From CRM-System-Effectiveness to Profitability

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Completed Research Paper

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Abstract

The ability to manage customer relationships has become a key differentiating factor for companies that compete in a hypercompetitive environment. The purpose of this research is to investigate the mechanisms by which CRM-systems in their distinct architecture contribute to firm profitability. Drawing from prior work in the information systems and accounting literature, we examine the effect of CRM system effectiveness on profitability, considering the mediating roles of firms’ customer knowledge and customer strategy proactiveness. The results of serial mediation analysis based on data from a sample of 138 executives offer novel insights into the mechanism through which CRM systems contribute to performance gains. Our research contributes to the IS and the strategic management literatures by developing a conceptualization for CRM-system effectiveness and by delineating the causal process between CRM-system effectiveness and profitability.

Keywords: CRM-system effectiveness, customer knowledge, customer strategy proactiveness, profitability
Introduction

Customer relationship management (CRM) is undergoing massive changes (Chang et al. 2009). A prominent example is that of the US-retail company “Target”, which analyzed customer data using big data analytics and discovered a teenage girl’s pregnancy even before her family members became aware of (Ellenberg 2014). This example illustrates the deep understanding that companies can develop about their customers, once they set themselves to systematic and information-driven CRM. While technological capabilities of systems grow ever richer, the costs to acquire and run advanced IT-based systems have decreased, thus enabling not only large but also small- and medium-sized companies to capitalize on innovative technologies and system (Carlo et al. 2011).

CRM-systems are highly necessary as customers decide on when, where, how and why they want to interact with their supplying companies, producing timely and locally dispersed data fragments that reference a multitude of channels (Edelman and Singer 2015). Often, mobile devices play a major role in this and companies can easily gain full access to data on web-browsing behavior or even geolocation profiles, allowing them to personalize marketing efforts more effectively through timely and spatial contextualization of marketing efforts (Ding et al. 2015). This, in turn, calls for an IT infrastructure that accounts for the underlying information characteristics needed by managers who aim at optimization of customer engagement (Chenhall 2005). While CRM as a general management approach has been focus of intense research, the systems themselves have been addressed by few. Topics covered include the interplay of information technology, employee skills, organizational culture and processes (Ahearne et al. 2007; Bradley et al. 2012; Chen and Popovich 2003; Reinartz et al. 2004), recipes for a successful implementation of an overall customer relationship-oriented management approach (Bohling et al. 2006; Lipiäinen 2015) or, from a more general view point, determinants of an information system’s (IS) effectiveness at large (e.g., DeLone and McLean 2003). We aim to fill this gap of an appropriate conceptualization of CRM-system effectiveness by providing one that includes both a systems perspective as well as a content-related perspective.

In this paper, we investigate CRM-system effectiveness as a key property of the information system that underlies CRM activities. In particular, we show a transmission mechanism through which a CRM-system with distinct properties contributes to the overall profitability of the firm through the improvement of customer knowledge and customer strategy proactiveness (Mithas et al. 2005). Doing so, we acknowledge that the presence of superior IT alone does not create value on its own nor does it constitute a sufficient condition of sustained competitive advantage (Kohli and Grover 2008; Trainor et al. 2014; Wade and Hulland 2004). Established models of information system effectiveness and their antecedents mostly adopt a general view and typically neglect the informational needs that arise from the customer managerial-context. Based on prior research on performance measurement systems (e.g., Homburg et al. 2012), we develop a conceptualization for the concept CRM-system effectiveness that considers two important notions: information quality and quantity. In addition, we examine how CRM-system effectiveness transforms into performance gains. We propose a research model that considers customer knowledge and customer strategy as two intervening variables assumed to mediate the effect of CRM-system effectiveness on profitability. We test this model based on data from a study with 138 executives from different companies. The results of our research support the hypothesized relationships and allow us to derive several implications for managerial practice.

Conceptual background

Theoretical foundation

The primary theoretical perspective adopted herein is that of organizational information processing theory (Daft and Lengel 1986; Galbraith 1974). This theory contends that the purpose of organizations’ information management is to consider two conditions: uncertainty and equivocality. Uncertainty is defined as the lack of task-related information and manifests in a negative delta between information needed and the information owned by the company to perform the respective task (Galbraith 1973). Equivocality refers to ambiguity that emerges from several and potentially conflicting interpretations of a piece of information. It results in “confusion and a lack of understanding” (Daft and Lengel 1986, p. 556). Thus, equivocality is the result of different interpretations attached to a piece of information (Daft and
Weick 1984). Companies can reduce uncertainty by collecting additional data or developing buffers that reduce the effects of uncertainty. For equivocality reduction, however, companies need to ensure clarity in data interpretation, which is a process of sense making and doesn’t always require collecting additional data (Daft and Lengel 1986). For a company to achieve high performance, information processing should take place in a matched way as to counter uncertainty and equivocality effects. Ultimately, organizations need to establish a fit between information needs and information processing capabilities. This challenge has particular relevance for the management of customers and customer relationships.

CRM is a managerial concept that encompasses the use of IT to individualize relationships with customers to maximize mutually extractable value (Saeed et al. 2011). The purpose of CRM is the long-term oriented management of a customer portfolio with the aim of attracting, extending and maintaining profitable customer relationships (Massey et al. 2001). CRM “requires a cross-functional integration of processes, people, operations, and marketing capabilities that is enabled through information technology and applications” (Payne and Frow 2005, p. 186). CRM-systems represent the IT-based backbone that provides the informational foundation to all further customer-directed activities, both pro- and reactive. A key function of CRM systems is to gather, store, disseminate customer information to enhance companies’ customer knowledge and allow them design management programs and activities to build strong and profitable customer relationships (e.g., Kerin et al. 1999). As such effectiveness of CRM-systems seems paramount.

To date, academic research on the topic has produced mixed effects. While some studies indicate positive effects of CRM-system use on firm performance (e.g., Mithas et al. 2005), other studies indicate negative effects (e.g., Reinartz et al. 2004) or reveal insignificant effects (Jayachandran et al. 2005). CRM-systems possess a unique architecture covering collaborative, analytical and operational CRM (Gefen and Ridges 2002; Karimi et al. 2001; Saeed et al. 2011; Schierholz et al. 2007; Teo et al. 2006). Analytical CRM refers to the system part that is used to detect new patterns and confirm supposed ones which help firms generate customer knowledge as information is being processed by managers (Huang and Rust 2013). As the amount of data on customer opinion and behavioral data has grown exponentially in volume, velocity and variability, systems that can handle this type of “big data” have gained importance (Chen et al. 2012; Gandomi and Haider 2015). Operational CRM refers to the part of the system architecture that is used for marketing and sales automation purposes. Collaborative CRM enables the internal coordination of customer-related processes across functions, reducing internal coordination costs. This division of tasks is important, as it implies different causal paths between the focal construct and how profitability is achieved. However, CRM-system effectiveness is the key property, clearly to distinguish from the concept of CRM effectiveness (e.g., Hillebrand et al. 2011), that describes the effectiveness of the management approach in its entirety.

**Literature Review**

Both information systems and marketing literature provide conceptualizations that describe the success factors of information systems in general and CRM-systems in particular. Conceptualizations can be differentiated by (1) whether they offer a discrete tool for the evaluation of CRM-system properties or (2) whether they focus on the effectiveness by focusing on the outcomes of the CRM-process. Apparently, for the latter ones and since CRM-systems cannot achieve outcomes by themselves, these conceptualizations embed CRM-systems in the larger context of other CRM-affiliated factors, such as employee support, organizational culture, or relational processes. These conceptualizations tend to be less detailed in describing the key features of the system. Instrument-oriented conceptualizations, on the other hand, typically are discussed from a general information systems point of view. Thereby, they exclude the idiosyncrasies of an IS that is bound to be used in customer management context on purpose and apply a terminology that treats IS effectiveness as a construct that is very closely related to IS success (Delone and Mclean 1992).

The first empirically validated model to conceptualize IS success is the Information System Success Model (ISSM) by Delone and Mclean (1992). Based on previous conceptual work, it argues that IS effectiveness is achieved through the use at individual level, which then translates into effects at organizational level. It argues that IS effectiveness at individual level is influenced by system quality and information quality, as they drive individuals’ intention to use and actual use behaviour, with intention influencing behaviour. Further work incorporates service quality as measured by an adaptation of the SERVQUAL scale.
(Parasuraman et al. 1988) as a third antecedent to both intention to use and use behaviour (Pitt et al. 1995; Delone and Mclean 2003). Ultimately, use behaviour is the source of net benefits that make the IS effective at the organizational level. The ISSM has found widespread use in varying contexts, such as nursing (Booth, 2012), public services (Zaied 2012), or online banking (Lee and Chung 2009). Because of its general approach, the ISSM is only partially suitable for an application in a CRM context, as it does not account for the specificity of information that derives from the CRM-system’s character as an instrument to CRM controlling.

In marketing, CRM-systems are referred to as ‘CRM-technology’ because the strategic concept of CRM is a multifaceted management approach that encompasses human resources, processes and technology (Chen and Popovich 2003). Two foci have emerged in CRM-system research: (1) research on effectiveness of CRM-systems is seen as equivalent to CRM-technology and viewed from a general CRM effectiveness-perspective. Research attempts are directed at identification of interaction effects and mediating relationships between CRM-technology and other management process-related constructs. These contain, for instance, the interplay of technology with relational processes (e.g., Jayachandran et al. 2005), customer strategies (e.g., Hillebrand et al. 2011), management structures (e.g., Reinartz et al. 2004) or organizational learning processes (e.g., Mithas et al. 2005; Stein and Smith 2009). These interaction effects help explain the effectiveness by which financial or customer-related success measures are achieved. (2) The implementation of CRM-systems itself is a further topic of interest. Thus, research efforts are pointed at understanding and optimizing the implementation process (e.g., Foss et al. 2008; Kim and Pan 2008; Wilson et al. 2002). Since we aim at pointing out literature that is related to the effectiveness aspect of CRM-systems, we will not discuss these implementation-directed works any further. Contrary to previous work that sees CRM-system effectiveness as the result of a given set of IT applications with other factors, we introduce the concept of CRM-system effectiveness as a property of the already implemented system. We define CRM-system effectiveness as the extent to which a CRM-system is designed to contribute relevant information and actions for translating customer-strategic decisions into operational activities. This focus on effectiveness as an IS property is a relevant perspective, as CRM-systems are inherently designed to integrate information from various sources and allow the adjustment of measures depending on documentation of previous outcomes. By conceptualizing it as a general property, we aim to detach CRM-technology research from having to account for discrete manifestations of CRM-related applications that undermine the comparability of studies.

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Focal construct</th>
<th>Conceptualization</th>
<th>CRM-system properties included</th>
<th>Properties of CRM-content included</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pitt et al. (1995)</td>
<td>information system effectiveness</td>
<td>instrument-oriented</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Hillebrand et al. (2011)</td>
<td>CRM effectiveness</td>
<td>outcome-oriented</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Kim et al. (2003)</td>
<td>CRM effectiveness</td>
<td>outcome-oriented</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Kim and Kim (2009)</td>
<td>CRM performance</td>
<td>outcome-oriented</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>DeLone and McLean (2003)</td>
<td>information system success</td>
<td>instrument-oriented</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>This study</td>
<td>CRM-system effectiveness</td>
<td>instrument-oriented</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

Information systems literature offers several criteria that contribute to the success of an information system of which we include system quality and comprehensiveness into our conceptualization: the formatively measured construct of system quality consists of the aspects of system reliability, flexibility to new informational needs, integration of a variety of sources, easy accessibility of information as well as
timeliness of response (DeLone and McLean 2003). We incorporate this construct as dimension into CRM-system effectiveness together with customer management-related informational requirements which we subsume by the also formatively assessed dimension of CRM-system comprehensiveness (Homburg et al. 2012). Following the recommendation of Bisbe et al. (2007), we conceptualize CRM-system comprehensiveness as comprised of the dimensions detailedness, fit with strategy and causal relationships that relate to the system design. Detailedness provides information on the diversity of the picture that is drawn of the individual customer account, covering financial and non-financial as well as lagging and leading measures (Ittner et al. 2003). Fit with strategy reflects the extent to which the system accounts for metrics that are implied by the customer strategy (Banker et al. 2004). Causal relationships describe the degree to which the database allows for the controlling of effectiveness of actions taken within customer-managerial context (Pauwels et al. 2009; Stein and Smith 2009).

Research Framework

This research posits that CRM-system effectiveness is a resource that enables customer strategy proactiveness through the provision of sound customer knowledge. It is customer strategy proactiveness that ultimately contributes to competitive advantage, as it connects knowledge about customers that already exists with the awareness of technological change in the environment (Benitez-Amado and Walczuch 2012; Boulding et al. 2005). The theoretical perspective we adopt is the resource-based view (RBV), which explains heterogeneous firm performance with heterogeneous resource bases and configurations thereof (Wernerfelt 1995). To constitute foundations to sustained competitive advantage, resources need to be valuable, rare, inimitable and non-substitutable (Barney 1991). Thus, we choose the organization as our unit of analysis and focus on organizational impact when assessing the effectiveness of an information system (Delone and Mclean 1992). From an RBV-perspective, the CRM-system and customer knowledge constitute valuable resources as they fulfill these criteria. Even though CRM-systems by themselves do not constitute rare resources, systems that are well fitted to the technological and processual needs of the organization and thus are effective can be considered as such (Bharadwaj 2000; Ravichandran and Lertwongsatien 2005). Customer knowledge in form of knowledge about the present and future, latent and salient needs of customers is an important resource, as it is key input to the effective and efficient management of customer bases and segments (Cao and Gruca 2005; Gebert et al. 2003). However, the sort of customer knowledge we emphasize comprises awareness of technological progress and its impact on customer needs. This awareness is important, as technological progress turns latent into salient needs through technological enablement. For instance, farmers’ latent informational need to know about quality of soil has been transformed into a salient one, as companies introduced connected sensors that were able to cost-efficiently serve this need (Porter and Heppelmann 2014). This type of customer knowledge is highly individual to all customer bases and segments as well as hard to obtain, making it rare, valuable, non-substitutable and inimitable.

We model CRM-system effectiveness as a reflective construct of second order, containing the formatively measured dimensions of technological and content-related properties to generate information. For the assessment of operational system performance, we adopted system quality from the Information System Success Model. We excluded service quality and information quality from our work, as the context for which they were originally included into the ISSM- namely to predict use and intention to use of any IS - does not apply in our study (DeLone and McLean 2003). Additionally, we draw the distinction between the CRM-system and properties of the information contained therein. We account for the informational needs of CRM by incorporating the second dimension, that is, the content-related aspects of comprehensiveness, following the suggestion of Bisbe et al. (2007) who specified criteria for performance measurement systems to meet in general and adopting them into a customer-managerial context. Further adaptations of this conceptualization in other marketing-related contexts can be found with Homburg et al. (2012), who successfully adopted the construct for marketing performance measurement systems. Customer knowledge is a crucial resource in the market-oriented management of companies, as the concept of market orientation also covers the information from and about customers to align processes and capabilities with requirements (Day 1994; Slater and Narver 1995). However, information only represents the source of knowledge, as knowledge refers to a ”fluid mix of framed experience, values, contextual information and expert insight that provide a framework for evaluation and incorporating new experiences and information” (Davenport and Prusak 2000: p.5). In terms of a dynamic environment, customer knowledge more specifically refers to the understanding of how and why specific changes in the
customer base take place (Blocker and Flint 2007). The generation of customer knowledge is core element and main purpose of the implementation of a CRM-system (Boulding et al. 2005), because it is an input factor to development, execution and adjustment of any customer strategy. A customer strategy in terms of a company that conducts strategic CRM engulfs different aspects, such as which target groups to market to, how to address them, and how to draw lines between different segments (Payne and Frow 2006). A customer strategy that automatically adjusts for specific environmental parameters has been conceptualized as a dynamic capability contributing to superior performance (Aragon-Correa and Sharma 2003). Thus, generation and improved usage of customer knowledge are direct aims of any CRM-system (Foss et al. 2008).

For the creation of customer knowledge, CRM-system effectiveness is vital, as it allows users to bypass cognitive resource constraints and enables insights that are only identifiable by use of mathematical algorithms (Clarke 2016). The information provided is ultimately consumed and processed by employees who integrate it with previously existing knowledge, thereby extending their knowledge base (Nonaka 1994). Furthermore, CRM-systems are embedded into a closed-loop architecture, gathering information on results of campaigns and customer data to allow for the controlling and adjustments of measures (Payne and Frow 2005). To serve this purpose, systems need to contain details on the respective customer accounts that enable the detection of relevant causal relationships which are in line with customer-strategic decisions on how to serve the customer base at large and respective segments at small scale (Homburg et al. 2012). Accordingly, a positive linear effect of CRM-system effectiveness on customer knowledge can be assumed:

H1a: CRM-system effectiveness leads to higher levels of customer knowledge.

Since information systems do not provide competitive advantage by mere presence (Wade and Hulland 2004) a coherence of technological enablers, knowledge and strategy is needed (Payne and Frow 2005). Given that knowledge about latent and salient customer needs exists in an organization, strategic understanding of CRM calls for proactiveness in serving customers as a mean of stabilizing and strengthening relationships that are already in existence. Functionalities of CRM-systems like marketing and sales automation are discrete applications to harness these potentials that enable a firm to execute a customer strategy that is characterized by proactiveness. Thus, we hypothesize

H1b: CRM-system effectiveness leads to greater customer strategy proactiveness.

Customer strategy proactiveness in this view is the mediating mechanism by which the resource of customer knowledge is transferred into superior financial performance (Edelman et al. 2005; Reimann et al. 2010). We define customer strategy proactiveness as the customer strategy’s property of incorporating environment and its customers’ properties and needs, making the exerting firm highly adaptive and superior in seizing opportunities and efficiently developing customer relationships (Lukas et al. 2001). Given the awareness of how customer demand changes, we thus hypothesize:

H2: Customer knowledge has a positive effect on the degree of customer strategy proactiveness.

Customer strategy proactiveness improves the efficiency of customer-related processes and leverages the acquirable turnover potential from customers by making use of operational features of a CRM-system. This presumably leads to a positive impact on profitability (Pauwels et al. 2004). A company that holds a strategy that implies the proactive use of these automation potentials thus will experience improved profitability.

H3: Customer strategy proactiveness leads to higher levels of profitability.

Figure 1 depicts our research framework and shows the path diagram including control variables. The four centered boxes depict the serial mediation model.
**Research Approach**

**Data Collection and Sample Characteristics**

To analyze the relationships between CRM-system effectiveness, customer knowledge, customer strategy proactiveness, and financial performance we conducted a mixed mode survey. The sampling frame consisted of firms obtained by a professional provider of business addresses. The firms covered a wide range of industries such as industry goods, professional services, retail, or consumer goods to allow for general inferences about different industries. The key informants have expert knowledge about the design properties of the CRM System in use and insight into customer-related resources (i.e., CEOs, managing directors, marketing and sales managers).

The first step of data collection consisted of a self-administered mail survey. The questionnaire and a cover letter that invited the respondents to participate in the survey were sent to the key informants. The cover letter informed the key informants about the topic of the study and stated that there are no correct or wrong answers. Additionally, the letter informed the respondents that all data are collected anonymously and that results of the study will be reported only on aggregate level (Podsakoff et al. 2003). After the initial mail survey, we sent a reminder via e-mail, including a link to the questionnaire in online format to allow the key informants to participate online. Finally, we called a random sample of the key informants by telephone to increase the number of participating firms.

We received valid and complete responses from 138 firms. The average firm has 50 to 100 employees and a sales volume between 5 million and 50 million Euro. Approximately 82 percent of the firms operate mainly in business markets, meaning a share of turnover from business-to-business relationships above fifty percent. 31.7 percent of the respondents have a top management position (i.e., CEO or managing director), 37.4 percent hold a senior-level management position (i.e., marketing or sales director), 23 percent have a mid-level management position (i.e., marketing or sales manager), and 7.9 percent hold another position (e.g., technical director). On average, respondents’ tenure within the firm is 13.6 years (SD=9.7) and the average age is 45.5 years (SD=10.0).

**Construct Measures, Measurement Validation, and Tests for Potential Biases**

We used a standardized questionnaire to collect information about the constructs of interest. The constructs were measured with multiple-item scales. CRM-system effectiveness has two components. For the system quality as applied in the IS success model (DeLone and McLean 2003; Wixom and Todd 2005). For the content-related aspects of CRM-system effectiveness, we adopted the measurement of CRM-system comprehensiveness from Homburg et al. (2012), who originally investigated the properties of marketing performance management systems. Both dimensions were assessed formatively, so sum scores were calculated. As system quality and CRM-system comprehensiveness conceptually reflect properties of an effective CRM-system and showed good psychometric properties, we modelled the second order reflective (Shin and Kim 2011). For the second-order CRM-system effectiveness, variables were
weighted according to their respective factor loadings obtained in confirmatory factor analysis (CFA). We measured customer knowledge using a scale adopted from Moorman and Miner (1997). The customer strategy proactiveness scale was adopted from Lukas et al. (2001). Finally, a scale by Vorhies and Morgan (2005) was used to assess profitability relative to major competitors. We included control variables of firm size and share of services as covariates into the model, since company size and share of services may co-determine both profitability and CRM-system effectiveness: smaller companies may be less able to invest into CRM-solutions while also suffering from missing economies of scale. Companies that offer primarily services in turn may differ from primarily goods producing companies in terms of both their cost structure as well as the number of customer interactions, potentially resulting in increased profitability and CRM-system effectiveness.

We established the measurement model using CFA in SPSS AMOS 23 by assessing global fit indices and criteria for the internal model structure (e.g., Bagozzi et al. 1991; Bagozzi and Yi 1988). Multiple fit indices indicate that the measurement model has an acceptable overall model fit. The comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA) all match the suggested thresholds ($\chi^2=57.58; \text{df}=48; \chi^2/\text{df}=1.20; \text{CFI}=0.99; \text{TLI}=0.99; \text{RMSEA}=0.04$). We assessed the validity and reliability criteria of the construct measures by calculating additional parameters. The results of these analyses showed that Cronbach’s alpha for the respective scales ranges between 0.74 and 0.93. These values exceed the commonly accepted threshold of 0.7 (Nunnally 1978). Additionally, the measurement scales exhibit satisfying convergent validity. The composite reliability (CR) for the respective constructs ranges between 0.79 and 0.93 and thus exceeds the threshold of 0.6. The average variance extracted (AVE) ranges between 0.64 and 0.76 and thus exceeds the threshold of 0.5 (Bagozzi and Yi 1988). The comparison of the average variance extracted of every construct with the squared correlation between any pair of constructs indicates discriminant validity (Fornell and Larcker 1981). Additionally, the reliability parameters of the measurement of CRM-system effectiveness consisting of the weighted composite measures of dimensions ($\alpha=0.74, \text{CR}=0.85, \text{AVE}=0.76$) supports the reflective conceptualization of CRM-system effectiveness as a higher order construct. Table 2 provides information on reliability and validity criteria about each construct. Table 3 provides information on discriminant validity between constructs. In brief, the model validation procedure indicated an acceptable model fit with empirical data.

We performed additional tests to control for possible biases well known in survey research. We deployed two different tests to check for nonresponse bias (Armstrong and Overton 1977). Comparisons between responses and archival data obtained from the commercial provider of business addresses indicate that there are no significant differences in sales volume and number of employees between responding and nonresponding firms (all $p>.05$). Furthermore, in a series of t-tests for all constructs of interest, we compared answers from the initial mail survey and from those who did not answer until phone contact, indicating no significant differences between early and late responders (all $p>.05$). We conclude that our study does not suffer from any systematic nonresponse bias.

<table>
<thead>
<tr>
<th>Table 2. Information on Construct Measures</th>
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<tbody>
<tr>
<td><strong>CRM-System Effectiveness ($\alpha = 0.74, \text{CR} = 0.85, \text{AVE} = 0.76$)</strong></td>
</tr>
<tr>
<td><strong>Dimension 1: System Quality</strong></td>
</tr>
<tr>
<td>How do you evaluate your CRM-system quality with regard to the following aspects?</td>
</tr>
<tr>
<td>7-point Likert-type rating scale ranging from 1 = “very poor” to 7 = “very good”</td>
</tr>
<tr>
<td>– Reliability</td>
</tr>
<tr>
<td>– Flexibility</td>
</tr>
<tr>
<td>– Integration</td>
</tr>
<tr>
<td>– Accessibility</td>
</tr>
<tr>
<td>– Timeliness</td>
</tr>
</tbody>
</table>
Dimension 2: CRM-System Comprehensiveness
To what extent does your CRM-system fulfill the following aspects?
7-point Likert-type rating scale ranging from 1 = “very poor” to 7 = “very good”
– Degree to which the customer data sets reflect monetary and non-monetary as well as leading and lagging indicators of customer value.
– Fit of real and by customer strategy implied CRM-system design.
– Degree of contained quantitative information that allows identification of cause-and-effect-relationships between customer-strategic marketing activities and changes in the customer base.

Customer Knowledge (α = 0.88, CR = 0.87, AVE = 0.64)
To what extent do you agree or disagree with the following statements?
7-point Likert-type agreement scale ranging from 1 = “completely disagree” to 7 = “completely agree”
– We know the relevant value-drivers in our customer base.
– Our knowledge concerning the development of our customers is thorough.
– When deviations to the customer strategy plan occur we often know which areas are affected.
– When deviations to the customer strategy plan occur we are in most cases able to identify the cause.

Customer Strategy Proactiveness (α = 0.78, CR = 0.79, AVE = 0.65)
To what extent do you agree or disagree with the following statements? Please use such decisions your firm has made in the last five years as the frame of reference when answering the questions below.
7-point Likert-type agreement scale ranging from 1 = “completely disagree” to 7 = “completely agree”
– In making strategic customer decisions, we respond to signals of opportunities quickly.
– In making strategic customer decisions, we constantly seek to introduce new initiatives.

Profitability (α = 0.93, CR = 0.93, AVE = 0.76)
Please evaluate the performance of your strategic business unit relative to your biggest competitor.
7-point Likert-type rating scale ranging from –3 = “a lot worse than competitor” to +3 = “a lot better than competitor”
– Profitability of SBU
– Return on investment
– Return on sales
– Achievement of financial goals

Additionally, we tested for common method bias as dependent and independent variables were measured in the same instrument from the same informants (Podsakoff 1986; Podsakoff et al. 2003). A single factor test based on exploratory factor analysis indicates that no first factor can explain most variance in the variables. To corroborate that no common method bias is present, we additionally conducted a χ²-difference test based on confirmatory factor analysis (Malhotra et al. 2006) which revealed that the model based on a single factor fits the empirical data significantly worse than the hypothesized multi-factor model in which items load on their respective factors (Δχ²=531.62, Δdf=4, p<.001). Thus, these tests indicate that there is no issue with common method bias in our study.

Table 3. Discriminant Validity

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
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<tbody>
<tr>
<td>CRM-System Effectiveness</td>
<td><strong>0.76</strong></td>
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<td></td>
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<tr>
<td>Customer Knowledge</td>
<td>0.13</td>
<td><strong>0.64</strong></td>
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<tr>
<td>Customer Strategy Proactiveness</td>
<td>0.12</td>
<td>0.46</td>
<td><strong>0.65</strong></td>
<td></td>
</tr>
<tr>
<td>Profitability</td>
<td>0.01</td>
<td>0.04</td>
<td>0.09</td>
<td><strong>0.76</strong></td>
</tr>
</tbody>
</table>

Notes: AVE in bold on the diagonal and squared correlations between constructs below the diagonal.
Analytic Approach and Findings

To test our hypotheses, we conducted a serial mediation analysis using SPSS 23 and the PROCESS macro (version 2.16; Hayes 2013). We applied model 6 using CRM-system effectiveness as the independent variable, customer knowledge as the first-stage mediator and customer strategy proactiveness as the second-stage mediator. Profitability was the dependent variable. We estimated the model using a bootstrapping approach based on 10,000 bootstrap samples and calculated 95 percent bias-corrected confidence intervals for the indirect effects.

Figure 2 depicts the results of the analysis. We found evidence of a significant total indirect effect of CRM-system effectiveness on profitability, indicated by estimates of effect sizes that did not include zero in the given confidence interval (f=0.02; LLCI=0.00; ULCI=0.04). This significant total indirect effect consists of two significant specific indirect effects: the first effect is exerted through customer knowledge and customer strategy proactiveness as mediators (standardized path coefficient a\_1\times d\_1\times b\_2=0.01; LLCI=0.00; ULCI=0.02). We thus find evidence for our hypotheses H1a, H2 and H3, implying that CRM-system effectiveness influences profitability positively through improved customer knowledge that feeds into the mediating mechanism exerted through customer strategy proactiveness. The second path only affects profitability solely through customer strategy proactiveness, thus corroborating H1b (path a\_2\times b\_2=0.01; LLCI=0.00; ULCI=0.03). This supports our hypothesis that customer strategy proactiveness is a strategy property to leverage the effect of CRM-system effectiveness on profitability, as CRM-system effectiveness is beneficiary to the execution of a proactive customer strategy. Significant direct effects were found for CRM-system effectiveness affecting customer knowledge positively (a\_1=0.09, p<0.01), CRM-system effectiveness affecting customer strategy proactiveness positively (a\_2=0.05, p<0.05), customer knowledge affecting customer strategy proactiveness positively (d\_1=0.53, p<0.01) and customer strategy proactiveness affecting profitability positively (b\_2=0.18, p<0.05). A significant direct effect of CRM-system effectiveness on profitability did not show, thus pointing to an indirect-only mediation (Zhao et al. 2010). As hypothesized, CRM-system effectiveness appears as a property that benefits several antecedents to profitability, while not being sufficient to it in itself. Overall, we found a significant total effect as indicated by c\_1=0.05 (p<0.05). Control variables of firm size and share of services did not show to have an impact on profitability in our model.

![Figure 2. Results](attachment:figure2.png)
Discussion

Part of CRM-systems research focuses on process outcomes of the relationship management process while another adopts an instrumental perspective to assess the effectiveness of the instruments used. We assess CRM-system effectiveness combining a system-oriented perspective and a content-guided approach rooted in the accounting literature.

The findings of our inquiry support the conceptualization of CRM-system effectiveness and suggest that the concept contributes to a better understanding of latent and salient customer needs. The findings corroborate those of prior research concerning how CRM-technology contributes to improved customer knowledge (e.g., Mithas et al. 2005) and strengthens firm profitability (e.g., Sin et al. 2005). This improved knowledge is the informational resource that enables the pursuit of market opportunities that are then seized by a customer strategy with a highly proactive element to it. This proactiveness towards the market enables returns that are above industry average. Additionally, CRM-system effectiveness exerts a positive impact on profitability through an improvement of customer strategy proactiveness, excluding customer knowledge from the relationship. This draws attention towards operational CRM that, in case of an effective design as implied in our conceptualization, can facilitate operative customer management through marketing automation.

Despite low effect sizes, significance was observed for the two ways of mediation, resulting in a significant total effect. We do not find a direct effect of CRM-system effectiveness on profitability. On the one hand, this may be due to system costs. These costs may outweigh any other positive direct effect. Still, the total effect remains significant and positive, which implies that benefits of CRM-system effectiveness, once placed in the right setting, may overcompensate negative cost effects. On the other hand, our findings are in line with the literature that stresses the importance of strategy as mediating mechanism between CRM and profitability (Palmatier et al. 2006; Sawhney and Zabin 2002). With our investigation, we add to the list of strategy properties that are positively associated with increased profitability. Explicitly, we identify a customer strategy’s goal to act ahead of competition, irrespective of cost leadership or a differentiation focus in the business strategy, to have relevance for a firm’s financial performance (Reimann et al. 2010).

Theoretical Contribution and Managerial Implications

Our study contributes to the literature on CRM-system research in three ways: (1) using a theory-guided approach, we introduce a new conceptualization of CRM-system effectiveness that focuses on both user and process needs derived from customer management processes by incorporating the aspects of system comprehensiveness and system quality. Especially regarding studies that place CRM-technology into the larger context of the CRM process, we propose considering system quality in future research. IS researchers have rightfully acknowledged that the presence of functionalities alone is not a guarantee, but rather a prerequisite to an IS delivering intended benefits. Marketing scholars should consider the fact that systems with identical functionalities yet differing system qualities deliver differently when assessing marketing-related IS in the future. (2) We add evidence to the literature on CRM-technology research, that produced mixed and ambiguous results in the past, for instance showing non-significant (e.g., Hendricks et al, 2007; Jayachandran et al. 2005) or even negative effects of CRM-technology on profitability (Reinartz et al. 2004). Rather, our research is in line with the findings of Sin et al. (2005) who reported a positive impact of CRM-technology on firm financial performance. (3) Drawing on organizational information processing theory, we outline how CRM-system effectiveness embedded in a surrounding that cultivates customer strategy proactiveness can yield above-average returns. Thereby, we complement the business strategy literature that showed cost leadership and differentiation foci to have beneficial effects for firm performance (Reimann et al. 2010) with a customer-strategic component, as encouraged by Payne and Frow (2005).

Managerial implications of this study are twofold: (1) the possession of theoretically capable CRM-technology itself is insufficient for increased profitability but rather appears to be a cost driver (e.g., Wade and Hulland 2004). Rather, our results imply a call to action for marketing managers to leverage the operational potential of their CRM-systems through intentional and purposeful acquisition and accumulation of knowledge.
Customer managers need to be aware of latent and salient customer needs and how they change driven by technological progress. Given this awareness, proactiveness in the customer strategy may help to capitalize on potentials for increased profitability. In this context, Porter and Heppelmann (2014) describe the change of farmers’ latent needs to know about the nutritional status of each square feet of soil to improve process efficiency in fertilizing and ploughing. Technological progress allows farmers to satisfy their informational need while simultaneously opening entirely new fields of business for supplying companies. Further examples may include telematic information of commercial vehicles sent to fleet managers to improve maintenance cycles and reduce wear or similar data-driven services and extension of revenue streams.

Limitations and Avenues for Future Research

This research bears limitations as any other quantitative empirical study. First, the sampling frame consisted of solely German companies which may show a different understanding of CRM than international counterparts. In fact, we accounted for the ambiguity inherent to the term “CRM” by explicitly asking for the “CRM-system” and its components. In an accompanying text, we clarified what we meant by that, covering any IT-based solution that was used to support customer management processes. We thereby also included makeshift-solutions that do not hold up to the performance of fully integrated systems, such as those by Salesforce.com, but that also reflect their properties in low scores on the dimension of system quality. Further research may investigate in more detail how integration of data sources, for instance with information systems run by associated companies, can benefit the user as well as the networks they are embedded in.

Second, we need to stress that our conceptualization of CRM-system effectiveness, despite borrowing from the Information System Success Model, follows a different approach than the information systems evaluation literature. That is, our conceptualization focuses on the ability to perform the tasks it was designed for in terms of customer management-related issues. This teleological approach we take is followed on purpose, as we place our contribution in the literature-guided identification and validation of dimensions rather than in the actual benchmarking of dimensions. Given the low effect sizes we identified, we call for replication studies that may corroborate the persistence of effects given different organizational sample and respondent backgrounds.

Third, our research relies on a sample that comprises an important number of companies that act in a business-to-business context. Thus, future studies may test for differences with business-to-consumer contexts. However, research suggests that “while consumer firms are somewhat more transactional in their approach to the market and B2B firms are more relational, overall patterns of marketing practice are similar across firm type” (Coviello and Brodie, 2001, p. 382). Hence, it may be more interesting to actually test for differences between firms whose markets and strategies reflect different levels of relationalism.

References


