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Research on new ventures has indicated that poorly conducted marketing is among the main reasons for new venture failure. To acquire urgently needed initial funding, new ventures strive to conform to investors' expectations of appropriate marketing capabilities because these capabilities may endow them with legitimacy in the eyes of potential investors. Drawing on organizational legitimacy and human resource theory, the authors argue that the characteristics of the chief marketing officer (CMO) may endow new ventures with marketing legitimacy. Employing a two-stage selection hazard rate analysis to simultaneously account for potential selection bias and right-censored observations, the authors analyze a comprehensive data set of 2,945 high-technology new ventures. Bearing in mind that this research is a first exploratory attempt to illuminate the role of marketing for new venture funding using correlational secondary data, the results indicate that CMO education, marketing experience, and industry experience are positively related to the likelihood of funding. Moreover, the relationships between CMO characteristics and funding are contingent on task-related uncertainty and industry legitimacy. These findings provide initial insights for entrepreneurs, venture capitalists, and public policy makers.

Keywords: chief marketing officer, entrepreneurship, venture capital, legitimacy, start-ups

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The Role of Chief Marketing Officers for Venture Capital Funding: Endowing New Ventures with Marketing Legitimacy

New ventures often lack financial resources for establishing and expanding their business, and thus, they frequently turn to venture capital (VC) firms for funding. Venture capital refers to professionally managed capital pooled in funds and invested in privately held companies in early phases of the organizational life cycle. In 2012 alone, U.S. new ventures raised more than $26 billion of VC money (National Venture Capital Association 2013). However, only a small proportion of new ventures succeed in this critical step of their organizational development: approximately 1 out of every 100 new ventures receives funding (Kirsch, Goldfarb, and Gera 2009).

Entrepreneurship and finance research have identified a plethora of criteria that venture capitalists use when deciding whether to invest in a new venture (Zacharakis and Meyer 1998). In addition to these systemized funding criteria, descriptive academic findings and anecdotal evidence from business practice suggest that venture capitalists also consider marketing crucial for new venture success (Crane 2010; Hills 1985; Lodish, Morgan, and Kallianpur 2001). For example, Politis (2005, p. 404) observes that "financial

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problems as well as marketing problems seem consequently to be common reasons for the high failure rates among new ventures." Unsurprisingly, media targeted at venture capitalists as well as start-ups' own press releases provide extensive information on marketing executives. For example, when Neil Morgan, a former vice president at Adobe, became chief marketing officer (CMO) of the social analytics start-up Socialbakers, the company itself and VC information sources such as TechCrunch.com extensively reported on Morgan's knowledge regarding product marketing and brand building and on prior marketing appointments in reputable companies (Ha 2013). Marketing research, however, is relatively silent on how marketing-related aspects may increase new ventures' odds of being funded.

The current study addresses this research gap by investigating the role of the CMO in acquiring VC. If venture capitalists acknowledge the importance of marketing-related aspects in their funding decisions, the question arises whether aspects of the CMO—the spearhead of marketing in a new venture—affect funding beyond well-established funding criteria. To develop our conceptual model, we draw on organizational legitimacy theory (Rao, Chandy, and Prabhu 2008). We reason that certain characteristics of the CMO may increase the new venture's marketing legitimacy, thus increasing its odds of obtaining funding.

Specifically, we expect that a new venture that has a CMO with greater job-relevant experience (i.e., marketing experience, industry experience, and start-up experience) and a valuable educational background (i.e., Master of Business Administration [MBA] degree) conforms to investors' cognitive expectations of appropriate marketing capabilities (Aldrich and Fiol 1994). Moreover, we argue that this relationship is moderated by factors that reflect the degree of uncertainty in the venture's institutional environment and the CMO's task environment.

To test the hypotheses, we compiled a data set from multiple sources that contains longitudinal data on 2,945 new ventures. We analyze the data using a two-step Heckman-type continuous hazard rate model. This model specification enables us to analyze the relationship between CMO characteristics and the hazard of VC funding while accounting for self-selection bias that may result from the decision to establish a CMO in the top management team. The results reveal that CMO education, marketing experience, and industry experience are positively related to funding, but start-up experience is not. Moreover, the effects of CMO characteristics are contingent on environmental moderators. For example, the positive relationship between CMO industry experience and funding is more pronounced under high levels of demand uncertainty.

The current study is exploratory, taking a first look at the role of marketing for new venture funding. Thus, the conclusions that can be drawn from this correlational, exploratory research are necessarily tentative and subject to further investigation, particularly with regard to the underlying processes. Considering this limitation, the results provide three main contributions to the literature. First, prior marketing research has focused mainly on investor reactions to new ventures that initially offer public stock or that are already listed on a stock exchange (DeKinder and Kohli 2008; Luo 2008; Rao, Chandy, and Prabhu 2008; Saboo and Grewal 2013; Xiong and Bharadwaj 2011). In contrast, the current study builds on the work of Srinivasan, Lilien, and Rangaswamy (2008) and focuses on much younger ventures. We extend their research by investigating venture capitalists, an investor community that is not yet on the agenda of the marketing–finance interface research (Hanssens, Rust, and Srivastava 2009), which has only begun to address new ventures' initial public offering (IPO) performance (Luo 2008). A fundamental difference between the investment decisions of venture capitalists and IPO-stage investors is that the latter can observe prior VC investment as "a reliable measure of the success the firm has had in the past in securing financial capital, and so is an indicator of the firm's potential for growth as well" (Higgins and Gulati 2006, p. 12). Thus, in contrast to IPO-stage investors, venture capitalists face a decision situation that provides comparatively little information on a new venture's quality. Our results provide information on how entrepreneurs should form their start-up team to better conform to venture capitalist expectations, thus enhancing their chances of receive funding.

Second, we theoretically add to the growing stream of research on entrepreneurial marketing. This research has examined factors such as new ventures' flow signaling, alliances, and absorptive capacity (e.g., DeKinder and Kohli 2008; Xiong and Bharadwaj 2011). We contribute to this research by drawing on organizational legitimacy theory to establish a theoretical background for why the CMO may also matter to potential investors (Rao, Chandy, and Prabhu 2008). We argue that certain characteristics of the CMO endow the new venture with human and social resources that facilitate the acquisition of financial resources (Brush, Greene, and Hart 2001). Moreover, we relate these resources to the different roles of the CMO that Boyd, Chandy, and Cunha (2010) identify to develop the mechanisms underlying our hypotheses. Thus, we provide first insights into the complex relationships between a new venture's marketing function and its likelihood of obtaining funding.

Third, this study is the first to investigate CMOs of new ventures. This focus extends prior research that has focused on CMOs of stock market–listed companies but has struggled to provide evidence of a positive impact of CMO presence on performance (Nath and Mahajan 2008, 2011). Small and young firms, however, are characterized by high managerial discretion, which refers to the degree of influence of top managers on a firm's actions and success (Aspelund, Madsen, and Moen 2007; Souitaris and Maestro 2010). Therefore, new ventures provide a unique context for examining CMO-related outcomes.

Specifically, we take a contingency perspective and investigate specific CMO characteristics in addition to mere CMO presence. Extending the work of Boyd, Chandy, and Cunha (2010), who examine stock market reactions to CMOs' role- and firm-specific experience, we also consider CMO education and disentangle CMO role-specific experience into marketing experience, industry experience, and start-up experience. We show that the importance of these characteristics varies with factors that determine the level of uncertainty in the firm's environment. Our results thus shed light on the role of CMOs in small and young firms and on the contingent nature of the CMO–performance link in more general terms.

THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

This research focuses on VC funding because raising funds is among the core tasks of new ventures (Brush, Greene, and Hart 2001; Zimmerman and Zeitz 2002). Specifically, we draw on legitimacy theory and recent research on CMOs (Boyd, Chandy, and Cunha 2008; Nath and Mahajan 2008, 2011; Rao, Chandy, and Prabhu 2008) to conceptually and empirically link the CMO as a member of the top management team to the new venture's likelihood of funding.

Entrepreneurship research has identified several criteria that venture capitalists use to decide whether to provide a particular new venture with funding. Zacharakis, McMullen, and Shepherd (2007) divide these criteria into those related to human capital (e.g., experience in a particular job, experience in the respective industry, start-up experience) and market characteristics (e.g., demand for the product, ability to protect intellectual capital, competitive intensity). Zacharakis and Meyer (1998; see also Hall and Hofer 1993) provide a more fine-grained classification and differentiate team characteristics (e.g., experience, education, personality), product characteristics (e.g., concrete attributes, prototype availability), market characteristics (e.g., demand for the product, whether the new venture creates a new market, competitive intensity), and financial characteristics (e.g., liquidity, return on revenue). Our goal is to examine whether specific characteristics of the CMO affect VC funding after accounting for these established funding criteria. In our empirical analyses, we therefore include all established funding criteria that are appropriate and available in our research context. Chief marketing officer effects beyond these criteria would provide initial evidence for the role of marketing in VC funding decisions.

Legitimacy of New Ventures

Legitimacy refers to "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman 1995, p. 574). Aldrich (1999) distinguishes two types of organizational legitimacy: cognitive and sociopolitical legitimacy. Because sociopolitical legitimacy directly emanates from adherence to existing laws and regulations, we concentrate on cognitive legitimacy, which is the general perception that a new entity is appropriate (Aldrich 1999; Khaire 2010). New ventures inherently lack cognitive legitimacy because they are new and unfamiliar entities. However, because legitimacy is a prerequisite to gain financial resources (Zimmerman and Zeitz 2002), entrepreneurs must convince investors of their firms' appropriateness.

Prior research has suggested that venture capitalists pay particular attention to marketing-related issues because they consider marketing a central determinant of new venture success (Crane 2010; Muzyka, Birley, and Leleux 1996). For example, venture capitalists argue that a profound market analysis could reduce new venture failure by 60%. They also believe that most new ventures overestimate actual customer demand for their products and misjudge customer needs (Hills 1985). In line with these observations, Politis (2005, p. 404) traces the high failure rates of new ventures to "inadequate funding and inefficient marketing." Establishing marketing legitimacy in the eyes of potential investors thus constitutes a central challenge for new ventures.

The seminal works on legitimacy in new venture contexts regard it as a quality signal because other, particularly economic, indicators are not available in a new venture context (Cohen and Dean 2005; Zimmerman and Zeitz 2002). Legitimacy, in turn, develops as new ventures adhere to socially constructed norms of appropriate organizational attributes (Bruton, Ahlstrom, and Li 2010; DiMaggio and Powell 1983; Meyer and Rowan 1977). The expectation underlying this rationale is that conforming to accepted norms and rules will ultimately enhance performance. For example, Zimmerman and Zeitz (2002, p. 416) suggest that in the absence of any prior market-based performance measures, legitimacy helps in assessing a new venture's quality "by signaling that the organization is properly constituted; committed to the proper scripts, rules, norms, values, and models; able to use appropriate means; and pursuing acceptable ends."

Because detailed internal information on new ventures is scarce, venture capitalists focus on salient and visible information cues (Baum and Silverman 2004; Zacharakis and Meyer 1998). The most important cue is the top management team, which directly influences the new venture's likelihood of survival and future performance because of the high level of managerial discretion in young and small firms (Souitaris and Maestro 2010). Next, we focus on the centrality of the CMO for establishing marketing legitimacy by discussing her or his main roles.

Contribution of CMOs to New Venture Legitimacy

According to Boyd, Chandy, and Cunha (2010), the tasks that fall under the domain of the CMO are threefold. First, the informational role consists of gathering, analyzing, and disseminating market information, which is especially crucial for new ventures because many market opportunities are based on difficult-to-identify latent customer needs. Second, the relational role involves developing and managing relationships with external stakeholders. Because of their small size, new ventures cannot execute all tasks internally and therefore must rely on external entities. For example, the CMO must endorse relationships with (1) channel partners to establish initial sales channels, (2) advertising agencies to optimize search engine marketing, and (3) the business press to gain media coverage. Third, the decisional role ensures that resource allocation decisions account for customer perspectives.

Because the existence of a CMO in the top management team provides "an indicator of both corporate status of marketing and corporate adoption of the marketing concept" (Nath and Mahajan 2008, p. 65), the decisional role is accounted for by the mere presence of a CMO—an attribute that is easily observable by venture capitalists.[1] Regarding the informational and relational roles, however, the CMO of a new venture does not have a substantial track record in that particular venture that may indicate her or his capability

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[1] Although we do not formulate a hypothesis for this expectation, we conducted an additional analysis revealing that the presence of a CMO significantly increases the likelihood of VC funding (for details, see the "Results" section).

of fulfilling these roles. Therefore, marketing legitimacy may be derived from adequate levels of previously acquired human and social resources that are deemed beneficial for CMOs' role-specific tasks (Certo 2003; Cohen and Dean 2005; Higgins and Gulati 2006; Packalen 2007).

The most central human and social resources are knowledge (both tacit and explicit), reputation, and business contacts (Hall 1993; Khaire 2010). Outsiders cannot directly observe these resources, so they must rely on "symbolic signals of competence" (Sine, Mitsuhashi, and Kirsch 2006, p. 123). Indicative of the level of such resources is information on the top management team's formal education and practical experience, which are the primary mechanisms to acquire the respective resources (Brush, Greene, and Hart 2001; Lam 2000).

Thus, we focus on CMO education and experience as valid and visible indicators of a new venture's marketing legitimacy (Deeds, Mang, and Frandsen 2004; Waldman and Spangler 1989). In particular, we delineate how education and experience facilitate CMOs' informational and relational tasks by endowing them with resources in the form of knowledge, reputation, and contacts. Figure 1 depicts the conceptual framework.

CMO Education

Chief marketing officer education refers to the quality of the CMO's tertiary business education, as indicated by whether he or she attended a prestigious university (Palmer and Barber 2001). We argue that the knowledge, contacts, and reputational resources acquired through formal education increase CMOs' ability to fulfill informational and relational tasks.

First, education may facilitate CMOs' informational tasks through the provision of knowledge and contacts. Through formal education, the CMO accumulates "specialized, explicit and codified knowledge" (Scott 1994, p. 81). For example, Zimmerman and Zeitz (2002, p. 420) argue that a degree from a top business school "indicates that the firm is aware of the most effective management techniques." Thus, formal education may indicate that the CMO is aware of advanced tools for information gathering (e.g., market potential analysis, conjoint analysis) and is capable of codifying the gathered information to make it useful for product development, channel selection, and communications (Arenius and De Clercq 2005). Moreover, education facilitates CMOs' informational tasks through "connections to other 'knowledgeable' others such as alumni network contacts" (Arenius and De Clercq 2005, p. 252).

Second, education may facilitate CMOs' relational tasks by endowing them with reputation and contacts. Education creates reputational resources because "attendance at certain schools carries with it an aura of prominence in the business elite" (Finkelstein 1992, p. 516). Such status helps CMOs when endorsing relationships with external partners because their functional qualifications are taken more for granted (D'Aveni 1990). Furthermore, education enhances

Figure 1
CONCEPTUAL FRAMEWORK OF CMO HUMAN AND SOCIAL RESOURCES, ENVIRONMENTAL CONTINGENCIES, AND VC FUNDING
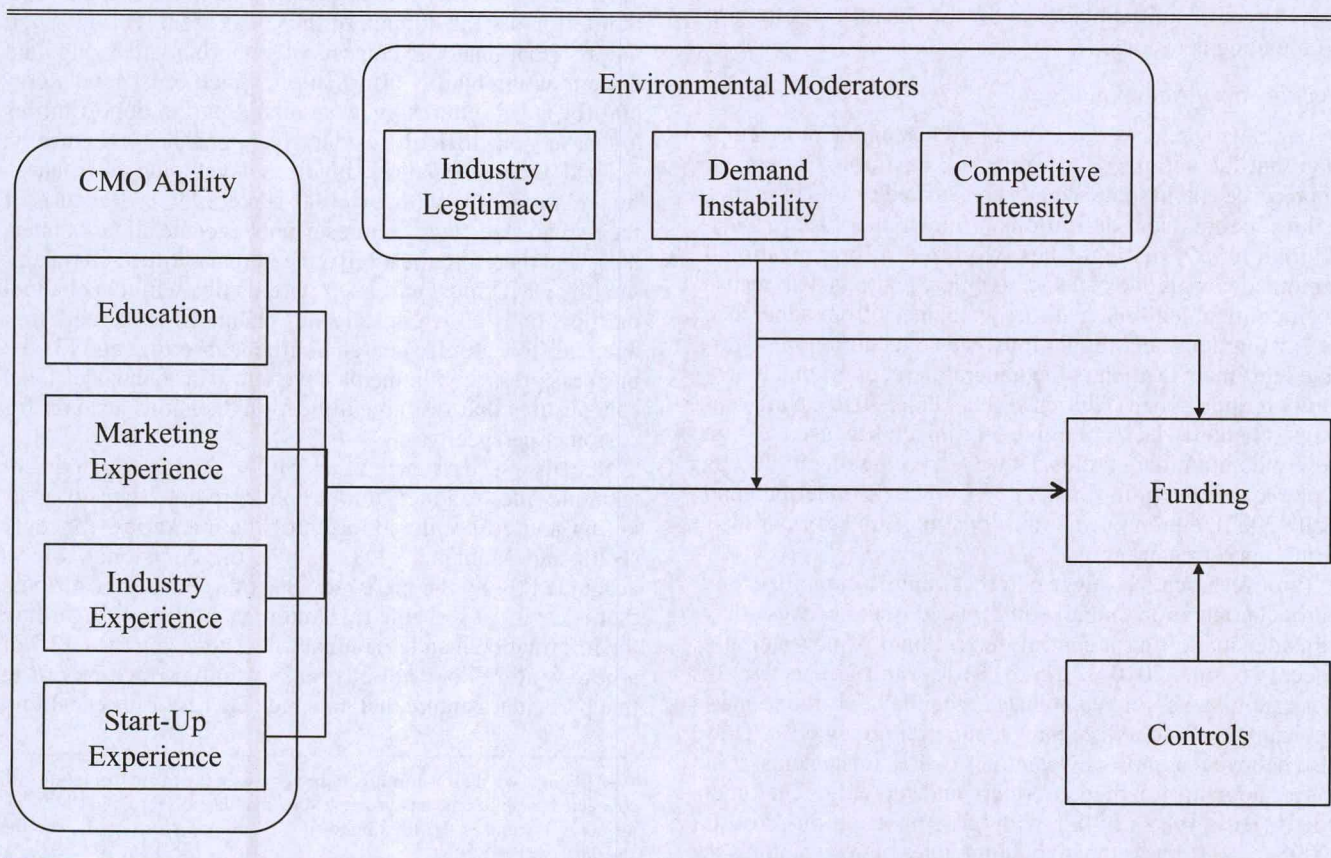
relational tasks through "social contacts from school or networks that will be useful in building partnerships" (Brush, Greene, and Hart 2001, p. 74). Thus,

H_1: Chief marketing officer education enhances the likelihood of VC acquisition.

CMO Experience

Chief marketing officer experience refers to the depth of CMOs' work experience and endows them with human and social resources in the form of knowledge and contacts (Hitt et al. 2001; Waldman and Spangler 1989). In contrast with education, experience fosters tacit knowledge, which is action oriented, difficult to formalize, and focused on routines and operational skills (Lam 2000).

Prior research on CMOs has examined two types of work experience: CMO role experience, which refers to experience associated with the specific role as a CMO, and CMO firm experience, which is the level of work experience in a specific firm. Although both types of experience may positively affect investor perceptions of established firms (Boyd, Chandy, and Cunha 2010), we focus on role experience because firm experience is of limited relevance in recently established firms. Moreover, we extend the work of Boyd, Chandy, and Cunha (2010) and disentangle role experience into marketing, industry, and start-up experience to gain a more nuanced picture of the criticality of different types of experience. We expect that knowledge and contacts acquired through these different types of experience indicate CMOs' capability of fulfilling informational and relational tasks.

CMO marketing experience. Chief marketing officer marketing experience refers to the depth of work experience in marketing-related assignments. Such experience may facilitate informational tasks because the CMO has accumulated knowledge about operational procedures and efficient routines for information gathering and analysis. This knowledge enables CMOs to better interpret and differentiate relevant and less relevant information for a given decision task (Cohen and Bacdayan 1994; Reagans, Argote, and Brooks 2005) and give investors "the comfort of knowing the firm is being led by those who have done it before" (Cohen and Dean 2005, p. 686).

In addition to such knowledge resources, marketing experience endows CMOs with contacts to the marketing community that enable the timely identification of new trends and methods. Such contacts may also include important service providers, such as advertising agencies and market research companies, enabling CMOs to better fulfill relational tasks. Thus,

H_2: Chief marketing officer marketing experience enhances the likelihood of VC acquisition.

CMO industry experience. Chief marketing officer industry experience refers to the depth of work experience in the new venture's specific industry setting. Colombo and Grilli (2005, p. 800) summarize the knowledge and contact resources stemming from industry experience, stating that "the new firm can exploit the knowledge [of managers] about technologies, customers' needs, and competitors' strengths and weaknesses and the contacts with potential customers and suppliers ... developed in their previous occupation." Thus, tacit knowledge acquired through industry experience indicates CMOs' familiarity with the structure and dynamics of the industry and the management of industry-specific processes, both of which are important for CMOs' informational tasks. Moreover, existing contacts to lead customers and suppliers in the industry can facilitate CMOs' relational tasks (Packalen 2007). Thus,

H_3: Chief marketing officer industry experience enhances the likelihood of VC acquisition.

CMO start-up experience. Chief marketing officer start-up experience refers to the level of work experience in new venture contexts. Start-up experience indicates knowledge of the unique challenges and constraints in an entrepreneurial setting and the ability to cope with high uncertainty and fast decision making in small and young organizations (Delmar and Shane 2004). Such knowledge resources are particularly valuable for CMOs' informational tasks because the tacit knowledge acquired through previous start-up experience aids them in "gathering the right information and making effective decisions about opportunities" (Politis 2005, p. 405). Thus, CMOs with start-up experience may have better knowledge about which information in particular is relevant to complete marketing-related tasks in an entrepreneurial environment.

Moreover, CMOs' relational tasks may be facilitated because "social capital must have come from somewhere, and one likely way is through prior involvement in the entrepreneurial community" (Hsu 2007, p. 726). Chief marketing officers with start-up experience may already have contacts to important facilitators, such as start-up-related media, service providers (e.g., search engine marketing agencies), and potential investors (Brüderl and Preisendörfer 1998; Hsu 2007). Thus,

H_4: Chief marketing officer start-up experience enhances the likelihood of VC acquisition.

Environmental Moderators

Upper-echelon research has argued that the impact of the top management team on the fate of an organization depends on the level of uncertainty in the organizational environment (Carpenter and Fredrickson 2001). Legitimacy theory similarly stresses uncertainty as an important contingency factor (Zimmerman and Zeitz 2002). Therefore, we posit that the relationship between CMO education and experience and funding is contingent on the level of environmental uncertainty. We consider two sources of uncertainty: the venture's institutional environment and the CMO's task environment (i.e., uncertainty related to the fundamental forces in the market).

Institutional environment. Regarding the institutional environment, we consider industry legitimacy as a potential source of uncertainty affecting CMO effects. Industry legitimacy refers to taken-for-granted organizational practices, standards, ideas, models, and processes in the industry. When industry legitimacy is high, potential investors have a profound understanding of how successful firms in the particular industry should operate (Aldrich and Fiol 1994; Deeds, Mang, and Frandsen 2004). In contrast, when operating in newly established industries with low legitimacy, a new venture's need to obtain legitimacy is higher. This further increases the importance of the CMO for establishing legitimacy, because in an "emerging industry, VCs are

likely to rely even more on signals of venture quality relative to more mature industry situations" (Hsu 2007, p. 729; see also Grewal and Dharwadkar 2002; Saboo and Grewal 2013; Zott and Huy 2007). Consequently, the roles of education and experience as indicators of CMOs' ability to complete informational and relational tasks may be even more relevant than in mature industries. For example, Hsu (2007) argues that low industry legitimacy strengthens the role of education as an indicator of relevant contacts. This in particular may hold because emerging industries often originate from elite universities.

A fundamental difference between emerging, low-legitimacy markets and established markets is that in low-legitimacy markets, many market opportunities are latent such that customers and competitors are not explicitly aware of them. This increases the need to identify and assess such opportunities. Whereas start-up experience facilitates the identification of opportunities (Politis 2005), marketing experience indicates that CMOs can assess such opportunities in an efficient and timely manner (Cohen and Bacdayan 1994). In addition to experience, education facilitates opportunity identification and assessment because "highly-educated individuals have a broader knowledge base to draw from and thus a higher likelihood that they can relate this knowledge to potential entrepreneurial opportunities" (Arenius and De Clercq 2005, p. 252).

Moreover, in an emerging industry with low legitimacy, "the supplier, the sellers, and the buyers in this industry have as yet to be verified" (Macdonald 1985, p. 159). Therefore, existing contacts to customers and suppliers stemming from previous industry experience may be even more important than in mature industries with established channels. Thus,

H5: The positive effects of (a) CMO education, (b) CMO marketing experience, (c) CMO industry experience, and (d) CMO start-up experience on the likelihood of acquiring VC increase as industry legitimacy decreases.

Task-related uncertainty. Chief marketing officer education and experience may likewise be more relevant for investors when uncertainty related to marketing tasks is high because CMOs reduce the "uncertainty that the TMT [top management team] faces in the marketing domain or in critical decision-making areas affected by the marketing domain" (Nath and Mahajan 2008, p. 68). Uncertainty in the marketing-related task environment is determined by the fundamental forces in the market (i.e., customers and competitors; Li and Calantone 1998). Examining venture capitalists' perceptions of new ventures, Zahra and Filatotchev (2004, p. 890), for example, argue that marketing-related task uncertainty is high because "new firms often exist in hypercompetitive environments where the rules of competition are not clear." Likewise, Sapienza and Gupta (1994, p. 1622) argue that new ventures are surrounded by high levels of uncertainty from "greater unresolved demand uncertainties." The respective types of uncertainty are embodied in demand uncertainty, which refers to the volatility of customer preferences (Grewal and Tanushaj 2001; Nath and Mahajan 2011), and competitive intensity, which refers to the degree of competition in the market (Saboo and Grewal 2013; Zhou, Yim, and Tse 2005).

Beckman, Haunschild, and Phillips (2004, p. 263) argue that companies can best cope with high levels of market uncertainty, including both demand and competitive uncertainty, through information sharing with existing and known contacts because this "improves the richness and reliability of information." Therefore, CMO education as well as the different kinds of role experience—all of which provide CMOs with social resources in the form of established contacts—may be more important as indicators of a new venture's legitimacy under high levels of demand uncertainty or competitive intensity.

Moreover, high levels of industry experience "enable the firm to gain insight into competitor policies and practices as well as industry knowledge" (Higgins and Gulati 2006, p. 6), thus indicating the new venture's ability to cope with highly competitive environments. High levels of industry experience likewise lead to higher levels of rationality in decision making and information processing (Papadakis and Barwise 2002). Such enhanced rationality is particularly important in competitive environments because they are often associated with biased information processing regarding competitive moves (Leeflang and Wittink 1996).

Finally, high levels of demand uncertainty and competitive intensity require quick decision making to react to sudden changes in consumer demand and competitor behavior (Augusto and Coelho 2009). Florin, Lubatkin, and Schulze (2003, pp. 374–75) argue that in contexts of high market uncertainty, top management team members with high levels of education and experience "should be more able to effectively plan, troubleshoot, and problem-solve, and they should be better able to continuously adapt to environmental contingencies." Thus,

H6: The positive effects of (a) CMO education, (b) CMO marketing experience, (c) CMO industry experience, and (d) CMO start-up experience on the likelihood of acquiring VC increase as demand instability increases.

H7: The positive effects of (a) CMO education, (b) CMO marketing experience, (c) CMO industry experience, and (d) CMO start-up experience on the likelihood of acquiring VC increase as competitive intensity increases.

METHODOLOGY

Model

To model the relationships between CMO characteristics and funding, we specify a hazard rate model with the continuous duration random variable Y_i. Each new venture is under risk of acquiring VC from the beginning of the observation period until (1) the end of data measurement (i.e., right-censoring) or (2) the exit of the specific new venture from the population through funding. For the equations, refer to Web Appendix A. We can analyze the relationships between CMO characteristics and funding only for new ventures with a CMO. However, variables that determine CMO presence in the new venture may simultaneously explain the likelihood of receiving VC. Similar to Nath and Mahajan (2011), we specify a selection model to account and correct for potential selection bias. In particular, we employ the estimator DURSEL, which relies on full information maximum likelihood to simultaneously estimate the selection process and the hazard rate (Boehmke 2005;

Boehmke, Morey, and Shannon 2009). Web Appendix A provides details of the binary selection model.

Sample

Data scarceness is a challenge for empirical research on new ventures (Srinivasan, Lilien, and Rangaswamy 2008). Therefore, we compiled a unique multisource data set. We obtained a sample from CrunchBase, a database that provides information about new ventures and investor activities. CrunchBase is a free database that anyone can edit. To ensure the validity of content, any edit must be approved by the operator, TechCrunch, which is considered one of the most important blogs on entrepreneurship (Technorati 2013). Although this is the first marketing study to employ CrunchBase, the database is becoming increasingly popular in entrepreneurship and finance research on VC (Alexy et al. 2011; Block and Sandner 2009; Werth and Böert 2013). The earliest available data determined the starting date of data collection, and we set the termination date after a cutoff of approximately one year to achieve a sufficient observation period. Specifically, the data span 330 days, from September 15, 2008, to August 11, 2009.

At the start of data collection, the database contained information on 9,123 firms. We eliminated dissoluted firms, firms that underwent an IPO, acquired firms, and firms with missing data on the top management team or age. Moreover, because our focus is on seed and early-stage new ventures, we eliminated firms older than three years and with more than 250 employees (Kazanjian and Drazin 1989). These eliminations resulted in a sample of 3,289 new ventures.

We then collected biographical data on the 332 CMOs in the sample. We identified CMOs following established procedures in marketing research (Nath and Mahajan 2008, 2011). Specifically, we code the variable CMO presence as 1 if there is a team member with a marketing-related job title (e.g., vice president of marketing, CMO) and 0 otherwise. Although prior research on top management teams has relied on Securities and Exchange Commission filings to obtain biographical data (e.g., Boyd, Chandy, and Cuha 2010), such filings are not available for new ventures. Thus, we hand-collected data from a variety of sources, such as LinkedIn, company websites, and press releases and trade journals accessed through Factiva. We obtained data on 283 CMOs of the 332 new ventures that employed a CMO.

Furthermore, we collected biographical information on chief executive officer (CEO) characteristics that may simultaneously account for CMO presence and funding because CEOs largely shape new ventures (Wasserman 2006). We also collected biographical data on the chief financial officers (CFOs) of these firms because, next to marketing, financial problems are a main obstacle for new venture success (Hills and LaForge 1992). Overall, we obtained data for a sample of 2,945 new ventures with biographical data for CEOs, CFOs, and, if existent, CMOs. Table 1 lists the sample descriptives.

Measurement

Consistent with hazard rate methodology, we use the time until funding as the dependent variable. Of the 283 new ventures in the sample that have a CMO, 42 obtained funding during the observation period. The remaining 241 new ventures did not receive funding until August 11, 2009.

Therefore, these cases are potentially right censored, which we take into account by specifying hazard rates.

To measure CEO, CMO, and CFO eduation, we code binary variables as 1 if the executive received an MBA degree from a prestigious university as defined by Palmer and Barber (2001): Columbia University; Dartmouth College; Harvard University; Massachusetts Institute of Technology; Northwestern University; Stanford University; University of California, Berkeley; University of California, Los Angeles; University of Chicago; University of Michigan; and University of Pennsylvania. We measure CEO, CMO, and CFO industry experience as the number of years the executive has worked in the respective industry. Similarly, start-up (marketing) experience is the number of years in start-up (marketing-related) jobs.

To add industry-level moderators, we matched the industry classification of CrunchBase with the Standard Industrial Classification (SIC) according to the correspondence table provided in the Web Appendix (see Table W1). Competitive intensity is the Herfindahl–Hirschman index of market concentration at the four-digit SIC level with data from Compustat (e.g., Morgan and Rego 2009). Demand instability is the standard deviation across three lagged years of the median sales growth at the four-digit SIC level (e.g., Nath and Mahajan 2011).

To measure industry legitimacy, we rely on academic raters and employ procedures analogous to those used by Saboo and Grewal (2013) for measuring industry complexity. Specifically, we provided five academic raters with the definition and conceptualization of legitimacy and industry descriptions. Then, the raters assessed the industries in line with the following: "Please rate the overall degree of cognitive legitimacy of these industries according to the following scale: 1 = very low cognitive legitimacy, 10 = very high cognitive legitimacy." Table 1 shows the corresponding values (interrater reliability = .85; Shrout and Fleiss 1979).

Our focal variables cover central human capital/team-related drivers of VC acquisition as discussed by prior research (except for personality aspects of the managers), and our moderating variables cover the central market-related characteristics (i.e., industry legitimacy, demand instability, and competitive intensity), except for the ability to protect intellectual capital (see Zacharakis, McMullen, and Shepherd 2007; Zacharakis and Meyer 1998). Although we unfortunately cannot control for personality-related aspects because we use archival data, we include the size of the new venture's patent portfolio as a proxy for intellectual capital protection efforts and the firms' innovation strategy. Moreover, we account for firms' differentiation strategy by measuring the size of the trademark portfolio (Srinivasan, Lilien, and Rangaswamy 2008). We collected these data from the U.S. Patent and Trademark Office's databases.

With regard to market-related characteristics, we also control for two additional variables that seem particularly relevant in our high-technology context. The first is technological turbulence, which is the instability of technology regimes in an industry. Technological turbulence may increase investors' uncertainty about future technological developments, such as product and process innovations. We measure this variable as the ratio of research and development spending to firm sales at the four-digit SIC level (e.g., Saboo and Grewal 2013). Moreover, we employ data pro-

Table 1
SAMPLE COMPOSITION AND VALUES FOR INDUSTRY LEGITIMACY

SIC	Industry Description	Frequency	Percentage	Industry Legitimacy
2836	Biological Products, Except Diagnostic	13	.44	4.8
3570	Computer and Office Equipment	27	.92	8.4
3674	Semiconductors and Related Devices	3	.10	7.8
5961	Catalog and Mail-Order Houses	184	6.25	6.8
7311	Advertising	231	7.84	9.0
7371	Custom Computer Programming Services	138	4.69	7.1
7372	Prepackaged Software	607	20.61	7.8
7374	Data Processing and Preparation	146	4.96	5.2
7375	Information Retrieval Services	101	3.43	6.4
7379	Computer Related Services	1,210	41.09	5.3
8111	Legal Services	4	.14	8.8
8700, 8741, 8742	Business and Management Services	281	9.54	8.6
	Total	2,945	100	

vided by Saboo and Grewal (2013) to control for industry complexity, which is the extent and severity of the demands that institutional constituents exert on firms in a certain industry.[2] Table W2 in the Web Appendix provides a detailed overview of these measures.

In addition to team- and market-related characteristics, previous research has identified product characteristics and financial characteristics as important drivers of VC funding (Zacharakis, McMullen, and Shepherd 2007; Zacharakis and Meyer 1998). However, because our focus is on new ventures in the very early phases of the organizational life cycle, most of these companies do not yet have extensive data on products and financial characteristics. Nonetheless, we include the binary variable product introduction (measured as 1 if the new venture has already introduced a product and 0 otherwise); product introductions may endow new ventures with legitimacy because they indicate successful entry into the marketplace (Rao, Chandy, and Prabhu 2008).

In addition, we control for a variety of factors that have not been the focus of studies systemizing VC drivers but that may be related to funding. First, we control for previous new venture success of the CMO and the CEO, which is 1 if the executive has worked in a firm that initially offered public share at a stock exchange. Controlling for this variable enables us to infer that CMO characteristics endow new ventures with legitimacy beyond CMO quality signals such as CMO new venture success.[3] Second, we include locational legitimacy because investors tend to invest in areas that are known for successful new ventures, such as Silicon Valley (Rao, Chandy, and Prabhu 2008). We measure VC cluster as 1 if the zip code of the new venture is located in Silicon Valley, San Francisco, New York, or Boston (Sorenson and Stuart 2001). Third, previous studies have found a negative effect of company age on funding; thus, we control for new venture age, measured as the number of years since founding (Baum and Silverman 2004). Fourth, we control for the internationalization of the new ventures because internationalization enhances new venture growth and performance and thus may endow new ventures with legitimacy (Zahra, Ireland, and Hitt 2000). We code the variable

born global as 1 if the new venture also operates outside its home country market. Fifth, we obtained data on alliances from the SDC Platinum database to account for external legitimacy arising from interfirm relationships (DeKinder and Kohli 2008; Rao, Chandy, and Prabhu 2008; Xiong and Bharadwaj 2011). However, the database reported alliances for only 17 firms in our sample. We believe that this is due to the young age and small size of the firms, which contrasts with prior start-up research in marketing that has focused on stock market–listed start-ups.

RESULTS

Main Results

We first examine whether having a CMO in the new venture matters at all. Therefore, we specify a continuous hazard rate model with funding as the dependent variable as described in Web Appendix B. The sample of this model is identical to the first-stage probit model, and it includes the same array of control variables (see Table W3). Furthermore, we include CMO presence as an independent variable. The results in Table W4 show that CMO presence is positively and significantly related to funding ($\beta_1 = 1.45$, $p < .05$), which indicates that including a CMO in the top management team of a new venture increases the likelihood of venture capital acquisition by 46%. Furthermore, including CMO presence in the model significantly improves model fit ($\chi^2(1) = 4.21, p < .05$), indicating that considering the CMO adds explanatory power beyond previously established drivers of VC acquisition. We tested this model against alternative baseline distributions (i.e., exponential, lognormal, loglogistic, and Weibull) and found similar results. Estimating a Cox proportional hazard model also yields similar results.

With regard to our focal hypotheses, Table W3 in the Web Appendix depicts the results of the selection model and compares the them with the findings of Nath and Mahajan (2008). Table W5 provides descriptive statistics and correlations of the variables employed as determinants of CMO presence in the selection model. Table 2 shows the descriptive statistics and the correlations for the hazard rate model. Consistent with our research focus on new ventures, the average age is 1.74 years.

Model 3 in Table 3 provides the results of the hazard rate model. In support of H_1, CMO education increases the likelihood of funding ($\beta_1 = 1.22, p < .05$). Consistent with H_2

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[2]For the SIC code 8111 (Legal), which is not included in Saboo and Grewal's (2013) sample, we replicated their procedure with five academic raters and obtained a score of 8 for industry complexity.

[3]We thank two anonymous *JMR* reviewers for this valuable suggestion.

Table 2

CORRELATIONS AND DESCRIPTIVE STATISTICS

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. CMO education	.13	.33																							
2. CMO marketing experience	5.53	5.62	.01																						
3. CMO industry experience	2.15	3.09	.02	.37																					
4. CMO start-up experience	2.50	3.35	.02	.30	.31																				
5. CMO new venture success	.02	.16	.08	.08	.04	-.07																			
6. Industry legitimacy	6.63	1.41	-.04	.01	-.01	-.12	-.01																		
7. Demand instability	.00	.05	.09	-.08	-.03	-.12	.01	.20																	
8. Competitive intensity	.73	.18	-.09	.01	-.14	-.05	-.02	.09	-.38																
9. Patent portfolio size	.70	2.23	.04	.19	.09	-.01	.25	.03	-.07	-.01															
10. Trademark portfolio size	.57	1.28	.00	.27	.23	.01	.07	-.01	-.03	.00	.42														
11. Firm age	1.85	.69	.23	.20	.19	.13	.15	-.00	-.02	.03	.21	.21													
12. Product introduction	.20	.40	-.01	-.09	-.05	-.09	.03	.16	-.06	.15	.06	-.05	-.07												
13. Born global	.04	.20	-.03	-.01	.01	.01	-.03	-.03	.01	-.12	.05	-.01	-.06	.11											
14. VC cluster	.20	.40	.17	.06	-.03	.07	.09	-.02	.07	-.06	.05	.04	.12	-.02	-.06										
15. CEO education	.18	.38	.18	.16	.04	-.03	.22	-.14	-.07	-.01	.18	.08	.14	-.01	-.05	.11									
16. CEO marketing experience	3.22	5.32	-.01	.30	.18	.02	-.00	-.04	.03	.04	.11	.14	-.02	-.13	-.07	.04	.12								
17. CEO industry experience	2.06	3.21	-.03	.18	.34	.05	-.03	.15	.03	.04	.06	.22	.09	.02	-.07	.08	.02	.23							
18. CEO start-up experience	3.65	5.37	.09	.11	.12	.20	.01	-.10	.05	-.10	.06	.10	.09	-.04	-.03	.14	.07	.14	.31						
19. CEO new venture success	.04	.18	-.02	.12	.07	.00	-.03	-.02	.03	-.08	.02	.07	-.00	-.10	-.04	.05	.06	.24	.07	.07					
20. CFO education	.03	.17	.06	.15	.08	-.10	-.03	.05	.05	.01	.12	.16	.12	-.03	-.04	-.09	.14	.12	.09	-.04	-.03				
21. CFO industry	.28	1.37	.13	.17	.15	-.14	.06	.13	.13	-.11	.02	.15	.06	-.01	.00	-.04	.18	.11	.13	-.05	-.04	.55			
22. CFO start-up experience	.09	.69	.00	.16	-.04	-.09	-.02	.04	.02	-.06	-.04	-.05	-.04	-.03	.13	-.04	-.02	.14	-.07	-.03	-.03	.33	.44		
23. Technological turbulence	.06	.05	-.06	.10	-.02	.04	-.02	.07	-.65	.39	.08	.07	.03	.09	-.09	.05	.08	-.04	.09	-.05	.01	.04	-.06	.04	
24. Industry complexity	2.99	1.01	.06	-.03	-.05	.00	-.03	-.72	.22	-.01	-.00	.02	-.01	-.08	-.03	.01	.10	.06	-.10	.07	.02	.06	-.09	-.00	-.15

Table 3
RELATIONSHIP BETWEEN CMO CHARACTERISTICS, CONTINGENCY FACTORS, AND VC FUNDING

Dependent Variable: VC Funding	Model 1 Controls Only		Model 2 Main Effects		Model 3 Final Model	
Moderating Relationships of Industry Legitimacy						
CMO education × industry legitimacy					.70*	(.38)
CMO marketing experience × industry legitimacy					−.01	(.03)
CMO industry experience × industry legitimacy					.10*	(.05)
CMO start-up experience × industry legitimacy					−.01	(.05)
Moderating Relationships of Demand Instability						
CMO education × demand instability					−3.51	(1.86)
CMO marketing experience × demand instability					−1.05	(.81)
CMO industry experience × demand instability					3.36*	(2.02)
CMO start-up experience × demand instability					2.33	(1.86)
Moderating Relationships of Competitive Intensity						
CMO education × competitive intensity					−2.26	(1.69)
CMO marketing experience × competitive intensity					−.21	(.22)
CMO industry experience × competitive intensity					.55*	(.29)
CMO start-up experience × competitive intensity					.50*	(.28)
Main Relationships						
CMO education			1.24**	(.42)	1.22*	(.57)
CMO marketing experience			.09**	(.02)	.05*	(.03)
CMO industry experience			.07*	(.04)	.14*	(.07)
CMO start-up experience			−.03	(.06)	−.00	(.07)
Control Variables						
CMO new venture success	.45	(.67)	.13	(.99)	.52	(.96)
Industry legitimacy	−.05	(.38)	−.14	(.42)	−.37	(.42)
Demand instability	8.57	(11.05)	9.96	(11.92)	4.02	(12.71)
Competitive intensity	−1.90	(1.35)	−1.76	(1.39)	−2.23	(2.10)
Technological turbulence	10.11	(6.55)	11.67*	(6.98)	11.40*	(5.90)
Industry complexity	−.15	(.40)	−.24	(.44)	−.18	(.33)
Patent portfolio size	.13**	(.05)	.18**	(.07)	.19**	(.07)
Trademark portfolio size	−.22*	(.13)	−.35*	(.16)	−.36*	(.20)
Firm age	.39	(.31)	−.02	(.33)	−.16	(.43)
Product introduction	.13	(.48)	.22	(.49)	−.12	(.51)
Born global	.81	(.70)	.72	(.66)	.97	(.63)
VC cluster	.06	(.51)	.27	(.51)	.43	(.50)
CEO education	.07	(.43)	−.10	(.45)	−.29	(.55)
CEO marketing experience	.05**	(.02)	.03	(.03)	.04	(.03)
CEO industry experience	−.02	(.04)	−.06	(.06)	−.05	(.08)
CEO start-up experience	.06*	(.03)	.05*	(.02)	.06**	(.03)
CEO new venture success	.56	(.61)	.38	(.77)	.12	(.71)
CFO education	1.83**	(.74)	1.73**	(.73)	1.42	(1.18)
CFO industry experience	−.07	(.09)	−.11	(.10)	−.24*	(.15)
CFO start-up experience	−.09	(.22)	−.02	(.15)	.03	(.19)
p (duration dependence)	1.27**	(.12)	1.34**	(.13)	1.40**	(.17)
Rho (error correlation)	.07	(.01)	.07	(.09)	.12**	(.04)
Observations	283		283		283	
Log-likelihood	−1,235.69		−1,225.16		−1,216.69	
Wald χ^2	72.28**		73.35**		76.62**	

*$p < .05$.
**$p < .01$.
Notes: One-tailed tests of significance. Standard errors are in parentheses. We estimated models with STATA 12 using DURSEL 2.0. Positive coefficients indicate higher hazards and, thus, shorter durations.

and H_3, CMO marketing experience ($\beta_2 = .05, p < .05$) and CMO industry experience ($\beta_3 = .14, p < .05$) increase the likelihood of funding. However, we find no support for H_4; CMO start-up experience is not significantly related to funding ($\beta_4 = −.00, p > .05$).

Regarding the potential moderating effect of industry legitimacy, the results do not support H_{5a} and H_{5c}; in contrast with our predictions, the positive relationships between CMO education ($\beta_5 = .70, p < .05$) and CMO industry experience ($\beta_7 = .10, p < .05$) and funding increase as industry legitimacy increases. Thus, firms benefit more from a CMO with a degree from a prestigious university and from a CMO with greater industry experience when operating in

industries that are already well established. We discuss these results subsequently. For H_{5b} and H_{5d}, the coefficients are in the expected direction but not significant. Thus, we find no support for the hypotheses that the relationships between CMO marketing ($\beta_6 = −.01, p > .05$) and start-up experience ($\beta_8 = −.01, p > .05$) and funding become stronger when industry legitimacy decreases.

Regarding the moderating effect of demand uncertainty, the positive relationship between CMO industry experience and funding increases as demand uncertainty increases ($\beta_{11} = 3.36, p < .05$), in support of H_{6c}. However, the results do not support H_{6a} ($\beta_9 = −3.51, p > .05$), H_{6b} ($\beta_{10} = −1.05, p > .05$), or H_{6d} ($\beta_{12} = 2.33, p > .05$). We find evidence that the

importance of CMO industry experience increases as demand instability increases, but we find no such moderating effect for CMO education, marketing experience, or start-up experience.

Regarding the moderating effect of competitive intensity, the interactions of CMO industry experience and CMO start-up experience with competitive intensity are positive and significant, lending support to H_{7c} (β_{15} = .55, p < .05) and H_{7d} (β_{16} = .50, p < .05). However, the results do not support H_{7a} (β_{13} = −2.26, p > .05) or H_{7b} (β_{14} = −.21, p > .05). Thus, competitive intensity does not moderate the relationships between CMO education and CMO marketing experience and funding.

Regarding the control variables, technological turbulence is positively related to funding (β_{21} = 11.40, p < .05), which indicates that new ventures in technology-driven industries are more likely to receive VC. Consistent with prior research, the size of the patent portfolio is positively related to funding (β_{23} = .19, p < .01) (Baum and Silverman 2004), whereas the size of the trademark portfolio is negatively related to funding (β_{24} = −.36, p < .05). In addition, unlike CMO start-up experience, CEO start-up experience is positively and significantly related to funding (β_{32} = .06, p < .01), while CFO industry experience is negatively related to funding (β_{32} = −.24, p < .05). Finally, we find that both nested models provide significant improvements in model fit compared with a controls-only baseline model (Model 2: $\chi^2(4)$ = 21.06; Model 3: $\chi^2(16)$ = 38.00), which provides further evidence that including the CMO significantly adds explanatory power to the previously established drivers of VC acquistion.

Additional Analyses

Do CMO characteristics increase the amount of funding? Table 4 shows Tobit models with the amount of funding as the dependent variable (for details on the model specification, see Web Appendix C). We could obtain data on the amount of funding for 40 of the 42 funding rounds within our sample. The amount of funding ranges from $10,000 to $20,000,000, with a mean of $4,684,000 and a standard deviation of $4,415,902. We divided the variable by 1,000,000 for rescaling and then took the natural log because its distribution is skewed. Consistent with results of Model 3 in Table 3, CMO education (b_1 = .99, p < .05), marketing experience (b_2 = .07, p < .01), and industry experience (b_3 = .17, p < .01) are positively related to the amount of money received. Again, CMO start-up experience is not significantly related to the amount of money received (b_4 = −.09, p > .05).

Moreover, in line with the main model, the interaction terms of CMO education with industry legitimacy (b_5 = .77, p < .01) and CMO industry experience with industry legitimacy (b_7 = .14, p < .01) are positively related to the amount of money received. Similar to the main model, the coefficients of the the interaction terms of CMO marketing (b_6 = −.01, p > .05) and start-up experience (b_8 = −.05, p > .05) with industry legitimacy are not significantly related to the amount of money received.

The interaction term of CMO industry experience and demand instability is positive but only marginally significant (b_{11} = 2.62, p < .08). Similar to the main model, the interaction terms of CMO education (b_9 = .36, p > .05),

CMO marketing experience (b_{10} = −.95, p > .05), and CMO industry experience (b_{12} = .47, p > .05) with demand instability are not significantly related to the amount of money received.

In contrast with the main model, the interaction terms of CMO industry experience (b_{15} = .45, p > .05) and start-up experience (b_{16} = .17, p > .05) with competitive intensity are not significantly related to the amount of money received. Furthermore, the interaction terms of CMO education (b_{13} = −1.95, p > .05) and marketing experience (b_{14} = −.16, p > .05) with competitive intensity are not significantly related to the amount of money received.

Thus, the results indicate that CMO education, CMO marketing experience, and CMO industry experience increase the amount of funding the new venture receives. Moreover, the moderating role of industry legitimacy is similar to that in the hazard rate model, but the contingencies demand instability and competive intensity do not significantly moderate the main relationships. However, the results must be interpreted with caution because we do not have information on the amount of equity investors receive, a potentially important control variable.

Alternative measurement of CMO education. Regarding the education measure, we examined whether the focus on an MBA degree might be too narrow. Thus, we coded the education variable as 1 if the executive holds any degree from a prestigious university (Palmer and Barber 2001). We reestimated the models and found the results to be robust for seven of the eight supported hypotheses (see Model 1 in Table 5).

CMO tenure. Research has argued that CMO tenure is important because many CMOs have a short tenure at established firms (McGirt 2007). However, we do not regard this issue as critical because start-up firms are very young, and thus, potential CMO tenure is limited. Nevertheless, we included CMO tenure as an additional variable in the hazard rate model and obtained robust results from the reestimated model for seven of the eight supported hypotheses (see Model 2 in Table 5). However, we were able to obtain data on CMO tenure for only 226 firms (80% of the data set). Because we do not regard CMO tenure as relevant for start-ups as for established firms, we opted to exclude this variable from the models.

Alternative specifications of the baseline hazard. To test the sensitivity of the estimated parameters to the specification of the baseline hazard, we reestimated the model with alternative parametric specifications implemented in DURSEL, namely, exponential and log-normal distributions. Across the models, the overall pattern of results of the Weibull model remains stable for most of the supported hypotheses (see Models 3 and 4 in Table 5).

Sampling time frame. To determine whether the date of left censoring (i.e., the starting date of data collection) might influence the parameter estimates, we created two subsets of the sample, excluding the first and fifth percentiles of the earliest funding rounds. We then reestimated the models for each subsample. The results remain consistent for all hypotheses (see Models 1 and 2 in Table 6). Furthermore, to examine whether the choice of the date of right censoring (i.e., end of data collection) influences the parameter estimates, we created two subsets of the sample such that right censoring occurs after 95% and 99% of the sampling time

Table 4

RELATIONSHIP BETWEEN CMO CHARACTERISTICS, CONTINGENCY FACTORS, AND AMOUNT OF VC FUNDING

Dependent Variable: VC Funding	Model 1 Controls Only		Model 2 Main Effects		Model 3 Final Model	
Moderating Relationships of Industry Legitimacy						
CMO education × industry legitimacy					.72*	(.37)
CMO marketing experience × industry legitimacy					−.00	(.02)
CMO industry experience × industry legitimacy					.14**	(.05)
CMO start-up experience × industry legitimacy					−.05	(.05)
Moderating Relationships of Demand Instability						
CMO education × demand instability					−4.49	(9.42)
CMO marketing experience × demand instability					−.70	(.77)
CMO industry experience × demand instability					1.89	(1.89)
CMO start-up experience × demand instability					.00	(2.62)
Moderating Relationships of Competitive Intensity						
CMO education × competitive intensity					−2.34	(1.82)
CMO marketing experience × competitive intensity					−.13	(.22)
CMO industry experience × competitive intensity					.32	(.31)
CMO start-up experience × competitive intensity					.10	(.41)
Main Relationships						
CMO education			1.31**	(.44)	.98*	(.51)
CMO marketing experience			.11**	(.03)	.08**	(.03)
CMO industry experience			.13*	(.07)	.17**	(.07)
CMO start-up experience			−.09	(.07)	−.10	(.09)
Control Variables						
CMO new venture success	.44	(1.00)	.18	(1.00)	−.01	(.93)
Industry legitimacy	−.05	(.32)	−.12	(.30)	−.54	(.38)
Demand instability	8.85	(9.37)	9.23	(8.79)	8.75	(10.85)
Competitive intensity	−2.42*	(1.29)	−1.95*	(1.13)	−1.60	(1.60)
Technological turbulence	11.49*	(6.30)	11.03*	(6.41)	11.33*	(6.17)
Industry complexity	−.26	(.33)	−.28	(.31)	−.37	(.31)
Patent portfolio size	.19**	(.07)	.21**	(.07)	.20**	(.07)
Trademark portfolio size	−.27	(.16)	−.41*	(.19)	−.32*	(.18)
Firm age	.69*	(.33)	.28	(.29)	.24	(.30)
Product introduction	.24	(.52)	.28	(.47)	.24	(.45)
Born global	1.18*	(.70)	.92	(.67)	1.12*	(.64)
VC cluster	.39	(.53)	.41	(.49)	.67	(.48)
CEO education	.12	(.54)	−.22	(.53)	−.10	(.54)
CEO marketing experience	.10**	(.04)	.07*	(.04)	.08*	(.03)
CEO industry experience	−.02	(.07)	−.06	(.07)	−.07	(.07)
CEO start-up experience	.07*	(.03)	.07*	(.03)	.07**	(.03)
CEO new venture success	.84	(.94)	.64	(.84)	−.01	(.88)
CFO education	2.41*	(1.08)	2.36**	(.88)	1.58	(.97)
CFO industry experience	−.06	(.16)	−.14	(.14)	−.27*	(.12)
CFO start-up experience	−.08	(.34)	−.20	(.21)	−.06	(.19)
Observations (uncensored)	281 (40)		281 (40)		281 (40)	
F (d.f.)	2.83** (20, 261)		4.27** (25, 256)		4.05** (37, 244)	
LL	−144.43		−139.82		−127.20	
Pseudo-R^2	.13		.20		.24	
Incremental χ^2 (d.f.)			21.06** (4)		38.00** (16)	

*$p < .05$.
**$p < .01$.
Notes: One-tailed tests of significance. Standard errors are in parentheses.

frame. We reestimated the models with these alternative right-censoring dates and found that the results remain robust for seven of the eight hypotheses (see Models 3 and 4 in Table 6).

Validation of CrunchBase data. Because CrunchBase is a relatively new database, we assessed its reliability. To do so, we gathered data on the time of funding from press releases for the 42 funding rounds in our sample. The dates of the funding rounds reported in these press releases were the same as in CrunchBase (±1 day) for 35 of the funding rounds. For the 6 funding rounds with differing data, we determined the exact date from the reliability and consistency of the sources. We reestimated the models with the

alternative dates and found the models to be robust. We could not find a press release for one funding round. However, because of the high reliability of CrunchBase, we decided to include this funding round in the sample. We also estimated the models without this observation and found the results to be robust. These results are in line with a recent cross-check of CrunchBase with ThomsonOne Private Equity that indicated no missing or incorrect entries in CrunchBase (Werth and Böert 2013).

Collinearity. To test for collinearity between the CMO characteristics, we estimated four models introducing one CMO characteristic at a time and found the results to be robust (see Models 1, 2, 3, and 4 in Table 7). Moreover, we

Table 5

ROBUSTNESS CHECKS 1

Dependent Variable: VC Funding	Model 1 Alternative Education		Model 2 CMO Tenure		Model 3 Exponential Baseline Hazard		Model 4 Log-Normal Baseline Hazard	
Moderating Relationships of Industry Legitimacy								
CMO education × industry legitimacy	.79*	(.41)	1.04**	(.45)	.58*	(.30)	−.47*	(.23)
CMO marketing experience × industry legitimacy	−.01	(.03)	.01	(.03)	−.01	(.02)	.01	(.02)
CMO industry experience × industry legitimacy	.10*	(.05)	.13**	(.05)	.09*	(.04)	−.09**	(.03)
CMO start-up experience × industry legitimacy	−.02	(.05)	.01	(.06)	−.01	(.04)	.02	(.03)
Moderating Relationships of Demand Instability								
CMO education × demand instability	−9.80	(9.62)	3.04	(15.06)	1.26	(7.71)	−.72	(5.14)
CMO marketing experience × demand instability	−.90	(.74)	−1.45	(.96)	−1.10	(.68)	1.02*	(.56)
CMO industry experience × demand instability	2.65	(1.66)	3.85	(2.77)	3.12*	(1.64)	−1.85	(1.25)
CMO start-up experience × demand instability	1.74	(1.62)	3.96*	(2.31)	2.12	(1.58)	−1.39	(1.21)
Moderating Relationships of Competitive Intensity								
CMO education × competitive intensity	−2.78*	(1.63)	−1.66	(2.53)	−1.29	(1.36)	1.43	(1.21)
CMO marketing experience × competitive intensity	−.23	(.23)	−.38	(.25)	−.19	(.19)	.08	(.17)
CMO industry experience × competitive intensity	.42*	(.21)	.73*	(.40)	.50*	(.24)	−.31*	(.16)
CMO start-up experience × competitive intensity	.42*	(.25)	.75*	(.37)	.43*	(.23)	−.21	(.20)
Main Relationships								
CMO education	1.04*	(.61)	1.40*	(.69)	1.02*	(.49)	−.85*	(.37)
CMO marketing experience	.06**	(.02)	.05*	(.03)	.04*	(.02)	−.04*	(.02)
CMO industry experience	.12*	(.06)	.16*	(.09)	.12*	(.06)	−.09*	(.05)
CMO start-up experience	−.02	(.06)	.03	(.09)	−.00	(.05)	.02	(.04)
Control Variables								
CMO tenure			.00	(.00)				
CMO new venture success	.63	(.92)	.26	(.99)	.34	(.78)	.01	(.66)
Industry legitimacy	−.40	(.44)	−.96	(.65)	−.22	(.32)	.13	(.21)
Demand instability	8.94	(11.29)	2.12	(22.84)	1.79	(6.15)	−4.64	(4.13)
Competitive intensity	−1.35	(1.97)	−1.17	(3.80)	−2.10	(1.55)	1.36	(1.11)
Technological turbulence	12.36*	(6.22)	8.14	(7.10)	9.52*	(4.41)	−7.86*	(3.74)
Industry complexity	−.18	(.34)	−.42	(.59)	−.08	(.20)	.16	(.19)
Patent portfolio size	.20**	(.07)	.24**	(.09)	.15*	(.07)	−.10*	(.05)
Trademark portfolio size	−.38*	(.19)	−.43*	(.25)	−.29	(.18)	.21*	(.11)
Firm age	−.14	(.43)	−.08	(.46)	−.09	(.36)	−.00	(.21)
Product introduction	−.09	(.49)	−.18	(.79)	−.11	(.45)	−.06	(.33)
Born global	1.01	(.65)	.46	(.69)	.80	(.56)	−.69	(.51)
VC cluster	.46	(.51)	.54	(.56)	.39	(.39)	−.34	(.29)
CEO education	−.43	(.54)	−.31	(.60)	−.23	(.46)	.05	(.37)
CEO marketing experience	.05*	(.02)	.04	(.03)	.03	(.03)	−.03*	(.02)
CEO industry experience	−.05	(.08)	.00	(.09)	−.04	(.07)	.05	(.05)
CEO start-up experience	.07**	(.03)	.06**	(.03)	.05*	(.02)	−.05**	(.02)
CEO new venture success	−.18	(.74)	.36	(.77)	.20	(.55)	−.05	(.52)
CFO education	1.54	(1.11)	−.04	(2.11)	.95	(1.07)	−.83	(.65)
CFO industry experience	−.22	(.14)	−.07	(.22)	−.18	(.12)	.20*	(.09)
CFO start-up experience	−.01	(.17)	.07	(.23)	−.01	(.18)	.01	(.14)

*p < .05.
**p < .01.
Notes: One-tailed tests of significance. Standard errors are in parentheses. We estimated models with STATA 12 using DURSEL 2.0.

reestimated the model without the control variables and found seven of the eight hypothesized results to be robust (see Model 1 in Table 8).

DISCUSSION

This study is an attempt to shed light on the role of marketing for new venture funding. Drawing on human and social resource literature streams, we argue that CMOs enhance new ventures' marketing legitimacy and thus increase their chances of obtaining funding. Before summarizing key results and drawing conclusions, we must acknowledge that our secondary data set provides correlational insights; therefore, care must be taken in drawing strong causal inferences.

Our results suggest that CMO education, CMO marketing experience, and CMO industry experience are positively

related to the likelihood of funding, but there is no such direct relationship for CMO start-up experience. Furthermore, these relationships partially depend on the fit with the task environment such that the positive impact of industry experience increases when demand instability and competitive intensity increase and the impact of start-up experience increases when competitive intensity increases. Moreover, the impact of education and industry experience increases when industry legitimacy increases, which contrasts with our hypotheses.

These findings provide a first step toward a better understanding of how marketing-related aspects—and particularly CMO-related aspects—affect VC funding. Although most of the examined CMO characteristics positively influence funding even when controlling for established VC decision criteria (Zacharakis and Meyer 1998), the follow-

Table 6

ROBUSTNESS CHECKS 2

Dependent Variable: VC Funding	Model 1 Excluding First Percentiles of the Earliest Funding Rounds		Model 2 Excluding Fifth Percentile of the Earliest Funding Rounds		Model 3 Right-Censoring After 99% of the Sampling Time Frame		Model 4 Right-Censoring After 95% of the Sampling Time Frame	
Moderating Relationships of Industry Legitimacy								
CMO education × industry legitimacy	.70*	(.38)	.70*	(.38)	.66*	(.38)	.68*	(.38)
CMO marketing experience × industry legitimacy	−.01	(.03)	−.01	(.03)	−.01	(.03)	−.01	(.03)
CMO industry experience × industry legitimacy	.10*	(.05)	.10*	(.05)	.10*	(.04)	.10*	(.05)
CMO start-up experience × industry legitimacy	−.01	(.05)	−.01	(.05)	−.01	(.05)	−.01	(.05)
Moderating Relationships of Demand Instability								
CMO education × demand instability	−3.51	(1.86)	−3.50	(1.86)	−3.50	(1.26)	−3.26	(1.79)
CMO marketing experience × demand instability	−1.05	(.81)	−1.05	(.81)	−1.00	(.78)	−1.04	(.80)
CMO industry experience × demand instability	3.36*	(2.02)	3.36*	(2.02)	2.97	(1.91)	3.26	(2.00)
CMO start-up experience × demand instability	2.33	(1.86)	2.33	(1.86)	2.27	(1.76)	2.35	(1.84)
Moderating Relationships of Competitive Intensity								
CMO education × competitive intensity	−2.26	(1.69)	−2.26	(1.69)	−2.06	(1.66)	−2.18	(1.68)
CMO marketing experience × competitive intensity	−.21	(.22)	−.21	(.22)	−.17	(.22)	−.20	(.22)
CMO industry experience × competitive intensity	.55*	(.29)	.55*	(.29)	.48*	(.26)	.54*	(.28)
CMO start-up experience × competitive intensity	.50*	(.28)	.50*	(.28)	.47*	(.26)	.50*	(.27)
Main Relationships								
CMO education	1.22*	(.57)	1.22*	(.57)	1.17*	(.57)	1.21*	(.57)
CMO marketing experience	.05*	(.03)	.05*	(.03)	.05*	(.03)	.05*	(.03)
CMO industry experience	.14*	(.07)	.14*	(.07)	.12*	(.07)	.14*	(.07)
CMO start-up experience	−.00	(.07)	−.00	(.07)	−.00	(.06)	.00	(.06)
Control Variables								
CMO new venture success	.52	(.96)	.52	(.96)	.46	(.93)	.50	(.96)
Industry legitimacy	−.37	(.42)	−.37	(.42)	−.33	(.41)	−.36	(.42)
Demand instability	4.01	(12.71)	4.01	(12.72)	3.89	(12.24)	3.80	(12.64)
Competitive intensity	−2.23	(2.10)	−2.23	(2.10)	−2.21	(1.98)	−2.25	(2.07)
Technological turbulence	11.40*	(5.90)	11.40*	(5.90)	10.89*	(5.87)	11.21*	(5.88)
Industry complexity	−.18	(.33)	−.18	(.33)	−.17	(.34)	−.18	(.33)
Patent portfolio size	.19**	(.07)	.19**	(.07)	.18**	(.07)	.19**	(.07)
Trademark portfolio size	−.36*	(.20)	−.36*	(.20)	−.33*	(.19)	−.35*	(.19)
Firm age	−.16	(.43)	−.16	(.43)	−.12	(.42)	−.15	(.43)
Product introduction	−.12	(.51)	−.12	(.51)	−.10	(.51)	−.11	(.51)
Born global	.97	(.63)	.97	(.63)	.90	(.64)	.94	(.63)
VC cluster	.43	(.50)	.43	(.50)	.38	(.50)	.41	(.50)
CEO new venture success	−.29	(.55)	−.29	(.55)	−.27	(.55)	−.28	(.55)
CEO education	.04	(.03)	.04	(.03)	.04*	(.03)	.04*	(.03)
CEO marketing experience	−.05	(.08)	−.05	(.08)	−.05	(.08)	−.05	(.08)
CEO industry experience	.06**	(.03)	.06**	(.03)	.06**	(.03)	.06**	(.03)
CEO start-up experience	.12	(.71)	.12	(.71)	.04	(.66)	.11	(.69)
CFO education	1.42	(1.18)	1.42	(1.18)	1.23	(1.16)	1.37	(1.16)
CFO industry experience	−.24*	(.15)	−.24*	(.15)	−.24	(.15)	−.24	(.15)
CFO start-up experience	.03	(.19)	.03	(.19)	.02	(.19)	.03	(.19)

*$p < .05$.
**$p < .01$.

Notes: One-tailed tests of significance. Standard errors are in parentheses. We estimated models with STATA 12 using DURSEL 2.0. Positive coefficients indicate higher hazards and, thus, shorter durations.

ing implications are not meant as exhaustive coverage of the role of marketing for VC acquisition. Instead, we encourage readers to view them as a first step to spark interest in this highly relevant topic.

Implications for Theory and Directions for Further Research

This study contributes to three research streams. First, we add to the "insights into marketing strategy and financial performance of start-up firms, which have rarely been studied in the extant marketing-finance literature" (Xiong and Bharadwaj 2011, p. 101). Whereas prior research in this context has focused on investor reactions to stock market–listed start-ups or IPOs (e.g., Luo 2008; Rao, Chandy, and

Prabhu 2008; Xiong and Bharadwaj 2011), we examine venture capitalists' reactions. Drawing on legitimacy theory, we suggest that CMOs may serve as an important information cue for venture capitalists. The focus on venture capitalists also enriches marketing research on legitimacy because "the role of legitimizing strategies in other marketing contexts [than product introductions] is a topic that merits additional research" (Rao, Chandy, and Prabhu 2008, p. 72). Introducing VC funding as a dependent variable to the marketing–finance literature stream enables examination of effects of further marketing-related variables, such as the acquisition of lead customers in the context of young ventures, for which no stock market data are available (Coviello and Joseph 2012; Srinivasan and Hanssens 2009).

Table 7
ROBUSTNESS CHECKS 3

	Stepwise Introduction of Independent Variables						
	Model 1		Model 2		Model 3		Model 4	
Main Relationships								
CMO education	1.26**	(.45)						
CMO marketing experience			.08**	(.02)				
CMO industry experience					.08**	(.03)		
CMO start-up experience							.02	(.05)
Control Variables								
CMO new venture success	.67	(.77)	.35	(.71)	.33	(.71)	.49	(.69)
Industry legitimacy	−.10	(.39)	−.07	(.37)	−.04	(.38)	−.04	(.38)
Demand instability	9.37	(11.67)	9.70	(1.79)	8.44	(11.04)	8.39	(11.00)
Competitive intensity	−1.92	(1.30)	−1.92	(1.31)	−1.58	(1.42)	−1.86	(1.32)
Technological turbulence	11.64*	(6.79)	9.88	(6.38)	10.23	(6.53)	9.85	(6.57)
Industry complexity	−.26	(.42)	−.15	(.40)	−.15	(.40)	−.13	(.41)
Patent portfolio size	.15**	(.06)	.15**	(.06)	.13*	(.06)	.13**	(.05)
Trademark portfolio size	−.20	(.14)	−.32*	(.14)	−.24*	(.13)	−.22*	(.13)
Firm age	.18	(.33)	.23	(.31)	.35	(.31)	.38	(.31)
Product introduction	.07	(.50)	.21	(.47)	.17	(.47)	.15	(.47)
Born global	.84	(.71)	.84	(.63)	.64	(.74)	.79	(.71)
VC cluster	−.12	(.47)	.19	(.51)	.25	(.48)	.04	(.52)
CEO education	−.03	(.43)	−.04	(.44)	.04	(.44)	.09	(.43)
CEO marketing experience	.05*	(.02)	.03	(.03)	.05**	(.02)	.05*	(.02)
CEO industry experience	−.01	(.04)	−.02	(.04)	−.08	(.06)	−.02	(.04)
CEO start-up experience	.06**	(.02)	.05*	(.03)	.06**	(.03)	.06*	(.03)
CEO new venture success	.77	(.64)	.52	(.64)	.33	(.72)	.59	(.61)
CFO education	1.95**	(.68)	1.80**	(.62)	1.95**	(.78)	1.84**	(.73)
CFO industry experience	−.14	(.10)	−.06	(.09)	−.09	(.10)	−.07	(.09)
CFO start-up experience	−.00	(.23)	−.07	(.15)	−.09	(.22)	−.08	(.22)

*$p < .05$.
**$p < .01$.
Notes: One-tailed tests of significance. Standard errors are in parentheses. We estimated models with STATA 12 using DURSEL 2.0. Positive coefficients indicate higher hazards and, thus, shorter durations.

Second, this study adds to a still sparse but growing research stream at the marketing–entrepreneurship interface by investigating the role of the CMO. Although management research has shown that the members of the top management team play a crucial role in new ventures that have high managerial discretion, prior CMO research has neglected this context. Instead, this research stream is "biased away from smaller or younger firms that typically are not publicly traded" (Boyd, Chandy, and Cunha 2010, p. 1174). We address this research gap by exploring the role of the CMO. Our results show that characteristics such as CMO education, CMO marketing experience, and CMO industry experience may enhance new ventures' likelihood of obtaining urgently needed financing. Further research might examine the role of CMOs in building relationships with other relevant stakeholders, such as lead customers (Coviello and Joseph 2012), and relate CMOs to product-market performance, such as sales volume.

Third, we add to CMO research, which is important because "the CMO remains a rather enigmatic creature in academic literature. Given the importance of CMOs to firms, and to the marketing function in particular, the scarcity of systematic research about them is lamentable" (Boyd, Chandy, and Cunha 2010, p. 1174). We contribute to this literature stream by analyzing CMO education for the first time, disentangling the CMO experience construct, and establishing the importance of environmental contingencies. We show that the prior focus on experience alone to examine how CMOs fulfill their various roles is insufficient because education, in addition to experience, influences

investor responses. Thus, further research should encompass both experience and education when conceptualizing the human and social resources of the CMO.

Whereas Boyd, Chandy, and Cunha (2010) focus on CMO role-specific experience measured as a prior appointment as CMO, we provide a more nuanced view and acknowledge that various types of role-specific experience exist. Our results underscore the importance of such a fine-grained perspective: whereas CMO marketing experience and CMO industry experience are beneficial in a new venture context, CMO start-up experience is not significantly related to funding. One explanation for the latter result is that this variable does not contain information on the success of CMOs' previous start-up endeavors. As Hsu (2007, p. 727) states, "From the standpoint of VCs inferring new venture quality, however, observing repeated prior entrepreneurial failure is likely to send a negative signal." Further research might draw on these insights by conceptualizing CMO experience in more detail along two lines: (1) the types of assignments on which CMOs gained experience (i.e., marketing, industry, and context) and (2) CMO success in these assignments. However, this might constitute an ambitious endeavor. For example, although we control for a certain type of CMO new venture success (i.e., bringing a new venture toward an IPO), this is only one view on what defines success of a new venture. Other measures may capture new venture survival for seed-stage new ventures, sales growth for expansion-stage new ventures, or even acquisition by another firm to assess success (Srinivasan, Lilien, and Rangaswamy 2008). Likewise, there may be many defi-

Table 8
ROBUSTNESS CHECKS 4

Dependent Variable: VC Funding	Without Controls Model 1	
Moderating Relationships of Industry Legitimacy		
CMO education × industry legitimacy	.67*	(.37)
CMO marketing experience × industry legitimacy	−.02	(.02)
CMO industry experience × industry legitimacy	.08*	(.04)
CMO start-up experience × industry legitimacy	.01	(.05)
Moderating Relationships of Demand Instability		
CMO education × demand instability	3.69	(9.92)
CMO marketing experience × demand instability	−1.29*	(.68)
CMO industry experience × demand instability	3.38*	(1.55)
CMO start-up experience × demand instability	2.25	(1.67)
Moderating Relationships of Competitive Intensity		
CMO education × competitive intensity	−.73	(1.53)
CMO marketing experience × competitive intensity	−.11	(.21)
CMO industry experience × competitive intensity	.47*	(.22)
CMO start-up experience × competitive intensity	.17	(.26)
Main Relationships		
CMO education	1.07**	(.43)
CMO marketing experience	.06**	(.02)
CMO industry experience	.10*	(.05)
CMO start-up experience	.03	(.06)
Control Variables		
CMO new venture success	.50	(.86)
Industry legitimacy	−.16	(.25)
Demand instability	−7.06	(8.58)
Competitive intensity	−1.85	(1.95)
Technological turbulence	N.A.	N.A.
Industry complexity	N.A.	N.A.
Patent portfolio size	N.A.	N.A.
Trademark portfolio size	N.A.	N.A.
Firm age	N.A.	N.A.
Product introduction	N.A.	N.A.
Born global	N.A.	N.A.
VC cluster	N.A.	N.A.
CEO education	N.A.	N.A.
CEO marketing experience	N.A.	N.A.
CEO industry experience	N.A.	N.A.
CEO start-up experience	N.A.	N.A.
CEO new venture success	N.A.	N.A.
CFO education	N.A.	N.A.
CFO industry experience	N.A.	N.A.
CFO start-up experience	N.A.	N.A.

$*p < .05.$
$**p < .01.$
Notes: One-tailed tests of significance. Standard errors are in parentheses. N.A. = not applicable. We estimated models with STATA 12 using DURSEL 2.0. Positive coefficients indicate higher hazards and, thus, shorter durations.

nitions and measures for marketing- and industry-related success.

An alternative explanation for the finding that CMO start-up experience is not significantly related to funding rests on the notion that empirical findings regarding the performance consequences of top management start-up experience are contradictory, which hints at potential contingencies (West and Noel 2009). In support of this reasoning, our results show that in highly competitive markets, CMO start-up experience benefits the new venture.

Substantiating this important role of external contingencies, the results reveal that the impact of CMO industry experience increases as demand instability and competitive intensity increase—two aspects of the CMO's task environment. Moreover, and in contrast with our expectations, the positive impact of CMO industry experience and CMO education increases when industry legitimacy increases, indicating that in established industries, CMO human and social resources may already be taken for granted and expected. This finding is in line with the conformity proposition in strategy research, which states that a firm exhibiting structures that reflect the norms of the respective industry "avoids legitimacy challenges that hinder resource acquisition" (Deephouse 1999, p. 152). These "industry recipes" develop over time in an industry and include organizational structures and institutional templates (Spender 1989).

In more established industries, the norm of having a CMO who exhibits specific characteristics may therefore be more pronounced; consequently, these characteristics may constitute a requirement to be perceived as legitimate. Altogether, this study thus reveals that CMO-related effects are more complex than previous CMO research focusing on individual- and firm-level contingencies has indicated. Therefore, CMO research should consider how CMOs fit with their external task-related and institutional environments.

Implications for Practice

Because our aggregate data structure does not enable us to examine how investors perceive the existence of a CMO in a top management team, the insights that can be drawn for entrepreneurs, investors, and public policy makers must be regarded as tentative. First, while new ventures strongly emphasize their product and team when pitching in front of investors, they might also proactively communicate marketing capabilities and the value they assign to marketing to increase their chances of getting funding—for example, by including a CMO in their founding team. When searching for a suitable recruit, founders should adopt a nuanced view and seek a CMO who has already worked in the start-up's specific industry, especially when the target market is highly turbulent and competitive. Investors also seem to expect such experience in established markets. Moreover, the CMO should have experience in marketing and a formal education because these factors may indicate his or her ability to fulfill informational and relational roles. Our results suggest that start-ups should explicitly communicate knowledge and experience in fields that are most important to them. For example, when hiring their first CMO, DataSift, a venture focusing on big data analysis, described their recruit Beth Beld as having "deep expertise in defining business opportunities that lead to the definition of new market categories and the creation of high growth opportunities in existing markets" (DataSift 2013).

However, enhancing the status of a new venture's top management team with a CMO who exhibits the identified characteristics is not costless. In most cases, new ventures will have to hire such a skilled CMO from outside the firm; thus, the question arises as to how the compensation scheme for key nonfounder employees should be designed. Because of the limited amount of resources available, compensation may entail a high incentive pay that is linked to prearranged strategic goals and, to instill an ownership perspective, a certain proportion of the venture's equity (Balkin and Swift 2006). The issue of compensation design is also critical because it may affect the CMO's willingness to deploy her or his abilities in line with the new venture's goals.

Second, when deciding which start-ups to invest in, investors should pay close attention to indicators of marketing legitimacy, such as characteristics of the CMO. Investors often do not invest alone but draw money from other funds to accumulate capital and share risk (i.e., syndication; see Lerner 1994). Such investment partners may be more willing to participate in a syndicated funding round if the investment object shows greater marketing legitimacy.

Third, we provide insights for public policy makers. Supporting entrepreneurship through small business development programs is a major issue on the agenda of public policy makers and universities. The results suggest that marketing legitimacy is important for the acquisition of external funding, a major hurdle in the development path of many ventures. Entrepreneurship support, however, often focuses on personal training, the development of a business plan, or patentable technologies. It might be fruitful to make founders aware of the crucial role of marketing. In addition, universities could provide recruiting pools for new ventures to establish relationships with graduates from MBA programs who are suitable for the role of CMO.

Limitations

Although our study offers some initial insight into the role of marketing for new ventures' acquisition of financial resources, the design of our study and the nature of our data do not allow for a deeper examination of the mechanisms underlying the effects of CMO education and experience on venture capitalists' perceptions and funding decisions. First, our reasoning implies that, in addition to accounting for several established decision criteria, venture capitalists also account for characteristics of the new venture's CMO to infer its marketing legitimacy. Our results show that these characteristics are indeed related to whether the new venture receives funding; however, our data cannot provide any process insight on how venture capitalists actually use and interpret this kind of information. Our reasoning suggests that venture capitalists expect that the examined characteristics facilitate the CMO's informational and relational roles. Nonetheless, it could be that the inferences VC investors draw from information on experience and education deviate from this reasoning. Designs observing actual VC decision making in real or fictitious funding situations might be most appropriate to gain insight into these processes (for an approach based on conjoint analysis, see, e.g., Franke et al. 2008).

Second, we specify a selection model to account for the possibility that variables determining CMO presence may simultaneously explain the likelihood of receiving VC (see Table W3 in the Web Appendix). However, we cannot rule out that CMOs might be drawn to new ventures for the same reason that investors want to fund them. Additional research might therefore aim to uncover CMO motivations to join the top management team of a particular new venture.

Third, our research focuses on the influence of the CMO on VC funding while controlling for characteristics of other top management team members; however, we did not explicitly examine the relative importance of other members of the C-suite. In addition, VC investors' focus on characteristics of a single executive versus a more holistic view of the entire top management team may depend on contextual factors. Initial results of Franke et al. (2008), for example,

suggest that experienced venture capitalists may put more emphasis on the cohesion of the top management as a whole, whereas novice VC investors may put more emphasis on individual and more tangible characteristics such as education and experience.

Fourth, we did not explicitly consider cost–benefit trade-offs that new ventures face when deciding whether to hire a skilled CMO. For example, the costs that arise from hiring an outside CMO—which are also manifest in the form of equity that must be distributed to the new top management team member—may be contrasted with the benefit of retaining a higher portion of equity relative to VC investors as a result of higher confidence in the new venture's quality (Balkin and Swift 2006).

Fifth, although we strove to include established determinants of VC funding as control variables, future studies might include a broader array of such controls. For example, including data on the CMO's personal success in obtaining financing or an examination of personality-related variables might increase confidence in the robustness of our results. In addition, studies examining the impact of marketing-related aspects on funding in more established new ventures might control for financial characteristics such as return on revenue (Zacharakis and Meyer 1998). Sixth, the DURSEL statistical package does not currently provide hazard ratios, which limits interpretation of effect sizes between the models in this study.

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