Business analytics use in CRM: A nomological net from IT competence to CRM performance

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ABSTRACT

Business analytics (BA) becomes increasingly important under rapidly changing business environment. A research challenge is that BA use is not fully understood. We tackle this challenge from the perspective of dynamic capability by using an empirical model with the emphasis on BA use in customer relationship management (CRM). Based on 170 samples from firm-level survey, we analyze the nomological linkage from IT competence to CRM performance. The results show data management capability fully mediates between IT competence and BA use, while customer response capability partially mediates between BA use and CRM performance.

1. Introduction

Contemporary organizations have adopted business analytics (BA) to gain competitive advantage under rapidly changing business environment (Goes, 2014; McAfee & Brynjolfsson, 2012; Popovič, Hackney, Tassabehji, & Castelli, 2016). BA enables firms not only to better understand internal business processes through data-driven decision making but also to sense market opportunities and threats by strengthening customer relationship management (Kiron, 2013). BA continues to be a top priority for a number of organizations and the promise of BA is attracting many followers (Işık, Jones, & Sidorova, 2013; Verhoef, Kooge, & Walk, 2016). Although BA is one of the most essential technologies to sharpen innovation (Chen, Chiang, & Storey, 2012), considerable number of BA implementations have failed and the adopters still struggle to obtain the suitable benefits (Işık et al., 2013; Ransbotham, Kiron, & Prentice, 2016; Schick, Frolick, & Ariyachandra, 2011). However, the reasons of the failures of BA adoption have not been fully explored in the literature.

From the resource based view, previous scholars have noted the impact of information technology (IT) competence on competitive advantage (Mata, Fuerst, & Barney, 1995), business value (Bharadwaj, 2000) and business performance (Lioukas, Reuer, & Zollo, 2016). Since BA is an IT-enabled technology, business analytics capability has been also considered a driver of business performance (Akter, Wamba, Gunasekaran, Dubey, & Childe, 2016; Wamba et al., 2017). However, technology competence per se does not always affect the performance. IT alone does not enhance organizational performance clearly (El Sawy, Malhotra, Park, & Pavlou, 2010). IT business value is determined by the extent of IT usage in business activities (Zhu & Kraemer, 2005) and depends on a firm's abilities to leverage IT than IT itself (Clemons & Row, 1991; Ross, Beath, & Goodhue, 1996). Applying the findings of prior studies on IT to BA, we focused on the use of BA rather than BA itself or capability.

Analytics has been actively invested and widely adopted to support customer relationship management (CRM) technology (i.e. acquire and retain customers). CRM vendors and practitioners believe that BA-enabled CRM capability, an ability to analyze, integrate, and leverage information resources and customer feedback for decision-making support in CRM, will improve business value and are active in introducing BA systems with advanced statistical modeling, simulation, forecasting and machine learning (Coltman, 2007; Coltman, Devinney, & Midgley, 2011; Shanks & Bekmamedova, 2012). However, the results of the use of CRM technology are debatable (e.g., Reinartz, Krafft, & Hoyer, 2004), and there has been little research on the BA use to improve CRM performance. Since CRM is traditionally the basis of data analysis and is now being transformed into big data- or business analytics-based, it is necessary to study a series of processes that generate business value and the result can be a guide for BA use and application to practitioners. Thus, this study attempts to explore the nomological net by focusing on BA use in driving business value from IT competence in the context of CRM.

Dynamic capability perspective can provide a theoretical lens for linking BA use and CRM performance drawn from IT competence. Since this view explains how organizations integrate, reorganize, and renew IT resources in order to response to rapidly changing customer needs and market environments (Eisenhardt & Martin, 2000; Pavlou & El

Sawy, 2006; Teece, Pisano, & Shuen, 1997), previous studies have considered dynamic capability as a theoretical basis for BA research on supply chain (Chae & Olson, 2013), as a foundation of big data analytics capability model (Wamba et al., 2017), and as the mediators on BA-related variables and performance (e.g., Cao, Duan, & Li, 2015; Wang & Byrd, 2017). This study conceptualizes a firm's data management capability and customer response capability as BA-related dynamic capabilities that play a mediating role between IT competence to CRM performance. The capability of data management is necessary for BA since today's data sources go beyond the structure data and includes a ton of unstructured data generated across the value chain (Prahalad & Krishnan, 2008). Despite its importance for business analytics, information scholars have focused on IT competence itself and have less addressed data management capability. Moreover, organizations have used the technology to enhance customer relationship and analyze customer behavior (Jayachandran, Sharma, Kaufman, & Raman, 2005; Ling & Yen, 2001), since firms need to response quickly to changes in customer needs (Day, 1994). Thus, firms should cultivate dynamic capability before and after the use of BA to manage data and respond to customer needs effectively for making better performance. By considering data management capability and customer response capability as important dynamic capabilities of a firm and attempting to identify their roles in BA use, this study seeks to shed more light on dynamic capabilities that can leverage BA that leads to better CRM performance from IT competence.

This study is meaningful in information systems (IS) literature. We develop a parsimonious model by examining the antecedents and consequences of BA use. We collect data from firm-level survey and 170 samples are used to test our research model. By exploring the relationship around BA use, we discover the missing links from IT competence to business performance through BA use. From the dynamic capability perspective, we enhance the understanding of nomological net from IT competence to CRM performance by defining customer response capability and data management capability. This study can be a stepping stone to future studies on BA use in CRM and dynamic capability.

2. Theoretical background: dynamic capability

Dynamic capability is "a firm's ability to integrate, build, and re-configure internal and external competences to address rapidly changing environments" (Teece et al., 1997, p. 516). Strategic management literature has suggested that resource based view conceptualizes a firm as a bundle of resources that creates business value by combining heterogeneous resources if underlying resources are economically valuable, difficult to imitate, or imperfectly mobile (Barney, 1991; Bharadwaj, 2000). The rapidly changing environment makes unrealistic the presumption that relocation of resources is difficult. Since firms continually reconfigure their existing resources and capabilities, the recent dynamic business environment come to highlight the dynamic capabilities to integrate and reconstruct the enterprise resources (Eisenhardt & Martin, 2000).

Strategic management scholars have studied a variety of organizational dynamic capabilities. For instance, Helfat (1997) regarded R&D as dynamic capability to develop new products and processes in response to changes in market prices. Karim and Mitchell (2000) considered acquisition process as a dynamic capability that plays a crucial role in business reconfiguration, offering opportunities to build on extant resources and obtain different resources. Modularity in organizational structure can also be a dynamic capability (Karim, 2006). By reshuffling business unit, a firm can recombine and adopt resources in keeping with the change in environment.

IS field has also paid particular attention to dynamic capability. Wade and Hulland (2004) suggested that although IT may not be able to directly create a competitive advantage, it helps to develop, add, and integrate principal resources and plays an important role in bringing

about a long-term competitive edge in an unstable environment. Pavlou and El Sawy (2006) found that IT leveraging competence has actually no direct influence on competitive advantage, but dynamic capabilities act as mediator in the process. In case of BA, scholars have considered BA as a dynamic capability to enhance firm performance directly (Akter et al., 2016) or as an enabler of performance mediated by dynamic capability such as absorptive capacity (Wamba et al., 2017; Wang & Byrd, 2017). Maklan and Knox (2009) strengthened the critical role of dynamic capability by pointing out that the reason of the return on investment for CRM below expectations is that the investment in CRM had been too much concentrated on resources such as databases, web sites, analytical tools, and call center, while investment in dynamic capabilities that could select, develop, and deploy the CRM resources had not been sufficient.

In this study, we define the data management capability and customer response capability as major dynamic capabilities for BA use in CRM. Data management capability consists of the ability to enhance data quality and integrate data from various sources in order to provide qualified and integrated data for further analysis. Even if a company has lots of data, it takes a lot of time and effort to rework and integrate data and the analytics results cannot be trusted when data quality is low. Due to the deterioration in data quality, costs for product-related rework are all on the rise (Russom, 2006). In fact, data analysis teams spend 90 percent of their time on data manipulation, cleansing, and integration prior to analysis and modeling (Vidgen, Shaw, & Grant, 2017). While incremental dynamic capabilities are related with continuous improvement with no change in the base of resources of the enterprise, renewing dynamic capabilities transform or manufacture the resources (Ambrosini & Bowman, 2009). Data quality enhancement can be considered as incremental dynamic capability since it involves no special change in the base of resources, but data integration is a renewing dynamic capability because this capability reconfigures new data set by integrating heterogeneous data sources.

Even though it is necessary to response to changing customer needs quickly for organizations (Day, 1994), it becomes more difficult to grasp customer needs as they become more diversified and complex. Organizations thus harness information processes and technology use for their customer relationship (Jayachandran et al., 2005) and use BA to capture customer insights to enhance frontline employee-customer interaction (Lam, Sleep, Hennig-Thurau, Sridhar, & Saboo, 2017). CRM requires analytic methods like data mining to leverage customer-related data by analyzing hidden patterns in customer behavior (Ling & Yen, 2001), and it leads to customer response capability that refers to the ability to satisfy customer needs through effective and quick response (Jayachandran et al., 2005). It is also a dimension of the customer agility, a crucial capability for hypercompetitive environments, which is an ability to sense and respond to customer needs as an important dynamic capability because it enables firms to shape opportunities and threats, respond to market opportunities, and maintain competitiveness through reconfiguring the firm's tangible and intangible resources (Roberts & Grover, 2012).

3. Research model and hypotheses

3.1. Research model

We develop a research model to examine the antecedents and consequences of BA use for CRM as shown in Fig. 1. We explore the links from IT competence to CRM performance through BA use from the perspective of dynamic capabilities including data management capability and customer response capability.

3.2. BA use for CRM

Analytics is "the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based
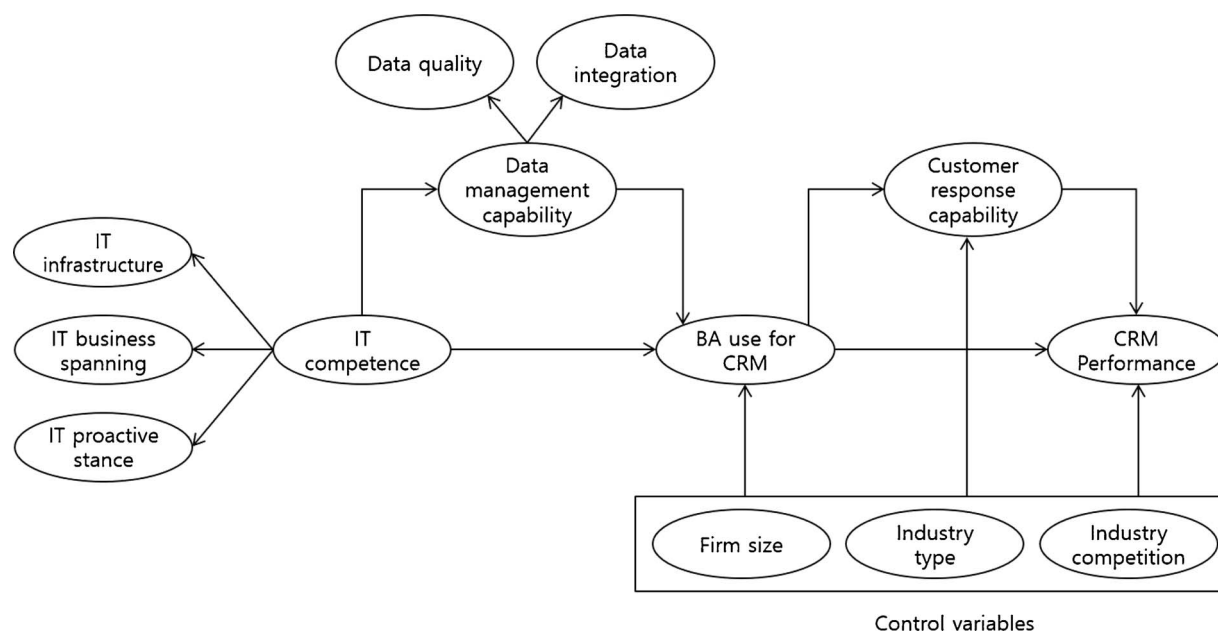
Fig. 1. Research model.

management to drive decisions and actions" (Davenport & Harris, 2007, p. 7). Although analytics can be applied to a wide variety of organizational issues (Park, Huh, Oh, & Han, 2012), this study focuses on an organization's use of BA for CRM. The primary goal of CRM is to heighten customer loyalty and increase customer retention. Since CRM process consists of customer acquisition, retention, and expansion, various data mining techniques and prescriptive analytics such as mathematical optimization are utilized to analyze the data and derive valuable knowledge from each process (Kim & Kim, 2009).

While BA technology is likely to enhance CRM performance, the firm should continue to use BA in order to lead to real performance. Since Orlikowski (2000, p. 425) emphasized that "technology per se can't increase or decrease the productivity of the workers' performance, only use of it can", other scholars have echoed the importance of technology use (Bharadwaj, 2000; Bhatt & Grover, 2005). The actual technology use is one of the important drivers of capabilities and firm performance (Devaraj & Kohli, 2003). Thus, we focus on actual use of BA and attempt to explore the nomological net from IT competence to performance in CRM context.

3.3. IT competence

IT competence is a firm's ability to acquire, deploy, combine, and reconfigure IT resources in support and enhancement of business strategies and work processes (Sambamurthy & Zmud, 1997). IT competence has been consistently investigated as an important factor for successful IS adoption and usage (Zhu & Kraemer, 2005; Zhu, Kraemer, & Xu, 2006) because IT is critical in gaining sustainable competitive advantages (Bharadwaj, 2000). IT competence consists of various dimensions (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013; Wade & Hulland, 2004). This study includes three dimensions such as IT infrastructure capability, IT business spanning capability, and IT proactive stance as proposed by Lu and Ramamurthy (2011) because these three dimensions measure the actual quality of IT resources as well as resources themselves (Mao, Liu, & Zhang, 2014).

3.4. Data management capability

Data management capability is an essential building block of BA. Since the objective of BA is to identify insights from very large data about firm's product and/or services, customers, manufacturing, sales,

purchasing, and partnership (Davenport, Harris, & Shapiro, 2010), the data stored in various corporate database systems becomes inputs to BA. With the advent of big data, data source goes well beyond transaction-based structured data. The importance of unstructured, external data has increased, which poses a challenge to data management. Given diverse types of data gathered from a wider array of sources, a much higher level of data quality and data integration capability are required (Prahalad & Krishnan, 2008).

Data quality refers to the accuracy, consistency, comprehensiveness, and recency of data (Kwon, Lee, & Shin, 2014; Wang & Strong, 1996). Management of data quality for CRM is not an easy task, since customers ceaselessly bring about changes in personal information as they move to another place, change contact information and personal information without any notice to firms. Qualified data is needed to get reliable insights from BA. Data integration refers to combining data that reside at different sources (Goodhue, Wybo, & Kirsch, 1992; Lenzerini, 2002). Given qualified and diverse data, firms can improve the value of analytics results through data integration. BA for CRM initiatives is likely to require the integration of both structured and unstructured data. Data integration in this sense provides the user with a unified view of data (Pan & Lee, 2003). Firms should equip this capability with systematic data governance at the corporate level by frequently updating time-sensitive data and requesting accurate information from their customers and outside partners (Chuang & Lin, 2013).

3.5. Customer response capability

Marketing literature has supported the importance of marketing capabilities such as customer response capability that is prone to influence the organizational performance. Jayachandran, Hewett and Kaufman (2004) defined customer response capability as the firm's ability to serve customer needs through quick actions. Customer response capability, one dimension of customer agility, enables a firm to sense and response quickly to customer-based opportunities for innovation and competitive action (Roberts & Grover, 2012).

3.6. Hypotheses development

3.6.1. IT competence and data management capability

High quality data depends on IT infrastructure (Bharadwaj, 2000; Dakin, 1993). IT competence enables firms to integrate and support

different system components effectively under changing business conditions (Dakin, 1993; Weill, Subramani, & Broadbent, 2002). Pavlou and El Sawy (2006) argued in the context of new product development that IT leveraging competence is essential for dynamic capability. Kim, Shin, Kim and Lee (2011) showed that IT infrastructure flexibility and IT personal expertise have influence on process-oriented dynamic capability of organization. From CRM perspective, Jayachandran et al. (2005) found that a sophisticated IT can enhance a firm's ability to integrate customer data from external sources. Chuang and Lin (2013) hinted that IT competence is positively associated with customer-information quality. Hence, we propose,

Hypothesis 1. IT competence is positively associated with data management capability.

3.6.2. Data management capability and BA use for CRM

Well-managed data through quality management and integration ensures the production of reliable and valuable information and fosters its tactical and strategic usage (Kwon et al., 2014). The problem caused by poor data quality in CRM is serious; for example, erroneous customer data can cause a business to lose customers due to operational delay, customer dissatisfaction, and inappropriate recommendation. On the other hand, good quality data enable CRM strategies to be much more effective (Abbott, Stone, & Buttle, 2001). Popovič, Hackney, Coelho and Jaklič (2012) showed that information content quality has positive relationship with information use for business intelligence. Since external source is a precious asset that helps to overcome the difficulty to understand customers only with internal data, customer insight gained from the integration of the internal and external data will secure successful CRM. This way, effective analytics can become the basis of more advanced data management capability (Kiron, Prentice, & Ferguson, 2014). Thus, successful integration of qualified data can lead to more use of BA for CRM.

Hypothesis 2. Data management capability is positively associated with BA use for CRM.

3.6.3. Mediation role of data management capability between IT competence and BA use for CRM

IS literature based on the resource-based view has implied that IT competence is critical for a company to realize competitive advantage and business value (Melville, Kraemer, & Gurbaxani, 2004; Wade & Hulland, 2004). As management environment changes rapidly, industry competition gets fiercer, and customer demands shift fast, a strong case has been proposed that IT competence by itself is not enough for sustainable competitive advantage (Tippins & Sohi, 2003).

Support for our claim that the relationship between IT competence and BA use is mediated by intervening factors is drawn from the perspective of dynamic capability. Because a ton of unstructured data are being generated inside and outside organizations, well-developed data-related capability is required, which goes beyond existing IT infrastructure capability that mainly focuses on processing structured data (Klievink, Romijn, Cunningham, & de Bruijn, 2017). Firms need new dynamic capability to collect, update and integrate data (Prahalad & Krishnan, 2008) for the prerequisite of using it at analytics stage. Specific to CRM context, data quality and data integration are vital for reliable customer insights based on IT in order to enhance business objectives and create business opportunities. Data management capability is likely to be incorporated into the link between IT competence and BA use for CRM. Hence, we propose,

Hypothesis 3. The relationship between IT competence and BA use for CRM is mediated by data management capability.

3.6.4. BA use for CRM and customer response capability

A firm's ability to identify and respond to market opportunities is

determined by the ability to create and utilize the outcome of analytics (Roberts & Grover, 2012; Teece, 2007). BA use for CRM is helpful for capturing customer needs deeper and quicker. If a firm notices, through BA use, changes in customer needs better than the competitors, it could respond to customers quicker than the competitors to keep ahead of the competition. For example, BA use in time-sensitive CRM activities like the prevention of customer churn contributes to a faster decision-making process. BA use in this sense can play a similar role to customer knowledge process that enhance the customer response speed and expertise which are two aspects of customer response capability (Jayachandran et al., 2004; Slater & Narver, 1995). In this way, BA can response quickly to customers by providing customer insights such customer identification of his/her preference, situational and emotional states (Lam et al., 2017). Hence, we propose,

Hypothesis 4. BA use for CRM is positively associated with customer response capability.

3.6.5. Customer response capability and CRM performance

Customer response capability is regarded as an essential capability that helps to achieve a customer base more sustainably and loyally (Jayachandran et al., 2005). A quick response to customer needs provides a company with first-mover advantages (Kerin, Varadarajan, & Peterson, 1992). Inimitable capability of a firm to respond to the dormant and existing needs of customers leads to higher performance (Hult & Ketchen, 2001). A rapid response to customer dissatisfaction or claim increases customer satisfaction which is one of the core components of CRM performance. Past empirical studies also revealed the positive relationship between customer response capability and organizational performance (Jayachandran et al., 2004; Ziggers & Henseler, 2016). This study attempts to confirm this relationship with BA in the context of CRM. Hence, we propose,

Hypothesis 5. Customer response capability is positively associated with CRM performance

3.6.6. Mediation role of customer response capability between BA use for CRM and CRM performance

Technology use should be examined together with their impacts (DeLone & McLean, 1992), because the consequences of technological innovations are determined by the context and the manner where they are used (Mishra, Konana, & Barua, 2007). BA use for CRM enables a firm to sense customer needs and discover customer insights, so it is likely to be positively related to CRM performance. However, customer sensing through BA use needs to be aligned with customer response capability based on mediation perspective (Overby, Bharadwaj, & Sambamurthy, 2006; Roberts & Grover, 2012). When Teece (2007)'s proposition that "An enterprise's ability to manage competitor threats and to reconfigure itself is dependent on its investment activity, which is in turn dependent on its ability to sense an opportunity." (p.1343) is applied to this study, an organizational performance depends on its response capability to customer (Roberts & Grover, 2012). A previous study also revealed organizational responsiveness to market fully mediates market information processing like BA use and firm performance (Hult, Ketchen, & Slater, 2005). Taken together, customer response capability can mediate the relationship between BA use and CRM performance. Hence, we propose,

Hypothesis 6. The relationship between BA use for CRM and CRM performance is mediated by customer response capability.

4. Methods

4.1. Data collection

To test the hypotheses of research model as described in Fig. 1, we

Table 1
Sample characteristics (N = 170).

	Number	Percentage
Industry type		
Manufacturing	37	21.8
Retail	34	20.0
Service	76	44.7
Others	23	13.5
Number of employees		
< 100	36	21.2
100–300	28	16.5
300–500	21	12.4
500–1000	23	13.5
1000–5000	37	21.8
> 5000	25	14.7
Position of respondents		
Manager level	57	33.5
Director level	69	40.6
VP level	36	21.2
President/Chief Executive	8	4.7

designed a questionnaire and conducted a firm-level survey. The survey questionnaire was developed based on comprehensive literature review and interviews with several experts in business analytics. An expert panel reviewed each item on the questionnaire for its content, scope, and purpose (content validity). After the questionnaire was finalized, the survey was executed jointly with Korea Customer Relationship Management Association (KCRMA) and Knowledge Management Research Center at Korea Advanced Institute of Science and Technology (KAIST).

We combined the list of organizations from two institutions. Then, 900 firms were randomly selected from the list and surveyed for 2 months. In total, 190 responses from 900 firms were returned with the response rate of 21.1%. At the beginning of the survey, a screening question was asked to the respondents whether they are the most informed person of the firm in terms of business analytics and CRM to answer the questionnaire since the most involved member of the adopting unit would be the most informed respondents (Hage, 1980). Since 20 responses were inadequate or from the identical firms, we used the remaining 170 responses for further analysis. Table 1 summarizes the distribution of surveyed firms in terms of the firm size, firms' industry type, and respondents' job position.

4.2. Measurement

The development of the measurement model includes phases of theoretical modeling, statistical testing, and refinement (Straub, 1989). Indicators were mainly adopted from a comprehensive review of the literature and their wording was modified to adjust to our context by

reflecting expert opinions. IT competence and data management capability are second-order constructs: IT competence consists of IT infrastructure, IT business spanning, and IT proactive stance, and data management capability consists of data quality and data integration. To measure IT competence, we used items for IT infrastructure capability, IT business spanning capability, and IT proactive stance from Lu and Ramamurthy (2011). For data management capability, we adopted measure by Kwon et al. (2014) and measures for data integration capability come from Jayachandran et al. (2005). For BA use in CRM, we adopted the measures developed by Jayachandran et al. (2005) and BA examples come from Chen et al. (2012). Items for customer response capability come from Roberts and Grover (2012). To measure CRM performance, we used items from Chang, Park and Chaiy (2010). To fully account for the difference among organizations, we include three control variables that characterize our unit of analysis. These variables are firm size, industry type, and industry competition. Items for industrial competition are adopted from Jayachandran et al. (2005). All variables except firm size and industry type were measured using a seven-point Likert scale. We used log transform of the number of employees to measure firm size (Kim & Kim, 2009). To control industry type of each firm, we used dummy variables for manufacturing, service, retail, and others (Lu & Ramamurthy, 2011). Appendix A contains construct and associated indicators in our research model.

5. Results

5.1. Measurement model

We first assessed reliability and construct validities of measurement model. Table 2 summarizes reliability, validity for each construct and correlation between constructs. For reliability, all test statistic values of Cronbach's alpha and composite reliability exceeded the recommended threshold values, 0.70. All factor loadings for own constructs are above 0.6 and average variance extracted (AVE) for each construct exceeded 0.5, thus demonstrating convergent validity (Fornell & Larcker, 1981; Hair, Black, Babin, Anderson, & Tatham, 2006). For the discriminant validity, the square root of AVE were greater than correlations between the constructs (Fornell & Larcker, 1981). Since there are some high cross-loadings between constructs, we conducted another way to assess discriminant validity by checking the difference between the loadings and the cross-loadings. None of the differences in our model was lower than the cut-off value (an acceptable difference is 0.10) (Wixom & Todd, 2005). Thus, the discriminant validity of all constructs is found to be satisfactory. In addition to validity assessment, we also conducted variance inflation factor (VIF) analysis for checking multicollinearity issue because of the relatively high correlations amid some variables. The VIF values for all of the constructs are acceptable (i.e., between 1.156 and 3.768; less than 5.0) (Gu, Park, & Konana, 2012). The results of factor analysis are described in Appendix B.

Table 2
Correlation matrix, reliability and validity.

First-Order Constructs	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Cronbach's alpha	CR	AVE
(1) IT infrastructure capability	4.37	1.39	0.93									0.93	0.95	0.87
(2) IT business spanning capability	4.57	1.43	0.71[**]	0.91								0.89	0.93	0.82
(3) IT proactive stance	4.52	1.53	0.69[**]	0.84[**]	0.93							0.95	0.96	0.87
(4) Data quality capability	4.51	1.23	0.66[**]	0.60[**]	0.58[**]	0.88						0.92	0.94	0.77
(5) Data integration capability	4.17	1.34	0.53[**]	0.57[**]	0.57[**]	0.68[**]	0.95					0.95	0.97	0.90
(6) BA use for CRM	3.96	1.53	0.38[**]	0.36[**]	0.34[**]	0.46[**]	0.48[**]	0.92				0.97	0.98	0.85
(7) Customer response capability	4.53	1.44	0.54[**]	0.61[**]	0.61[**]	0.51[**]	0.57[**]	0.34[**]	0.94			0.94	0.96	0.89
(8) CRM performance	4.00	1.86	0.41[**]	0.42[**]	0.37[**]	0.52[**]	0.55[**]	0.72[**]	0.38[**]	0.95		0.96	0.97	0.90
(9) Industry competition	5.13	1.27	0.08	0.15	0.16[*]	0.17[*]	0.11	0.25[**]	0.20[**]	0.14	0.88	0.87	0.92	0.78
(10) Firm size	6.40	2.18	0.35[**]	0.24[**]	0.23[**]	0.26[**]	0.27[**]	0.17[*]	0.22[**]	0.27[**]	0.23[**]	–	–	–

Note: Square-root of AVE values are described at the diagonal.

CR: Composite Reliability, AVE: Average Variance Extracted.

[*]p < 0.05; [**]p < 0.01.

As our data were collected from a single key respondent, there is a potential common method bias resulting from multiple sources including consistency motif and social desirability (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). We conducted statistical analyses to access the common method bias. First, Harman's single-factor test was performed (Podsakoff & Organ, 1986). All variances were included in an exploratory factor analysis and the first factor explained less than 50% (48.40%) of variance. Second, we also included a common method factor in the PLS model suggested by Liang, Saraf, Hu and Xue (2007). The average substantively explained variance of the indicators is 0.860, while the average method-based variance is 0.003 (see Appendix C). The ratio of substantive variance to method bias is about 332:1, which means that common method bias is not of great concern in this study.

5.2. Structural model

To test our hypotheses, partial least squares (PLS) method was employed. Since our sample size is relatively small (n = 170), PLS is a suitable method for our research model (Chin, 1998). Higher-order constructs, IT competence and data management capability, were examined using the hierarchical component approach by assigning all manifest variables of underlying first-order latent variables for second-order latent variable (Wetzels, Odekerken-Schröder, & Van Oppen, 2009).

To check for the preference of a mediating effect, we adopted a competitive model analysis by Singh, Goolsby and Rhoads (1994). The first model (direct effects) contains IT competence, BA use for CRM and CRM performance to examine direct relationships between IT competence and BA use for CRM and between BA use for CRM and CRM performance. The second model (partial mediation effect) adds data management capability as a mediator of the relationship between IT competence and BA use for CRM, and customer response capability as a mediator between BA use for CRM and CRM performance.

Table 3 shows the results of the competing model analysis. The results show that data management capability mediates the relationship between IT competence and BA use for CRM. First, the partial mediation model explains more variance in BA use for CRM than the direct effects model (0.33 vs. 0.23). Second, positive relationships exist between IT competence and data management capability (β = 0.702, t = 13.697) and data management capability and BA use for CRM (β = 0.422, t = 3.699). Third, the significant relationship between IT competence and BA use for CRM in the direct model (β = 0.338, t = 2.994) becomes nonsignificant in the partial mediation model (β = 0.050 t = 0.373). Our analysis result provides compelling evidence of a fully discernible mediating effect of data management capability between IT competence and BA use for CRM.

The result also shows that customer response capability mediates the relationship between BA use for CRM and CRM performance. First, the partial mediation model explains more variance in CRM performance than the direct model (0.55 vs. 0.53). Second, positive relationships exist between BA use for CRM and customer response capability (β = 0.208, t = 3.010) and customer response capability and CRM performance (β = 0.162, t = 2.197). Third, the significant relationship between BA use for CRM and CRM performance in the direct model (β = 0.720, t = 11.980) is still significant but decreases slightly (β = 0.673, t = 9.548). Amid control variables, only companies on retail industry are found to use more analytics technology.

We further use Chin (1998)'s approach to examine the effect size of mediation. R^2 was 0.23 when IT competence had a direct effect on analytical capability (reduced model). R^2 was 0.33 when IT competence had an indirect effect on analytical capability via data management capability (full model). Mediation effect analysis was conducted by f^2.[1]

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[1] $f^2 = \dfrac{R^2_{full\ model} - R^2_{reduced\ model}}{1 - R^2_{full\ model}}$.

Table 3
Analysis results.

Effects	Direct effects model	Partial mediation model
Hypothesized paths		
ITC → DMC (H1)	–	0.702*** (13.697)
DMC → BAU (H2)	–	0.422*** (3.699)
ITC → BAU (H3)	0.338** (2.994)	0.050 (0.373)
BAU → CRC(H4)	–	0.280** (3.010)
CRC → CRMP (H5)	–	0.162* (2.197)
BAU → CRMP (H6)	0.720*** (11.980)	0.673*** (9.548)
Control measure		
FIRMSIZE → BAU	0.157 (1.684)	0.125 (1.305)
FIRMSIZE → CRC	–	0.046 (0.565)
FIRMSIZE → CRMP	0.050 (0.718)	0.036 (0.550)
MANUFACTURING → BAU	0.087 (0.737)	0.094 (0.842)
MANUFACTURING → CRC	–	−0.055 (0.151)
MANUFACTURING → CRMP	−0.019 (0.215)	−0.013 (0.396)
RETAIL → BAU	0.286* (2.311)	0.239* (2.055)
RETAIL → CRC	–	−0.025 (0.779)
RETAIL → CRMP	−0.034 (0.328)	−0.101 (0.226)
SERVICE → BAU	0.186 (1.399)	0.150 (1.144)
SERVICE → CRC	–	−0.028 (0.959)
SERVICE → CRMP	0.005 (0.047)	0.144 (0.276)
INDUSCOMPET → BAU	0.044 (0.345)	0.071 (0.665)
INDUSCOMPET → CRC	–	0.183 (1.706)
INDUSCOMPET → CRMP	−0.040 (0.512)	−0.046 (0.396)
Measurement model and first order factors		
ITC → IIC	0.859*** (30.838)	0.861*** (31.314)
ITC → IBC	0.928*** (54.049)	0.928*** (62.731)
ITC → IPS	0.942*** (77.051)	0.941*** (78.622)
DMC → DQM	–	0.945*** (92.497)
DMC → DIC	–	0.879*** (40.080)

Note: Values in parentheses are t-value. ITC = IT competence, DMC = data management capability, BAU = BA use for CRM, CRC = customer response capability, CRMP = CRM performance.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

f^2 is computed as 0.15, which shows mediator has a medium impact. This result suggests that for excellent BA use it is not sufficient for an enterprise to have IT competence in isolation but it also should equip itself with data management capability. And R^2 was 0.53 when BA use for CRM had a direct effect on CRM performance (reduced model). R^2 was 0.55 when BA use for CRM had an indirect effect on CRM performance through customer response capability (full model). As a result, f^2 is 0.04, which implies that the impact of mediator is small (see Table 4).

6. Discussion

We developed an empirical model of BA use in CRM and tested the model with 170 organizations. This study provides a better understanding of the antecedents and consequences of BA use for CRM and examines the links from IT competence to CRM performance through data management capability and customer response capability. Several points are worthy of note. First, the results of this study show BA use plays a major role in leading IT competence to CRM performance. As firms with higher IT use are likely to achieve greater value, the results imply high use of BA for CRM is associated with improved CRM performance. Previous studies that focus on a direct relationship between IT competence and business performance don't take into full consideration the true facilitators of performance improvement enhanced

Table 4
Results for the effect size of mediation.

Mediator		R^2	ΔR^2	f^2
Data management capability	Full model	0.33	0.11	0.15
	Reduced model	0.23		
Customer response capability	Full model	0.55	0.02	0.04
	Reduced model	0.53		

Note: f^2 small = 0.0, medium = 0.15, large = 0.35.

by IT competence (Tippins & Sohi, 2003). By employing BA use, we confirm the postulation that actual usage is the important link from IT payoff to performance (Devaraj & Kohli, 2003). BA use would be a link in the nomological net of the relationship between IT competence and CRM performance (Fig. 2).

Moreover, customer response capability partially mediates the relationship between BA use and CRM performance. Roberts and Grover (2012) found that action efficacy is greater when customer sensing capability is high and customer responding capability is medium than when both capabilities are high. This finding reveals that high customer responding capability per se does not translate into continuous increase in CRM performance. Interviews with staff in charge of BA were conducted to find out why response capability does not have a greater influence on performance. A plausible reason is that process delay can happen due to the reporting to management to reflect the insight in the management strategy. BA staff admitted that this tendency is severer particularly when a large investment is needed based on the knowledge secured through BA. Another explanation would be that the attempt to reflect customer needs in real-time using BA leads to decreased operational stability. Frequent changes in system to response quickly for the needs of customers may increase the possibility of errors. Some companies deliberately refrain from real-time service although they can afford real-time response to customers. These reasons explain why customer response capability partially mediates the relationship between BA use and CRM performance.

The result shows that data management capability fully mediates the relationship between IT competence and BA use. Data management capability is important for BA, since analytics begins with data management. Our interviews in the firms with outstanding data management capability confirmed that data management capability is an

essential capability for BA use. Interviewees said if companies have less reliable data, the results through analyzed data are less reliable. When data from diverse systems are not integrated, analysis agility is less expected due to longer preparatory period. Companies that regard BA as the core competence of their organizations are already planning on integrating data from specific data sources before they proceed to analytics.

6.1. Limitations and future research opportunities

This study offers a few areas for further refinement. First, although our study examines the role of BA and dynamic capability in CRM with firm-level survey, the interpretation of analysis results might be confined to the organizations in Korea. Future research can enhance the generalizability of the findings by considering cross-national or multinational survey. For example, in line with multinational study, comparison of the developed countries and the developing countries can provide additional insights based on differences between two groups. Second, the hypotheses tested in this study represent a snapshot in time, since our dataset is cross sectional. While we conducted the interview with the managers and described the exemplary cases to overcome the limitation of data and reflect practical experience, future research should consider longitudinal data or other data source including archival data of BA usage logs in order to explore dynamics of company and provide more rigorous findings. Third, the result of control variable show that companies in certain industry use technology of business analytics rather than other industries. This way, research focusing on certain industry can provide deeper findings with usage of business analytics such as specific technology or characteristics of industry. For example, based on our results, retail industry can provide deeper and interesting findings with BA usage in CRM context. Finally, we only examined a limited set of dynamic capabilities as mediators or missing links. Nevertheless, our results reveal the link between IT competence and CRM performance is fully and partially mediated by BA use and appropriate dynamic capabilities. Further research considering other dynamic capabilities can enrich our understanding of BA use and CRM through discovering other missing links.
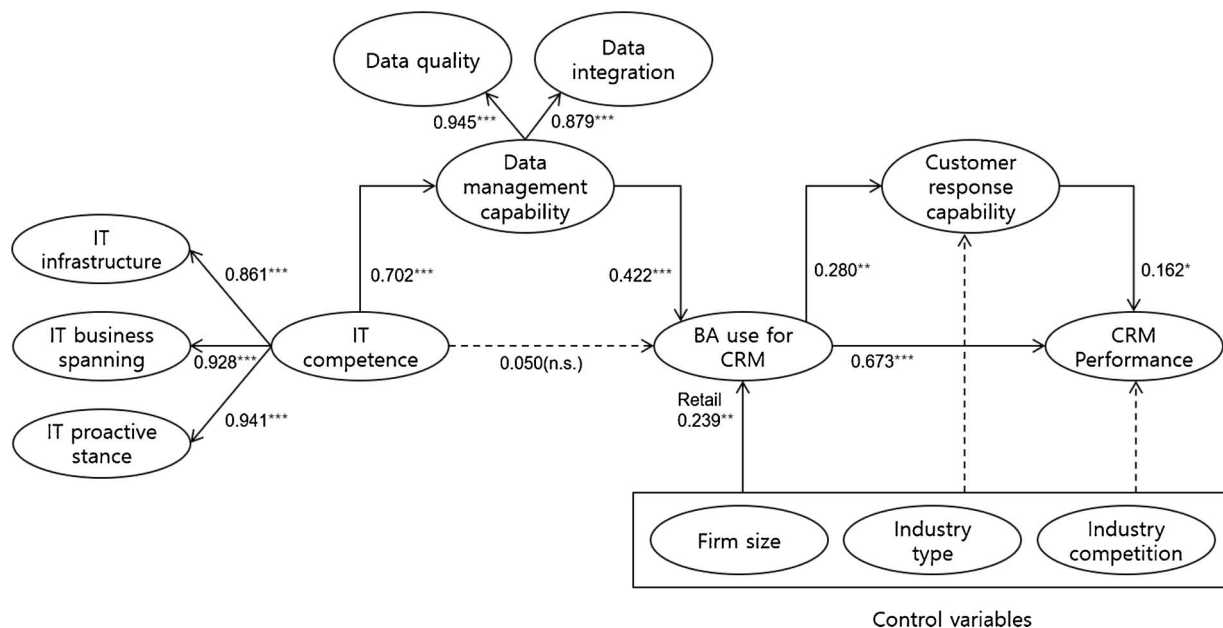
Fig. 2. Model results.
*p < 0.05; **p < 0.01; ***p < 0.001

6.2. Theoretical implications

This study has several theoretical contributions. Most importantly, our integrative model is the first to examine the role of BA use in CRM and investigate the possible missing links from IT competence to business performance through BA use. While prior research has investigated the relationship between IT competence and firm performance (Bharadwaj, 2000), IT use and firm performance (Deephouse, Mukhopadhyay, Goldenson, & Kellner, 1995) or determinants that impact IT use (Chwelos, Benbasat, & Dexter, 2001; Cooper & Zmud, 1990), only few IT payoff research has considered IT usage as mediator. This study provides a better understanding of the connection between IT competence and firm performance by focusing on the mediating role of BA use. Additionally, we employed two dynamic capabilities in terms of data management capability and customer response capability to explore the nomological net for CRM performance. This model enables researchers to test the richer components in the nomological net and leads to theoretical extensions (Devaraj & Kohli, 2003; Mishra et al., 2007; Zhu & Kraemer, 2005).

More specifically, this study finds that data management capability and customer response capability play critical roles to maintain competitive advantage with BA use in CRM context. Since BA aim to produce value from data (Bichler, Heinzl, & van der Aalst, 2017), data management capability is important to encourage BA. We confirm the importance of data management in BA from the finding that IT competence should support an appropriate data management capability to obtain the benefits from BA use. Moreover, customer response capability is still important to the relationship between BA use and performance, since the mediating role between them is to respond quickly to customer needs (Wang & Byrd, 2017). While the result shows that the effect of customer response capability is partially mediating, customer response capability can play a sufficient role to make CRM performance. By employing both data management capability and customer response capability, we illustrate how dynamic capabilities facilitate BA use and thereby harvest competitive advantage. Our findings can enlarge the understanding of dynamic capability in literature related to BA by focusing its mediating role before and after using BA. This study is a stepping-stone for further understanding of dynamic capabilities related to BA.

Lastly, we offer a multidimensional scale to assess data management capability such as data quality management and data integration capability. Since prior scales address the data quality aspect of data management capability in isolation (Kwon et al., 2014; Mithas, Ramasubbu, & Sambamurthy, 2011), they might overlook the diversity of today's data sources. However, data integration and governance responsibilities are required to handle the large variety of data sources (Li, Thomas, & Osei-Bryson, 2016) and it is a prerequisite of data analysis and interpretation and remains important even in healthcare organizations (Wang & Byrd, 2017). Organizations have to consolidate various types of data such as web logs, mobile logs, text in social media and customer transaction data to gain meaningful insights. Using both capabilities for data quality and data integration can be a good alternative for advancing the current studies of business analytics. We hope this study will be a meaningful theoretical starting point for business analytics literature.

6.3. Practical implications

This study has clear practical implications, particularly in contemporary highly competitive environments. We provide useful guidance to CRM practitioners on how firms can improve CRM performance by using business analytics. First, our findings highlight the imperative role of data management capability to use BA extensively. Such capability helps collect and process data from different sources prior to using data. While many firms have largely invested in their IT to implement CRM, in the big data era, managers should more focus on capability for data management to adopt advanced analytics for CRM than IT competence itself. Without a strong data management capability, firms are not easy to utilize BA for CRM. In this way, futuristic data-centric IT infrastructure can be recommended; for example, increased scale of data requires Hadoop-based platforms for rapid data processing. Metadata technology to integrate diversified types of data is desirable to move toward No-SQL databases.

Second, CRM practitioners should pay attention to customer response after conducting analytics. Active use of BA for CRM can provide a fruitful outcome even for the companies that find difficulty in immediately reflecting customer insights. While BA use alone can lead to a sufficient performance, BA use has much greater influence on CRM performance with customer response capability. Although BA is data-driven and/or fact-based, the results of the analysis can be misleading for a variety of reasons including data errors, false assumptions, misinterpretations, and customer annoyances caused by excessive suggestions. Through customer response capability, managers could adjust the misleading results by capturing the needs of customers and aligning them with BA use for CRM.

7. Conclusion

From the dynamic capability perspective, this study establishes an empirical model with the emphasis on BA use in the context of CRM. Based on 170 samples from firm-level survey, we explore the nomological net from IT competence to CRM performance through the competitive model analysis. Our analysis results show that data management capability fully mediates between IT competence and BA use, and customer response capability partially mediates between BA use and CRM performance. Based on our empirical verification, we suggest data management capability, a multidimensional scale consisting of data quality management and data integration capability, and customer response capability as major dynamic capabilities for BA use and CRM. This study provides further thoughtful implications for CRM practitioners in regard of these two dynamic capabilities.

Funding source

Conflicts of interest

None.

Appendix A. Measurement scales

Construct and Measurement Items	Related Research
IT infrastructure capability (IIC) - Relative to other firms in your industry, please evaluate your organization's IT infrastructure capability in the following areas on a 1–7 scale (1 = strongly disagree, 7 = strongly agree).	Bharadwaj (2000), Lu & Ramamurthy (2011), Mao et al. (2014), Ross et al. (1996), Weill et al. (2002)

- IT facilities' operations/services (e.g., servers, large-scale processors, performance monitors, etc.) are superior.
- The network communication is sufficient with good connectivity, reliability, and availability in our organization.
- The quality of IT application and services (e.g., ERP, ASP, software modules/components, emerging technologies, etc.) can meet our organization needs.

IT business spanning capability (IBC)

- Relative to other firms in your industry, please evaluate your organization's IT management capability in the following areas on a 1–7 scale (1 = strongly disagree, 7 = strongly agree).   Lu & Ramamurthy (2011), Mao et al. (2014), Mata et al. (1995)
- Our organization has a clear understanding on how IT contributes to the competitive advantages.
- Our organization integrates business strategic planning with IT planning.
- Our organization enables functional area and general management ability to understand the value of IT investment.

IT proactive stance (IPS)   Lu & Ramamurthy (2011), Mao et al. (2014), Weill et al. (2002)

- Relative to other firms in your industry, please evaluate your capability in acquiring, assimilating, transforming, and exploiting IT knowledge in the following areas on a 1–7 scale (1 = strongly disagree, 7 = strongly agree).
- We constantly keep up with new IT innovations
- We support new ways of using IT.
- We constantly seek new ways to enhance the effectiveness of IT use.
- We establish an effective and flexible IT planning process and developing a robust IT plan.

Data quality management (DQM)   Chuang & Lin (2013), Kwon et al. (2014)

- Relative to other firms in your industry, please evaluate your organization's data management capability in the following areas on a 1–7 scale (1 = strongly disagree, 7 = strongly agree).
- Our company operates an automatic method to collect data for consistency.
- All data are commonly defined and managed in the same way throughout the organization.
- Once data error is discovered, we correct it as soon as possible.
- Our company often updates changeful data.
- All sources have been inputted by our customer and/or suppliers with no omission.

Data integration capability (DIC)   Goodhue et al. (1992), Jayachandran et al. (2005)

- Relative to other firms in your industry, please evaluate your organization's data integration capability in the following areas on a 1–7 scale (1 = strongly disagree, 7 = strongly agree).
- Our company properly uses various tools to integrate data from different sources.
- Our company combines internal transaction data with external source data efficiently.
- Our company integrates customer data form customer single view.

BA use for CRM (BAU)   Chen et al. (2012), Jayachandran et al. (2005), Kim & Kim (2009)

- Relative to other firms in your industry, please evaluate your organization's use of business analytics for CRM in the following areas on a 1–7 scale (1 = strongly disagree, 7 = strongly agree).
- Our company uses BA for acquiring potential customers.

- Our company uses BA for capturing change of customer's needs.
- Our company uses BA for expecting and protecting customer defection.
- Our company uses BA for offering personalized services to customers.
- Our company uses BA for designing and running our loyalty program.
- Our company uses BA for up/cross sellng.
- Our company uses BA for promoting customer referrals.

< Examples of BA >

Web Analytics
- Web crawling
- Web log analysis
- Web site ranking
- Recommendation systems

Data Analytics
- Classification
- Clustering
- Regression
- Association analysis
- Optimization
- Machine learning

Network Analytics
- Link mining/prediction
- Social network analysis
- Social influence
- Opinion and information dynamics
- Sensor network analysis

Text analytics
- Natural language process
- Opinion mining
- Sentimental analysis
- Question answering

Mobile Analytics
- Location based analysis
- Mobile platform analysis
- Mobile web/application analysis

Customer response capability (CRC)   Jayachandran et al. (2004), Roberts & Grover (2012)

- Relative to other firms in your industry, please evaluate your organization's customer response capability in the following areas on a 1–7 scale (1 = strongly disagree, 7 = strongly agree).
- We respond rapidly if something important happens with regard to our customers
- We quickly implement our planned activities with regard to customers
- We are fast to respond to changes in our customer's product or service needs

CRM performance (CRMP)   Akter et al. (2016), Chang et al. (2010), Jayachandran et al. (2005)

- In the most recent year, relative to your competitors, how was your business performed in the following areas on a 1–7 scale (1 = strongly disagree, 7 = strongly agree).
- We have experienced higher customer satisfaction through BA.
- We have experienced higher customer loyalty through BA.
- Customer acquisition rate has increased through BA
- Customer retention rate has increased through BA.

Firm size

- How many employees does your organization have in total? () people   Kim & Kim (2009)

Industry type   Lu & Ramamurthy (2011)

- Please check your organization's industry type.
☐ Manufacturing
☐ Retail
☐ Service
☐ Others

Industry competition (IC)   Jayachandran et al. (2005)

- Please evaluate your industry competition in the following areas on a 1–7 scale (1 = strongly disagree, 7 = strongly agree).
- Our industry changes rapidly

- Changes provide big opportunities in our industry
- A large number of new ideas have been made possible
  through technological breakthroughs in our industry

Appendix B. Results of Cross loadings and Cronbach's alpha

Item	IIC	IBC	IPS	DQM	DIC	BAU	CRC	CRMP	IC
IIC1	**0.94**	0.68	0.66	0.65	0.51	0.39	0.51	0.11	0.11
IIC2	**0.94**	0.65	0.65	0.60	0.50	0.29	0.53	0.08	0.08
IIC3	**0.92**	0.65	0.61	0.59	0.48	0.37	0.46	0.03	0.03
IBC1	0.67	**0.91**	0.76	0.54	0.51	0.28	0.28	0.16	0.16
IBC2	0.60	**0.90**	0.74	0.57	0.53	0.33	0.33	0.13	0.13
IBC3	0.66	**0.92**	0.78	0.52	0.52	0.37	0.37	0.13	0.13
IPS1	0.63	0.79	**0.92**	0.52	0.51	0.30	0.56	0.19	0.19
IPS2	0.68	0.75	**0.92**	0.58	0.54	0.33	0.63	0.15	0.15
IPS3	0.58	0.76	**0.94**	0.50	0.51	0.32	0.55	0.18	0.18
IPS4	0.66	0.82	**0.95**	0.56	0.58	0.33	0.54	0.12	0.12
DQM1	0.63	0.59	0.62	**0.89**	0.60	0.44	0.50	0.19	0.19
DQM2	0.55	0.54	0.56	**0.91**	0.59	0.45	0.46	0.22	0.22
DQM3	0.57	0.51	0.48	**0.88**	0.55	0.39	0.45	0.14	0.14
DQM4	0.60	0.54	0.47	**0.86**	0.61	0.39	0.45	0.12	0.12
DQM5	0.55	0.45	0.41	**0.86**	0.61	0.36	0.40	0.07	0.07
DIC1	0.50	0.54	0.51	0.63	**0.95**	0.44	0.55	0.10	0.10
DIC2	0.49	0.52	0.52	0.63	**0.96**	0.45	0.52	0.05	0.05
DIC3	0.52	0.58	0.59	0.67	**0.95**	0.39	0.57	0.10	0.10
BAU1	0.36	0.33	0.31	0.41	0.43	**0.92**	0.31	0.23	0.23
BAU2	0.34	0.34	0.30	0.44	0.46	**0.92**	0.29	0.25	0.25
BAU3	0.34	0.35	0.33	0.43	0.47	**0.91**	0.32	0.19	0.19
BAU4	0.34	0.29	0.29	0.39	0.41	**0.93**	0.31	0.16	0.16
BAU5	0.31	0.33	0.32	0.42	0.43	**0.92**	0.33	0.18	0.18
BAU6	0.34	0.33	0.30	0.44	0.41	**0.93**	0.32	0.16	0.16
BAU7	0.39	0.37	0.35	0.46	0.50	**0.92**	0.34	0.19	0.19
CRC1	0.51	0.57	0.57	0.47	0.54	0.33	**0.95**	0.23	0.23
CRC2	0.51	0.57	0.58	0.52	0.58	0.36	**0.97**	0.25	0.25
CRC3	0.49	0.58	0.59	0.46	0.50	0.28	**0.91**	0.25	0.25
CRMP1	0.44	0.43	0.37	0.52	0.54	0.70	0.42	**0.96**	0.16
CRMP2	0.40	0.44	0.43	0.51	0.55	0.65	0.39	**0.94**	0.16
CRMP3	0.37	0.36	0.29	0.45	0.49	0.66	0.34	**0.93**	0.09
CRMP4	0.35	0.35	0.32	0.49	0.51	0.73	0.31	**0.96**	0.12
IC1	−0.08	0.09	0.08	0.06	0.00	0.16	0.21	0.14	**0.86**
IC2	0.17	0.20	0.23	0.23	0.16	0.24	0.29	0.13	**0.94**
IC3	0.10	0.11	0.11	0.13	0.03	0.14	0.16	0.10	**0.86**

Appendix C. Common method bias test

Construct	Indicator	Substantive Factor Loading (R1)	$R1^2$	Method Factor Loading (R2)	$R2^2$
IT infrastructure capability	IIC1	0.884	0.782	0.066	0.004
	IIC2	0.987	0.974	−0.061	0.004
	IIC3	0.928	0.861	−0.005	0.000
IT business spanning capability	IBC1	0.926	0.857	−0.026	0.001
	IBC2	0.903	0.815	−0.006	0.000
	IBC3	0.893	0.798	0.032	0.001
IT proactive stance	IPS1	0.936	0.877	−0.025	0.001
	IPS2	0.874	0.764	0.064	0.004
	IPS3	1.000	0.999	−0.073	0.005
	IPS4	0.919	0.845	0.034	0.001

Data quality management	DQM1	0.809	0.654	0.101	0.010
	DQM2	0.923	0.851	−0.009	0.000
	DQM3	0.916	0.839	−0.046	0.002
	DQM4	0.808	0.653	0.056	0.003
	DQM5	0.940	0.883	−0.104	0.011
Data integration capability	DIC1	0.961	0.924	−0.020	0.000
	DIC2	1.000	1.009	−0.060	0.004
	DIC2	0.884	0.781	0.080	0.006
BA use for CRM	BAU1	0.911	0.829	0.010	0.000
	BAU2	0.964	0.929	−0.045	0.002
	BAU3	0.941	0.885	−0.023	0.001
	BAU4	0.953	0.909	−0.026	0.001
	BAU5	0.865	0.748	0.068	0.005
	BAU6	0.935	0.875	−0.021	0.000
	BAU7	0.883	0.779	0.037	0.001
Customer response capability	CRC1	0.959	0.919	−0.011	0.000
	CRC2	0.951	0.905	0.019	0.000
	CRC3	0.915	0.837	−0.009	0.000
CRM performance	CRMP1	0.904	0.817	0.067	0.005
	CRMP2	0.907	0.822	0.049	0.002
	CRMP3	0.991	0.982	−0.076	0.006
	CRMP4	0.986	0.973	−0.042	0.002
Average			0.855		0.003

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