

Table 3

Estimates of influences on performance for different industry sub-samples

	(1)	(2)	(3)	(4)
	High-tech	Low-tech	Manufacturing	Services
R&D focus $t-1$	0.04(0.10)	0.01 (0.07)	0.11(0.12)	-0.02(0.06)
Production focus $t-1$	0.26**(0.09)	0.16**(0.06)	0.18*(0.06)	0.12+(0.07)
Marketing focus $t-1$	0.08(0.09)	0.17*** (0.04)	0.09(0.08)	0.18*** (0.04)
Startup experience $t-1$	0.02(0.08)	0.03(0.03)	0.03(0.08)	0.02(0.03)
External financing $t-1$	0.14 (0.14)	0.02(0.10)	0.13(0.12)	0.03(0.11)
Performance $t-1$	0.64*** (0.04)	0.68*** (0.02)	0.60*** (0.03)	0.70*** (0.02)
Industry experience $t-1$	0.13(0.12)	0.19*** (0.05)	0.23+(0.12)	0.16*** (0.04)
Intellectual property $t-1$	0.01(0.08)	0.04(0.04)	-0.03(0.06)	0.06(0.04)
College degree $t-1$	0.28** (0.11)	0.05(0.04)	0.14+(0.07)	0.10* (0.04)
Regional infrastructure $t-1$	-0.07(0.09)	0.05(0.04)	0.01(0.07)	0.04(0.04)
No. of owners $t-1$	0.12+(0.06)	0.21*** (0.04)	0.13* (0.05)	0.20*** (0.04)
High-tech $t-1$			0.10(0.09)	0.02(0.06)
No. of employees $t-1$	0.30*** (0.07)	0.18*** (0.03)	0.28*** (0.06)	0.17*** (0.37)
Alliances $t-1$	0.22* (0.09)	0.06(0.05)	0.13(0.09)	0.08+ (0.04)
Constant	4.04*** (0.44)	3.68*** (0.21)	4.41*** (0.39)	3.50*** (0.21)
Observations	1,002	5,746	1,925	4,823
Number of firms	337	2,102	681	1,789
R-squared	0.7355	0.7245	0.7250	0.7194
x2	790.68	2786.22	954.64	2736.88

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$; robust standard errors clustered on the firm in parentheses; two-tailed tests. The high-tech variable is omitted in Models 1 and 2 because of the high-tech and low-tech sub-samples. Manufacturing industries include NAICS 1-3, Service industries include NAICS 4-9. High-tech sectors include NAICS 3345, NAICS 3254, NAICS 3341, NAICS 3342, NAICS 3344, NAICS 3332, NAICS 3335, NAICS 5417, NAICS 5415, NAICS 5112, NAICS 3346, NAICS 3359, NAICS 3364, NAICS 3329, and NAICS 3251. All other industries that are *not* high-tech, are represented in the low-tech category. The variables R&D, Production and Marketing focus are dummies equal to 1 if more than 50 percent of the firm's employees and owners were primarily responsible for research and development of new products, production activities, and marketing activities respectively, and zero otherwise.

Table 4

T-tests of differences in means of variables across R&D, production, and marketing focus

	R&D focus					Production focus					Marketing focus				
	p-val	mean 1	N1	mean 2	N2	p-val	mean 1	N1	mean 2	N2	p-val	mean 1	N1	mean 2	N2
Competitive advantage expertise	0.01	0.761	453	0.937	32	0.84	0.781	420	0.723	65	0.78	0.781	371	0.745	114
Competitive advantage price	0.892	0.519	454	0.406	32	0.10	0.501	421	0.584	65	0.95	0.533	371	0.443	115
Competitive advantage marketing	0.80	0.422	452	0.343	32	0.91	0.429	419	0.338	65	0.02	0.391	370	0.500	114
Competitive advantage speed	0.91	0.595	452	0.468	32	0.03	0.571	420	0.687	64	0.54	0.588	369	0.582	115
Competitive advantage reputation	0.59	0.791	451	0.774	31	0.21	0.784	418	0.828	64	0.59	0.792	367	0.782	115
Competitive advantage cost	0.27	0.493	452	0.548	31	0.27	0.491	419	0.531	64	0.81	0.508	368	0.460	115
Competitive advantage design	0.11	0.711	451	0.812	32	0.06	0.706	419	0.796	64	0.97	0.739	369	0.649	114
Provide service	0.83	0.847	6373	0.828	362	1.000	0.856	5873	0.781	862	0.001	0.834	4918	0.881	1817
Provide product	0.83	0.566	6372	0.539	363	0.001	0.541	5871	0.722	864	1.000	0.597	4920	0.475	1815
Product innovation	0.002	0.263	2453	0.375	136	0.001	0.254	2226	0.360	363	1.000	0.304	1824	0.185	765
Process innovation	0.05	0.200	2452	0.257	136	0.001	0.194	2225	0.261	363	0.99	0.219	1824	0.166	764
Competitive advantage teaming up with university	0.001	0.071	2510	0.206	165	0.67	0.080	2320	0.073	355	0.99	0.086	1971	0.058	704
Competitive advantage teaming up with firms	0.03	0.295	2507	0.363	165	0.97	0.306	2316	0.255	356	0.02	0.289	1971	0.329	701
Competitive advantage teaming up with government	0.001	0.031	2505	0.109	165	0.86	0.037	2316	0.025	354	0.98	0.040	1969	0.022	701
Competitive advantage patents	0.001	0.091	2504	0.327	165	0.60	0.106	2315	0.101	354	1.000	0.129	1969	0.038	700
License-out IP	0.001	0.026	6385	0.074	363	0.90	0.029	5884	0.022	864	0.99	0.033	4926	0.015	1822
International sales	0.02	0.228	4284	0.283	243	0.001	0.214	3903	0.336	624	1.000	0.251	3234	0.181	1293
Internet sales	0.58	0.284	4281	0.278	241	0.99	0.292	3899	0.232	623	0.85	0.288	3233	0.273	1289

One-tailed tests. $\text{diff} < 0$ [$\text{diff} = \text{mean}(1) - \text{mean}(2)$]. R&D focus is a dummy variable (mean 1= R&D focus equals zero and mean 2= R&D focus equals one). Production focus is a dummy variable (mean 1= Production focus equals zero and mean 2= Production focus equals one). Marketing focus is a dummy variable (mean 1= Marketing focus equals zero and mean 2= Marketing focus equals one). The variables R&D, Production and Marketing focus are dummies equal to 1 if more than 50 percent of the firm's employees and owners were primarily responsible for research and development of new products, production activities, and marketing activities respectively, and zero otherwise.

Figure 1

Effects on performance of the interaction of entrepreneurial experience and focus

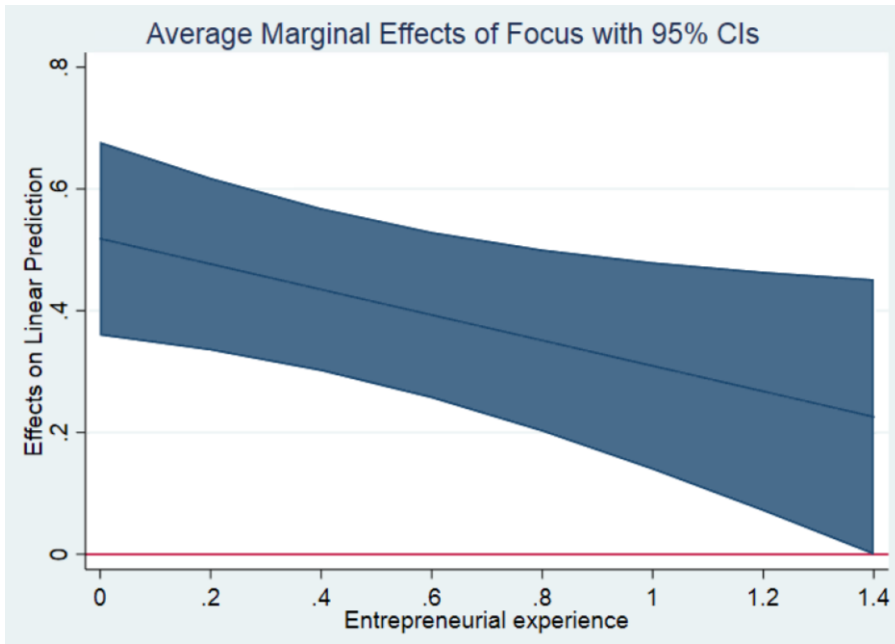


Figure 2

Effects on performance of the interaction of external financing and focus

