CRM software success: a proposed performance measurement scale

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Abstract

Purpose – *This article aims to seek to provide a performance measurement scale for customer relationship management (CRM) software. The CRM concept is wide, yet prior literature offers only specific approaches. This scale goes beyond specific scenarios, to cover the various perspectives on CRM and provide quantitative validation of the measures.*

Design/methodology/approach – *This paper describes the complete process for conceptualizing and operationalizing this reflective second-order construct, including a thorough literature review, qualitative research and a quantitative study with 208 companies that have implemented CRM software.*

Findings – *Three main, interconnected constructs emerge to measure CRM software performance: customer life cycle, firm performance and operational performance. Retention, loyalty and satisfaction indicators form the customer life-cycle dimension. Firm performance refers to market share, efficiency, product adaptation, and new product launch indicators. The operational dimension includes improvement in sales performance, marketing campaigns, customer service and analysis of customer information.*

Research limitations/implications – *This scale guides every element involved in CRM software implementation, toward a common objective.*

Practical implications – *The CRM scale supports CRM software industry players and firms that intend to implement CRM software. The three model constructs provide guidelines about which improvements should be noted with a CRM implementation.*

Social implications – *This scale help the companies who intend to implement CRM software conduct their agreement with the other parts involved (consultants, software developers and the firm).*

Originality/value – *This paper meets an identified need, namely, to provide a CRM software performance measurement scale. The huge, unique sample is exclusive and obtained from a dedicated CRM software developer.*

Keywords *Performance measurement, CRM, Customer relationship management, Relationship marketing, Scale*

Paper type *Research paper*

1. Introduction

Customer relationship management (CRM) and its related technology market account for substantial value worldwide. According to Rivera and Van der Meulen (2014), growth in the CRM software market remains moderate but significant after several years of strong investments; worldwide revenues reached $23.9 billion in 2014. Key players such as Oracle, SAP and Microsoft offer cutting-edge CRM technological solutions every year, and their information technology (IT) partners earn significant profits through consultancies and the sale of CRM software licenses. We thus must recognize the importance of technology for a CRM strategy (Boulding *et al.*, 2005): technology represents a nearly mandatory investment for firms interested in deriving benefits from their relationship marketing.

In recent years, measuring the performance of the IT applications and information systems (IS) projects that companies implement has grown increasingly important as a means to evaluate whether investments directed to these areas are worthwhile (Hasan and Tibbits, 2000). Although the payoff earned from CRM programs is a growing issue

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> **"The primary objective of the CRM technological solution is to track, capture, and analyze customers' interactions and transactions over time."**

in marketing and IT research (Coltman and Dolnicar, 2007), no clear evidence exists regarding the link between CRM investments and performance. Some authors suggest directing efforts toward the construction of a performance measurement system that can track improvements and refine the activities and applications of a CRM program. For example, Pan and Lee (2003) highlight the need to develop metrics to monitor and improve CRM systems for totally integrated projects. Bull (2003) refers to CRM as a complex, holistic concept, such that its software implementation cannot succeed without effective leadership, sourcing, targeting and evaluation strategies. Furthermore, the need for performance measurements is vastly heightened by the disappointing outcomes of investments in this area. According to International Data Corporation and the Gartner Group, the rate of successful CRM software implementations is less than 30 per cent (Rigby *et al.*, 2002), which hardly justifies the cost of implementation (Lindgreen *et al.*, 2006).

Because CRM is an IT-enabled business strategy, rather than an IS, models from IS contexts are insufficient to measure the success of CRM software implementations. In addition, whereas CRM software exhibits IT development and software installation pathways that are similar to those for enterprise resource planning (ERP), the two software types serve different purposes and applications. For example, ERP integrates back-office functions, connects functional areas to suppliers and focuses on the supply and demand of key resources and materials. CRM software instead integrates back and front office, improves customer touch points and front office applications, addresses fragmented customer data, enables analyses of customer behavior and preferences and extends data mining capabilities through increased Web access to various supply chain members. Because of these distinctions, measuring CRM software success requires a specific, unique scale.

A review of CRM literature suggests that performance measurement is not a popular research area; according to a categorization of CRM research in 1992-2002 (Ngai, 2005), studies related to performance management are scarce. Another study classifies the central topics as CRM technology, human factors in CRM, CRM business models, CRM markets and CRM and knowledge management (Romano and Fjermestad, 2003). That is, the focus has been on why and how to engage in CRM applications, rather than on evaluating the performance of actual activities and projects.

To enrich this research area, we propose a measurement instrument of CRM software success that integrates different perspectives on CRM performance. We first propose a clear definition and conceptualization of CRM and CRM software, which informs our review of prior approaches to CRM measurement and our in-depth analysis of existing CRM performance indicators. From this review and analysis, we derive a scale that we then specify, evaluate, validate and test empirically. Finally, we conclude with a discussion of our findings and suggestions for further research.

2. Theoretical framework

2.1 CRM, CRM software and customer knowledge management

Previous literature provides multiple definitions of CRM (Richards and Jones, 2008), ranging from the implementation of specific technology solutions to a holistic approach to manage customer relationships that creates both customer and firm value (Arman, 2014).

This plethora of definitions has caused some confusion, although the field has started to converge on a common definition (Boulding *et al.*, 2005). We adopt a holistic definition (Richards and Jones, 2008, p. 120):

> CRM is a set of business activities supported by both technology and processes that is directed by strategy and is designed to improve business performance in an area of customer management.

That is, in our study, CRM is primarily a strategic approach (Bohling *et al.*, 2006).

In turn, CRM software refers to the technological application that links the front office (e.g. sales, marketing, customer service) to the back office (e.g. finance, operations, logistics and human resources) at the company's "touch points" (Chen and Popovich, 2003; Fickel, 1999). The most common touch points are the Internet, e-mail, sales, direct mail, short messaging services, call centers, fax, pagers, stores and kiosks. Thus, CRM software is a tool to facilitate the implementation of a CRM strategy.

This software generally relies on a standard structure, although variations may exist across different software providers. The structure comprises operational and analytical modules. In the operational module, the software automates selling, marketing and service processes to make these functions more efficient and effective (Raman *et al.*, 2006; Li and Mao, 2012). Operational software applications include those that support sales force automation (SFA), product configuration, event-based marketing, opportunity management, campaign management and contact management solutions (Ang and Buttle, 2006). The analytical module instead comprises technologies that aggregate customer information and provide data to improve business decisions and actions (Raman *et al.*, 2006), such as answers to questions about "What should we offer this customer next?" "What is this customer's propensity to churn?" or "How can our customers be segmented for campaigning purposes?" (Ang and Buttle, 2006), as well as "How should we communicate with our customers?" or "What are my customers' color and size preferences?" (Chen and Popovich, 2003; Arman, 2014).

The primary objective of the CRM technological solution is to track, capture and analyze customers' interactions and transactions over time. Then, CRM helps convert these collected data into useful information for directing activities, such as creating personalized marketing plans, developing new products or services and designing communication programs that attract, reward and retain customers (Croteau and Li, 2003; Schniederjans *et al.*, 2012; Chang *et al.*, 2014).

According to CRM definitions, obtaining and managing customer-related knowledge is a means to attain CRM objectives. Knowledge constitutes one of the main assets of organizations (Drucker, 1993). Knowledge management refers to the process of capturing collective expertise and intelligence in an organization, then using them to foster innovation through continued organizational learning (Nonaka, 1991; Quinn *et al.*, 1996). This expertise and intelligence often involves customers, so CRM relates strongly to knowledge management and especially to customer knowledge management (Romano, 2000; Stefanou *et al.*, 2003; Massey *et al.*, 2001). According to Romano (2000), companies should explore and refine their CRM knowledge management methods to access value-added knowledge, for both themselves and their customers, as well as to understand customer purchasing patterns and trends, attitudes and preferences. From a CRM standpoint,

"The holistic nature of the Balanced Scorecard makes it suitable for strategic management and measuring the performance of CRM software."

"Firms wishing to improve their relationships with customers need to monitor the three dimensions validated in this study constantly: operational benefits, customer life cycle benefits, and performance benefits."

knowledge management entails all activities directed toward creating and leveraging the market intelligence that firms need to build and maintain a portfolio of customer relationships that maximizes their organizational profitability (Zablah *et al.*, 2004). Customer-related knowledge, customer service and customer satisfaction are especially significant for retaining the firm's competitive advantage (Porter, 1985; Hee-Woong and Young-Gul, 2001), although a competitive advantage also may require the support of CRM software that has been implemented successfully. That is, CRM software can manage customer knowledge gathered from every customer interaction with the company, across different contact points.

2.2 CRM software success measurement

In our literature review, we found relevant perspectives on CRM performance measurement, including internal versus external indicators and tangible versus intangible indicators. Internal indicators represent the firm's improvement due to and satisfaction with CRM (Jutla *et al.*, 2001; Croteau and Li, 2003). External indicators reveal customers' satisfaction with the company's innovation or support in response to the CRM implantation. Tangible indicators can be obtained without the support construct, such as profitability, cost reduction or even employee productivity. Intangible indicators reflect perceptual measures, such as customer satisfaction or level of customer service (Chen and Chen, 2004; Reinartz *et al.*, 2004). However, according to our literature review, other dimensions related to the customer perspective and innovation were added to the CRM performance and should be considered in a new approach. Moreover, a few papers deal specifically with CRM performance measurement and related issues (Jain *et al.*, 2002; Lindgreen *et al.*, 2006, Zablah *et al.*, 2004).

For example, using a model with both input and output, Zablah *et al.* (2004) develop a CRM assessment tool that defines CRM success as linkages of a knowledge management process that creates customer intelligence (internal process) with an interaction management process that can handle customer communications (external process). The two processes, applied to enhance existing roles, technology and business processes, reveal potential improvements and thus enable companies to reach success in their CRM initiatives. Their study advances comprehension of CRM as a process because the authors focus on making a CRM strategy work. However, their review lacks empirical verification, does not focus on the CRM software and does not describe the performance measure in detail.

Lindgreen *et al.* (2006) propose another assessment tool that consists of ten evaluative elements, categorized into three groups:

1. strategic elements, such as customer and brand strategy;
2. infrastructural elements, such as culture and people; and
3. process elements, including the relationship management process.

Because CRM software includes various perspectives, it sometimes cannot generate immediate organizational performance on these proposed measures. It is also crucial to

consider different perspectives and contexts related to CRM software performance to achieve better comprehension.

Deviating from a traditional quantitative approach, Jain *et al.* (2002) conduct interviews with experts and thus suggest some behavioral and qualitative elements to assess CRM performance. They reduce the measures into ten factors: attitude, understanding expectations, quality perceptions, reliability, communication, customization, recognition, keeping promises, satisfaction audit and retention. This exploratory work focuses on internal measures that result from innovation and better customer understanding, providing a relevant but not sufficient assessment of CRM performance. These authors also note the need for a scale of CRM measures and cite the IT perspective on CRM as a gap to be filled. In this sense, key performance indicators (KPI) from traditional literature might be reintroduced and integrated, together with the software performance indicators. Finally, Jain *et al.*'s approach is not conclusive and does not give companies a means to find ways to improve their performance through CRM software.

2.3 Balanced scorecard to assess CRM software success

The balanced scorecard (BSC) is a strategic management and performance measurement tool developed by Kaplan and Norton (1992). It offers four perspectives on company performance: financial, customer, innovation and internal perspectives. The essence of the BSC is its effort to address the link between a company's long-term strategy and its short-term actions. Kaplan and Norton (1996) discuss how to manage this link according to four major implementation processes for the balanced scorecard:

1. Translating the vision to company management.
2. Communicating and linking it to departmental and individual objectives.
3. Business planning, which directs all efforts and resources toward a macro plan drawn by the BSC.
4. Feedback and learning to monitor results.

Some previous studies use BSC, whether in its original dimensions or with alterations, to measure IS performance. In early attempts to measure and evaluate IS activities using BSC, Martinsons *et al.* (1999) and Hasan and Tibbits (2000) propose, including business value, user orientation, internal processes and future readiness. Their adaptations of the BSC framework reflect the premise that IT is essentially an internal support function for an organization, whereas the original framework focused on impacts on the external market. They also removed the customer perspective, whereas, for CRM, this key perspective must be reconsidered. Their work provides both an exploratory and a case study and applies BSC to IS performance measures. However, further empirical work is needed to create a valid tool.

The holistic nature of the BSC makes it suitable for strategic management and measuring the performance of CRM software. That is, CRM software aims to enhance revenue by building relationships with customers, such that the BSC approach, which connects long-term objectives with short-term actions, matches a CRM philosophy and CRM software outcomes that relate key measures to performance drivers. The four questions in the BSC (How do customers view the company? What must the company excel at? Can the company continue to improve and create value? and How does the company look to shareholders?) (Kaplan and Norton, 1992) can be answered with the support of the CRM software, as well as to assess CRM software performance.

In explicitly considering the use of BSC for CRM, Kim *et al.* (2003) propose four customer-oriented dimensions in their case study: customer knowledge, interaction, value and satisfaction. The cause – effect schema they propose suggests a single direction for creating outcomes. However, according to the original structure of the BSC, results and

relationships across dimensions can go in both directions (Kaplan and Norton, 1992). In this sense, the BSC-based CRM software approach is not well supported by their model.

In another attempt, Kim and Kim (2009) propose a CRM scorecard that includes a wide array of performance measures, reduced to four perspectives:

1. organizational performance, which involves indicators such as profitability and customer equity;
2. a customer perspective, with satisfaction and loyalty measures;
3. the process perspective, which involves acquisition, retention and expansion; and
4. infrastructure, featuring sub-dimensions such as IT and human capital usage, the match between organizational structure and culture and the CRM strategy.

In this work, CRM software is just another IT. Thus, they ignore some KPIs related to the performance of CRM software, as well as their impact on the BSC. However, CRM software is a core tool that can manifest all the dimensions of the BSC, and almost all CRM strategy implementations depend on its support. The BSC approach, when applied to software, must include dimensions related to the software's performance.

Mohammad *et al.*'s (2011) case study in an Iranian context enabled them to develop a fuzzy approach to BSC for CRM, with four dimensions: organizational performance, process, customer and infrastructure. These authors assert that their method can evaluate CRM general performance in the beverage industry. Therefore, this narrow application of the BSC to a single context requires extensions to other industries.

Similar to the original BSC, the scale we propose enables managers to view performance across several areas simultaneously, and it brings together many seemingly disparate elements of a company's competitive agenda. Yet by providing information from different perspectives, it also minimizes information overload, in that it limits the number of measures used (Kaplan and Norton, 1992). Accordingly, our proposed scale complements prior research. Specifically, we consider a software perspective, provide empirical findings derived from a large sample of companies from many economic sectors and include both KPI and behavioral indicators that we identified from our literature review.

In comparison with Martinsons *et al.* (1999) and Hasan and Tibbits (2000), we offer a BSC approach that is specific to CRM software, include a customer perspective and provide an empirical study whose results likely generalize to various kinds of companies. Moreover, compared with Mohammad *et al.* (2011), our approach is validated by a sample obtained from multiple sectors and different activities. We also include a more extensive literature review to construct our survey, such that we used the most representative measures.

The CRM software we proposes also makes some significant advances over other CRM performance attempts with a BSC perspective. For example, Kim *et al.* (2003) propose a cause-and-effect path by which CRM increases profits (i.e. customer knowledge improves customer interaction and customer interaction affects customer value and then customer satisfaction). This path corresponds with the notion that innovation and learning improve internal business perspectives, which affect financial perspectives, which improve results in customer perspectives. Although this approach seems interesting, the model diverges from the original purpose of the BSC, which would not accept a single cause-and-effect path among variables. Moreover, previous CRM literature indicates differences in how companies obtain outcomes from their CRM initiatives (Bohling *et al.*, 2006). Our measurement tool, similar to the BSC, reports performance on different perspectives simultaneously.

Finally, the approach suggested by Kim and Kim (2009) establishes a cause – effect relationship, with the influence of BSC. However, their performance measurement framework is not suitable for CRM software because they regard CRM software as only a

(non-central) part of the CRM infrastructure. We seek to assess CRM software specifically and therefore propose a measure of the outcomes of the software.

2.4 Construction of a CRM software success scale

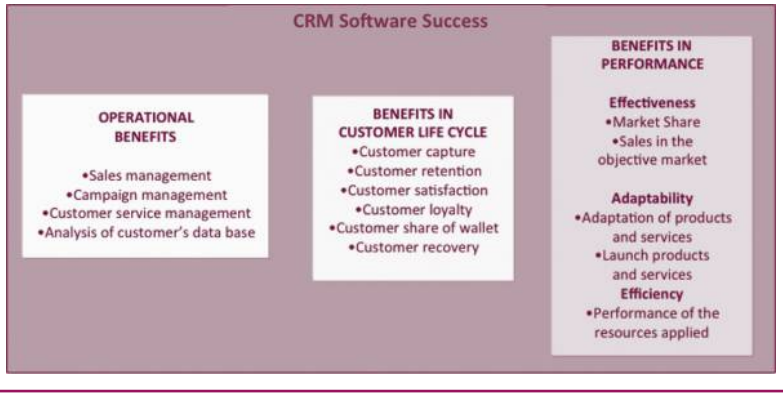
Our proposed CRM software success scale emerges from the BSC structure (Figure 1). However, we combine two perspectives of BSC by integrating the financial perspective with the innovation and learning perspective. In the case of BSC applied to the CRM context, a long-term financial improvement, which aims to answer "how do we look to the shareholders?", can be observed directly through the success of innovation and learning. For example, a sample of specific advantages of CRM identified from prior literature includes increased profits, reduced marketing costs and more repurchases, all of which represent tangible outcomes (Ko *et al.*, 2008). Nevertheless, other advantages in the same list, such as accurate customer information for developing new products, are also likely to produce financial benefits for the company.

Moreover, noting the performance indicators we found in our literature review, we considered it appropriate to rename some dimensions of BSC, to adapt them to a CRM software context. Specifically, we refer to the customer perspective as a customer life cycle; the internal perspective is renamed operational; and innovation and financial benefits become firm performance. This renaming process helps facilitate comprehension of the CRM variables in a BSC structure, but we retain the meaning of each original dimension.

2.4.1 Operational: the internal perspective. Operational benefits attained from CRM software relate to gains in productivity and operations, due to the effective management of sales campaigns, customer service and customer database analyses. For example, SFA technology incorporated into CRM software usually establishes a standard for the sales process, whereas a campaign management module supports the effective planning, creation and execution of campaign details. In addition to segmenting customers, selecting sales channels, providing content suggestions and controlling campaign developments, CRM offers customer service support because it records all transactions and interactions and issues rapid, appropriate responses to customer requests across multiple contact points. Also, CRM software facilitates analyses of the customer database. It records historical customer behaviors, and its analytical tools offer helpful insights into customer preferences and buying intentions.

A key area for improvement in this perspective is the pursuit of reductions in company costs and increased effectiveness in responding to customer requests, such as customer service. For example, "responsiveness" to customer inquiries and the "efficiency" of the CRM implementation, in terms of cost reduction, time saving and alleviation of CRM load,

Figure 1 Initial CRM software success scale



represent two likely measures of CRM success (Luo *et al.*, 2006). Moreover, Scullin *et al.* (2004) pinpoint important benefits of successful CRM implementations, such as more effective marketing informed by detailed customer information and good predictions of the type and timing of purchases, which offer great advantages to the departments responsible for marketing campaigns, sales and analysis.

2.4.2 Customer life cycle: the customer perspective. In the customer life cycle, CRM software produces benefits by improving the firm's ability to capture, retain, satisfy, ensure the loyalty of, attract the share of wallet of and recover customers (Croteau and Li, 2003; Gustafsson *et al.*, 2005; Kim and Kim, 2009; Ko *et al.*, 2008; Reinartz *et al.*, 2004; Zikmund *et al.*, 2003). These benefits contribute to increasing customer lifetime value and customer equity, which are the primarily pursued outcomes of a CRM strategy (Kumar *et al.*, 2006). Thus, the usefulness and productivity of CRM projects depend greatly on the customer (end user), who is not internal, as might be the case in most IT projects. In turn, it becomes necessary to evaluate CRM implementations in relation to the success of their customer-based outputs. The customer-based assessment of CRM programs focuses most heavily on customer value, satisfaction, loyalty and retention; Jutla *et al.* (2001) suggest customer retention, satisfaction, acquisition and profitability as the major metrics for evaluating CRM. A satisfied, loyal customer base is the ultimate goal of CRM, and businesses must include CRM as an integral part of their business processes to create loyalty (Da-wei, 2007). Because customer acquisition, retention, satisfaction and loyalty are so important to CRM success, many measures reflect these variables. For example, Tan *et al.* (2002) categorize CRM programs into those that focus on winning customers back, prospecting to win new customers, encouraging customer loyalty and cross- or up-selling to increase the share of wallet – each of which relates closely to one of the four main themes. In another study, the customer perspective includes similar measures: customer satisfaction, retention rates and repeat orders, acquisitions and new leads, number of hits, impressions and visits (Van Grembergen and Amelinckx, 2002).

2.4.3 Firm performance: financial and innovation/learning perspectives. The performance of CRM software can be measured according to the performance of firms that implement it. A good indicator might consist of effectiveness, efficiency and adaptability toward customer needs and the market (Walker and Ruekert, 1987). Effectiveness refers to success in sales efforts and market share gains compared with competitors. Efficiency entails a comparative measure of effectiveness against the resources required to achieve success in the market. Adaptability represents the successful ability to respond over time to changing conditions and new opportunities with customers.

Various studies demonstrate that CRM improves understanding of consumer behavior and the delivery of personalized services, which supports the adaptation, effectiveness and efficiency of products and services (Ab Hamid and Kassim, 2004). Other important goals include service innovations, continuous improvement in CRM and successful penetration of new markets (Strauss *et al.*, 2006). Moreover, CRM applications might improve firms' performance by helping them answer questions such as, "What products or services are important to our customers? How should we communicate with our customers? What are my customer's favorite colors or what is my customer's size?" (Chen and Popovich, 2003).

Companies that use CRM software generally are satisfied with their return on investment (Ang and Buttle, 2006), and CRM initiatives frequently result in increased competitiveness for companies, as manifested in their higher revenues and lower operational costs (Chen and Popovich, 2003). Finally, CRM applications help organizations reach and then assess their profitability with measures such as repeat purchases, dollars spent and longevity (Chen and Popovich, 2003).

3. Methodology

3.1 Item generation and content validity

We identify CRM software success as a multidimensional construct that consists of various performance indicators found in prior literature. However, to propose a more complete measure of CRM performance that includes the most relevant indicators, as well as to conform to our adopted definition of CRM, we conducted a thorough review of CRM performance indicators and benefits. From CRM software success literature, we identified the 33 articles most relevant to CRM performance and success, from which we derived a list of the 167 most recurrent measures of CRM success. Next, we purified this list through interviews with professionals familiar with CRM software. Five academics and six CRM industry professionals checked the scale indicators for face validity and provided feedback, which we used to revise the scales and validate the final indicators of CRM success. We refined and selected those items that appeared at least three times in prior literature and thereby reduced the scale to 15 items for further analysis (Table I).

As shown in Figure 1, we group the key indicators into three interrelated dimensions of CRM software success: operational benefits, customer life-cycle benefits and firm performance benefits.

3.2 Sample and data collection

The CRM software market comprises many technological solutions. For the purposes of this study, we selected a single, relevant, international CRM software provider, to avoid the biases that might accrue due to differences across CRM solutions. This provider sells CRM software as a single solution or assembled in an ERP software package; it always uses IT consulting partners for its implementation services.

The provider's database of ERP customers in Spain provided a starting point for this study. It contains 4,100 customer companies throughout Spain; of them, 130 companies had implemented a single CRM software, 1,522 had implemented a large ERP software package and 2,448 had implemented a medium-sized ERP software package. The ERP customers also could have implemented the CRM software assembled within the ERP solution. The database did not distinguish ERP from ERP–CRM customers, so we introduced a filter question into the questionnaire.

We sent e-mails to the managers in charge of implementation for each company in the database, inviting them to complete an online questionnaire by clicking a link in the message. To encourage participation, each respondent was entered into a raffle. We also made more than 400 telephone calls to spread invitations, along with four separate rounds of e-mails. This collection process, carried out between May and July 2009, resulted in 763 responses, 208 of them from firms that had implemented CRM software. Of these 208 respondents, 29 adopted the single CRM software, 58 used the large ERP–CRM assembled software package and 121 had the medium-sized ERP–CRM-assembled software package.

The respondents were mainly marketing, sales or customer service executives, typically at the level of vice president or general manager in a strategic business unit. The firms operated in business-to-business markets (55.8 per cent), business-to-consumer markets (4.8 per cent) or both (39.4 per cent). Moreover, 21.6 per cent of the respondents represented multinational companies, whereas 78.4 per cent were from local companies. The study includes a wide range of companies, distributed across more than 50 sectors, including commerce, industry, services and public administration. The annual revenues of the firms were diverse: 14.4 per cent earned less than €1.5 million, 11.5 per cent between €1.5 and 3 million, 20.2 per cent between €3 and 6 million, 32.7 per cent between €6 and 30 million and 21.2 over €30 million. Finally, most companies had fewer than 250 employees (77.4 per cent).

Table I CRM performance indicators and benefits

CRM software success review	*Operational benefits*					*Benefits in customer life cycle*			*Effectivity*		*Benefits in performance* *Adaptability*		*Efficiency*
Author/year	*Sales management*	*Campaign management*	*Customer service management*	*Analysis of customer's database*	*Customer loyalty*	*Customer satisfaction*	*Customer share of wallet*	*Customer recovery*	*Market share*	*Sales from the target market*	*Adaptation of products and services*	*Launch of products and services*	*Performance of applied resources*
Ahearne *et al.* (2007)	x	x	x				x			x			
Al-Refaie *et al.* (2014)			x			x					x		x
Ang and Buttle (2006)							x						x
Arman (2014)	x	x		x	x					x			x
Buttle (2004)					x	x							x
Chang *et al.* (2014)						x	x						x
Chen and Chen (2004)			x		x	x					x	x	x
Chen and Popovich (2003)		x	x	x			x		x	x			
Croteau and Li (2003)	x	x									x		
Gustafsson *et al.* (2005)						x							
Hart *et al.* (2004)	x		x				x				x	x	x
Jalvagi *et al.* (2006)			x		x	x							x
Jayachandran *et al* (2005)						x							
Kim and Kim (2009)				x	x	x					x	x	x
Kim *et al.* (2003)				x		x							x
King and Burgess (2008)	x		x	x		x							x
Ko *et al* (2008)		x	x	x	x		x	x	x	x	x	x	x
Lemon *et al.* (2002)					x	x					x	x	
Li and Mao (2012)	x	x	x										
Lin *et al.* (2006)					x	x			x	x			
Mckim and Hughes (2001)				x									
Mcnally (2007)							x						x
Mithas *et al.* (2005)				x		x							
Mohammad *et al.* (2011)		x		x	x								
Park and Kim (2003)		x	x								x	x	x
Parvatiyar and Sheth (2001)					x		x						
Reinartz *et al.* (2004)													x
Rigby and Ledingham (2004)	x	x	x					x					
Rigby *et al.* (2002)													x
Ryals, L. (2005)													
Verhoef (2003)						x	x						
Wilson *et al.* (2002)													
Winer (2001)								x					
Zikmund *et al.* (2003)					x	x	x				x		

Non-response bias is a potential threat. Therefore, we compared early respondents against late respondents on all the response items for each scale. The chi-square tests showed no significant differences between early and late respondents on the CRM success scale. In addition, *t*-test results indicated no significant differences between early and late respondents for the CRM or performance measures. Thus, non-response bias did not appear to be a serious concern for this study.

3.3 Measures

Our measure of CRM software success reflected the theoretical framework we described previously. The success indicators were grouped into three dimensions: operational benefits, customer life-cycle benefits and performance benefits (i.e. efficiency, effectiveness and adaptability). All the scales consisted of seven-point Likert-type indicators, such that each participant indicated, on a seven-point scale (1 = "strongly disagree" and 7 = "strongly agree"), the extent to which he or she perceived CRM software improvements across the dimensions of CRM success.

3.3.1 Assessment of model fit. Because structural equation modeling (SEM) offers a powerful tool for theory testing (Steenkamp and Baumgartner, 2000) and allows modelers to set the relationships between observed variables (i.e. indicators) and their respective unobserved variables (i.e. latent variables or constructs) by defining a particular structural model (Bollen, 1989), we considered it appropriate for this study. All the dimensions of CRM software success were estimated with at least three indicators (Bollen, 1989). For the firm performance dimension, all sub-items were estimated as a single dimension. Measuring constructs with a single item is discouraged though, due to its inability to reflect abstract constructs (Steenkamp and Baumgartner, 2000), so instead we combined the performance indicators into a unique construct.

The sample size of 208 was appropriate for the purposes of this study, and it met the requirements of the SEM technique. That is, it exceeded a minimum of 100-150 individuals (Ding *et al.*, 1995), as well as the threshold of 200 that reportedly reduces biases in model estimation (Kline, 2005; Loehlin, 1998). In accordance with existing suggestions related to the ratio value (Bentler, 1995; Bentler and Chou, 1987), we found differences between models with ratios as low as five (i.e. trustworthy parameter estimates) or ten (i.e. suitable significant tests) individuals per parameter.

Therefore, we began by estimating the full model with 15 indicators, distributed across the three dimensions of CRM success. Although the full model fit was relatively close to our expectations (χ^2 = 329, df = 87, root mean square error of approximation [RMSEA] = 0.116, normed fit index [NFI] = 0.91, confirmatory fit index [CFI] = 0.932), we also considered re-specifications. In an attempt to improve model fit, we deleted items without substantial loadings on the factors to which they originally were assigned or those that loaded on more than one factor (as indicated by large modification indices) (Figure 2). These criteria reduced the number of items representing CRM software success from 15 to 11 (Figure 3). Refitting the model without these items resulted in a considerable improvement of fit (χ^2 = 93 df = 41, RMSEA = 0.079, NFI = 0.959 and CFI = 0.976). This procedure also is supported by prior literature, in that an excessive number of items per construct might be unnecessary or generate inefficiencies (Bagozzi and Edwards, 1998; Little *et al.*, 2002). For example, the more items (i.e. free parameters to estimate) needed to define a construct, the longer and more expensive the survey becomes, and the higher the chance for variability in representation (i.e. face validity) or residual correlations, which implies a loss of quality in the sample size-free parameters ratio. The confirmatory factor analysis indicated the elimination of four measurement indicators. Finally, the results of this analysis suggested that CRM software success in Spanish firms is a multidimensional construct that consists of three dimensions (Figure 4).

3.3.2 Assessment of measurement and structural models. To assess the internal consistency of the measures, we considered the Cronbach's alphas of the dimensions. The

Figure 2 Measurement model results for reflexive measures

Measurement Model Results for Reflexive Measures

										Convergent Validity
			Variables / Indicators	Number of initial Indicators	Number of final Indicators	Weights of final indicators	Cronbach Alpha	Chi Square (d.f)	Composite Reliability	Extracted Variance
	Constructs		**All CRM Success variables	15	11	11				
CRM software success	Benefits in customer life cycle		Customers acquisition	6	3		0.961	93,3 (41)	0.95	0.87
			Customer retention			0.94				
			Customer loyalty			0.97				
			Customer satisfaction			0.89				
			Customer share of wallet							
			Customer recovery							
	Benefits in performance	Effectivity	Market share	5	4	0.88	0.950		0.94	0.79
			Sales from the objective market							
		Adaptability	Adaptation of products and services			0.92				
			Launch of products and services			0.93				
		Efficiency	Performance of applied resources			0.83				
	Operational benefits		Sales management	4	4	0.77	0.876		0.88	0.64
			Campaign management			0.76				
			Customer service management			0.81				
			Analysis of customer's database			0.87				

GFI	0,923
CFI	0,976
NFI	0,959
RMSEA	0,079

* = Regression weight fixed to 1 in CFA due to model identification
** = Full CRM Model: Operational benefits + Benefits in customer life cycle + Benefits in performance

Discriminant validity

	Customer Life Cycle	Performance	Operational
Customer Life Cycle	*0,87	**0,77	**0,37
Performance		*0,79	**0,41
Operational			*0,65

* = Extracted variance
** = Square of the correlation between the factors

Figure 3 Reduced CRM software success scale

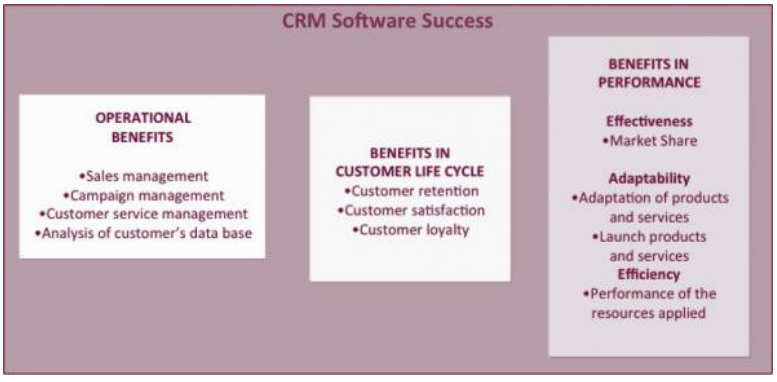
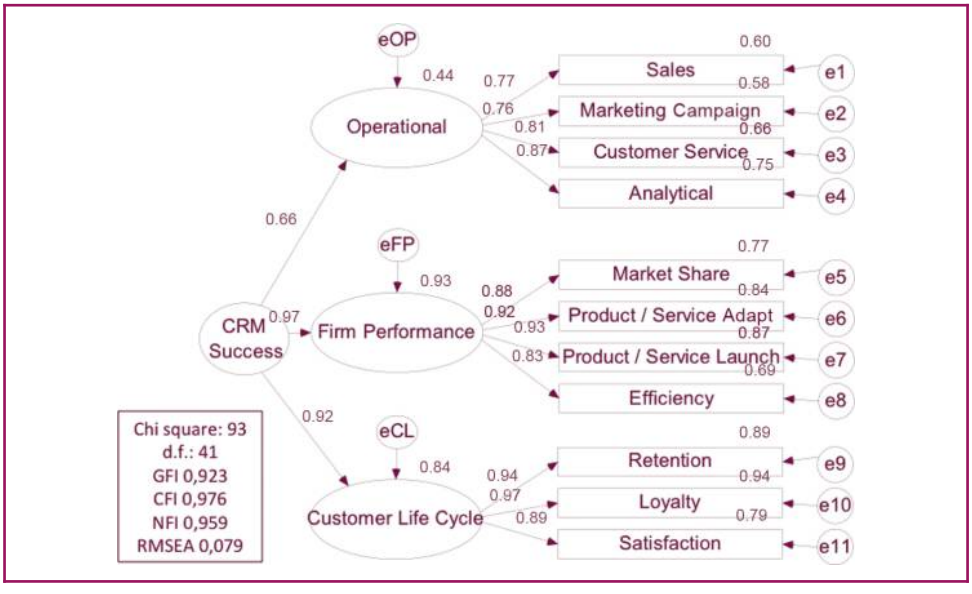


Figure 4 Confirmatory factor analysis of CRM software success scale



coefficients ranged from 0.876 to 0.961, all above the cut-off of 0.7 (Nunnally and Bernstein, 1994). To assess the reliabilities of the three subscales of CRM, we computed the construct reliability for each factor (Fornell and Larcker, 1981). The reliability coefficients of the three subscales ranged from 0.88 to 0.95, which more than met the standard of 0.7 (Nunnally and Bernstein, 1994). These findings affirm the scale reliability of the CRM measures.

3.3.3 Construct validity. Construct validity is "the degree to which a measure assesses the construct it is purported to assess" (Peter, 1981, p. 134). We measured the construct validity of the CRM scale according to its convergent, discriminant and nomological validity:

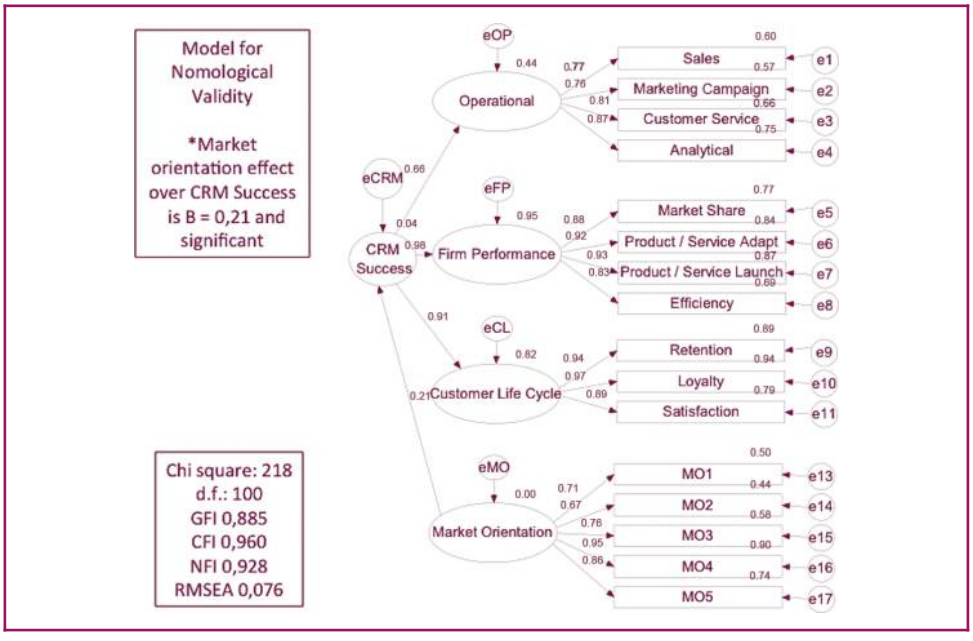
- *Convergent validity*. For the CRM scale, evidence of convergent validity or the degree of agreement across two or more measures of the same construct, was assessed by inspecting the variance extracted for each factor (Figure 2). Convergent validity exists if the variance extracted value exceeds 0.50 for a factor (Fornell and Larcker, 1981). A confirmatory factor analysis showed that the variance extracted values ranged from 0.65 to 0.87. In addition, all items in the CRM software success measure loaded significantly positively on their specified factor (Figure 4). This loading is a confirmation

of the convergent validity of the scale, so the scales for these three dimensions of CRM software success possessed convergent validity.

- *Discriminant validity*. To measure discriminant validity, or the degree to which measures of conceptually distinct constructs differ, we used a test in which we compared the pairwise correlations between factors obtained from the three-factor correlated model with the variance extracted estimates for the dimensions that constituted each possible pair (Fornell and Larcker, 1981). Evidence of discriminant validity exists when the variance extracted estimates exceed the square of the correlation between the factors that make up each pair. As Figure 2 shows, the relatively high variance extracted for each factor, compared with the inter-scale correlations between factors, supported discriminant validity.
- *Nomological validity*. Nomological validity indicates a scale's ability to behave as expected with respect to other constructs to which it is related (Churchill, 1995). There are well-grounded theoretical reasons to expect a positive association between CRM and market orientation (Javalgi *et al.*, 2006; Chen and Ching, 2007; Plakoyiannaki *et al.*, 2008). For our study, nomological validity would be demonstrated if the scores of the measures of CRM correlated positively and significantly with market orientation. For the measure of market orientation, each respondent evaluated his or her company's market orientation before the CRM software implementation, using three items: customer orientation, competitor orientation and inter-functional coordination. We collected their responses on seven-point, Likert-type scales, ranging from "better than" to "worse than" major competitors. To assess the nomological validity of the CRM scale, we relied on subsequent SEM analyses. The findings supported the hypothesis of a positive correlation between CRM software and marketing orientation ($r = 0.21$, $p < 0.01$) (Figure 5). Thus, we obtained evidence of nomological validity for the proposed CRM scale.

In summary, we found evidence of convergent validity, discriminant validity and nomological validity, and our findings lend support to the overall construct validity of the three-factor model of CRM software success.

Figure 5 Nomological validity of the CRM software success scale



4. Discussion

As a measure of CRM software success, the proposed CRM software success scale demonstrates a high degree of reliability and validity. Despite increasing research attention paid to CRM, to date, no valid and comprehensive operational measure of CRM software success has been available. To the best of our knowledge, this study is the first to provide a comprehensive, psychometrically sound, operationally valid measure of a firm's CRM software success.

In turn, it offers several contributions and applications for research. We help advance current CRM literature by explicating an integrative framework that clarifies how CRM software success might translate into an array of actionable dimensions. We explore the nature of CRM, provide a clear conceptualization of the construct and then develop a conceptual model using the BSC framework. Our conceptualization and empirical findings are encouraging. In addition, we have provided a useful foundation for further theoretical and empirical research into CRM software success.

Our findings validate the long-held belief that CRM software is a critical success factor for business performance. Firms wishing to improve their relationships with customers need to monitor the three dimensions validated in this study constantly: operational benefits, customer life-cycle benefits and performance benefits. The proposed scale also could be used as a diagnostic tool, to identify areas where specific improvements are needed and pinpoint aspects of the firm's CRM software that require work. Similar to the BSC approach, which helps top management observe different outcomes through complementary perspectives, our CRM software measurement scale provides a meaningful tool for analysis, through different, simultaneous perspectives on CRM software outcomes. In addition, periodic measures of a firm's CRM could help managers track changes over time. Beyond its applicability for monitoring CRM success, the components in the CRM model may serve training needs, by assisting human resource managers in developing appropriate training programs that can improve staff members' understanding of the activities involved in CRM software applications. For example, negative evaluations on the operational perspective may indicate that companies should invest in specific training for their employees on how to use the software, so that they can provide faster customer service or else use more information about the software to generate new campaigns. Furthermore, top management could use this framework to develop relevant, effective marketing strategies and tactics. Managers also might apply it to set clear policies in which CRM software represents a necessary, essential business tool, and not just another type of software. If the customer life-cycle perspective suggests a negative evaluation, it may suggest insufficient usage of the support available through the CRM software. Most CRM software grants companies extended knowledge management capabilities, with information related to customers' contacts, personal preferences and cross- or up-selling opportunities. The appropriate use of this information by the sales force should improve performance on all indicators in the customer life cycle dimension.

5. Limitations and directions for research

It would be useful to assess the generalizability of the CRM model we have developed in other business environments, such as in other nations and cultures. Relationship marketing and CRM can invoke different themes and perspectives, so marketers need to be wary of prescribing universal frameworks to implement these culturally specific concepts (Palmer, 1997). Through replicative and creative research, a more comprehensive conceptual framework related to CRM could be developed.

The data for this study were collected using a key informant approach. Although managers as key informants are adequate sources of reliable and valid data (Tan and Litschert, 1994), information generated by a firm is not the only indicator of its level of CRM. It also would be important to contrast the internal assessment of the firm's degree of CRM (e.g.

managers' responses to questionnaires, as in this study) with the level of CRM perceived by customers, competitors or distributors. This offers another interesting avenue for CRM research.

Continued refinement of the CRM scale we have proposed and supported is thus both possible and desirable, through further research and in response to changes in business environments. Various refinements and modifications in the environment could require new items or the deletion of some original items. In some cases, our hypothesized factor structure may need modification. Although we sought to cover all relevant aspects of CRM by carefully examining CRM literature, some specific aspects could have been overlooked; others may become relevant as new trends for managing customer relationships emerge and evolve. To keep abreast of ever-changing business environments, researchers should incorporate these relevant aspects in replications of the proposed scale.

Finally, this study features a wide range of industries, which helped ensure the results were independent of the industry. Additional research still might take a deeper look at the characteristics of specific industries (e.g. market structure, competition) and their relative importance.

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