Enhancing customer-linking marketing capabilities using marketing analytics

Guangming Cao
Department of Business Administration, Ajman University, Ajman, United Arab Emirates, and
Na Tian
Northwestern Polytechnical University, Xi'an, Chinag

Abstract

Purpose – Evidence in the literature has indicated that customer-linking marketing capabilities such as customer relationship management (CRM) and brand management are important drivers of marketing performance and that marketing analytics use (MAU) enables firms to gain valuable knowledge and insights for improving firm performance. However, there has been little focus on how firms improve their CRM and brand management via MAU. This study aims to draw on the absorptive capacity theory, research on marketing capabilities and marketing analytics to examine the capability-developing mechanisms that enable a firm to use marketing analytics to enhance its CRM and brand management capabilities, thereby improving its marketing performance.

Design/methodology/approach – A research model is developed and tested based on an analysis of 289 responses collected using an online survey from middle and senior managers of Chinese firms with sufficient knowledge and experience in using marketing analytics for survey participation.

Findings – The findings demonstrate that MAU is positively related to both CRM and brand management capabilities, which in turn are positively associated with marketing performance; and that both CRM and brand management capabilities mediate the relationship between MAU and marketing performance.

Research limitations/implications – The study's outcomes were based on data collected from a survey, which was distributed using mass e-mails. Thus, the study is unable to provide a meaningful response rate. The research results are based on and limited to Chinese firms.

Practical implications – MAU is essential for enhancing customer-linking marketing capabilities such as CRM and brand management, but it alone is not sufficient to improve marketing performance. Firms wishing to improve marketing performance should leverage the knowledge and insights gained from MAU to enhance their critical customer-linking marketing capabilities.

Originality/value – This study explicates the capability-developing mechanisms through which a firm can use its market-sensing capability as manifested by MAU to enhance customer-linking marketing capabilities and to improve its marketing performance. In so doing, this study extends our understanding of the critical role of absorptive capacity in helping firms identify, assimilate, transform and apply valuable external knowledge.

Keywords Customer relationship management, Absorptive capacity, Brand management, Marketing analytics, Marketing performance

Paper type Research paper

Introduction

A firm's marketing capabilities refer to its ability to use available resources to perform marketing tasks thereby achieving desired marketing outcomes (Morgan *et al.*, 2012). Evidence within the marketing literature indicates that a firm's marketing capabilities are important drivers of marketing performance (Vorhies *et al.*, 2011); however, little research exists to examine how firms improve their marketing capabilities (Wedel and Kannan, 2016). In parallel, while analytics research shows that a firm can use marketing analytics to gain valuable knowledge and insights from data for enhancing its marketing capabilities and firm performance (Cao *et al.*, 2019; Wedel and Kannan, 2016), there is a lack of theoretical and empirical understanding of how the firm can utilize marketing analytics to improve its marketing capabilities (Cao *et al.*, 2019). Furthermore, there has been little focus on the interrelationship among marketing analytics use (MAU), marketing capabilities and marketing performance.

Therefore, this study seeks to answer one key research question: what are the mechanisms that enable a firm to use marketing analytics to enhance its marketing capabilities thereby improving its marketing performance? Specifically, this study seeks to conceptualize and empirically examine how a firm can develop its market-sensing capability (Day, 1994) as manifested by MAU to improve its customer-linking capabilities (Day, 1994) as manifested by customer relationship management (CRM) and brand management and their impacts on marketing performance.

To answer the question, this study draws on the absorptive capacity theory to explain the interrelationship among these

The current issue and full text archive of this journal is available on Emerald Insight at: **https://www.emerald.com/insight/0885-8624.htm**

Journal of Business & Industrial Marketing
35/7 (2020) 1289–1299
 [ISSN 0885-8624]
[DOI 10.1108/JBIM-09-2019-0407]

Received 13 September 2019
Revised 24 November 2019
2 January 2020
Accepted 5 January 2020

Journal of Business & Industrial Marketing
Volume 35 · Number 7 · 2020 · 1289–1299

constructs. Absorptive capacity helps understand how firms "recognize the value of new information, assimilate it and apply it to commercial ends" (Cohen and Levinthal, 1990, p. 128). Accordingly, this study, based on the tenet of absorptive capacity (Cohen and Levinthal, 1990; Zahra and George, 2002), conjectures that when a firm uses marketing analytics, it improves its abilities to acquire and assimilate external knowledge, which in turn allow the firm to transform and exploit its CRM and brand management capability (BMC) to have better customer-linking capabilities, thereby improving its marketing performance.

Specifically, this article investigates the role of absorptive capacity in enhancing a firm's customer-linking capabilities and eventually marketing performance in China, the world's second-largest economy (Hopewell, 2015). Given that the Chinese market conditions are characterized by very high volatility and variability (Li *et al.*, 2008) and that little attention has been paid to emerging economy firms (Wu and Voss, 2015), it would be pertinent and interesting to examine how Chinese firms use marketing analytics to improve their customer-linking marketing capabilities and marketing performance through recognizing, acquiring, assimilating and applying external knowledge.

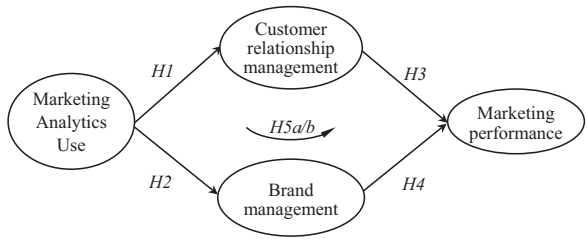
As a result, this article contributes new work on an under-researched phenomenon. By suggesting that a firm's absorptive capability determines the extent to which the firm could develop its market-sensing and customer-linking capabilities, this research advances understanding of absorptive capacity (Cohen and Levinthal, 1990; Zahra and George, 2002) in the context of marketing and business analytics. This study also contributes to research on marketing capabilities (Day, 1994; Morgan *et al.*, 2009; Vorhies, 1998; Vorhies *et al.*, 2011) by examining the development of CRM and brand management from the perspective of absorptive capacity and marketing analytics in a Chinese context. Further, this study adds to the analytics literature by investigating the impact of MAU on the development of marketing capabilities.

The remainder of this paper is structured as follows. The next section presents the study's overview of the theoretical underpinnings of its main concepts and proposed hypotheses. Then, the research methodology is discussed, including research design, sampling process, operationalization of constructs and fieldwork, followed by the data analysis and presentation of results. Finally, theoretical and managerial implications, study limitations and directions for future research are provided.

Theoretical underpinnings

The following section first discusses the key conceptual underpinnings. Then, building on the absorptive capacity theory, it develops testable hypotheses as represented in Figure 1. The hypotheses to be developed postulate the relationships between MAU and CRM (*H1*) and brand management (*H2*), the links from both CRM (*H3*) and brand management (*H4*) to market performance and the mediating roles of CRM (*H5a*) and brand management (*H5b*) in influencing the relationship between MAU and marketing performance.

Figure 1 Research model



Conceptual underpinnings

Marketing analytics, a domain of business analytics, refers to the collection, management and analysis of data to extract useful insights into support marketing decision-making (Cao *et al.*, 2019; Wedel and Kannan, 2016).

Customer-linking (Day, 1994) or focused (Vorhies *et al.*, 2011) capabilities in this study include CRM and brand management. CRM is a firm's ability to build relationships with potential customers and ability to leverage the established relationship with customers to acquire new customers and retain customers (Vorhies and Morgan, 2005; Vorhies *et al.*, 2011) thereby maximizing customer lifetime value and profit (Persson and Ryals, 2014). How firms adapt their customer offerings and communications strategy to manage customer relationships could have a significant impact on customer satisfaction (CS) and business performance (Vorhies *et al.*, 2011). When firms understand and satisfy customer needs, they are likely to be able to deliver value matching customers' expectations and to ensure customer retention and loyalty based on CS. Additionally, CRM is often associated with the implementation of technology solutions; thus how to use information technology (IT) to support CRM deserves attention (Wang *et al.*, 2013). While it is suggested that in a retail bank context CRM decisions are often extensively relied on managerial heuristics (Persson and Ryals, 2014), there is indication that business analytics could be used to provide information for identifying and targeting prospective customers thereby developing and cultivating customer relationships (Kiron *et al.*, 2013; LaValle *et al.*, 2011).

Brand management is a firm's ability to effectively deploy reputational resources to create, sustain and grow reputational brand assets (Vorhies *et al.*, 2011). This includes the process of creating, coordinating and monitoring interactions between a firm and its stakeholders for the purpose of transforming its brand value into superior marketing performance. Research indicates that firms with superior BMC will be better placed to see positive gains in marketing performance (Morgan and Rego, 2009).

While the importance of brand management is well accepted in business-to-consumer contexts, branding is becoming more prevalent in business-to-business settings (Casidy *et al.*, 2018; Leek and Christodoulides, 2011) as industrial firms have increasingly recognized the importance of brand positioning strategies (Maarit Jalkala and Keränen, 2014) and branding benefits such as raising the quality perceptions of their offerings (Michell *et al.*, 2001), enabling premium pricing strategies (Ohnemus, 2009) and improving marketing performance (Chang *et al.*, 2018).

Additionally, there is some evidence in the literature to suggest that top-performing firms use business analytics to

manage brand (LaValle *et al.*, 2011) or use social analytics to evaluate and monitor their brand equity and their competitive positions by identifying trending keywords (Wedel and Kannan, 2016). Thus, it is worth examining how marketing analytics could be used to support brand management.

Based on prior research on marketing capabilities, both CRM and brand management can be understood as customer-linking capabilities (Day, 1994; Vorhies *et al.*, 2011) to enable a firm "to achieve collaborative customer relationships so individual customer needs are quickly apparent to all functions and well-defined procedures are in place for responding to them" (Day, 1994, p. 49).

Expectedly, a firm that is able to use marketing analytics effectively to gain insights into, for example, its competitors' moves and its customers' needs is more likely to better manage its customer relationships and brand, and eventually to be the most competitive in the market. In this sense, market analytics use can be understood to demonstrate the firm's market-sensing capability that is the firm's ability to identify deep market insights and to sense market changes and unmet needs (Day, 1994). While evidence in the literature indicates that some firms use business/marketing analytics to enhance their CRM and brand management (Kiron *et al.*, 2013), many firms in the retail industry do not perceive the potential benefit to be gained from deploying customer analytics. This may be because most firms are unsure how to proceed, thus it has been suggested that firms need to transform their capabilities so advanced analytics can become a core element in their efforts to improve performance. However, there is limited empirical work examining how to use technology and complementary resources to form marketing capabilities that foster durable customer relationships (Rapp *et al.*, 2010).

This paper argues that the above phenomenon could be better understood through the lens of absorptive capacity, which refers to a firm's ability to identify, assimilate, transform and apply valuable external knowledge to advance commercialization and firm competitiveness (Cohen and Levinthal, 1990). While firms are now facing a dynamic environment that is characterized by increasing competition, rapidly evolving customer preferences and advances in technology, absorptive capacity enables them to "respond proactively to the opportunities present in the environment" (Cohen and Levinthal, 1990, p. 138). Absorptive capacity has been used to explore why some firms transfer external knowledge more successfully than others, for example, to enhance marketing capability and new product performance (Najafi-Tavani *et al.*, 2016), to improve firm performance by enhancing customer acquisition and retention (Rakthin *et al.*, 2016), or to achieve better marketing performance by improving product development and customer relationship capabilities (Tzokas *et al.*, 2015).

Among other findings, one key lesson is that for firms to be successful, they need to balance their technological and customer-related capabilities; however, this is yet to be tested empirically (Tzokas *et al.*, 2015). Moreover, limited research exists on absorptive capacity in a marketing context (Rakthin *et al.*, 2016). To the best of the author's knowledge, there is no known research using the absorptive capacity to explore how marketing analytics could be used to influence CRM and brand management through acquiring, assimilating and exploiting external knowledge.

Subsequently, based on the above discussions and drawing on the absorptive capacity theory, the following section develops testable hypotheses to theorize the interrelationships among marketing analytic use, customer-linking marketing capabilities and marketing performance.

Relating marketing analytics use to customer-linking marketing capabilities

Analytics research has suggested that firms could use business analytics to "extract previously unknown, potentially useful and interesting knowledge" (Oztekin, 2018, p. 363) such as customer lifecycle-encompassing acquisition, retention and expansion (Kitchens *et al.*, 2018), or "consumer opinion, customer needs, and recognizing new business opportunities" (Chen *et al.*, 2012, p. 1185) thereby better sensing market threats and opportunities (Cao *et al.*, 2019).

Drawing on the absorptive capacity theory, firms that are more able to acquire and assimilate externally generated knowledge about customers and the broader market environment (Zahra and George, 2002) through MAU are more likely to explore new ideas and use these ideas for developing innovative products and services to deliver real value to the customers. Specifically, the extent to which a firm can use marketing analytics to identify and assimilate externally generated knowledge determines the extent to which it can develop its market-sensing capability (Day, 1994), which then influences the extent to which the firm can transform and apply valuable external knowledge to provide the knowledge foundation for developing its marketing capabilities (Vorhies *et al.*, 2011). Again the extent to which a firm can develop its CRM and brand management by leveraging the knowledge foundation defines the extent to which it can develop its custom-linking capabilities (Day, 1994; Vorhies *et al.*, 2011).

For example, research suggests that firms using business/marketing analytics to gain externally generated knowledge are more likely to be able to identify and target prospective customers thereby developing and cultivating customer relationships (Ashrafi and Zare Ravasan, 2018; Kiron *et al.*, 2013; LaValle *et al.*, 2011), to transform new product development (Johnson *et al.*, 2017), to have new product success (Xu *et al.*, 2016), to differentiate its products or to offer customer involvement to provide valuable input for developing new products. Additionally, Oztekin (2018) suggested that a firm gaining higher levels of marketing knowledge from data analytics will be more likely to maximize the benefits of CRM to build relationships with potential customers and to leverage the established relationship with customers thereby acquiring new customers and retaining customers (Vorhies and Morgan, 2005; Vorhies *et al.*, 2011).

Additionally, the impact of MAU on CRM could be supported by prior IT research on the relationship between IT and CRM (Wang *et al.*, 2013; Wang *et al.*, 2016). Wang *et al.* (2016) showed that firms can better implement CRM based on data analytics as a large volume of customer data has been generated from IT applications. Wang *et al.* (2013) demonstrated that IT-enabled connectivity among functional departments and across supply chains could allow a firm to stay closer to its customers and partners, to provide information to groups involved in CRM, and to provide an effective network for connecting various IT and computer-based CRM; as a result, the firm could have greater

integration, sophisticated processing and advanced analyses thereby allowing it to be able to develop new applications in support of its CRM. Accordingly, this study argues that a firm can use marketing analytics to develop its market-sensing capability, which could further enable the firm to develop its customer-linking capabilities.

Thus, it is believable that the firm's ability to use marketing analytics to acquire and assimilate external knowledge can be seen to shape the firm's ability to transform and exploit the knowledge gained to further enhance its CRM to serve the customers better. Expectedly, the firm's analytics-enabled CRM may allow the firm to make better CRM decisions, such as developing a customer strategy that involves examining the existing and potential customer base, formulating a value creation strategy to determine what value to provide to its customer and receive from its customers, and deciding the most appropriate combinations of channels to use (Payne and Frow, 2005).

Building on these, it can be further argued that firms that are able to identify and assimilate knowledge and insights using marketing analytics are also in a better position to transform and exploit this external knowledge and insights to further boost its brand management. For example, MAU could enable firms to identify and assimilate data-driven understanding of consumer behavior and segments by analyzing the unprecedented quantity of data available, which leads to more precise identification of valuable brand positioning, brand building (Nichols, 2013) and understanding of the relationship between customers' brand perceptions and their lifetime value to the firm (Horst and Duboff, 2015). Additionally, evidence in the literature suggests that top-performing firms use business analytics to manage brand (LaValle *et al.*, 2011) or use social analytics to evaluate and monitor their brand equity and their competitive positions by identifying trending keywords (Wedel and Kannan, 2016). Thus, it is likely that firms with strong market-sensing capability as manifested by MAU may be able to transform and exploit external knowledge to create better BMC, which in turn allow firms to identify new customers by offering valued products/services and striving to maintain attractive value propositions relative to competing offerings using reputational assets (Vorhies and Morgan, 2005; Vorhies *et al.*, 2011).

Thus, drawing on the absorptive capacity theory and research on marketing capabilities and marketing analytics, it is perceivable that MAU, representing the firm's market-sensing ability to acquire and assimilate external knowledge, could provide the knowledge base to be transformed and exploited by the firm to enhance its custom-linking capabilities as manifested by CRM and brand management (Vorhies *et al.*, 2011; Zahra and George, 2002). In line with the above, the following hypotheses could be proposed:

H1. MAU relates positively to CRM capability.

H2. MAU relates positively to BMC.

Associating customer-linking marketing capabilities with market performance

The marketing literature has widely accepted that the development of strong relationships with customers helps firms to match products and services with customer needs thus to deliver real value to the customers, which in turn positively contributes to firm performance. For example, empirical evidence within the marketing literature has suggested that a firm can improve its performance from its marketing capabilities (Day, 1994; Vorhies *et al.*, 2011) such as brand management (Vorhies *et al.*, 2011) and CRM (Tzokas *et al.*, 2015), or managerial relationship capability that is centered on customers (Sánchez-Gutiérrez *et al.*, 2019). Hence, this study also proposes:

H3. CRM capability has a positive effect on marketing performance.

H4. BMC has a positive effect on marketing performance.

Customer-linking marketing capabilities mediating the relationship between marketing analytics use and marketing performance

In addition to the widely recognized role of CRM and brand management in driving marketing performance, there is also evidence to suggest that they are likely to be important mediators. For instance, Foltean *et al.* (2019) showed empirically that CRM mediates the relationship between social media technology and firm performance, whereas Vorhies *et al.* (2011) demonstrated empirically, though not specifically hypothesized, that marketing capabilities (including brand management) play a role in mediating the relationship between marketing exploitation/exploration and financial performance.

This proposed mediation role of CRM and brand management is also consistent with IT research that suggests that IT-related capabilities (market-sensing ability in this study) create business value indirectly by influencing other resources or capabilities (Kohli and Grover, 2008), supporting and enhancing other core competencies (Ravichandran *et al.*, 2005) or leveraging the value of other resources and capabilities such as management capabilities and operational capabilities (Radhakrishnan *et al.*, 2008). Similarly, analytics studies suggest that business analytics affects firm competitiveness and/or performance indirectly (Seddon *et al.*, 2017; Sharma *et al.*, 2014). Building on these and the hypotheses developed in this paper, it is plausible to further postulate that MAU is associated with marketing performance indirectly through the mediation of customer-linking marketing capabilities:

H5a/b. marketing analytics use is positively associated with marketing performance indirectly through the mediation of (a) CRM and (b) BMC.

Figure 1 summarizes the study's proposed research model. Primarily, MAU is conjectured to have a positive effect on both CRM and BMC, which in turn have a positive impact on marketing performance and mediate the relationship between MAU and marketing performance.

Research methodology

Measures

To test the proposed hypotheses, the constructs were measured using items developed by prior studies (Table I). MAU was

Table I Constructs and indicators of the study

Construct	Indicator	Reference
BMC reflective	How does your company perform the following activities relative to your key competitors?	Morgan *et al.* (2009), Vorhies and Morgan (2005), Vorhies *et al.* (2011)
	Routinely use customer insight to identify valuable brand positioning*	
	Consistently establish desired brand associations in consumers' minds	
	Maintain a positive brand image relative to competitors	
	Achieve high levels of brand awareness in the market on a regular basis	
	Systematically leverage customer-based brand equity into preferential channel positions*	
CRM, reflective	How does your company perform the following activities relative to your key competitors?	Morgan *et al.* (2009), Vorhies and Morgan (2005), Vorhies *et al.* (2011)
	Routinely establish a "dialogue" with target customers	
	Get target customers to try our products/services on a consistent basis*	
	Focus on meeting customers' long term needs to ensure repeat business	
	Systematically maintain loyalty among attractive customers	
	Routinely enhance the quality of relationships with attractive customers	
MAU, formative	To what extent has your company implemented marketing analytics in each of the following areas?	Cao *et al.* (2019)
	Customer insight	
	Customer acquisition	
	Customer retention	
	Segmentation	
	New product or service development	
	Product or service strategy	
	Promotion strategy	
	Pricing strategy	
	Marketing mix	
	Branding	
	Digital marketing	
	Social media	
	Multichannel marketing	
CS, reflective	Over the past year, how did your company perform relative to your key competitors?	Orr *et al.* (2011), Vorhies and Morgan (2005)
	CS	
	Delivering value	
	Delivering what our customers want	
	Retaining valued customers	
ME, reflective	Over the past year, how did your company perform relative to your key competitors?	Orr *et al.* (2011) Vorhies and Morgan (2005)
	Market share growth	
	Growth in sales revenue	
	Increasing sales to existing customers	
	Acquiring new customers	

Note: *dropped after the measurement evaluation

measured formatively by using 13 items adapted from Cao *et al.* (2019); BMC and CRM were each measured using five indicators adapted from prior studies (Morgan *et al.*, 2009; Vorhies and Morgan, 2005; Vorhies *et al.*, 2011); CS and market effectiveness (ME) were each measured using four items adapted from prior studies (Orr *et al.*, 2011; Vorhies and Morgan, 2005). Then, marketing performance was measured in terms of CS and ME. Additionally, this study controlled for firm size (number of employees), industry type and respondent's job title and tenure, following prior studies (Cao *et al.*, 2019; Vorhies *et al.*, 2011).

Sample and data collection

After measure development, the questionnaire survey was developed using the back-translation process, initially in English and then translated into Chinese to facilitate respondents' understanding. The back-translation process was repeated three times until the originator of the questions was satisfied that the Chinese version was representative of the original source. Then, the questionnaire survey was pilot-tested to ensure that the respondents understood the questions and there were no problems with the wording or measurements. This resulted in a number of formatting and presentation modifications. Table I shows the questions used in the survey to measure the research constructs.

The survey was conducted by a Chinese market research firm using a non-probability sampling approach. An online questionnaire was distributed by e-mail to 9,042 Chinese firms. Within two weeks, 303 responses were received and 289 were usable responses. As there is no agreed method for conducting surveys with mass e-mails yet, this study thus considered the number of responses from the perspective of building an adequate model. In the structural model, the maximum number of arrows pointing at a construct is two. To detect a minimum R^2 value of 0.10 in any of the constructs at a significance level of 1 per cent, the minimum sample size required is 158 (Hair *et al.*, 2014). Since 289 usable responses

were received, this minimum sample size requirement was thus met.

Data analysis and results

The hypotheses were tested using PLS-SEM (SmartPLS). Methodological research (Gefen *et al.*, 2011; Hair *et al.*, 2013; Wetzels *et al.*, 2009) recommended that PLS-SEM is well-suited for research situations where theory is not well-developed and formative constructs are part of the research model. This study used SmartPLS to empirically test the research model as research on the interrelationships among MAU, customer-linking marketing capabilities and marketing performance is insufficient and the present study handles both reflective and formative (e.g. MAU) constructs.

Respondents

Table II summarizes the company profile in terms of the industry, the number of employees and the province in which the firms were based (out of 34 Chinese provincial-level administrative units, only the top six provinces with the most responding firms were listed). Table III summarizes the respondent profile in terms of their organizational positions and tenure in the current industry.

A key informant approach was used to collect data. A total of 289 usable responses were collected from medium and large Chinese firms using an online survey approach. The reported positions of the respondents suggested that 85.5 per cent of the respondents were marketing managers and the rest of them were other middle and senior managers. Based on their position within the firm, the respondents were considered to have relevant knowledge and experience to be able to address the survey questions. The respondents were from a variety of different industries, including the home appliance, building materials, clothing/textile, machinery/equipment, automobile and accessories, electronic and others.

Common method and non-respondent bias

To control for common method bias, Harman's single-factor test was conducted and the correlation matrix was checked to identify if there were any highly correlated factors ($r > 0.90$). The result indicated that there is no evidence of substantial common method bias in this study. To evaluate the presence of non-respondent bias, a *t*-test was conducted to compare the first week with later respondents on all measures, indicating that there were no significant differences between respondents and non-respondents.

Evaluation of the measurement model

As both formative and reflective constructs were used, a separate set of analyses was used to evaluate the measurement model following the recommendations made by Hair *et al.* (2014). The reflective measurement model was evaluated by considering internal consistency (composite reliability; CR), indicator reliability, convergent validity and discriminant validity. The CR scores summarized in Table IV indicated that these constructs should be consistent. Although several scores of Cronbach's α's were slightly below 0.7, CR is recommended as more appropriate because it considers the indicators' differential weights, whereas Cronbach's α weights the indicators equally. It should be noted that to improve the model's validity and reliability several indicators with low loadings were dropped after the evaluation (indicated by * in Table I).

Discriminant validity was assessed based on the following tests. The first test was to analyze Fornell–Larcker criterion (Hair *et al.*, 2014) to evaluate if the square root of AVE value (diagonal elements) for each construct was greater than the correlation of the construct with any other construct (off-diagonal elements), which was true based on the comparison summarized in Table V. The second test was to observe if each reflective indicator loaded highest on the construct it is associated with, which was also true. Additionally, the values of variance inflation factor (VIF) were assessed to check if there is

Table II Company profiles ($n = 289$)

Industry	(%)	No. of employees	(%)	Province	(%)
Home appliance	5.7	50-249	46	Guangdong	13
Building materials	14.6	250-499	25.9	Beijing	11
Clothing/textile	17.4	500-999	13.6	Shanghai	7
Machinery/equipment	11.1	1,000-1,999	6.5	Hubei	5
Automobile and accessories	17.4	> = 2,000	8.0	Henan	3
Electronic	19.6			Sichuan	2
Other	14.2			Other	59

Table III Respondent profiles ($n = 289$)

Respondent positions	(%)	Respondent's tenure in the industry (*x*-years)	(%)
CEO/President/MD/Partner	1.6	$x \leq 5$	8.5
Vice President/Director	0.7	$5 < x \leq 10$	58.5
Other C-level Executive	11.5	$10 < x \leq 15$	23.7
Chief Marketing Officer	15.9	$15 < x \leq 20$	7.6
Director/Head of Marketing	69.6	$20 < x \leq 25$	1
Other directors	0.7	$x > 25$	0.7

Table IV Convergent validity and internal consistency reliability for LOCs

Construct	Indicator	Loading	Indicator reliability	CR	Cronbach's α	AVE
BMC	BMC1	0.78	0.61	0.81	0.64	0.58
	BMC2	0.73	0.53			
	BMC3	0.77	0.59			
CRM	CRM1	0.76	0.58	0.82	0.70	0.53
	CRM2	0.68	0.46			
	CRM3	0.77	0.59			
	CRM4	0.69	0.48			
CS	CS1	0.71	0.50	0.81	0.69	0.59
	CS2	0.67	0.45			
	CS3	0.80	0.64			
	CS3	0.73	0.53			
ME	ME1	0.78	0.61	0.80	0.66	0.50
	ME2	0.78	0.61			
	ME3	0.72	0.52			
	ME4	0.70	0.49			

Table V Descriptive statistics, correlations and AVE

	Mean	SD	1	2	3	4
1. BMC	5.52	0.94	*0.76*			
2. CRM	5.55	0.84	0.57**	*0.72*		
3. MP	5.55	0.69	0.66**	0.69**	*0.70*	
4. MAU	5.20	0.65	0.39**	0.37**	0.45**	#

Notes: # = formative construct; the diagonal elements (in bold) represent the square root of AVE; **$p < 0.01$

a potential multicollinearity issue. The assessment result indicated that all VIF values were below 3.3 (Petter *et al.*, 2007); there was no obvious multicollinearity issue. Thus, discriminant validity was satisfactory.

The formative measurement model was validated in terms of assessing multicollinearity, the indicator weights, significance of the weights, and the indicator loadings (Hair *et al.*, 2014). The level of multicollinearity was evaluated in terms of the VIF values of all formative constructs. It was satisfactory as all VIF values associated with the formative constructs were below 3.3. All indicators' outer weights were significant, indicating each formative indicator captured a portion of the associated construct's scope. Therefore, based on the above evaluations, the formative part of the measurement model was valid.

Hypotheses testing

SmartPLS3 was used for testing the hypotheses and assessing the predictive power of the research model. With both higher-order components and the lower order components (e.g. MAU) being used to model the constructs, a mixture of the repeated indicators approach and the use of latent variables scores in a two-stage approach was used to analyze path relationships as suggested by Hair *et al.* (2014). Additionally, a bootstrapping procedure (5,000 samples) was used to assess the significance of the hypothesized paths and the amount of variance in the dependent variables attributed to the explanatory variables (Hair *et al.*, 2014).

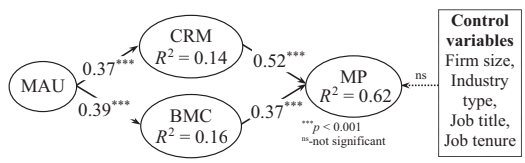
To understand whether firm size, industry type, respondent job title and tenure had an effect on marketing performance, this study controlled for these factors by the use of dummy variables. The results indicated that none of them had a statistically significant effect (at the 5 per cent level) on marketing performance (Figure 2).

The model's predictive power was evaluated by the amount of variance attributed to the latent variables (i.e. R^2). The R^2 values indicate that the full model explains 14 per cent in CRM, 16 per cent in BMC and 62 per cent in MP (marketing performance). In line with the suggestion in IT-related research that the effect size for R^2 is small = 0.1, medium = 0.25, and large = 0.36 when PLS is used (Wetzels *et al.*, 2009), the effect sizes of CRM and BMC were small, whereas the effect size of MP is large.

H1 proposes that MAU is positively related to CRM, which is confirmed by MAU's effect of 0.37 ($p < 0.001$) on CRM. *H2* proposes that MAU is positively related to BMC, which is supported as MAU's effect on BMC is 0.39 ($p < 0.001$). *H3* posits that CRM is positively associated with MP, which is confirmed by CRM's effect of 0.52 ($p < 0.001$) on MP. *H4* assumes that BMC is positively associated with MP, which is also supported by BMC's effect of 0.37 ($p < 0.001$) on MP.

H5a/b assumes that CRM/BMC mediates the relationship between MAU and MP. To verify *H5a/b*, the mediating role of CRM/BMC was analyzed based on bootstrapping (5,000 samples) (Hair *et al.*, 2014; Hayes, 2009; Preacher and Hayes, 2004). The analysis indicated that while MAU's direct effect on MP is not significant, its indirect effect through CRM on MP is significant ($\beta = 0.192$, $p < 0.001$) and its indirect effect through BMC on MP is significant ($\beta = 0.149$, $p < 0.001$),

Figure 2 Hypothesis test results



suggesting that CRM/BMC mediates the effect of MAU on MP. Thus, *H5a/b* is supported.

Key findings and research contributions

Discussions

Understanding how marketing analytics can be used to enhance customer-linking marketing capabilities is important to both firms and scholarly research since MAU is, in essence, the marketing-sensing capability and both CRM and brand management are essentially customer-linking capabilities (Day, 1994; Vorhies *et al.*, 2011). Integrated together, these capabilities are important drivers of marketing performance (Vorhies *et al.*, 2011). Despite that research has recognized the importance of customer-linking marketing capabilities and MAU separately, there has been little focus on the interrelationships among MAU, marketing capabilities, and marketing performance. This study drew on absorptive capacity to examine the capability-developing mechanisms that enable a firm to use marketing analytics to enhance its CRM and brand management capabilities thereby improving its marketing performance. Specifically, this study examined the effects of: MAU on CRM (*H1*) and brand management (*H2*), CRM (*H3*) and brand management (*H4*) on marketing performance, respectively, and CRM (*H5a*) and brand management (*H5b*) as mediators on the relationship between MAU and marketing performance.

With respect to the effects of marketing analytic use on CRM and brand management, the empirical findings indicate that MAU is positively associated with CRM ($\beta = 0.37$ at $p < 0.001$) and brand management ($\beta = 0.39$ at $p < 0.001$) capabilities. The firms included in this study seem to be able to use marketing analytics to develop their market-sensing capabilities to identify market changes, competitors move and customers' expectations and unmet needs, which in turn allow these firms to transform and exploit customer-linking capabilities, that is, CRM and brand management capabilities, to create and manage close customer relationships.

These findings show that MAU relates to customer-linking marketing capabilities significantly and positively. This is consistent with the marketing literature previously discussed in that marketing capabilities are built upon marketing knowledge (Vorhies *et al.*, 2011). The positive relationship between MAU and CRM and brand management capabilities demonstrated in this study implies that the firms in this study can use marketing analytics to develop their market-sensing capabilities to acquire and assimilate external knowledge, which in turn enables them to transform and exploit the external knowledge gained to improve their customer-linking capabilities, that is, CRM and BMC. However, unlike prior marketing studies (Day, 1994; Morgan *et al.*, 2009; Vorhies, 1998; Vorhies *et al.*, 2011) that have examined marketing capabilities mainly from a marketing perspective, this study investigated market-sensing and customer-linking capabilities from the lens of analytics and marketing studies. Moreover, while there is limited research on absorptive capacity in a marketing context (Rakthin *et al.*, 2016), this study applied absorptive capacity to understanding the link between MAU and CRM and brand management.

Thus, the findings from this study extend the existing knowledge regarding marketing analytics use. Unlike prior analytical studies that have recognized the potentials of using marketing analytics to identify data-driven insights, thereby influencing marketing capabilities (Cao *et al.*, 2019; Chen *et al.*, 2012; Kitchens *et al.*, 2018; Oztekin, 2018), this study is among the first to have provided empirical evidence to show that marketing analytics use is positively related to CRM and brand management. Unlike prior IT research examining the relationship between IT and marketing capabilities (Wang *et al.*, 2013; Wang *et al.*, 2016), this study focused on one special type of information processing technologies, that is, MAU and demonstrated how this contemporary information processing technology could be related to the firm's market-sensing capability, which in turn can be used to enhance its customer-linking capabilities.

With regard to the hypothesized effects of CRM and brand management on marketing performance, this study's findings confirmed that CRM is positively related to marketing performance ($\beta = 0.52$ at $p < 0.001$) and that brand management is positively related to marketing performance ($\beta = 0.37$ at $p < 0.001$). The findings provide additional empirical evidence to support prior research suggesting that marketing capabilities are the drivers of marketing performance (Day, 1994; Morgan *et al.*, 2009; Vorhies *et al.*, 2011) in the context of marketing analytics, and prior research on the effect of business/marketing analytics (Cao *et al.*, 2019; Wedel and Kannan, 2016).

Relating to the conjectured mediating roles of CRM and brand management in influencing the relationship between MAU and marketing performance, this study's findings confirmed that both CRM and brand management mediate the relationship between MAU and marketing performance. This finding is consistent with prior findings that IT and/or analytics use do not lead directly to firm performance (Kohli and Grover, 2008; Radhakrishnan *et al.*, 2008; Seddon *et al.*, 2017; Sharma *et al.*, 2014). This finding also provides new empirical evidence to support only a few prior studies that suggested that CRM and brand management are important mediators (Vorhies and Morgan, 2005 and Foltean *et al.*, 2019). The implication of this finding is that MAU does not lead directly to marketing performance but to enhance CRM and brand management, which in turn improve marketing performance.

Theoretical contributions

This study offers several contributions that improve the theoretical understanding of the conditions surrounding the capability-developing mechanisms in the context of marketing analytics and marketing capabilities.

First, this research advances understanding of absorptive capacity (Cohen and Levinthal, 1990; Zahra and George, 2002) in the context of marketing and business analytics by demonstrating that a firm's absorptive capability can be used to explain the capability-developing mechanisms that enable the firm to develop its market-sensing capability as manifested by MAU, and further cultivate its customer-linking capabilities including CRM and brand management. In particular, the extent to which the firm is able to use marketing analytics to acquire and assimilate external insights and knowledge about competitors, customers, technological change and so on will influence the extent to which the firm will be able to transform and exploit the insights and knowledge so gained to boost its

customer-linking marketing capabilities such as CRM and brand management. There are two important implications of this study:

1 a firm's absorptive capacity plays a critical role in helping the firm identify, assimilate, transform, and apply valuable external knowledge; and
2 the firm's market-sensing and customer-linking capabilities are related and their development depends on the firm's overall absorptive capability.

Second, this study contributes to marketing research by extending our understanding of the links between market-sensing capability and customer-linking marketing capabilities. By testing the proposed research model, the findings provide valuable theoretical understanding and empirical evidence on how CRM and brand management capabilities can be enhanced by market-sensing capability as manifested by MAU. As a result, this study broadens the relationships between marketing analytics and CRM and brand management capabilities, indicating that a firm should be able to improve its marketing performance by enhancing its customer-linking marketing capabilities through effectively leveraging its market-sensing capability. Additionally, this study contributes to marketing research by explicating the mediating roles of both CRM and brand management. This indicates that to improve marketing performance, developing market-sensing capability using marketing analytics to identify and assimilate external knowledge alone is insufficient; external knowledge must also be transformed and applied to improve customer-linking marketing capabilities, pointing to the importance of absorptive capacity.

Third and finally, this study adds to the analytics literature by investigating the impact of MAU on the development of marketing capabilities. Specifically, in addition to the impact of business/MAU on organizational decision-making and competitiveness identified by prior studies, this study is among the first to demonstrate that MAU significantly influence the development of customer-linking marketing capabilities directly and marketing performance indirectly. Moreover, this study also contributes conceptually and empirically to the insufficiently investigated research on how to balance technological and customer-related capabilities (Tzokas *et al.*, 2015) by demonstrating that marketing analytics and customer-linking marketing capabilities could be used together to improve marketing performance.

Practical implications

Furthermore, the research model developed in this study has significant managerial implications. First, firms wishing to improve their market-sensing and customer-linking marketing capabilities and to attain better marketing performance can orient their strategies toward developing favorable internal conditions for the effective acquisition, assimilation, transformation and exploitation of external knowledge from the dynamic business environment.

Second, the findings from this research provide useful insights into understanding the importance of utilizing marketing analytics for the purpose of improving market-sensing and marketing capabilities and gaining better marketing performance. The findings suggest that MAU alone is not sufficient and marketing performance could only be improved when a firm enhances its customer-linking marketing capabilities through the effective use of marketing analytics to sense market opportunities. The implication is that the firm needs to leverage its market-sensing capability to enhance its customer-linking capabilities.

Third, the research model allows a firm to appreciate the interrelatedness of market-sensing and customer-linking marketing capabilities. Fourth, the significant and positive effects of MAU on CRM and brand management, and CRM and brand management on marketing performance, provide incentives for firms to invest in marketing analytics.

Limitations and future research

This study has several limitations, some of which provide avenues for future research. First, the study's outcomes were based on data collected from non-probability sampling, which limits the generalizability of the study's findings. Future research could further confirm this study's findings by utilizing probability sampling.

Second, the study's outcomes were based on data collected from a survey. Thus, they are dominantly correlational analyses and should not be understood as causal analysis. Future research may complement this study's findings by utilizing, for example, longitudinal analysis and/or qualitative approaches that will provide additional causal evidence and more in-depth insights and knowledge on this topic. Third, the current research results are based on and limited to Chinese firms. Considering the importance of the research topic, it would be worthwhile to extend this work to firms in other countries.

Finally, the present study focuses on developing an understanding of the ways in which marketing analytics can be used to develop market-sensing and customer-linking capabilities to improve marketing performance. Hence, it was not intended to include all key variables relevant to the research topic; caution is required to interpret the research results. Future research could include additional variables to further test the validity and usefulness of this research model.

Conclusion

Drawing on the absorptive capacity theory and research on marketing capabilities and marketing analytics, this study has articulated and tested a research model for understanding the capability-developing mechanisms through which a firm's market-sensing capability is linked to customer-linking capabilities. Essentially, the current study suggests that the extent to which a firm is able to acquire, assimilate, transform and exploit external knowledge from its dynamic environment determines the extent to which the firm can use marketing analytics to develop its CRM and BMC, thereby improving its marketing performance.

References

Ashrafi, A. and Zare Ravasan, A. (2018), "How market orientation contributes to innovation and market performance: the roles of business analytics and flexible IT infrastructure", *Journal of Business & Industrial Marketing*, Vol. 33 No. 7, pp. 970-983.

Cao, G., Duan, Y. and El Banna, A. (2019), "A dynamic capability view of marketing analytics: evidence from UK firms", *Industrial Marketing Management*, Vol. 76, pp. 72-83.

Casidy, R., Nyadzayo, M.W., Mohan, M. and Brown, B. (2018), "The relative influence of functional versus imagery beliefs on brand sensitivity in B2B professional services", *Industrial Marketing Management*, Vol. 72, pp. 26-36.

Chang, Y., Wang, X. and Arnett, D.B. (2018), "Enhancing firm performance: the role of brand orientation in business-to-business marketing", *Industrial Marketing Management*, Vol. 72, pp. 17-25.

Chen, H., Chiang, R.H.L. and Storey, V.C. (2012), "Business intelligence and analytics: from big data to big impact", *MIS Quarterly*, Vol. 36 No. 4, pp. 1165-1188.

Cohen, W.M. and Levinthal, D.A. (1990), "Absorptive capacity: a new perspective on learning and innovation", *Administrative Science Quarterly*, Vol. 35 No. 1, pp. 128-152.

Day, G.S. (1994), "The capabilities of market-driven organizations", *Journal of Marketing*, Vol. 58 No. 4, pp. 37-52.

Foltean, F.S., Trif, S.M. and Tuleu, D.L. (2019), "Customer relationship management capabilities and social media technology use: consequences on firm performance", *Journal of Business Research*, Vol. 104, pp. 563-575.

Gefen, D., Rigdon, E.E. and Straub, D. (2011), "An update and extension to SEM guidelines for administrative and social science research", *MIS Quarterly*, Vol. 35 No. 2.

Hair, J.F., Ringle, C.M. and Sarstedt, M. (2013), "Partial least squares structural equation modeling: rigorous applications, better results and higher acceptance", *Long Range Planning*, Vol. 46 No. 1-2, pp. 1-12.

Hair, J.F., Hult, G., Ringle, C. and Sarstedt, M. (2014), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Sage.

Hayes, A.F. (2009), "Beyond Baron and Kenny: statistical mediation analysis in the new millennium", *Communication Monographs*, Vol. 76 No. 4, pp. 408-420.

Hopewell, K. (2015), "Different paths to power: the rise of Brazil, India and China at the world trade organization", *Review of International Political Economy*, Vol. 22 No. 2, pp. 311-338.

Horst, P. and Duboff, R. (2015), "Don't let big data bury your brand", *Harvard Business Review*, Vol. 93 No. 11, pp. 75-78.

Johnson, J.S., Friend, S.B. and Lee, H.S. (2017), "Big data facilitation, utilization, and monetization: exploring the 3Vs in a new product development process", *Journal of Product Innovation Management*, Vol. 34 No. 5, pp. 640-658.

Kiron, D., Ferguson, R.B. and Prentice, P.K. (2013), "From value to vision: reimagining the possible with data analytics", *MIT Sloan Management Review*, Vol. 54 No. 3, pp. 1-19.

Kitchens, B., Dobolyi, D., Jingjing, L.I. and Abbasi, A. (2018), "Advanced customer analytics: strategic value through integration of relationship-oriented big data", *Journal of Management Information Systems*, Vol. 35 No. 2, pp. 540-574.

Kohli, R. and Grover, V. (2008), "Business value of IT: an essay on expanding research rirections to keep up with the times", *Journal of the Association for Information Systems*, Vol. 9 No. 1, pp. 23-39.

LaValle, S., Lesser, E., Shockley, R., Hopkins, M.S. and Kruschwitz, N. (2011), "Big data, analytics and the path from insights to value", *MIT Sloan Management Review*, Vol. 52 No. 2, pp. 21-32.

Leek, S. and Christodoulides, G. (2011), "A literature review and future agenda for B2B branding: challenges of branding in a B2B context", *Industrial Marketing Management*, Vol. 40 No. 6, pp. 830-837.

Li, J.J., Poppo, L. and Zhou, K.Z. (2008), "Do managerial ties in China always produce value? Competition, uncertainty, and domestic vs. foreign firms", *Strategic Management Journal*, Vol. 29 No. 4, pp. 383-400.

Maarit Jalkala, A. and Keränen, J. (2014), "Brand positioning strategies for industrial firms providing customer solutions", *Journal of Business & Industrial Marketing*, Vol. 29 No. 3, pp. 253-264.

Michell, P., King, J. and Reast, J. (2001), "Brand values related to industrial products", *Industrial Marketing Management*, Vol. 30 No. 5, pp. 415-425.

Morgan, N., Katsikeas, C. and Vorhies, D. (2012), "Export marketing strategy implementation, export marketing capabilities, and export venture performance", *Journal of the Academy of Marketing Science*, Vol. 40 No. 2, pp. 271-289.

Morgan, N.A. and Rego, L.L. (2009), "Brand portfolio strategy and firm performance", *Journal of Marketing*, Vol. 73 No. 1, pp. 59-74.

Morgan, N.A., Vorhies, D.W. and Mason, C.H. (2009), "Market orientation, marketing capabilities, and firm performance", *Strategic Management Journal*, Vol. 30 No. 8, pp. 909-920.

Najafi-Tavani, S., Sharifi, H. and Najafi-Tavani, Z. (2016), "Market orientation, marketing capability, and new product performance: the moderating role of absorptive capacity", *Journal of Business Research*, Vol. 69 No. 11, pp. 5059-5064.

Nichols, W. (2013), "Advertising analytics 2.0. (cover story)", *Harvard Business Review*, Vol. 91 No. 3, pp. 60-68.

Ohnemus, L. (2009), "B2B branding: a financial burden for shareholders?", *Business Horizons*, Vol. 52 No. 2, pp. 159-166.

Orr, L.M., Bush, V.D. and Vorhies, D.W. (2011), "Leveraging firm-level marketing capabilities with marketing employee development", *Journal of Business Research*, Vol. 64 No. 10, pp. 1074-1081.

Oztekin, A. (2018), "Creating a marketing strategy in healthcare industry: a holistic data analytic approach", *Annals of Operations Research*, Vol. 270 Nos 1/2, pp. 361-382.

Payne, A. and Frow, P. (2005), "A strategic framework for customer relationship management", *Journal of Marketing*, Vol. 69 No. 4, pp. 167-176.

Persson, A. and Ryals, L. (2014), "Making customer relationship decisions: analytics v rules of thumb", *Journal of Business Research*, Vol. 67 No. 8, pp. 1725-1732.

Petter, S., Straub, D. and Rai, A. (2007), "Specifying formative constructs in information systems research", *MIS Quarterly*, Vol. 31 No. 4, pp. 623-656.

Preacher, K.J. and Hayes, A.F. (2004), "SPSS and SAS procedures for estimating indirect effects in simple mediation models", *Behavior Research Methods*, Vol. 36 No. 4, pp. 717-731.

Radhakrishnan, A., Zu, X. and Grover, V. (2008), "A process-oriented perspective on differential business value creation by information technology: an empirical investigation", *Omega*, Vol. 36 No. 6, pp. 1105-1125.

Rakthin, S., Calantone, R.J. and Wang, J.F. (2016), "Managing market intelligence: the comparative role of absorptive capacity and market orientation", *Journal of Business Research*, Vol. 69 No. 12, pp. 5569-5577.

Rapp, A., Trainor, K.J. and Agnihotri, R. (2010), "Performance implications of customer-linking capabilities: examining the complementary role of customer orientation and CRM technology", *Journal of Business Research*, Vol. 63 No. 11, pp. 1229-1236.

Ravichandran, T., Lertwongsatien, C. and Lertwongsatien, C. (2005), "Effect of information systems resources and capabilities on firm performance: a resource-based perspective", *Journal of Management Information Systems*, Vol. 21 No. 4, pp. 237-276.

Sánchez-Gutiérrez, J., Cabanelas, P., Lampón, J.F. and González-Alvarado, T.E. (2019), "The impact on competitiveness of customer value creation through relationship capabilities and marketing innovation", *Journal of Business & Industrial Marketing*, Vol. 34 No. 3, pp. 618-627.

Seddon, P.B., Constantinidis, D., Tamm, T. and Dod, H. (2017), "How does business analytics contribute to business value?", *Information Systems Journal*, Vol. 27 No. 3, pp. 237-269.

Sharma, R., Mithas, S. and Kankanhalli, A. (2014), "Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organisations", *European Journal of Information Systems*, Vol. 23 No. 4, pp. 433-441.

Tzokas, N., Kim, Y.A., Akbar, H. and Al-Dajani, H. (2015), "Absorptive capacity and performance: the role of customer relationship and technological capabilities in high-tech SMEs", *Industrial Marketing Management*, Vol. 47, pp. 134-142.

Vorhies, D.W. (1998), "An investigation of the factors leading to the development of marketing capabilities and organizational effectiveness", *Journal of Strategic Marketing*, Vol. 6 No. 1, pp. 3-23.

Vorhies, D.W. and Morgan, N.A. (2005), "Benchmarking marketing capabilities for sustainable competitive advantage", *Journal of Marketing*, Vol. 69 No. 1, pp. 80-94.

Vorhies, D.W., Orr, L.M. and Bush, V.D. (2011), "Improving customer-focused marketing capabilities and firm financial performance via marketing exploration and exploitation", *Journal of the Academy of Marketing Science*, Vol. 39 No. 5, pp. 736-756.

Wang, S., Cavusoglu, H. and Deng, Z. (2016), "Early mover advantage in e-commerce platforms with low entry barriers: the role of customer relationship management capabilities", *Information & Management*, Vol. 53 No. 2, pp. 197-206.

Wang, E.T.G., Hu, H-F. and Hu, P.J.-H. (2013), "Examining the role of information technology in cultivating firms' dynamic marketing capabilities", *Information & Management*, Vol. 50 No. 6, pp. 336-343.

Wedel, M. and Kannan, P.K. (2016), "Marketing analytics for data-rich environments", *Journal of Marketing*, Vol. 80 No. 6, pp. 97-121.

Wetzels, M., Odekerken-Schröder, G. and van Oppen, C. (2009), "Using PLS path modeling for assessing hierarchical construct models: guidelines and empirical illustration", *MIS Quarterly*, Vol. 33 No. 1, pp. 177-195.

Wu, A. and Voss, H. (2015), "When does absorptive capacity matter for international performance of firms? Evidence from China", *International Business Review*, Vol. 24 No. 2, pp. 344-351.

Xu, Z., Frankwick, G.L. and Ramirez, E. (2016), "Effects of big data analytics and traditional marketing analytics on new product success: a knowledge fusion perspective", *Journal of Business Research*, Vol. 69 No. 5, pp. 1562-1566.

Zahra, S.A. and George, G. (2002), "Absorptive capacity: a review, reconceptualization, and extension", *Academy of Management Review*, Vol. 27 No. 2, pp. 185-203.

Corresponding author

Guangming Cao can be contacted at: g.cao@ajman.ac.ae