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# Customer Relationship Management, Innovation and Performance

## Abstract

**Purpose-**This study aims to empirically test a framework which identifies the relationships between customer relationship management (CRM) practices, organizational performance and innovation capability of Iranian manufacturing firms.

**Design/methodology/approach-** Data for the study were collected from a sample of 211 Iranian manufacturing firms. The research model was tested using structural equation modeling.

**Findings-**The results reveal CRM practices have a positive and significant, though weak, effect on organizational performance and innovation capability of Iranian manufacturing organizations. Innovation improvement caused by CRM also results in better organizational performance.

**Research limitations/implications-** As this study is conducted in Iranian manufacturing organizations, this implies that the generalizability of this study's findings is limited to manufacturing firms in Iran and cannot be applied to other markets without a further validation.

**Practical implications-** this empirical research has extended our understanding of CRM components and their impact on business performance and innovation capability of Iranian manufacturing firms which have not been addressed together in previous empirical studies in Iran. Also, the obtained findings offers the Iranian manufacturing executives and managers strategic insights in relation to CRM implementation, CRM items and, more importantly, the most influential components of CRM on the manufacturing organizations' performance and innovation.

**Originality/value-** This paper shows the importance of CRM practices and how they directly influence organizational and innovation capabilities of the Iranian manufacturing firms. This study is among few studies which attempt to empirically investigate the relationships between these variables particularly in the context of Iran.

**Keywords:** Customer Relationship Management (CRM), Innovation, Information Technology (IT), Organizational Performance, Manufacturing Organizations, Iran

## Introduction

Customer relationship management (CRM) has been recognized since the mid 1990s; mainly to the fact that many industries were experiencing increased demand from their customers for high quality and less fuzzy access to service (Smith, 2006). Valmohammadi and Bladpass (2014) by literature note that CRM is a management approach that enables organizations to identify, attract and increase retention of profitable customers, by managing relationships with them, being employed in both developed and developing economies. CRM came into the spotlight when markets were getting more and more competitive. Two main drivers behind the surge of interest in CRM are advances in information technology (IT) and the increasing prominence of customer orientation as a fundamental business philosophy (Akroush et al., 2011). According to Light (2001), CRM evolved from business processes such as relationship marketing and the increased emphasis on improved customer retention through the effective management of customer relationships. Relationship marketing emphasises that customer retention affects company profitability in that it is more efficient to maintain an existing relationship with a customer than create a new one (Payne et al., 1999; Reichheld, 1996). Smith (2006) states that originally CRM was defined as a strategic relationship managing process that combined the best business practices, resources, knowledge management and appropriate CRM software of a company to better serve its customer's personalized needs and to increase customer loyalty.

It should be mentioned that CRM can be applied and utilized in both B2C and B2B marketing strategies using electronic- Customer Relationship Management (e-CRM). With the advancements in the field of IT and burgeoning application of cloud computing technology in organizations as Balco and Gregus (2014) argue has reduced investment and operation cost of organizations. Also, Lin et al., (2010) argue that CRM between manufacturing firms and industrial customers not only retains customers but also encourages them to provide important suggestions for improving products and service. Good customer relationship management (CRM) between manufacturing firms and industrial customers not only retains customers but also encourages them to provide important suggestions for improving products and service. CRM helps firms refine their knowledge about customers' tastes and preferences. The effectiveness and efficiency of CRM are increasingly recognized as means for developing

innovation capability and providing a lasting competitive advantage (Lin et al., 2010). As a result, competitors would be differentiated based on their capability of responding to the requirements and demands of the markets and customers with innovative products and services (Boon et al., 2002; Chalmers, 2006).

On the other hand, innovation is vital to economic prosperity. Innovative companies grow faster and generate more jobs than less innovative ones. Innovation is an important driver of productivity, both in terms of efficiency through improvements in processes but also in generating competitive advantage for manufacturers and service sectors, through increased market share and entry into new markets. In an era of rapidly changing technology and highly unpredictable markets, manufacturers must enhance their innovation capabilities to satisfy market demands and customer preferences in order to maintain a long-term competitive advantage (Panayides, 2006). Lawson & Samson (2001) define innovation capability as the ability to continuously transform knowledge and ideas into new products, processes and systems for the benefit of the firm and its stakeholders. Effective development of innovation capabilities to meet the demands of highly unpredictable competitive markets has become an important issue for manufacturing firms (Shane and Ulrich, 2004).

Based on the extant statistics during the past decades Iran has added to the national innovation capacity through establishing research institutes, universities, and nurturing of scientists and engineers. In Iran during the past couple of years and with the start of deregulation policies of the government towards privatization of industries and expanding free market, most of organizations in the country have shown interest in the development of innovation management practices which is also heavily related to rising pressure from fierce competition in the marketplace of the country, so most manufacturing and service organizations look at innovation in order to improve their competitive advantage (Valmohammadi, 2012a). On the other hand as Akroush et al. (2011) argue, measures such as those of CRM due to differences in national market conditions, such as cultural values and economic development speed, should be assessed in accordance with culture of the targeted country.

In the existing literature, researchers have acknowledged the importance of CRM and innovation to performance, but sufficient attention has not been paid to address how they work together to

achieve higher performance. Also, though prior conceptual work has suggested that CRM can enhance an organisation's innovation, empirical evidence is sparse (Battor & Battor, 2010). In addition, Lin et al., (2010) state that the relationship between innovation capabilities and CRM has not been adequately studied. Given the context of Iran and considering the main practices of CRM and innovation capabilities, this study aims to investigate how CRM and innovation interact to affect organizational performance and what is the role of innovation? In other words, we intend to examine whether CRM practices foster innovation capabilities of Iranian manufacturing organizations or not.

### **Review of the Literature**

CRM refers to utilizing extensive strategies and engineering to find, obtain, and cultivate advantaged customers, and hence maintain long-term partnerships (Sin et al., 2005). Generally, there are two streams of CRM literature, the process of developing CRM and the content of CRM (Lin et al, 2010). Reinartz et al. (2004) divided CRM process into initiation, maintenance, and termination from the points of process view. In contrast, CRM content is related to various activities to enhance customer relationships, For instance, Sin et al. (2005) indicated that CRM involves activities that manufacturers practice to satisfy customer needs, identify customer preferences, resolve customer complaints, provide after-sale service, and establish long-term relationships with their customers.

Kim & Kim (2009) argue that CRM could be implemented successfully by linking a knowledge management process creating customer intelligence (internal process) with an interaction management process handling customer communications (external process). This implies that which CRM aspects should be focused on, depends on the conceptualized perspective of the CRM system. Also, Zablah et al. (2004) state that divergent perspectives exist on CRM, conceptualizing CRM as a process, strategy, philosophy, capability, and technology.

Lin et al., (2010) argue that researchers classify various CRM mechanisms into internal and external Programs. Internal programs emphasize organization structure, culture, and knowledge management, while external programs involve interaction with customers (e.g. information sharing and customer involvement). In this study we focus on external-oriented CRM programs

and the five most popular CRM practices are considered namely, information sharing, customer involvement, long-term partnership, joint problem solving, and technology-based CRM (Lin et al. 2010).

**Information sharing:** knowledge management (KM) functions are reflected in basic CRM activities that include: capturing customer information about their needs and preferences both directly and indirectly; developing sound mechanisms for sharing customer knowledge to facilitate concerted actions by different departments; and acting on the knowledge generated and disseminated (Sin et al., 2005). McEvily and Marcus (2005) point out that it refers to the sharing and exchange of essential and exclusive information through interactive activities between manufacturers and their customers. Therefore, as Hasanian et al. (2015) state having a planned strategy plays an important role in the successful implementation of CRM process.

**Customer involvement:** CRM is an enterprise-wide customer-centric business model that must be built around the customer. It is a continuous effort that requires redesigning core business processes starting from the customer perspective and involving customer feedback (Chen & Popovich, 2003). Lin et al, (2010) argue, customer involvement is related to customer participation in new product development (NPD) activities, technical meetings, supply chain annual conference, and market evaluation conferences. Also Mladenow et al. (2014) in their study suggest that organizations could avail crowdsourcing communities as a suitable source of customers for participation in innovation processes.

**Long-term partnership:** Numerous studies have proven that a long-term partnership entails high degrees of commitment and mutual trust in which both parties are willing to provide resources, in a fair and dependable manner, in order to maintain and reach the goals of both parties (Handfield & Bechtel, 2002). As marketing is now more concerned with better responding to customer demand, actions taken in a prompt manner not only enhance service quality, but also foster long-term relationships with customers (Sin et al., 2005).

**Joint problem solving:** Incorporating a variable describing the degree to which the parties solve exchange problems together – referred to as joint problem solving or interactive problem solving (Skarp & Gadde, 2007). McEvily and Marcus (2005) point out it refers to collaboration between manufacturers and customers in solving problems together and sharing responsibilities when

they encounter difficult or unexpected situations. Joint problem solving ensures mutually satisfactory solutions for encountered contingencies and thereby adds to relationship success (Claro et al., 2003).

**Technology-based CRM:** In achieving high levels of customer orientation, firms have found IT to be an indispensable factor (Bharadwaj, 2000). In fact, CRM, as a customer orientation strategy, is rooted in the core IT capability of the firm (Keramati et al., 2010). Keramati et al. (2010) by literature argue that through defining clear goals for CRM strategy, its implementation can be as simple as making a “frequently asked questions (FAQ)” page on a company's Web site, giving customers information about the availability of products, or simply telling employees to be more careful with customers, or it can be as complex as executing complicated systems and processes. Sin et al. (2005) state, technology-based CRM involves manufacturers using computer technologies to facilitate various CRM activities and actively offer technology assistance to customers, including data storage, data mining, and CRM software systems.

### **Innovation capability**

Recently, innovation is considered important for achieving sustainable competitive advantages and, by extension, for the success of businesses in the market. The main reason is that innovative firms are more flexible and have a greater capacity to adapt to changes. This means that they can protect themselves when the climate is unstable, they can respond faster to changes, create new opportunities and exploit existing ones to a greater extent than the competition (Valencia et al., 2010). Innovation has been defined as the generation, acceptance, and implementation of new ideas, processes, products, or services (Thompson, 1965). Innovation in an organizational context is an idea, a product, a process, a system, or even a device that successfully brings new insights and impacts to an individual, groups of people, organizations, an industrial sector and the whole society (Vakola and Rezgui, 2000). Chandler et al. (1998) argue that sources of value creation have shifted, making ideas and relationships the new economic currency. Also, Green et al. (1995) indicated that innovation is a multi-dimensional concept where manufacturers focus on product, process, and service to implement gradual modification (e.g. product line expansion,

current function, and minor adjustments in operation activities). Grant (1997) defined capability as the capacity of a set of individual resources to perform some task or activity. Innovation capability refers to the implementation or creation of technology as applied to systems, policies, programs, products, processes, devices, or services that are new to an organization (Chang and Lee, 2008; Damanpour & Evan, 1984).

In this study definition of firm innovation capability by Chandler et al. (1998) has been adopted. According to him “the potential ability of an organization to position itself in an arena of modernism such as new product development, technology and other advancements result in competitive advantages over its rivals.” Inauen & Schenker-Wicki (2011) point out that based on Schumpeter’s classification system there are 5 categories of innovation but most of the literature has focused on the first two areas of innovation, product and process innovations. Similarly, Schmookler argues that understanding the distinction between the related terms product technology (product innovation) and production technology (process innovation) is crucial for understanding innovations. Product innovations represent the invention and commercialization of entirely new products or services, whereas process innovations describe changing the production process of products and services through the adoption of new technology and innovations (Inauen & Schenker-Wicki, 2011). For Schumpeter, this implies not only the introduction of new products but also the successful commercialization of new combinations, based on the application of new materials and components, the introduction of new processes, the opening of new markets or the introduction of new organizational forms (Fortuin & Omta, 2009). Another type of innovation classification which is widely cited in innovation literature is; incremental innovation and radical (breakthrough) innovation. The labels radical and incremental innovation, represent the degree of change the innovation brings and, as such, they could be attributes of any of the other types of innovation such as product, process, administrative, or technical (Rowley et al., 2011). Radical innovations are fundamental changes that represent revolutionary changes in technology. They represent clear departures from existing practice. In contrast, incremental innovations are minor improvements or simple adjustments in current technology. Compared with incremental innovation, radical innovation is more valuable, especially for firms competing to be a leader in their market. Consistent with existing literature



(Inauen and Schenker-Wicki, 2011; Prajogo and Sohal, 2001; Chen & Tsou, 2007) in this study we examine two aspect of innovation, i.e. product and process innovation.

### **CRM and innovation capability**

Recently, the literature has begun to link the practice of CRM with the development of innovation capability (Lin et al., 2010). Chesbrough (2003) also promoted the idea of open innovation where firms are encouraged to use external ideas as well as internal ideas, and internal and external paths to market as the firms look to advance their technology. Thus, organizations should continuously exceed customer expectations in order to provide satisfying services and products and to enhance service quality (Sofiyabadi, et al., 2015). Through CRM, firms are able to share information internally and externally, thus making it possible to improve a firm's innovation capability. CRM calls for "information-intensive strategies" which utilize computer technologies in building relationships, leveraging existing technology and rigorously linking technology deployment to targeted business initiatives (Harding et al. 2004). Computer technologies such as computer-aided design/manufacturing, flexible manufacturing systems, just-in-time production databases, data warehouses, data mining, and CRM software systems enable firms to provide greater customization with better quality at lower cost. It also helps staff at all contact points serve customers better. Many customer-centric activities would be impossible without appropriate technology (Sin et al., 2005). Ottum & Moore (1997) argue that manufacturers who receive important information from customers are able to increase their innovation capability by meeting the needs of a targeted market. Danneels (2002) states, innovation will take place when organizations have competences relating to technologies and customers. This can be linked to the CRM practices which as Chen & Popovich (2003) argue comprises of people, process and technology. CRM has been known to have positive effects on innovation capability although the alignment of these two programs is not fully understood (Lin et al., 2010).

### **Organizational performance**

Organizational performance refers to how well an organization achieves its market-oriented and financial goals (Li et al., 2006). The measures of organizational performance vary from direct costs and revenues associated with CRM activities (e.g. Ryals, 2005) to improvements in customer knowledge and customer satisfaction (e.g. Mithas et al., 2005). Other studies (e.g. Sin et al., 2005; Li et al., 2006; Akroush et al., 2011; Narasimhan et al., 2008; Keramati et al., 2010; Battor & Battor, 2010) aim to capture the multi-faceted nature of organizational performance by measuring both marketing and financial performance through several indicators. The measures employed in these studies include return on assets, return on investment, and profit margin on sales, sales growth, market share, market share growth, customer satisfaction, and overall profitability. All organizational performance items are subjective measures of how well the organization is performing with respect to its major competitors. The performance measures in this study were chosen for their applicability across a broad spectrum of industries. Given the diversity of the respondents in this study, the dependent variable was designed to capture evidence of an organization's perceived performance relative to their direct competitors to avoid confounding results with disparate inter-industry standards of performance (Cook et al., 2011).

### **Research model and hypotheses**

Review of literature shows a number of studies on CRM practices and organizational performance (Reinartz et al., 2004; Ryals, 2005; Lagrosen, 2005; Sin et al., 2005; Akroush et al., 2011; Battor et al., 2008). Sin et al., (2005) based studies on the development and validation of multiple measures for the dimensions of CRM i.e. key customer focus, CRM organization, knowledge management and technology-based CRM and found that there is a positive correlation between CRM and marketing performance and financial performance. They also concluded, due to encouraging results in terms of scale generalizability their developed CRM scale can not only be applied to financial industry, but it can also be generalized to a wide array of industries, ranging from manufacturing to services. Akroush et al., (2011) in order to examine the generalizability of the customer relationship management (CRM) scale originally developed by Sin et al. as well as to investigate the strength of linkages between CRM implementation components and business performance in Jordan's financial service organizations (FSOs), using

an instrument distributed among 320 top managers of 30 banks and insurance companies investigated the research hypotheses concerning the relationship between CRM implementation and business performance. They found the CRM implementation scale originally developed by Sin et al. does generalize to a Jordanian FSOs context. The findings indicate that there is a positive and significant relationship between CRM implementation components and FSOs' business performance comprised of financial and marketing performances. CRM organization and technology-based CRM were found the strongest predictors of variations in FSOs' business performance. These studies demonstrate explicit correlations between CRM practices and organizational performance. Therefore, the following hypothesis is proposed:

H1. CRM practices of manufacturing firms have a significant and positive impact on organizational performance.

Having the ability to understand customer needs and preferences can lead to innovative products. For many companies, customer information is the key source to innovative solutions. Innovative firms are more likely to apply the acquired customer knowledge to continually improve their products and services (Battor et al., 2008). Vilaseca-Requena et al.(2007) in their study found that intensive ICT use in marketing makes the company more innovative, as it perceives that its usage breaks down barriers to innovation and speeds up processes that in turn become more efficient. And also, increasing ICT use in marketing encourages company predisposition to collaborate with and integrate particular agents within the business environment in the development of the innovation process, improving the degree of adaptation of the new product to market demands. Carr & Pearson (1999) pointed out that information sharing between manufacturers and their clients about markets, designs, and processes enables manufacturers to adopt technologies that can improve design and process innovative capabilities. Overall, there are positive effects of information sharing on product and process innovations (Lin et al., 2010). The need for customer-based information has prompted a variety of collection approaches that have evolved into what has become known as customer involvement (Finch, 1999).Smith (2011) pints out that producer/customer involvement is evident in B2B as well as B2C transactions, as

these markets have formal dialogue between customer and suppliers through the management of the supply chain. This is evident in the business partnering that has been commonplace in most businesses. He, also by literature mentions that communication and information systems integration is a vital element of successful CRM and the internet allows companies to easily reach millions of global customers at very low cost. Specifically, early customer participation in new product development (NPD) activities or manufacturing technical meetings facilitates innovation capability to develop more differentiated products and services for particular target markets (Lagrosen, 2005). Also, customer involvement in the early stages of NPD activities, manufacturing technical meetings, and market evaluation conferences can also encourage customers to assist with the processes of NPD, and improvement of manufacturing techniques and product designs to benefit the innovation process (Ritter & Walter, 2003).

As manufacturers and customers both have the intention to maintain long-term partnerships, they develop a significant degree of loyalty and reliability. Through strategic alliances and joint ventures, manufacturers are more willing to invest in specific equipment, increase capacity buffers, adjust work shifts, and adapt to highly fluctuating market needs. Consequently, there is a higher likelihood of developing innovative products (Jack & Raturi, 2002). In other words, as Lin et al., (2010) point out long-term partnerships have positive effects on product and process innovations.

Joint problem-solving, is defined as the degree to which the parties to an exchange share the responsibility for maintaining the relationship itself and for problems that arise over time (Heide & Milner, 1992). Lin et al., (2010) state, joint problem solving is considered as a key factor affecting the success of product and market development. Joint problem solving influences innovation in that it generally introduces ongoing improvements to existing products, processes, or services, and it exploits the potential of established designs, processes, and markets (Huang & Chang, 2008).

IT assists with the re-design of a business process by facilitating changes to work practices and establishing innovative methods to link a company with customers, suppliers and internal stakeholders (Hammer & Champy, 1993). The adoption of new technology, such as IT, can be viewed as an enabler of process innovations from the perspective of the adopter if the

implementation succeeds, the routines are changed, and the new system is actually utilized. Newly adopted technology can also act as an enabler of product or service innovations from the perspective of the adopter if it is successfully used to offer a new service or to deliver products to customers in a way that is new to the enterprise. For example, a company that adopts and implements new online shop software usually changes the routine of how incoming orders are processed. This is a process innovation. Furthermore, the new online shop software may allow the firm to deliver its products to customers in a new way or to offer additional services, such as tracking orders online or getting immediate information about availability. This would be a service innovation (Koellinger, 2008). Accordingly, the following hypothesis is posed.

H2. CRM practices of manufacturing firms have a significant and positive impact on innovation capabilities.

The impact of innovation on performance has been examined extensively in prior research, and considerable empirical evidence of a positive impact has been accumulated (Battor & Battor, 2010). For instance, Yamin et al. (1997) in their study of relationships between organizational performance and organizational innovativeness among Australian manufacturing firms found that organizational innovativeness will increase a firm's competitive advantage, which leads to better organizational performance. Also, the importance of innovation in the success of businesses is illustrated in an innovation survey performed by the American Management Association (Jamrog, 2006) including 1,396 executives from large multinational companies. Jamrog concluded that more than 90 per cent of the respondents consider innovation to be important or extremely important for a company's long-term survival, with over 95 per cent considering that this will still be the case in ten years' time (Fortuin & Omta, 2009). Although these studies have supported the relationships between organizational innovativeness and organizational performance, most of these studies are conducted in developed countries (Cheng et al., 2011). therefore, it is hypothesized that:

H3. Innovation capabilities of manufacturing firms have a significant and positive impact on organizational performance.

Figure 1 shows the conceptual model that illustrates the relationships between CRM and innovation capability and organizational performance.

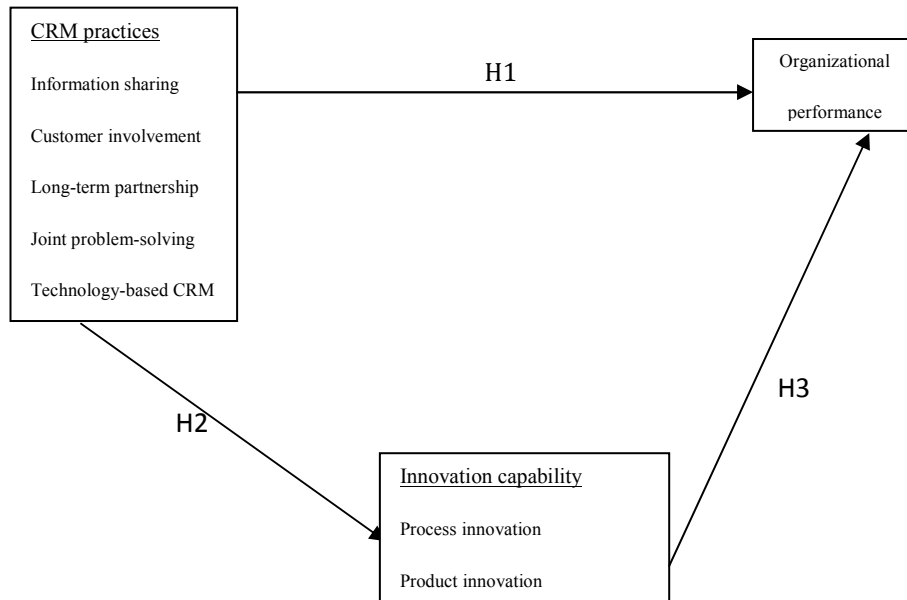


Figure 1. The conceptual model of the research

## Research methodology

### Sample and data collection

A survey instrument was developed in order to test the research model. The items and questions of the questionnaire related to CRM practices were adopted from Lin et al.(2010), and Akroush et al.(2011) studies, while items measuring innovation capabilities were adopted from Chong et al. (2011) research and finally items measuring organizational performance in this study have been selected from a set of items used previously in literature (Sin et al., 2005; Akroush et al., 2011; Keramati et al., 2010; Battor & Battor, 2010 ) to measure aspects of performance that are conceptually identical to the construct of interest. The questionnaire used to collect the data was pretested using five academics and three executives in order to assess the face and content validity of the measurement items (Battor & Battor 2010). Data for this study were collected

using a self-administered questionnaire that was distributed to all 339 manufacturing firms in Tehran Stock Exchange (TSE) via postal mail, requesting them to response within one month. As the order of the questions can affect the response and in order to correct for this effect we distributed half of the questionnaires with one order, and the other half with another order. Much like designing survey questions, the order of the questioning is very important taking time to organize the questions will reward researcher with results that are reliable and actionable (Valmohammadi, 2014).

After the end of the deadline as Baruch & Holtom (2008) argue in order to increase the response rate via the aforementioned communications channels a reminder letter was sent to those firms who had not responded, asking them to response the questionnaire and send it back within one week. Finally after about two months of 339 distributed questionnaires 216 were returned. Five out of 216 returned questionnaires were disregarded due to incomplete answers. In total 211 statistically useful questionnaires were returned, resulting in a response rate of about 62.2 percent. The profile of the survey companies is shown in table 1.

Table1. The profile of the survey organizations

Type of industry	Frequency	Percent
Chemical	28	13.4
Plastic	25	11.9
Automotive	27	12.9
Electronics& ICT	23	10.2
Mechanical	25	11.9
Pharmaceutical	17	8.1
Food	28	13.4
Textile	22	10.5
Mining	7	3.4
Other	9	4.3
Total usable sample	211	100

It's worth mentioning based on the definition of Central Bank of Iran (<http://agahgroup.com/smes-in-iran-a-brief-introduction>, 2016) companies having less than 50 workforce are considered small, by 99 employees medium and more than 100, are called large organizations. Accordingly, based upon the information obtained, 32 of the sample organizations were small, 47 medium and the remaining, i.e. 132 were large organizations.

Organizations were requested that the questionnaire be completed by a senior officer/executive in charge of marketing in the firm, and the results indicated that most of the respondents were marketing managers (69 percent) from the firms. In order to minimize self-report bias in the data, the respondents were informed that their names and the organizations' name are not needed for the survey (Chong et al., 2011). Based on the recommendation of Baruch & Holtom (2008) non-response bias test (wave analysis) was done. We compared the responses of early and late waves of returned surveys based on the assumption that the opinions of late respondents are representative of the opinions of non-respondents. Student's t-tests yielded no statistically significant differences between early-wave and late-wave groups, suggesting that non-response bias was not a problem (Prajogo & McDermott, 2011). Also, as this study is relied on data from a single survey respondent from each organization, in the design of the questionnaire based on the steps taken by Arendt & Brettel (2010) and in order to minimize the possibility of common method variance. First, multiple-item scales were used to measure the constructs and scattered questions pertaining to the independent and dependent variables throughout the questionnaire. Second, Harman's single-factor test was conducted and found that no single factor or a general factor accounted for the majority of the variance in the measures. Third, the effects of a single unmeasured latent method factor added to our measurement model were analyzed by loading all items originating from the same informant onto both the method variable and its respective latent variable. The comparison of standardized parameter estimates with and without the method variable showed that the significance of the substantive relationship was not affected. Therefore based on the results, common method bias is not a concern.

Multivariate Analysis of Variance (MANOVA) was also performed to check any differences in the seven composite scores between small and medium sized enterprises (SMEs) and large firms. The composite scores of each construct were measured by calculating their factor scores



from principal component analysis (Prajogo et al., 2008). The results showed that there was no statistical difference between the two groups of different sized organizations. Therefore, it is appropriate to run the analyses using the sample as a whole.

### **Measures and Construct Validation**

Three constructs were measured (CRM practices, innovation capabilities, and organizational performance) by multiple-item scales. All items were operationalised using a five-point Likert-type scale. The items of the three constructs ranged from strongly disagree (1) to strongly agree (5). The six items used to measure the financial and marketing performance of the sample firms are based on the perception of respondents relative to their major competitors (see appendix). Exploratory factor analysis (EFA) with varimax rotation was performed on CRM practices and innovation capabilities in order to extract the dimensions underlying each construct. The EFA of the 24 items were loaded into the five CRM practices. As for the innovation capabilities, the nine items used to measure both process innovation and product innovation were loaded into one factor. Therefore, only innovation capability was used instead of breaking the innovation capability into two separate measurements. The six items for financial and marketing performance were loaded into one construct, and thus remained as organizational performance. Variables are dropped based on the cut-off values of loading ( $< .50$ ), cross-loading ( $> .30$ ). Factors are kept as constructs when eigenvalue ( $\geq 1.0$ ) criterion is satisfied (Hair et al., 2010) (Table 3).

Descriptive statistics and intercorrelations (bivariate (Pearson-r) correlations) among the seven factor scores are presented in Table 2. The descriptive results show relatively considerable variance for all variables, indicating that the surveyed organizations implement CRM practices and hold innovation capabilities at different levels. As shown, the correlation coefficients among the seven CSR factor scores were between 0.3 and 0.6 at medium level. This shows the synergistic role of different activities of CRM practices within an organisation, even among those firms with less engaged with CRM practices. These correlations, however, did not reach a magnitude which would create a problem of multicollinearity among the independent variables that may confound the results of path analysis (Prajago & McDermott, 2011).

TABLE 2. Person Correlations among the Variables

	Mean	SD	Inf.sh	Long.re	Cust.in	Joint.ps	Tb.crm	Ino.cap	Org.per.
Inf.sh	3.54	.65	1						
Long.re	3.22	.51	** .34	1					
Cust.in	3.14	.48	** .31	** .35	1				
Joint.ps	3.11	.72	** .41	* .61	** .41	1			
Tb.crm	2.99	.86	* .37	* .28	** .37	** .51	1		
Ino.cap	3.07	.69	* .32	* .27	** .39	** .57	* .43	1	
Org. Per.	3.19	.57	.15*	** .33	** .42	** .37	* .49	* .53	1

**Note:** Significance at: \*p, 0.05, \*\*p, 0.01

Inf.sh= Information sharing, Long.re=Long term relationship, Cust.in=Customer involvement, Joint.ps= Joint problem solving, Tb.crm=Technology based CRM, Ino.capr=Innovation capabilities, org.per= Organizational performance

Fornell and Larcker (1981) suggest convergent validity establishes when Average variance extracted (AVE) for each construct is greater than 0.5 and also composite reliability (CR) of constructs are greater than 0.7. Based on the calculated AVE (table 3) of the constructs and their relevant CR (see table 4) it can be seen that convergent validity is confirmed.

We examined discriminant validity following the procedure recommended by Fornell and Larcker (1981). They suggest that discriminant validity is established for a construct if its AVE (average variance extracted) is larger than its shared variance (i.e., square of the correlation) with any other construct. We compared the AVE with the highest variance that each construct shared with the other constructs. The AVE for each construct was always greater than the highest shared variance.

Table 3. Convergent validity values

Construct	AVE
Information sharing	0.77
Customer involvement	0.68
Long-term partnership	0.71
Joint problem solving	0.69
Technology based CRM	0.64
Innovation capability	0.73
Organizational performance	0.77

Collectively, these tests provide support for the robustness of our measures.

Table 4 shows the results of the EFA, CFA and reliability analysis. All of the Cronbach's alpha coefficients exceeded the 0.70 threshold considered acceptable for internal scale reliability (Nunnally, 1978). CR for any latent individual was higher than 0.7 (Wang and Hou, 2015). So, the actual range of values obtained for the variables provided sufficient variation for statistical analysis.

Table 4. EFA, CFA and Reliability Analysis

Factors	No. of Items	Factors loadings	Eigen values	Variance explained (%)	Cronbach's alpha	CR
Information sharing	6	0.752 - 0.822	1.499	64.12	0.742	0.85
Long term relationship	5	0.721 - 0.853	2.567	66.48	0.954	0.84
Customer involvement	5	0.729 - 0.867	1.322	63.41	0.866	0.86
Joint problem solving	3	0.744 - 0.813	2.409	62.53	0.788	0.75
Technology-based CRM	5	0.851 - 0.932	1.718	59.44	0.744	0.77
Innovation capability	9	0.722 - 0.844	1.77	58.11	0.715	0.78
Org. per	6	0.749 - 0.867	2.399	60.18	0.769	0.75

Confirmatory factor analysis (CFA), a particular analysis of structural equations modeling, was undertaken to check the goodness-of-fit of the measurement scales; this method also provides the correlations between factors or dimensions and the construct of interest (Fornell & Larcker, 1981). We therefore began by analysing the establishment of scale dimensionality by checking the factorial structure of each of the concept we wanted to measure, i.e. five CRM factors, innovation capability and organizational performance factors. A good measurement model fit would give support to the proposed factorial structure (Alegre et al., 2006). Based on the model used in this study, there are 23 items focusing on the five dimensions of CRM practices. The results show that the goodness-of-fit index (GFI) and comparative fit index (CFI) are all above the 0.9 levels, which indicates that there is unidimensionality in the factors (Hooper, et al. 2008). The root mean square error of approximation (RMSEA) is below 0.1 and hence it can be concluded that these conditions meet the requirement of an acceptable model (Hooper, et al. 2008) (see table 5).

Table 5. Model fit indices

Factors	No. of Items	GFI	CFI	SRMR
Information sharing	6	0.963	0.931	0.026
Long term relationship	5	0.954	0.915	0.028
Customer involvement	5	0.923	0.977	0.044
Joint problem solving	3	0.987	0.981	0.003
Technology-based CRM	5	0.933	0.923	0.023
Innovation capability	9	0.921	0.911	0.025
Org. Per	6	0.990	0.966	0.041

### Results for the Structural Equation Modeling

The research framework shown in Figure 1 has three hypothesized relationships among the variables CRM practices, innovation capability and organizational performance. The data were tested using structural equation modeling (SEM), and was selected to test the model due to the model's multivariate relations and interval indirect effects (Chong et al., 2011). Based on

studies by Chong et al., (2011), Kaynak (2003) and Lin and Lee (2005), the measurement model was assessed using six common goodness-of-fit measures: the ratio of  $X^2$  statistics to the degrees of freedom (df), CFI, GFI, adjusted goodness-of-fit index (AGFI), normed fit index (NFI) and RMSEA. The observed normed  $X^2/df$  for this model was 1.079 with p-value = 0.212, which comply with the requirements of less than 3 (Bagozzi & Yi, 1988). The overall indicators showed that the model is a good fit with GFI = 0.899, AGFI = 0.8007, CFI = 0.913, NFI = 0.915 and RMSEA = 0.025 (Li et al., 2006; Chong et al., 2011).

### **Findings Related to Hypotheses**

The individual CSR practices in Figure 2 shows the ranking of CRM practices as follow; information sharing ( $\beta = 0.399$ ;  $p < 0.05$ ), long-term relationship ( $\beta = 0.378$ ;  $p < 0.05$ ), customer involvement ( $\beta = 0.342$ ;  $p < 0.005$ ), joint problem solving ( $\beta = 0.330$ ;  $p < 0.01$ ), and technology-based CRM ( $\beta = 0.301$ ;  $p < 0.05$ ).

In H1, it is hypothesized that CRM practices of Iranian manufacturing firms have a significant and positive impact on organizational performance. The results reveal that CRM practices positively and significantly, though weak, impact organizational performance as shown by the standardized coefficient of 0.207 at significance level of less than 0.05. The results partially support the previous results from Sin et al., (2005), Battor & Battor (2010), and Akroush et al., (2011), where they in their studies found a positive and strong association between CRM practices and organizational performance. The weak relationship could stem from immaturity of CRM implementation among Iranian organizations, particularly, as Valmohammadi(2012b) argues in his study on teleworking implementation in Iranian organizations, may be poor IT infrastructure and lack of full e-government realization, and low speed of internet in the country could be one the most important reasons.

In H2, it is hypothesized that CRM practices of Iranian manufacturing firms have a significant and positive impact on innovation capabilities. The results show that H2 is supported and CRM practices have a higher impact on the innovation of organizations compared to the direct impact on organizational performance. This result is consistent with the findings of Lin et al., (2010),

and Battor & Battor (2010), where both studies confirmed that there is positive and significant relationship between CRM practices and innovation capability of organizations.

The results also confirm H3 which hypothesizes that innovation capabilities of Iranian manufacturing firms have a significant and positive impact on organizational performance. This result is consistent with the study of Valmohammadi (2012a) where he found that the use of innovation practices is significantly related to organizational performance in the Iranian business context. Chong et al., (2011) argue that it indicates that for firms in developing countries, being more innovative will allow the firms to perform better. Also, this result supports the finding of Battor & Battor (2010) where they found that innovation positively and significantly affects business performance of UK organizations which is consistent with previous studies in developed countries.

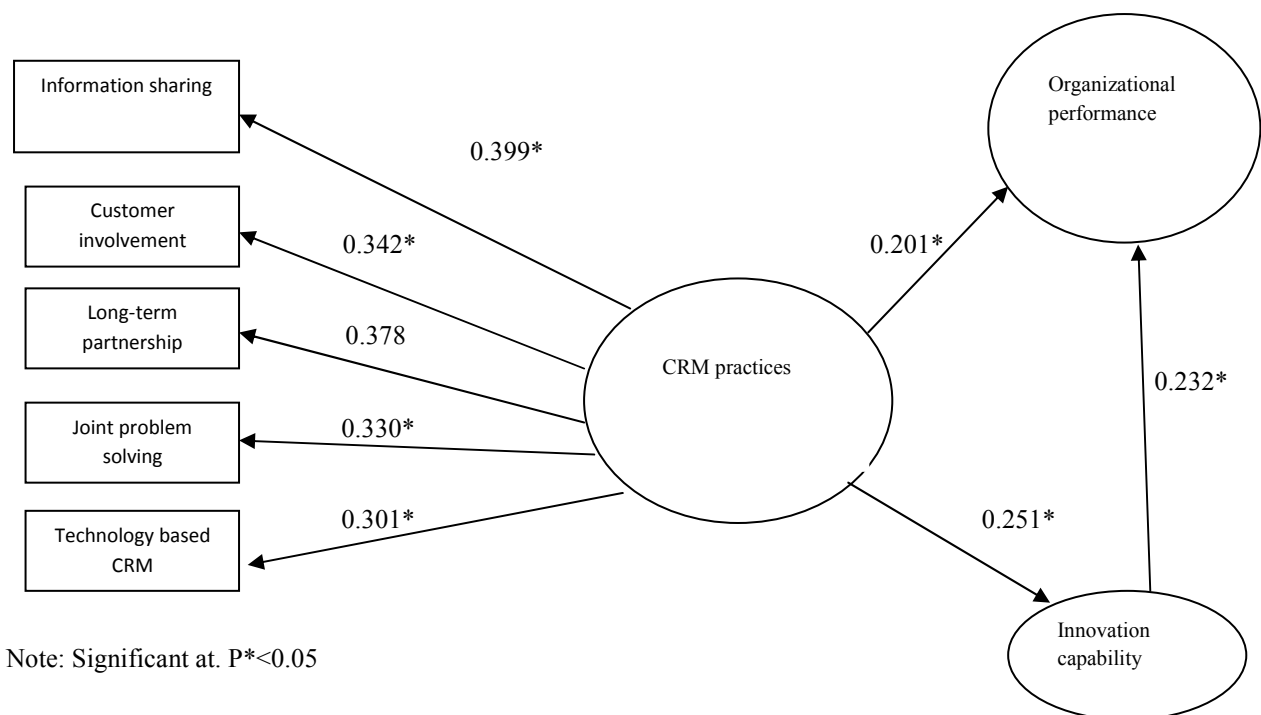


FIGURE 2. CRM practices, organizational performance and innovation capability

As shown in the path analysis in Figure 2, CRM practices increase innovation capability ( $\beta = 0.251$ ;  $p < 0.05$ ) of the firms in the first place, and innovation capability will in turn improve firms' organizational performance ( $\beta = 0.232$ ;  $p < 0.05$ ). Therefore, the findings of this study specify the presence of mediating impact of innovation between CRM practices and organizational performance which is consistent with the finding of Battor & Battor (2010) where they suggested the mediating role of innovation which fosters the impacts of CRM practices on organizational performance.

### **Discussion and conclusion**

This study has provided empirical justification for the proposed research framework which describes the relationships between CRM practices, organizational performance, and innovation among Iranian manufacturing firms. Our study is contrary to findings such as Reinartz et al. (2004) and Jayachandran et al. (2005) that CRM technology does not have a significant impact on organizational performance.

Also, the findings support existing studies from Sin et al. (2005), Lin et al. (2010) and Akroush et al. (2011) by empirically validating the CRM practices framework. Furthermore, this research shows that the validated CRM practices are applicable to developing countries such as Iran. This is important as previous CRM practices have been focused on Western countries or developed countries. CRM is touted as an imperative strategy to improve a firm's innovation capability and to enhance a firm's competitive advantage. Missing from the literature, however, is the knowledge of how these two strategic components can be integrated (Lin et al., 2010). Therefore, in this study in addition to the relationship between CRM practices and innovation capability of firms, in line with the study of Battor & Battor (2010) the missing link of innovation capability not previously conceptualised in the context of how CRM contributes to firm performance, has been considered.

One of the most important findings of this study is the lowest rank of technology -based CRM ( $\beta = 0.301$ ). As IT and IS play an important role in the development and implementation of CRM (Ngai, 2005) this indicates the sampled Iranian organization do not pay enough attention to employ the IT and IS related topics addressed in CRM literature such as software, tools, systems,

data mining and KM. Such a supportive role of IT includes database capabilities to collect and analyze customer information using statistical techniques such as data mining. This helps transform customer data into useful information and knowledge, which is considered to be a key organizational asset that is necessary in today's customer-centered business environment (Rygielski et al., 2002).

This is one of the very few CRM practices studies conducted in emerging markets especially in the Middle East region. In Iran, this is the first research effort devoted to investigate CRM implementation and business performance, and mediating role of innovation in manufacturing organizations. Empirical research has extended understanding of CRM components and their impact on business performance and innovation capability of manufacturing firms which have not been addressed together in previous empirical studies with such specific and suitable constructs in a model. Also, our findings have offered the manufacturing executives and managers strategic insights in relation to CRM implementation, CRM items and, more importantly, the most influential components of CRM implementation on manufacturing organizations performance and innovation. Information sharing, customer involvement, long-term partnership, joint problem solving, and technology-based CRM implementation are major drivers of the Iranian manufacturing organizations performance from which CEOs and managers can greatly benefit while developing their CRM implementation initiatives and strategies. These practical and strategic insights were not available to the surveyed organizations' executives and managers before conducting this research project. Finally, our empirical findings have opened up a research avenue in CRM implementation in Iran and perhaps in other emerging markets to examine CRM implementation in different business environments and cultures. Customer feedback and involvement which was considered as one of the main practices of CRM in this study, plays very important role in new product development activities and as Thornhill, (2006) suggest customer knowledge is a competitive resource for organizations ,so organizations that hold this ability and translate that knowledge into innovative products will benefit from more competitive performance. Thus, this study supports the finding of Battor & Battor (2010) that CRM is an antecedent to innovation, and that CRM and innovation simultaneously contribute to



firm performance. The findings provide support for the proposed relationships between CRM, innovation, and firm's superior performance.

### **Limitations and future research direction**

There are several limitations in this study. The present research has addressed CRM implementation adopting a scale developed by Lin et al. (2010), focusing on five main CRM practices. Although, CRM implementation could involve more than five components and other elements. However, this scale was used in this study since it was claimed as a valid and reliable scale in a research area that lacked well established scales and where research and debate is still going on (Akroush et al., 2011). The scale of CRM implementation of Lin et al. (2010) is valid, reliable, and is generalizable in the Iranian manufacturing organizations. A potential area of future research is to expand the five main factors of CRM practices and investigate if other factors could add value to its implementation and investigate their impact on organizational performance and innovation capabilities of firms.

Given the importance of external and internal factors such as environmental turbulences, organizational culture, and firm size, it is recommended in the future researches the role of these factors as moderator variables to be considered and studied. Also as Bishwas (2015) note as innovation and flexibility are interrelated variables, it would be useful in the future studies the role of this variable in the proposed model to be considered.

As this study is conducted in Iranian manufacturing organizations, this implies that the generalizability of this study's findings is limited to manufacturing firms in Iran and cannot be applied to other markets without a further validation. Also, as in the questionnaire subjective measures for performance were included it is recommended in future studies also objective measures for performance, such as ROA or ROI to be considered. Finally, it should be mentioned as the sample of this study comprises of various industries, according to the nature of these studies, on the one hand the external validity of the obtained results in comparison to a specific industry is increased but on the other it causes the internal validity of the results to reduce. So this could be another limitation of this study.

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## **Appendix. Research Questionnaire**

### **1. Long-term partnership**

Our company is committed to improving management of whatever customers suggest.

Our customers are trusted and willing to provide suggestions for products and services for our company.

Our company systematically provides customized products and services to our key customers.

Our company actively stresses customer loyalty or retention programs.

Our company maintains interactive, two-way communication with customers.

Our company cares about long-term development and successes with customers.

### **2. Information sharing**

Our company shares market information with customers (promotion information and competitive product information).

Our company shares product demand information with customers.

Our company shares inventory information with customers.

Our company jointly makes production plans with customers.

Our customers warn us of events that may affect supplying to us.

### **3. Customer involvement**

Our key customers are involved in NPD activities with us.

Our key customers are involved in periodically reviewing operations with us.

Our key customers are involved with us in modifying products.

Our key customers are involved with us regarding market evaluations.

Our key customers are involved with us regarding processing technology.

### **4. Joint problem-solving**

Our key customers work with us to overcome difficulties (inventory management, delivery delay, and logistics management).

Our company is jointly responsible with our key customers for getting things done.

Our company works with our key customers to help solve each other's problems (funding, production, and management).

### **5. Technology-based CRM**

Our company has the right software to serve our customers

Our company has the right hardware to serve our customers

Our company has the right technical personnel to provide technical support for the utilization of computer technology in building customer relationship

Our company maintains a comprehensive database of our customers

Our company constructed an integrated CRM performance evaluation system.

### **Innovation capabilities**

We are fast in adopting process with the latest technological innovations

We use up-to-date/new technology in the process

We use the latest technology for new product development

The process, techniques and technology change rapidly in our company

We have enough new products introduced to the market

We have new products which are first in market (early market entrants)

The speed of new product development is fast enough/ competitive

We are technologically competitive

We are able to produce products with novelty features

### **Organizational Performance**

In the last three years, in comparison with our most important competitors, we are satisfied with...

...the revenue growth of our organization (such as sale of new products and the increase of customers' purchasing)

- ....the profitability
- ....the increase of our customer satisfaction
- ....the increase of our market share
- ....the increase of ROI
- ....the increase of customer retention

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