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Does Competitive Intensity Moderate the Relationships between Sustainable Capabilities and Sustainable Organizational Performance in New Ventures?

Haili Zhang, Yufan Wang * and Michael Song

School of Economics and Management, Xi'an Technological University, Xi'an 710021, China; zhanghaili@xatu.edu.cn (H.Z.); michaelson@xatu.edu.cn (M.S.)

* Correspondence: wangyufan@xatu.edu.cn

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Abstract: Competitive intensity presents challenges to new ventures. Capabilities may lead to sustainable new venture performance. Yet, few studies have explored how competitive intensity moderates the effects of capabilities on sustainable new venture performance. Based on capability-based view, this study develops a research model to investigate how new ventures translate capabilities (marketing, technology, market-linking, and information technology capabilities) to achieve sustainability of new venture growth and performance under the different levels of competitive intensity. Using data collected from 146 U.S. new ventures, this study uses ordinary least squares regression analysis to test the research model and employs “pick-a-point” approach to examine how capabilities affect sustainable new venture performance at different levels of competitive intensity. The empirical results suggest that increasing competitive intensity decreases, *not increases*, the positive effects of marketing capabilities on performance. When competitive intensity is very high, the positive effects of marketing capabilities on performance become insignificant. In contrast, the positive effects of market-linking capabilities on performance increase, *not decrease*, as competitive intensity increases. For technology and information technology capabilities, there are no moderating effects of competitive intensity. The theoretical and managerial implications are suggested for sustainable entrepreneurship and sustainable development of new enterprises.

Keywords: new ventures; competitive intensity; capabilities; sustainable new venture performance; capability-based view

1. Introduction

The literature suggests that enterprises need to develop sustainable capabilities in order to achieve sustainable organizational performance [1,2]. Yet, previous empirical research has shown mixed results on the relationship between capabilities and sustainable organizational performance (the capabilities–performance relationship) [1–6]. Based on the capability-based view (CBV) theory [2], many empirical studies have provided support for a direct link between capabilities and sustainable organizational performance [2–4,6–8]. The argument that effective use of capabilities to achieve sustainable organizational performance depends on environmental conditions is widely accepted in the literature [1,2,9,10]. As Newbert [1] suggests, the positive capabilities–performance relationship exists in certain situations. Conversely, Eisenhardt and Martin [9] argue that under some environmental conditions, capabilities may decrease, not increase, sustainable organizational performance. Given the inconsistent findings in the literature, scholars have emphasized the needs for new research to explore the environmental boundary conditions for the capabilities–performance relationship [4,5].

New ventures are particularly sensitive to changes in environmental conditions and often deal with significant effects of environmental factors [8,11–14]. The competitive environment in which new ventures operate changes quickly and frequently and new ventures must promptly respond to the competitive changes [13,14]. It is important to understand how new ventures can most effectively use their capabilities to achieve sustainability of growth and performance in high versus low competitive environments [3,15–17]. Accordingly, prior studies have suggested that analysis of the capabilities–performance relationship should consider the potential moderating effects of complex competitive conditions [18]. We argue that as one of the most important environmental factors for new ventures, competitive intensity is a boundary condition of capability-based view theory [2] and resource-based view (RBV) theory [19]. Therefore, it is an important environmental factor to consider in resolving existing debates about the moderators that affect the capabilities–performance relationship.

In this study, we contribute to the literature by developing a research model to investigate how competitive intensity moderates the relationships between four important sustainable capabilities (marketing capabilities, technology capabilities, market-linking capabilities, and IT capabilities) and sustainability of new venture performance. Using data collected from 146 U.S. new ventures, we use ordinary least squares regression analysis to test the research model and employ “pick-a-point” approach to examine how capabilities affect sustainable new venture performance at different levels of competitive intensity.

This study makes two additional contributions to the literature. First, our empirical results indicate that competitive intensity is an important boundary condition of the CBV and RBV theories. Previous entrepreneurship research on environmental uncertainty has focused on how marketing and technology uncertainties moderate the relationship between capabilities and sustainable new venture performance [13,14]. Prior research has failed to provide empirical supports for the moderating effects of competitive intensity on the capability–performance relationship in new ventures. Second, we find that competitive intensity moderates the effects of marketing capabilities and market-linking capabilities on sustainable new venture performance. The empirical results indicate that as competitive intensity increases, the positive effect of marketing capabilities on sustainable new venture performance decreases, not increases, and the positive effect of market-linking capabilities on sustainable new venture performance increases, not decreases. In contrast, the relationships between technology capabilities and IT capabilities and sustainable new venture performance are *not* moderated by competitive intensity. These empirical findings provide new insights into our understanding of how new ventures cope with competitive intensity, why some new ventures invest in certain types of capabilities, and why some new ventures perform better than others. These insights are useful to the development of sustainable entrepreneurship.

2. Theory and Research Hypotheses

Literature indicates that resources do not automatically lead to sustainable organizational performance [1,2,9,20,21]. Mahoney and Pandain suggest that only with the best use of resources can firms achieve maximal productivity and/or financial yield [22]. Peteraf also argues that firms need to effectively manage and use their valuable resources to achieve superior organizational performance [23]. Over the past two decades, scholars have explored the mechanisms of resource deployment and utilization, such as core capabilities, competences, and organizational capabilities [2,3,5,7,21–25].

Capabilities are intangible resources that integrate knowledge, skills, and organizational processes, enabling firms to coordinate activities and make effective use of their assets [2,21,22]. This integration, which derives from firms’ experiences, tacit knowledge, and unique complex combinations of resources, affects the creation of valuable outputs [15,25]. The literatures in marketing, management, and entrepreneurship have suggested several major capabilities, such as marketing capabilities, technology capabilities, information technology capabilities, research and development (R&D) capabilities, management-related capabilities, operational capabilities, design capabilities, and innovation

capabilities [3,7,20,21,24–31]. These capabilities can be deployed to reduce costs and to create sustainable competitive advantages [32].

According to the CBV theory, sustainable competitive advantages are primarily driven by capabilities that cannot be easily traded or imitated [2,19,21,25] and distinctive capabilities have positive relationships with sustainable organizational performance [3,7,24,25]. Yet, the results are mixed [1,2,4,5]. Some studies have shown that the positive effect of capabilities on superior sustainable organizational performance depends on environmental conditions [1,9,10]. For new ventures, the environmental factors are important contingent factors affecting the relationships between capabilities and sustainable organizational performance [11,12,33,34]. Several studies have identified some variables that moderate the relationships between different capabilities and sustainable organizational performance [2,5,25,26]. Although competitive intensity is widely recognized as a moderator, e.g., [2,17], the moderating effect of competitive intensity in the capability–performance relationship remains understudied [15].

We propose a research model (shown in Figure 1) focusing on four capabilities (marketing, technology, market-linking, and IT capabilities) that have been suggested as most important for new ventures [3,7,25]. The model contains eight research hypotheses. It predicts that the four capabilities have positive effects on sustainable new venture performance (H1–H4). Furthermore, the model suggests that the level of competitive intensity moderates the four capability–performance relationships (H5–H8).

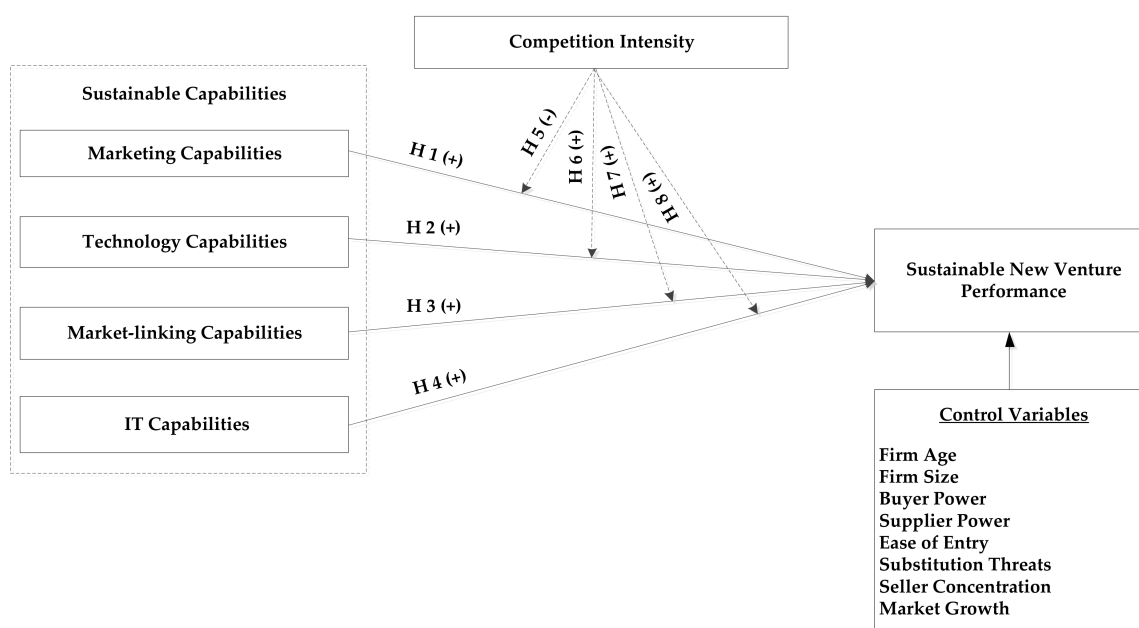


Figure 1. A research model for studying sustainable capabilities, competitive intensity, and sustainable new venture performance.

2.1. Capabilities and Sustainable New Venture Performance (H1–H4)

New ventures should possess multiple capabilities to achieve superior sustainable organizational performance [3]. New ventures are notorious for cash flow and capital needs. When new ventures are faced with investment constraints [13], it is critical for them to choose what capabilities to invest their capitals in order to improve their survival and enhance performance [3]. Day has suggested that “it is not possible for organizations to enumerate all possible capabilities, because every business develops its own configuration of capabilities that is rooted in the realities of its competitive market, past commitments, and anticipated requirements” [21] (p. 40). In this article, we choose to focus on four important capabilities consistent with research in marketing and management [3,7,24,25] and study the different effects of these four capabilities on the sustainable new venture performance.

Marketing capabilities permit the firm to swiftly and effectively respond to customer needs and implement marketing programs, which require skill in segmentation, targeting, pricing, advertising, and integrating marketing activity [3,7,24,26]. Technology capabilities include R&D, product development, production processes, manufacturing processes, forecasting technological change, and logistics technologies [3,24,25]. According to the CBV theory, marketing capabilities enable new ventures to generate and disseminate market information and carry out appropriate responses to customer needs and preferences [3,24,35]. Technology capabilities enable new ventures to differentiate products to respond external challenges and seize market opportunities [3,7,25]. In addition, prior studies have found that marketing and technology capabilities have positive impacts on sustainable new venture performance [3,7,25,36,37].

Market-linking capabilities include market sensing, channel linking, customer linking, and technology monitoring [3,38]. Market-linking capabilities enable new ventures to improve their sustainable competitiveness by managing durable relationships with customer and partners, detecting changes in the market, and responding to changes in customer demand [3,24]. Keeping good and durable relationships with customers and partners helps new ventures to know and meet the needs of customers [26]. Durable relationships with customers increase the sustainability of new venture growth and performance [3,7,26,38,39].

IT capabilities include facilitating technology and market knowledge creation, cross-functional integration, and internal and external communication [3,15,25]. For new ventures to achieve superior sustainable growth and performance, they need IT capabilities to disseminate technical and market information effectively across all relevant organizational areas [3,15,25,40,41]. Therefore, following the literature, we propose the following four hypotheses:

Hypothesis 1 (H1). *Marketing capabilities are positively related to sustainable new venture performance.*

Hypothesis 2 (H2). *Technology capabilities are positively related to sustainable new venture performance.*

Hypothesis 3 (H3). *Market-linking capabilities are positively related to sustainable new venture performance.*

Hypothesis 4 (H4). *IT capabilities are positively related to sustainable new venture performance.*

2.2. The Moderating Effect of Competitive Intensity

The current view of the CBV theory is that the utility of capabilities is contingent on the environment in which the firm operates [1,2,4,5]. Capabilities are essentially the application of resources, and that application occurs within a specific environment [2,10,18,42]. Therefore, the relationships between capabilities and sustainable organizational performance may vary under different environmental conditions [2]. This view is consistent with the contingency theory argument that the external environmental situation has a moderating effect on the relationships between capabilities and sustainable organizational performance [43–45].

As discussed earlier, competitive intensity is a key environmental factor in the organization theory, marketing, strategic management, and sustainability literatures [18,46,47]. In this study, competitive intensity refers to the degree of competitive actions in the industry. A high level of competitive intensity is characterized by cutthroat competition, many promotion wars, similar product offerings, and a high level of price competition. Competitive intensity may be caused by intentional strategic action of the competitors in the industry or a lack of understanding of information and the prospective actions of competitors [48,49]. Because competitive intensity derives from both current and future competitors, it is very difficult for new ventures to control. Past research suggests that competitive intensity influence strategic decision making [50,51].

We argue that competitive intensity *negatively* moderates the positive relationship between marketing capabilities and sustainable new venture performance. Relative to less competitive industries, new ventures in highly competitive environments face more cutthroat competition, higher entry barriers,

more difficulties in differentiating product offerings, frequent promotion wars, and higher levels of price competition. It is much more difficult for those new ventures facing highly competitive intensity to execute effective marketing decisions such as market segmentation, pricing, advertising, and integrative marketing activity [3,7,21,24]. New ventures need to spend more on marketing (advertising and promotions, marketing strategy adjustment) and reduce profit margins as a result of high competitive intensity. Therefore, we hypothesize:

Hypothesis 5 (H5). *Increasing competitive intensity decreases the positive effect of marketing capabilities on sustainable new venture performance.*

Increasing technology capabilities leads to better R&D, more product sustainable development, improved production and manufacturing sustainability processes, more accurate forecasting of technological change [3,24,52]. In a highly competitive environment, it is much more important for new ventures to differentiate their products and services from existing competitors. Increasing technology capabilities in a highly competitive environment then enables and promotes the sustainable development of new technology, lower costs, higher quality, and more differentiated products to allow the firm to better compete in highly competitive industries [7,21,24,53]. Therefore, we hypothesize:

Hypothesis 6 (H6). *Increasing competitive intensity increases the positive effect of technology capabilities on sustainable new venture performance.*

Past studies have suggested that market-linking capabilities have a stronger effect on sustainable organizational performance in environments with high levels of competitive intensity [54,55]. Under the conditions of fierce competition, new ventures will depend more on market-linking capabilities to build or maintain long-term relationships between customers and stakeholders, which can bring about customer loyalty, and strategic partnership with suppliers [56]. Therefore, we hypothesize:

Hypothesis 7 (H7). *Increasing competitive intensity increases the positive effect of sustainable market-linking capabilities on sustainable new venture performance.*

Relative to less competitive environments, new ventures operating in highly competitive intensity will face frequent promotional wars and cutthroat competition. New ventures in highly competitive environments will need constant updating of competitive activity. Increases in IT capabilities lead to greater access to competitive information, facilitate internal and external communication, and increase cross-functional communication of competitive information [7,24]. The effect of IT capabilities on sustainable new venture performance is greater in highly competitive environments than in less competitive environments [15]. Therefore, we hypothesize:

Hypothesis 8 (H8). *Increasing competitive intensity increases the positive effect of IT capabilities on sustainable new venture performance.*

3. Method

3.1. Data

From the companies listed in the ReferenceUSA.com, we selected the research sample of 2103 new ventures in four steps: (1) the initial population from all companies listed in ReferenceUSA.com was reduced to include only new ventures (less than 8 years old following prior study [3]) in the manufacturing businesses (with North American Industry Classification System code 31–33); (2) the sample was further reduced by including only new ventures in three industries: consumer electronics and accessories; electronics games, toys, and computer software; and manufacturing appliances for homes; (3) a random sample of 2500 new ventures was selected using a random number generator; (4)

after deleting 397 companies with incomplete or outdated contact information, the sample was reduced to 2103 firms with necessary information. The three industries were chosen because prior studies suggest that they offer rich empirical context for studying the capability-performance relationship in new ventures [3,7,27,38].

The empirical data used for this study were collected in three phases starting in January 2012. First, using fax, express mail, and/or email, we conducted a one-page presurvey by sending a formal letter requesting participation and offering a list of free research reports. The results of the presurvey are: 286 companies declined to provide data due to confidentiality of the data, company policy, and lack of time; 348 companies were contactable; 948 companies did not respond; and 521 new ventures agreed to participate and provided a contact person with the necessary background information such as when the new venture was created and firm size. From the ReferenceUSA.com, we also collected firm age and firm size for all firms.

Second, after the presurvey, we followed the three-wave mailing approach to collect data (i.e., capabilities, competitive intensity, firm age, total number of full-time employees, and industry characteristics such as buyer power, supplier power, ease of entry, substitution threats, seller concentration, and market growth) [3]. The first package included a new \$1 bill, a business card, a personalized letter, a professionally created survey, a preaddressed and prepaid returned express mail, and a list of free research reports. The package was sent by express mail to all 521 new ventures which had agreed to participate. The three-wave mailing approach was used following prior studies [3]. We also asked two questions to assess the respondent's confidence in providing the necessary data and deleted the survey if the answer was less than 3 (on 1–5 scales). We collected the required data from 221 new ventures.

The third phase took place one year later to reduce potential common method bias and enhance our ability to draw causal relationships. We collected the performance data (total sales and total costs) one year after collecting data on independent variables. As an additional check, we also independently verified performance data with ReferenceUSA.com. However, performance information was missing or unavailable for 67 firms. The final data used to test our research model included 53 new ventures in consumer electronics and accessories; 44 new ventures in electronics games, toys, and computer software; and 49 new ventures in manufacturing appliances for homes.

3.2. Tests for Potential Nonresponse Bias

We used two tests to evaluate possible nonresponse bias and representativeness of the participating firms [3,57]. First, we performed a multivariate analysis of variance to compare participating new ventures with nonparticipating new ventures in terms of firm age and total number of employees. The results suggested that the participating group is not significantly different from nonparticipating new ventures ($p < 0.10$). Second, we conducted t-tests to examine any significant differences between the early respondents (from the first package of the mail) and the late respondents (after two follow-ups) using all capability, industry variables, and profit margin. All t-statistics were not significant ($p < 0.10$). Therefore, we concluded that nonresponse bias was not a significant problem for this study.

3.3. Study Measures

3.3.1. Capabilities

To measure the four types of sustainable capabilities, we asked participants to evaluate how well or poorly they believe their organizations perform the specific activities or have the sustainable capability relative to their three main competitors. All capability scales were rated using a 5-point Likert-type scale ranging from 1 (much worse than the top three major competitors in the industry) to 5 (much better than the top three major competitors in the industry). The Appendix A presents the entire measures with sources.

All measures of capabilities were directly adopted from the existing well-validated measures. To measure marketing capabilities, we adopted 4-items scale from Di Benedetto et al. [7] and Hao et al. [3] to assess knowledge of customers and competitors, integration of marketing activities, skills in segmentation, and targeting markets. We measured technology capabilities using 5-items scale from Song et al. [25] and Hao et al. [3] asking about new product sustainable development capabilities, manufacturing sustainability processes, technology sustainable development capabilities, ability of predicting technological changes in the industry, production facilities. To measure market-linking capabilities, we used 5-items scale from Di Benedetto et al. [38] and Hao et al. [3] to assess market sensing capabilities, customer-linking, capabilities of creating durable relationships with our suppliers, ability to retain customers, channel-bonding capabilities. We adopted 5-items scale from Song et al. [25] and Hao et al. [3] to measure sustainable information technology capabilities by assessing the sustainable information technology systems that support new product sustainable development projects, facilitating cross-functional integration, facilitating technology knowledge creation, facilitating market knowledge creation, and internal communication.

3.3.2. Competitive Intensity

To measure competition intensity, we adopted 5-items scale from Narver and Slater [58]. The 5-items scale of competition intensity composed included competition in our industry is cutthroat, there are many “promotion wars” in our industry, anything that one competitor can offer, others can match readily, price competition is a hallmark of our industry, and our competitors are relatively weak. Participants rated each item using a 5-point Likert-type scale, which ranges from 1 (not descriptive) to 5 (very descriptive).

3.3.3. Sustainable New Venture Performance

We used profit margin to measure sustainable new venture performance. The scale for the profit margin was adopted from prior studies [27,32]. Profit margin was measured using an objected measure, calculated using the following equation:

$$\text{Profit Margin} = 100 \times (\text{Total Sales} - \text{Total Costs}) / (\text{Total Sales})$$

This measure of sustainable new venture performance has been widely accepted in entrepreneurship literature [3,27] and sustainability literature [32]. Ideally, one should also collect data on sales growth rate and profit margin over a few years (see [32] for example).

3.3.4. Other Factors as Control Variables

In addition to the focal variables of this study, entrepreneurship literature has suggested that new venture performance may be affected by other variables [3,27]. Following prior studies [3], we include same eight control variables as used in [3] to control for the effects of firm age, firm size, and the six variables as proxies of industry characteristics [3,58]. We used the logarithm of the number of employees as an indicator of firm size [3,27,58].

4. Results

4.1. Hypothesis Testing

All multi-item constructs have good reliability as Cronbach’s α ranges from 0.826 to 0.970 (see Appendix A). Table 1 presents the means, standard deviations, and correlations for the variables. We performed an exploratory factor analysis and found that all factor loadings exceeded 0.400 and that there were no double loadings (see Table 2).

Table 1. Descriptive statistics of the sample.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. PROFIT	1.000													
2. MC	0.088	1.000												
3. TC	0.527 ***	−0.021	1.000											
4. MLC	0.214 ***	0.162 *	0.034	1.000										
5. ITC	0.469 ***	−0.391 ***	0.375 ***	−0.103	1.000									
6. COIN	0.362 ***	0.103	0.407 ***	0.383 ***	0.175 **	1.000								
7. AGE	0.013	−0.021	−0.023	0.081	0.138 *	−0.028	1.000							
8. SIZE	−0.004	0.076	−0.094	0.107	−0.048	0.129	−0.005	1.000						
9. BPOW	0.037	0.015	0.023	−0.059	−0.092	−0.061	−0.047	0.085	1.000					
10. SPOW	−0.072	0.095	−0.120	0.020	−0.170 **	−0.083	0.019	0.110	0.064	1.000				
11. ENTRY	−0.021	−0.150 *	−0.049	−0.113	0.023	−0.103	0.073	−0.196 **	0.056	−0.170 **	1.000			
12. SUBS	−0.169 **	0.054	−0.232 ***	−0.104	−0.013	0.006	−0.024	0.010	−0.005	−0.081	0.005	1.000		
13. CONC	−0.093	−0.005	0.038	−0.046	−0.097	0.080	−0.043	0.074	−0.029	0.032	0.034	0.085	1.000	
14. MGRO	0.060	−0.015	0.143 *	−0.125	0.129	0.052	−0.040	−0.088	−0.027	−0.104	−0.051	−0.062	−0.132	1.000
Mean	9.798	2.283	2.716	2.485	3.605	3.144	5.637	2.676	3.171	3.240	3.356	3.301	3.301	3.295
S. D.	9.848	1.066	1.371	0.919	0.880	0.847	1.384	0.246	1.478	1.459	1.348	1.487	1.396	1.425

Notes: N = 146; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed test). MC = marketing capabilities, TC = technology capabilities, MLC = market-linking capabilities, ITC = IT capabilities, COIN = competitive intensity, AGE = firm age, SIZE = firm size, BPOW = buyer power, SPOW = supplier power, ENTRY = ease of entry, SUBS = substitution threats, CONC = seller concentration, MGRO = market growth. The number in the first row corresponds to the number from the first column.

Table 2. Exploratory factor analysis: factor loadings.

	Marketing Capabilities (MC)	Technology Capabilities (TC)	Market-Linking Capabilities (MLC)	IT Capabilities (ITC)	Competitive Intensity (COIN)
MC1	0.850	0.007	−0.059	−0.186	0.048
MC2	0.857	−0.074	0.050	−0.200	0.094
MC3	0.854	0.074	0.118	−0.254	0.027
MC4	0.832	0.009	0.145	−0.141	0.022
TC1	0.005	0.893	0.031	0.120	0.151
TC2	0.021	0.936	−0.032	0.125	0.223
TC3	−0.007	0.891	−0.007	0.167	0.140
TC4	−0.004	0.886	0.043	0.171	0.205
TC5	−0.018	0.877	−0.045	0.210	0.246
MLC1	0.076	−0.046	0.803	−0.160	0.070
MLC2	0.129	0.095	0.734	−0.005	0.159
MLC4	−0.093	0.000	0.719	−0.054	0.048
MLC3	0.122	−0.064	0.683	−0.032	0.225
MLC5	0.041	0.001	0.489	−0.006	0.345
ITC1	−0.216	0.183	−0.106	0.617	0.129
ITC2	−0.197	0.123	−0.151	0.582	−0.049
ITC3	−0.032	0.230	−0.097	0.429	0.320
ITC4	−0.210	0.160	−0.020	0.870	−0.003
ITC5	−0.177	0.114	0.062	0.868	0.041
COIN1	−0.002	0.122	0.188	0.148	0.786
COIN2	0.076	0.148	0.220	0.027	0.810
COIN3	0.036	0.235	0.225	−0.130	0.750
COIN4	0.104	0.230	0.097	0.129	0.816
COIN5	0.010	0.216	0.118	0.051	0.832

Note: bold numbers indicate items that load highly for the corresponding factor.

To test the first four hypotheses (H1–H4), we performed ordinary least squares regression analysis. Our results are reported in Table 3. Model 1 includes all the main effects of the capabilities on sustainable new venture performance ($F = 10.410$, $p < 0.01$). As hypothesized (H1–H4), the empirical results of Model 1 in Table 3 indicate that the parameter estimates for the impact of the four capabilities on sustainable new venture performance are significant and positive for marketing capabilities ($\beta = 2.350$, $p < 0.01$), technology capabilities ($\beta = 2.420$, $p < 0.01$), market-linking capabilities ($\beta = 2.263$, $p < 0.01$), and IT capabilities ($\beta = 5.363$, $p < 0.01$). These results provide support for our four main hypotheses and are consistent with the CBV theory and prior studies [3,7,24].

Table 3. Regression analyses results: profit margin as dependent variable.

	Model 1			Model 2		
	Parameter Estimate	Standard Error	Standardized Estimate	Parameter Estimate	Standard Error	Standardized Estimate
Intercept	0.000	0.611	0.000	−0.462	0.761	0.000
Marketing capabilities (MC)	2.350 ***	0.650	0.254	1.993 ***	0.697	0.216
Technology Capabilities (TC)	2.420 ***	0.521	0.337	2.143 ***	0.625	0.298
Market-linking Capabilities (MLC)	2.263 ***	0.700	0.211	1.602 *	0.840	0.149
IT Capabilities (ITC)	5.363 ***	0.867	0.479	4.840 ***	0.972	0.432
Firm Age (AGE)	−0.448	0.455	−0.063	−0.382	0.479	−0.054
Firm Size (SIZE)	0.513	2.602	0.013	−1.020	2.781	−0.026
Buyer Power (BPOW)	0.477	0.424	0.072	0.504	0.449	0.076
Supplier Power (SPOW)	0.126	0.441	0.019	0.358	0.471	0.053
Ease of Entry (ENTRY)	0.394	0.482	0.054	0.395	0.503	0.054
Substitution Threats (SUBS)	−0.486	0.436	−0.073	−0.506	0.456	−0.076
Seller Concentration (CONC)	−0.347	0.454	−0.049	−0.532	0.473	−0.075
Market Growth (MGRO)	−0.171	0.448	−0.025	−0.276	0.469	−0.040
Competitive Intensity (COIN)				1.683 *	1.010	0.145

Table 3. Cont.

	Model 1			Model 2		
	Parameter Estimate	Standard Error	Standardized Estimate	Parameter Estimate	Standard Error	Standardized Estimate
MC × COIN				−1.849 **	0.845	−0.174
TC × COIN				0.314	0.789	0.033
MLC × COIN				1.556 *	0.908	0.124
ITC × COIN				−1.275	1.056	−0.113
AGE × COIN				3.148	3.559	0.065
SIZE × COIN				−0.137	0.545	−0.017
BPOW × COIN				−0.348	0.625	−0.042
SPOW × COIN				−0.243	0.559	−0.031
ENTRY × COIN				−0.140	0.619	−0.016
SUBS × COIN				0.940	0.569	0.116
CONC × COIN				−0.467	0.622	−0.053
MGRO × COIN				1.161 **	0.580	0.140
F-value	10.410 ***			5.710 ***		
R ²	0.484			0.543		
Adjusted R ²	0.438			0.448		

Notes: N = 146; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed test).

The moderating hypotheses (H5–H8) predict that the four capabilities–performance relationships are moderated by the competitive intensity, we performed further analyses using the following equation:

$$\begin{aligned}
 \text{Profit margin} = & \alpha + \beta_1 \times \text{MC} + \beta_2 \times \text{TC} + \beta_3 \times \text{MLC} + \beta_4 \times \text{ITC} \\
 & + \beta_5 \times \text{COIN} + \beta_6 \times (\text{MC} \times \text{COIN}) + \beta_7 \times (\text{TC} \times \text{COIN}) \\
 & + \beta_8 \times (\text{MLC} \times \text{COIN}) + \beta_9 \times (\text{ITC} \times \text{COIN}) + \beta_{10} \times \text{AGE} \\
 & + \beta_{11} \times \text{SIZE} + \beta_{12} \times \text{BPOW} + \beta_{13} \times \text{SPOW} + \beta_{14} \times \text{ENTRY} \\
 & + \beta_{15} \times \text{SUBS} + \beta_{16} \times \text{CONC} + \beta_{17} \times \text{MGRO} \\
 & + \beta_{18} \times (\text{AGE} \times \text{COIN}) + \beta_{19} \times (\text{SIZE} \times \text{COIN}) \\
 & + \beta_{20} \times (\text{BPOW} \times \text{COIN}) + \beta_{21} \times (\text{SPOW} \times \text{COIN}) \\
 & + \beta_{22} \times (\text{ENTRY} \times \text{COIN}) + \beta_{23} \times (\text{SUBS} \times \text{COIN}) \\
 & + \beta_{24} \times (\text{CONC} \times \text{COIN}) + \beta_{25} \times (\text{MGRO} \times \text{COIN}) + \varepsilon,
 \end{aligned} \tag{1}$$

where: MC = marketing capabilities, TC = technology capabilities, MLC = market-linking capabilities, ITC = IT capabilities, COIN = competitive intensity, AGE = firm age, SIZE = log(# of employees), BPOW = buyer power, SPOW = supplier power, ENTRY = ease of entry, SUBS = substitution threats, CONC = seller concentration, MGRO = market growth, ε = disturbance terms for the equation.

We mean-centered four capabilities, competitive intensity, and control variables, as suggested by Jaccard, Turrise, and Wan [59]. The resulting variable inflation factor (VIF) scores for all models were within acceptable parameters, giving us confidence that multicollinearity was not an issue [60]. Therefore, the mean-centered data were used in subsequent data analyses.

The results in Model 2 of Table 3 reveal a negative and significant moderating effect of competitive intensity on the relationship between marketing capabilities and sustainable new venture performance ($\beta = -1.849$, $p < 0.05$), providing support for H5.

In addition, the empirical results in Model 2 of Table 3 indicate that the moderating effect of competitive intensity on the relationship between market-linking capabilities and sustainable new venture performance is significant and positive ($\beta = 1.556$, $p < 0.10$). Thus, H7 is supported by our empirical data.

Surprisingly, the empirical data do not provide supports for the hypothesized positive moderating effect of competitive intensity on the relationships between technology capabilities, IT capabilities, and sustainable new venture performance, respectively ($p > 0.10$). Therefore, H6 and H8 are not supported by our empirical data.

4.2. Additional Analyses by “Pick-a-Point Approach”

We extended the above analyses by applying the “pick-a-point approach” to determine whether marketing capabilities and market-linking capabilities affect sustainable new venture performance at different levels of competitive intensity [61]. We use Equation (2) to analyze the moderating effect of competitive intensity on the positive effects of marketing capabilities on sustainable new venture performance and use Equation (3) to analyze the moderating effect of competitive intensity on the positive effects of market-linking capabilities on sustainable new venture performance. The equations are as following:

$$\begin{aligned} \text{Profit margin} = & (\alpha + \beta_2 \times \text{TC} + \beta_3 \times \text{MLC} + \beta_4 \times \text{ITC} + \beta_{10} \times \text{AGE} + \beta_{11} \times \text{SIZE} + \beta_{12} \times \text{BPOW} \\ & + \beta_{13} \times \text{SPOW} + \beta_{14} \times \text{ENTRY} + \beta_{15} \times \text{SUBS} + \beta_{16} \times \text{CONC} + \beta_{17} \times \text{MGRO}) + \beta_1 \times \text{MC} \\ & + (\beta_5 + \beta_7 \times \text{TC} + \beta_8 \times \text{MLC} + \beta_9 \times \text{ITC} + \beta_{18} \times \text{AGE} + \beta_{19} \times \text{SIZE} + \beta_{20} \times \text{BPOW} \\ & + \beta_{21} \times \text{SPOW} + \beta_{22} \times \text{ENTRY} + \beta_{23} \times \text{SUBS} + \beta_{24} \times \text{CONC} + \beta_{25} \times \text{MGRO}) \times \text{COIN} \\ & + \beta_6 \times (\text{MC} \times \text{COIN}) + \varepsilon, \end{aligned} \quad (2)$$

$$\begin{aligned} \text{Profit margin} = & (\alpha + \beta_1 \times \text{MC} + \beta_2 \times \text{TC} + \beta_4 \times \text{ITC} + \beta_{10} \times \text{AGE} + \beta_{11} \times \text{SIZE} + \beta_{12} \times \text{BPOW} \\ & + \beta_{13} \times \text{SPOW} + \beta_{14} \times \text{ENTRY} + \beta_{15} \times \text{SUBS} + \beta_{16} \times \text{CONC} + \beta_{17} \times \text{MGRO}) + \beta_3 \times \text{MLC} \\ & + (\beta_5 + \beta_6 \times \text{MC} + \beta_7 \times \text{TC} + \beta_9 \times \text{ITC} + \beta_{18} \times \text{AGE} + \beta_{19} \times \text{SIZE} + \beta_{20} \times \text{BPOW} \\ & + \beta_{21} \times \text{SPOW} + \beta_{22} \times \text{ENTRY} + \beta_{23} \times \text{SUBS} + \beta_{24} \times \text{CONC} + \beta_{25} \times \text{MGRO}) \times \text{COIN} \\ & + \beta_8 \times (\text{MLC} \times \text{COIN}) + \varepsilon. \end{aligned} \quad (3)$$

To analyze the effects of marketing capabilities on profit margin at different levels of competitive intensity by applying the “pick-a-point approach”, we used the coefficient estimates in Model 2 of Table 3 and set all variables to their means except marketing capabilities and competitive intensity. Equation (2) becomes:

$$\begin{aligned} \text{Profit margin} = & -0.462 + 1.993 \times (\text{MC} - 2.283) + 1.683 \times (\text{COIN} - 3.144) \\ & - 1.849 \times [(\text{MC} - 2.283) \times (\text{COIN} - 3.144)], \end{aligned} \quad (4)$$

where: MC = marketing capabilities (from 1 to 5), COIN = competitive intensity (from 1 to 5).

The results from calculating the effects of marketing capabilities on profit margin for each level of competitive intensity are displayed in Figure 2a. From Figure 2a, we find that when competitive intensity is low (at levels equal to 1, 2, or 3), marketing capabilities increase sustainable new venture performance ($p < 0.10$). However, the effect of marketing capabilities on sustainable new venture performance decreases as competitive intensity increases. When competitive intensity increases to levels 4 or 5, market capabilities have no significant effect on sustainable new venture performance ($p < 0.10$). Therefore, we find that a new venture’s return on its investment from marketing capabilities is not useful when competitive intensity is at 4 or higher ($p < 0.10$).

To analyze the effects of market-linking capabilities on profit margin at different levels of competitive intensity, we used the coefficient estimates in Model 2 of Table 3 and set all variables in Equation (3) to their respective means except the market-linking capabilities (MLC), and competitive intensity. Equation (3) becomes:

$$\begin{aligned} \text{Profit margin} = & -0.462 + 1.602 \times (\text{MLC} - 2.485) + 1.683 \times (\text{COIN} - 3.144) \\ & + 1.556 \times ((\text{MLC} - 2.485) \times (\text{COIN} - 3.144)) + \varepsilon, \end{aligned} \quad (5)$$

where: MLC = market-linking capabilities (from 1 to 5), COIN = competitive intensity (from 1 to 5).

By changing the market-linking capabilities from 1 to 5 for each level of the competitive intensity, we present the results in Figure 2b. Market-linking capabilities have a positive and significant effect on sustainable new venture performance only when competitive intensity equals to 4 or 5 ($p < 0.10$). When the competitive intensity is at levels between 1 and 3, increases in market-linking capabilities do not significantly lead to higher sustainable new venture performance ($p > 0.10$).

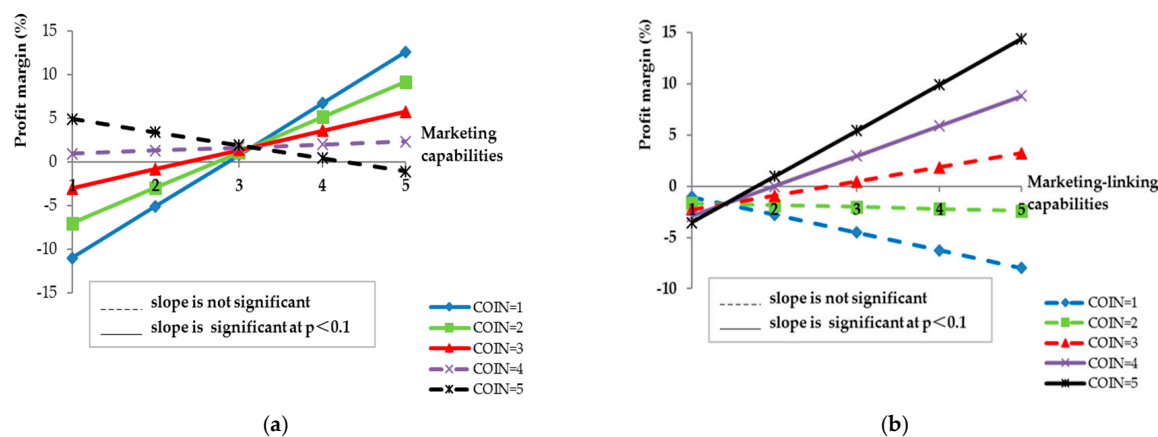


Figure 2. Moderating effects of competitive intensity on the capabilities–performance relationships. (a) Effects of marketing capabilities on profit margin (%) at different levels of competitive intensity, (b) Effects of market-linking capabilities on profit margin (%) at different levels of competitive intensity. Note: COIN = competitive intensity. The regression lines in this figure show the partial effects that are computed using “pick-a-point approach” recommended by Hayes and Matthes [61].

5. Discussion

5.1. Theoretical Implications

New ventures face different and perhaps even more challenging competitive circumstances than established firms do. Yet, there has been few prior research examining how the competitive intensity affects the capabilities–performance relationships in new ventures. In this study, we propose a theoretical model, based on the CBV theory, that examines the moderating role of competitive intensity in the relationships between capabilities and sustainable new venture performance.

This study contributes to the literature in several ways. First, our findings contribute to theoretical development in the relationships between capabilities and sustainable new venture performance. Previous research has highlighted the role of four key capabilities for sustainable new venture performance improvements, e.g., [3,7,8,13,27,29,38]. We find that marketing capabilities, technology capabilities, market-linking capabilities, and IT capabilities all have positive impacts on sustainable new venture performance, consistent with prior studies of new ventures, e.g., [3,7,27,29,38] and established firms, e.g., [25,38]. These findings bolster previous research results showing that investment in capabilities leads to increase in sustainable new venture performance [3,7,24,25,38].

Second, we advance the extant literatures by proposing and confirming empirically that competitive intensity moderates the capabilities–performance relationships in new ventures. There is lack of empirical evidence for identifying the potential effect of competitive intensity on capabilities–performance relationship in new ventures [15,18]. Capabilities involve the deployment of new venture’s resources, which needs to consider the environmental factor [10,18,42]. Without considering competitive intensity, all four capabilities have positive and significant effects on sustainable new venture performance. However, the findings of this study suggest that the relationships between capabilities and sustainable new venture performance may vary under different levels of competitive intensity. This adds to the prior studies [15].

Our study thus shows that competitive intensity is an important boundary condition for understanding the relationships between capabilities and sustainable new venture performance [1,2,4,5,15]. As competitive intensity increases, the positive relationships between marketing capabilities and sustainable new venture performance decreases, not increases. In contrast, the positive relationships between market-linking capabilities on sustainable new venture performance increases, not decreases as for marketing capabilities. Moreover, when competitive intensity is very high, marketing capabilities have no significant effects on sustainable new venture performance. At the same time, when competitive

intensity is low, market-linking capabilities have no significant effects on sustainable new venture performance. Finally, the effects of technology capabilities and IT capabilities on sustainable new venture performance are not moderated by competitive intensity. Our findings advance CBV and RBV theories by demonstrating the important role of competitive intensity as one of the boundary conditions for explaining the skepticism of the CBV and RBV theories [1,2,4,5].

5.2. Practice Implications

The results of this study provide two important insights for guiding executives of new ventures and for sustainable entrepreneurship. First, without considering competitive intensity, all four capabilities increase sustainable new venture performance. Examination of the standardized coefficient estimates in Model 1 of Table 3 suggests that these four capabilities have different effects on sustainable new venture performance. IT capabilities ($B = 0.479$, the highest standardized estimate) are found to have the greatest effect on sustainable new venture performance, followed by technology capabilities and the marketing capabilities. Market-linking capabilities ($B = 0.211$, the lowest standardized estimate) have the lowest effect on sustainable new venture performance.

These empirical results highlight the importance of investing in IT capabilities and technology capabilities to improve sustainability of new venture performance. New ventures should first consider increasing investment in IT systems for sustainable new product development projects and for facilitating market knowledge creation, technology knowledge creation, cross-functional integration, and internal communication. The next investment priority should be to invest in developing technology capabilities to predict technological changes in the industry, technology and new product development capabilities, and manufacturing processes.

Second, the above suggestions should also be conditioned on the level of competitive intensity. Specific suggestions are:

- (1) When competitive intensity is at low to moderate levels (i.e., 1, 2, or 3 on a 5-point scale), new ventures should devote the financial resources to increase marketing capabilities (see Figure 2a), but refrain from new investment to increase market-linking capabilities (see Figure 2b).
- (2) Conversely, when competitive intensity is high or very high (i.e., 4 or 5 on a 5-point scale), new ventures should make heavier investments in developing market-linking capabilities (see Figure 2b). Yet, they should not continue to invest in increasing marketing capabilities (see Figure 2a).

Therefore, it is critical for the new venture founding team to assess the level of competitive intensity in order to make appropriate investment decisions regarding what capabilities to invest in.

5.3. Research Limitations and Future Research Directions

This study has some limitations. First, this study focused on only the four most widely accepted capabilities in the literature. The sustainability of the new ventures may also be affected by other capabilities such as management capabilities, operations capabilities, supplier integration capabilities, and human resource management capabilities. Future studies should investigate if and how competitive intensity moderates the effect of these other capabilities on sustainable new venture performance.

Second, there may be other important contingent factors or boundary conditions that we did not examine in this study. The strategic management literature has called for additional research into boundary conditions to extend the CBV and RBV theories [5].

Third, this study used profit margin as a proxy to assess sustainable new venture performance. Although this measure has been widely accepted in the entrepreneurship literature [3,27] and in sustainability literature [32,62], recent studies in sustainability literature have used three-year average sales growth rate to measure sustainable performance [32,62]. Therefore, future research should collect both sales growth and gross margin to study the sustainable new venture growth and performance.

Finally, the empirical data set we used in this study included only U.S. new ventures. This study did not examine how culture may moderate or change the study findings. Future research should collect empirical data from other countries to further advance sustainable development goals.

6. Conclusions

By investigating the effects of capabilities on sustainable new venture performance, this study adds to our understanding of how marketing, technology, market-linking, and IT capabilities affects sustainable new venture performance under the different levels of competitive intensity. The results show that the relationships between four capabilities and sustainable new venture performance are moderated by the competitive intensity. Without considering competitive intensity, all four capabilities enhance sustainable new venture performance. However, as competitive intensity increases, the positive relationships between marketing capabilities and sustainable new venture performance decreases, not increases. In contrast, as competitive intensity increases, the positive relationship between market-linking capabilities and sustainable new venture performance relationships increases, not decreases in the case of marketing capabilities. These results further add to the extant literature that competitive intensity is an important contingent factor or boundary condition for the relationships between capabilities and sustainable organizational performance. The study findings contribute the development of sustainable enterprises.

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Appendix A Study Measures and Sources

Marketing capabilities (MC) (Cronbach's alpha = 0.917) (1 = Much worse than the top three major competitors in the industry; 5 = Much better than the top three major competitors in the industry) (adopted from [7], see also [3])

- MC1 Knowledge of customers.
- MC2 Knowledge of competitors.
- MC3 Integration of marketing activities.
- MC4 Skill to segment and target markets.

Technology capabilities (TC) (Cronbach's alpha = 0.970) (1 = Much worse than the top three major competitors in the industry; 5 = Much better than the top three major competitors in the industry) (adopted from [25], see also [3])

- TC1 New product sustainable development capabilities.
- TC2 Manufacturing sustainability processes.
- TC3 Technology sustainable development capabilities.
- TC4 Ability of predicting technological changes in the industry.
- TC5 Production facilities.

Market-linking Capabilities (MLC) (Cronbach's alpha = 0.829) (1 = Much worse than the top three major competitors in the industry; 5 = Much better than the top three major competitors in the industry) (adopted from [37], see also [3])

- MLC1 Market sensing capabilities.
- MLC2 Customer-linking (i.e., creating and managing durable customer relationships) capabilities.
- MLC3 Capabilities of creating durable relationship with our suppliers.
- MLC4 Ability to retain customers.
- MLC5 Channel-bonding capabilities (i.e., creating durable relationship with channel members such as whole sellers, retailers, etc.).

IT Capabilities (ITC) (Cronbach's alpha = 0.826) (1 = Much worse than the top three major competitors in the industry; 5 = Much better than the top three major competitors in the industry) (adopted from [25], see also [3])

- ITC1 Information technology systems for new product sustainable development projects.
- ITC2 Information technology systems for facilitating cross-functional integration.
- ITC3 Information technology systems for facilitating technology knowledge creation.
- ITC4 Information technology systems for facilitating market knowledge creation.
- ITC5 Information technology systems for internal communication (i.e., across different departments, across different levels of the organization, etc.).

Competition Intensity (COIN) (Cronbach's alpha = 0.921) (1 = Not descriptive; 5 = Very descriptive) (adopted from [58])

- COIN1 Competition in our industry is cutthroat.
- COIN2 There are many "promotion wars" in our industry.
- COIN3 Anything that one competitor can offer, others can match readily.
- COIN4 Price competition is a hallmark of our industry.
- COIN5 Our competitors are relatively weak.

Sustainable new venture performance is calculated as: Profit Margin = $100 \times (\text{Total Sales} - \text{Total Costs}) / (\text{Total Sales})$ (adopted from [27])

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