

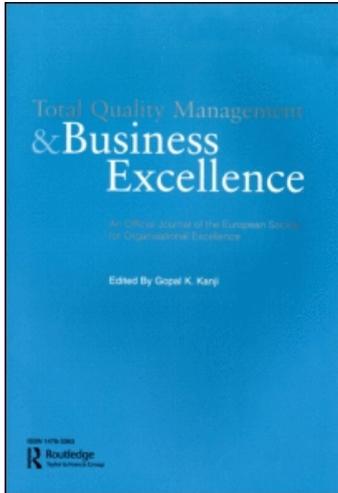
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Measuring CRM effectiveness: Construct development, validation and application of a process-oriented model

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Measuring CRM effectiveness: Construct development, validation and application of a process-oriented model

Ja-Shen Chen^a, H.J. Rebecca Yen^b, Eldon Y. Li^{c*} and Russell K.H. Ching^d

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The quality of customer relationship management (CRM) is usually evaluated by outcome indicators such as customer loyalty and business performance. To maintain or improve these indicators, CRM managers should regularly evaluate the progress of CRM practices. In this paper, we propose and develop a construct, called CRM effectiveness (CRME), comprising three dimensions: relationship marketing (RM), customer-focused information technology (CFIT) and customer-focused organisational climate (CFOC). The development of CRME followed the three-stage methodology of Churchill (1979). A survey was conducted at 523 financial services institutions and 407 manufacturing companies in Taiwan with 221 usable returns. The survey evaluated reliability, convergent validity, discriminant validity and nomological validity of the construct. The results support the proposed construct and its three dimensions. The three dimensions and their measures offer a parsimonious and practical approach for evaluating CRME and identifying its strengths and weaknesses. They reflect the process perspective of CRME and provide a better operationalisation of CRME for businesses and researchers to apply in practices.

Keywords: customer relationship management; information technology; relationship marketing; organisational climate; effectiveness; customer loyalty

Introduction

Pursuing high service quality may not necessarily render the desired returns in market share and profit margins. There is more to be done with managing customer relationships. Recently, there has been a movement in the marketing and service fields to pay more attention to customer relationship management (CRM). As a new paradigm, CRM takes advantage of information technology (IT), and gains greater insights into customer needs, behaviours and expectations by developing and maintaining interactive one-on-one relationships with them. While the CRM paradigm is becoming increasingly popular in the business sector, research into its effectiveness remains limited (Boulding et al., 2005; Mithas et al., 2005; Rogers, 2005). Although a number of studies have proven that CRM practices enhance company performance (Agrawal, 2004; Mithas et al., 2005; Srinivasan & Moorman, 2005), others have been sceptical about the success of CRM in developing customer share (Dowling, 2002; Zablah et al., 2004). This discrepancy might be due to the fact that the metrics commonly used by companies to measure

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and monitor CRM performance are not well developed or well communicated (Payne & Frow, 2005). These metrics include customer satisfaction, customer loyalty, acquisition costs, defection rate, retention rate and other indicators (Mithas et al., 2005; Winer, 2001). Furthermore, the values of these metrics could be affected by business processes other than CRM.

Payne and Frow (2005) indicated that extant metrics tend to be functionally driven and inappropriate for measuring cross-functional CRM. They propose a performance-assessment process not only to measure shareholder value but also to monitor performance and control it with a feedback loop. Despite this useful advance, limited effort, with one exception (Reinartz et al., 2004), has been directed toward developing a metric that could provide better insight into CRM success or failure. To fill this void, we propose a construct with three dimensions that aims to measure customer relationship management effectiveness (CRME) through a process perspective. Metrics for this multidimensional construct can be used to effectively monitor, diagnose and manage CRM, turning efforts into outcomes.

This process-oriented construct was developed around the argument that the success of CRM lies at the intersection of three dimensions. This argument is in accordance with literature on services marketing that recognised that firms can successfully meet the needs of their customers only when there is sufficient cooperation between marketing, operations, and human resources (Zeithaml et al., 2000). Taking on a similar perspective, Boulding et al. (2005) argued that CRM is the outcome of the continuing evolution and integration of marketing ideas, organisational forms, and data and technologies. Following this multifunction approach, the proposed CRME construct centres on three key elements: IT, relationship marketing (RM) and organisational climate (OC). IT is the most likely considered dimension of CRM; it provides tools and an infrastructure to orchestrate organisational activities and disseminate knowledge throughout the organisation. IT also allows CRM managers to gather and mine massive amounts of data for valuable information that may lead to innovations and responsive actions. We termed this dimension, which supports operations to deliver CRM practices, customer-focused IT (CFIT).

The second dimension, RM, addresses how an organisation manages and improves its relationship with customers for long-term profitability. RM is considered the root of CRM and a paradigm that directs a business toward attracting and retaining customers by emphasising customer satisfaction and offering innovative incentives and rewards. The third dimension is customer-focused organisational climate (CFOC), which corresponds to human resources and organisational forms. Implementing an enterprise-wide strategy such as CRM requires changes in organisational culture. The META Group Report (1998) concluded that investing in CRM technology without a customer-oriented culture is like throwing money into a black hole.

Based on this framework, the present study developed a survey instrument, and conducted an empirical study to validate the instrument. The remaining sections of this paper are organised as follows. First, we introduce the research model. Then, we discuss the research method and data analyses. Next, we present the discussion and conclusions, and recommend how to put our findings into practice. Finally, we address the limitations of this study and suggest future research.

A conceptual framework of CRM effectiveness

One major problem that organisations adopting CRM face derives from the great deal of confusion about what constitutes CRM (Payne & Frow, 2005). This phenomenon signifies

a variety of CRM viewpoints. Some business executives and researchers described CRM as solely technology-based customer solutions (Chen & Popovich, 2003), which represents a narrow perspective. In contrast, Payne and Frow (2005) defined CRM as a more strategic and holistic approach to manage customer relationships to create shareholder value. The way CRM is defined matters because it significantly affects how the organisation accepts and uses CRM practices. In this study, the proposed cross-functional conceptualisation of CRME corresponds to a broad perspective of CRM (Figure 1). The three dimensions used in the model are the essential process dimensions of CRME. Descriptions of these three factors follow.

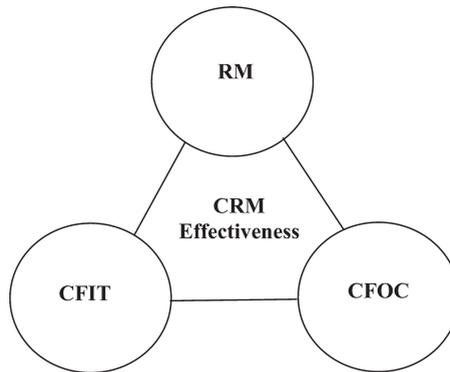


Figure 1. Three dimensions of the CRM effectiveness construct.

Customer-focused IT (CFIT)

IT has long been recognised as a radical tool for redesigning business processes to remarkably improve organisational performance (Davenport & Short, 1990; Porter, 1987). IT facilitates changes to work practices and establishes innovative methods for linking the organisation with its customers, suppliers and internal stakeholders (Hammer & Champy, 1993). CRM practices take full advantage of technological innovations that enable the collection of necessary data to determine the economics of customer acquisition, customer retention and lifetime value. In addition, disseminating information and knowledge about customers throughout the enterprise to ‘replicate the mind of the customer’ would not be possible without the support of IT. To ensure that IT solutions support the CRM practice of the organisation, it is important that the information management technology is planned around the customer.

The first dimension, CFIT, enables managers to collect customer, operational, and outside data, and provide an integrated view to assist prompt and accurate decision making (Crosby & Johnson, 2001; Swift, 2001). Different from traditional market-segmentation techniques that approach customers at the macro level first and then progressively break the market into smaller chunks, the CRM approach manages relationships with individual customers. That is, the firm has to view the customer relationship as all of the interactions a customer has with the firm, regardless of the channel the customer uses (Ryals & Payne, 2001). Aligning with this approach, the company must collect data about the relationship from all possible channels. Given the enormous amount of data that a company continually collects from customers, providing valuable services and retaining customers cannot be effective without the support of a suitable data infrastructure

(Pearce, 1997). Accordingly, the CFIT dimension applies IT to collecting customer data and delivering personalised services to maximise the value of each customer.

To collect and share such comprehensive data on customers requires relatively seamless convergence among the customer information systems throughout the whole firm. That is, a key role of CRM is to integrate different functions in the firm via business process automation, technology solutions, and information systems to maximise each customer's contact. This convergence of business functions helps reduce costs, improve efficiency and increase productivity (Elliott, 1997). However, this could not happen without the support of IT developed around the customer. Thus, CFIT also refers to the extent to which organisational IT enables the integration of administration and the activities involved in interfacing directly with customers and managing internal operations to achieve customer satisfaction.

Relationship marketing (RM)

Although several leading scholars have suggested that RM represents a paradigm shift in marketing approach and orientation (e.g. Grönroos, 1996; Parvatiyar & Sheth, 1997; Webster, 1992), Berry (1995) considered it a 'new-old concept'. In fact, the relationship perspective has been employed throughout the history of trade and commerce (Grönroos, 2000). The objective of RM is to establish, develop and maintain relationships with customers and other stakeholder groups (Berry, 1983; Grönroos, 1994; Jackson, 1985; Morgan & Hunt, 1994). Relationship marketers view customer relations as an asset that a company can manage with investment. The importance of RM is highlighted by the frequently referenced argument that attracting a new customer costs as much as five times more than keeping an existing one (e.g. Christopher et al., 1991; Filiatrault & Lapierre, 1997). The goal of RM is to improve customer profitability by shifting the company's focus from transaction-based marketing to customer retention through effective management of customer relationships (Christopher et al., 1991). Thus, we suggest that RM should be a dimension of CRME because the spirit of CRM is built upon the RM perspective. For example, a key theoretical basis for CRM is the literature on RM. Although some authors have taken a technological rather than a relational perspective to CRM (e.g. Kutner & Cripps, 1997; Peppers & Rogers, 1995), the philosophical foundation of CRM is composed of relationship orientation, customer retention and superior customer value created via process management (Ryals & Knox, 2001).

While CRM is rooted in RM, implementation of the latter on a company-wide scale will not be effective without process management encompassed by CRM practices. Reinartz et al. (2004) found that two stages of the CRM process, namely customer acquisition and retention, were positively associated with economic performance. Other studies also reported customer satisfaction and loyalty as consequences of RM (e.g. Guenzi & Pelloni, 2004; Hennig-Thurau et al., 2002). According to the literature, customer loyalty positively influences profitability by reducing costs and increasing revenue (Berry, 1995). These studies, among others, suggest that the success of CRM implementation depends in large part on RM. In the present study, we refer to Grönroos (2000), and define RM as the effort to acquire, maintain and enhance relationships with customers by providing superior service and fulfilling promises.

Customer-focused organisational climate (CFOC)

McGovern and Panaro (2004) suggested that the success of CRM depends on support from human resources and the alignment of CRM practices and people systems. In line with this

thought, we propose that organisational climate, which shapes a firm's focus on customers, is another dimension signifying CRM effectiveness. This dimension is termed CFOC. According to Schneider et al. (1994, p. 18), climate is 'the feeling in the air' that one gets from walking around a company. Organisational climate reflects shared beliefs and values in an organisation in terms of its systems, practices, and leadership style (McMurray, 2003). It stems from employees' perceptions of the firm's practices and procedures that are rewarded, supported and expected regarding customer service (Schneider, 1980; Schneider et al., 1998). Employees focus their energies and competencies, which determine outcomes, according to their perception of organisational priority and what is valued in their working environment. Given that employees are the building blocks of customer relations, CFOC as one major tool to shape how employees view customer service (Chen & Popovich, 2003) is essential to CRME.

In the present study, CFOC represents the shared beliefs and values among company employees regarding the organisation's focus on customer value and customer service as key to success. The climate is an organisation's internal environment for employees, which will ultimately influence customers' experiences (Schneider et al., 2000). Other things being equal, positive customer experience over the long run yields customer retention and higher profitability for the organisation (Deshpande et al., 1993; Narver & Slater, 1990; Rust & Zahorik, 1993; Schneider et al., 1994). Prior studies have reported a positive correlation between service climate and perception of customer service quality (Clark, 2002; Schneider, 1980; Schneider & Bowen, 1985; Schneider et al., 1998; Yoon et al., 2001). These studies concur with literature regarding the influence of people systems on customer outcome, and the reciprocal relationship between the internal and external environment of a service organisation. For example, Heskett et al. (1997) showed that the customer cycle of success is closely linked to the employee cycle of success. Following this logic, CFOC will instil in employees a customer-first spirit to solve customer issues, fulfil customer needs, and provide excellent customer service, all of which are part of the process leading to CRME.

Method

The development of CRME followed the three-stage methodology of Churchill (1979), including domain identification, instrument development, and statistical analysis of the data.

Domain identification

The first stage followed Nunnally's (1967) domain sampling. A review of the literature identified the salient elements that comprise CRME. Using these findings as a baseline and adopting the approach used by Zaichkowsky (1985), a formal meeting between three academicians and five business professionals was held to discuss the common definitions of CRME and establish the boundaries of its domain. The group agreed upon three domains and their operational definitions; one domain regards the philosophy of CRM that gives direction to actual practice, and the other two domains are concerned with the technological and organisational conditions that facilitate the implementation of CRM practices. These three domains coincide with the three dimensions of RM, CFIT and CFOC, respectively, and support the plausibility of the proposed CRME construct.

Instrument development

A subsequent review of prior research regarding the three dimensions identified many potential measures for these dimensions. The items were further discussed to eliminate redundancies and clarify unclear expressions. This process produced a set of 43 items.

The measures of CFIT were adapted from Applegate et al. (1996), Kalakota and Robinson (2001), Karimi et al. (2001), Swift (2001) and Tavinen (1995). They encompass CFIT capabilities for information transaction processing, order management, customisation, market analysis and internal integration. The RM items in this initial set were mainly adapted from Blattberg and Deighton (1996), Kaplan and Norton (1996), Narver and Slater (1990) and Reichheld and Sasser (1990). The measures assess a business' ability to deliver products quickly, offer personalised and friendly service, achieve customer satisfaction and retention, and acquire new accounts. The measures of CFOC were mainly adapted from Dietz et al. (2004), Narver and Slater (1990), Rogg et al. (2001) and Schneider et al. (1998). They include customer orientation, employee commitment, cooperation and coordination, and management competence.

To validate the predictive validity of the proposed CRME construct, we adopted customer loyalty as the predictive measure, because of its theoretical foundation and empirical support as the outcome variable of CRM implementation (Assael, 1998; Oliver, 1999). This measure includes two items, customer intent to purchase again in the future, and willingness to recommend products/services to others. These items are adapted from Dowling (2002).

The survey instrument of 43 items was pilot-tested on 25 managers to improve its conciseness. Participants were asked to rate the appropriateness and importance of each item for the dimension it was intended to measure, and items with low scores were removed from the instrument. This process removed 17 items, leaving 26 (not including two items assessing loyalty) for questionnaire design and data collection. The final questionnaire items and their reference sources, along with the two items regarding customer loyalty, are listed in Appendix A.

Data collection and analyses

The last stage involved data collection and analyses to test the proposed CRME construct. Specifically, we examined the instrument's convergent and discriminant validity using a confirmatory factor analysis (CFA), its reliability using Cronbach's alpha coefficient, and its nomological (i.e. predictive) validity using a structural equation modelling analysis.

To collect the data, a survey was conducted on 930 business firms, including 523 financial services institutions (i.e. banks, investment, insurance and trading companies) and 407 of the 1000 largest manufacturing companies in Taiwan. Questionnaires, along with a letter explaining the purpose of the survey and instructions for completing it, were sent to managers in charge of CRM practices. A total of 149 questionnaires were initially returned. Follow-up telephone calls and letters urging participants to complete the questionnaire brought the total to 231 respondents (24.7% return rate), of which 96 were from manufacturers, 127 from financial institutions and eight did not indicate. Ten incomplete questionnaires were removed, reducing the final sample to 221.

To ensure the generalisability of the results, tests for sample bias were performed. A comparison between the composition of companies surveyed and the responses received revealed no significant bias (Table 1).

Table 1. Survey responses.

	Surveyed	Returned
Financial	523 (56.2%)	127 (54.98%)
Manufacturing	407 (43.8%)	96 (41.56%)
Not indicated on return	n/a*	8 (3.46%)
Total	930 (100%)	231 (100%)

*Note: n/a denotes 'not applicable'.

Non-response bias may also adversely influence analysis. To address this concern, we performed variance analyses. Armstrong and Overton (1977) suggested that late responses can be treated as non-responses. A one-way ANOVA comparing timely ($n = 143$) and late responses ($n = 78$) showed no significant differences among the hypothesised dimensions and the customer loyalty construct (Table 2). Another comparison of different industry sectors also revealed no significant differences (Table 3). The results indicated that the following analyses can be generalised to the population.

Table 2. ANOVA table for early and late responses for all constructs.

		Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
RM	Between groups	0.010	1	0.010	0.026	0.872
	Within groups	81.232	219	0.371		
	Total	81.241	220			
CFIT	Between groups	0.994	1	0.994	2.310	0.130
	Within groups	94.264	219	0.430		
	Total	95.259	220			
CFOC	Between groups	0.352	1	0.352	0.988	0.321
	Within groups	77.921	219	0.356		
	Total	78.273	220			
Customer Loyalty	Between groups	0.490	1	0.490	2.159	0.143
	Within groups	49.700	219	0.227		
	Total	50.190	220			

Table 3. ANOVA table for different industries' responses for all constructs.

		Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
RM	Between groups	0.228	2	0.114	0.306	0.736
	Within groups	81.014	218	0.372		
	Total	81.241	220			
CFIT	Between groups	0.235	2	0.118	0.270	0.764
	Within groups	95.023	218	0.436		
	Total	95.259	220			
CFOC	Between groups	0.356	2	0.178	0.498	0.609
	Within groups	77.917	218	0.357		
	Total	78.273	220			
Customer Loyalty	Between groups	0.416	2	0.208	0.911	0.404
	Within groups	49.774	218	0.228		
	Total	50.190	220			

Analysis

Scale refinement

The initial process of scale validation involved correlation analysis and exploratory factor analysis (EFA). The EFA of all 26 CRME items resulted in three factors, confirming the proposed factor structure for the CRME construct. Based on these findings, we removed 10 items from the instrument that had either high cross-factor loadings or low Cronbach's alpha coefficients, reducing the items from 26 to 16. The remaining 16 were used for subsequent scale validation. Cronbach's alpha values for the three proposed dimensions ranged from 0.76 to 0.87 (Table 4), clearly exceeding the 0.70 cut-off value recommended by Nunnally (1967).

Model evaluation

To evaluate the proposed CRME construct, the 16 items were further subjected to CFA, using Amos 5.0 (Arbuckle, 2003). In this study, we intend to explore whether the three CRME dimensions are nested in a second-order factor structure. Therefore, we choose CFA because it is an appropriate tool for assessing models with a higher-order factor structure (Marsh & Hocevar, 1985).

Following the methods of Doll et al. (1994), we performed a series of CFA analyses to compare several possible factor structures (see Table 5). Specifically, we tested a one-factor model, a two-factor model, two three-factor models and a second-order model. Different criteria, including adjusted chi-square and alternative fit indices, were used to assess the models. As shown in Table 5, the best-fit model was the first-order three-factor model, which assumes inter-correlation between factors. The adjusted chi-square, i.e. the ratio of chi-square to the degree of freedom (χ^2/df), was 1.366, suggesting a reasonable fit. Other indices, including goodness of fit index (GFI), adjusted GFI, Bentler's (1990) normed comparative fit index (CFI) and Steiger's (1990) root mean squared error of approximation (RMSEA), also demonstrated an appropriate fit for the first-order three-factor model (Table 5). All other models, especially the first-order uncorrelated three-factor model, did not perform as well.

A higher-order model can help explain the covariance between first-order factors in a more restricted and parsimonious way. Thus, we explored whether a second-order structure might better represent the data than the three first-order factors. An assessment of the second-order three-factor model (Figure 2) indicated a reasonable fit, with all indices close to those of the first-order three-factor model. Because there is usually a difference in the degree of freedom between first-order and second-order factor models, whether the higher-order model fit the data as well as the base model (i.e. the first-order model) required further verification. Marsh and Hocevar (1985) suggested using a target coefficient ($T = \chi^2$ [first-order model]/ χ^2 [alternative model]) as the criterion to assess the efficacy of the alternative (second-order) model. A target coefficient close to 1.0 implies that a higher-order model sufficiently captures the relationships among first-order factors.

In the analysis of our data, χ^2 and adjusted χ^2 for the second-order factor model were 149.538 (df = 104) and 1.437, respectively. Although the second-order factor model does not fit as well as the first-order factor model in terms of the adjusted χ^2 and other fitness indexes (Table 5), most index values obtained from the two models were not much different. Furthermore, the target coefficient (0.93) was close to 1.0 and strongly supported the appropriateness of the second-order factor model as a representation of the construct.

Table 4. Test of convergent validity.

Dimensions and items	Mean	Standard Deviation	Standardised λ	Critical Ratio
RM (Cronbach's $\alpha = 0.76$, Composite Reliability = 0.83)				
ITEM1: We offer friendly and personalised services to our customers.	4.16	0.699	0.670**	—*
ITEM3: After receiving orders, we quickly deliver goods.	4.06	0.742	0.636**	6.557
ITEM4: Our customers are satisfied with our service processes.	3.75	0.706	0.690**	6.943
ITEM5: Our customer retention capability is better than our competitors.	3.76	0.863	0.788**	7.426
ITEM6: Our ability to acquire new customers is better than our competitors.	3.53	0.917	0.741**	7.247
CFIT (Cronbach's $\alpha = 0.80$, Composite Reliability = 0.81)				
ITEM9: Customer information can be transferred and utilised among departments.	3.46	0.965	0.668**	—*
ITEM13: We can handle mass interactive data automatically, such as order receiving, information inquiring.	3.90	0.805	0.642**	8.057
ITEM14: Conducting customer transactions correctly and rapidly is very common for us.	3.60	0.907	0.648**	8.089
ITEM15: Our products are accompanied with value-added information available to our customers.	3.52	0.951	0.668**	8.361
ITEM16: We regularly use our customer information to provide customised products to our customers.	3.84	0.757	0.735**	9.153
CFOC (Cronbach's $\alpha = 0.87$, Composite Reliability = 0.88)				
ITEM21: Our employees are committed to providing superior service to our customers.	4.29	0.719	0.738**	—*
ITEM22: Customers are truly valued.	4.23	0.748	0.659**	9.797
ITEM23: We pay close attention to after-sale service.	4.17	0.755	0.828**	11.558
ITEM24: Our customer service culture makes employees say they are proud to work here.	3.82	0.826	0.757**	10.987
ITEM25: When required, employees will make personal sacrifices to serve their customers.	4.30	0.747	0.685**	9.691
ITEM26: Departments cooperate to effectively and efficiently complete jobs (tasks).	3.86	0.828	0.750**	9.484

Notes: Chi-Square value of the measurement model = 119.405 ($p < 0.001$).

*Indicates the parameter of this scale item in the construct is fixed at 1.

** $p < 0.001$.

Therefore, CRME can be adequately conceptualised as one general factor despite being composed of three separate dimensions.

Assessment of measurement model

To further test the quality of the CRME scale, we assessed the measurement model with other criteria. First, we applied Cronbach's alpha values and composite reliabilities (CRs) to assess its reliability. Composite reliability (CR) measures the degree to which items are

Table 5. Comparison of models.

Models	One-Factor	Two-Factor	Three-Factor (uncorrelated)	Three-Factor (correlated)	Second-Order Model
χ^2	252.003	194.592	433.880	139.360	149.538
df	105	104	103	102	104
χ^2/df	2.400	1.871	4.212	1.366	1.438
GFI	0.871	0.901	0.819	0.935	0.926
AGFI	0.812	0.855	0.713	0.897	0.891
CFI	0.906	0.942	0.788	0.977	0.971
RMSEA	0.08	0.06	0.12	0.04	0.05

free from random error and therefore yield consistent results. Table 4 shows that the Cronbach's alpha coefficients and the CRs all exceed the cut-off of 0.70 suggested by Nunnally (1967), indicating acceptable construct validity. Second, we examined the standardised factor loadings for the scale items and their statistical significance to examine convergent validity. The standardised factor loadings on latent variables ranged from 0.638 to 0.828. Although it is recommended that the factor loading exceed 0.70, a moderate criterion of 0.30 is also acceptable in exploratory studies (Byrd & Turner, 2000). Given

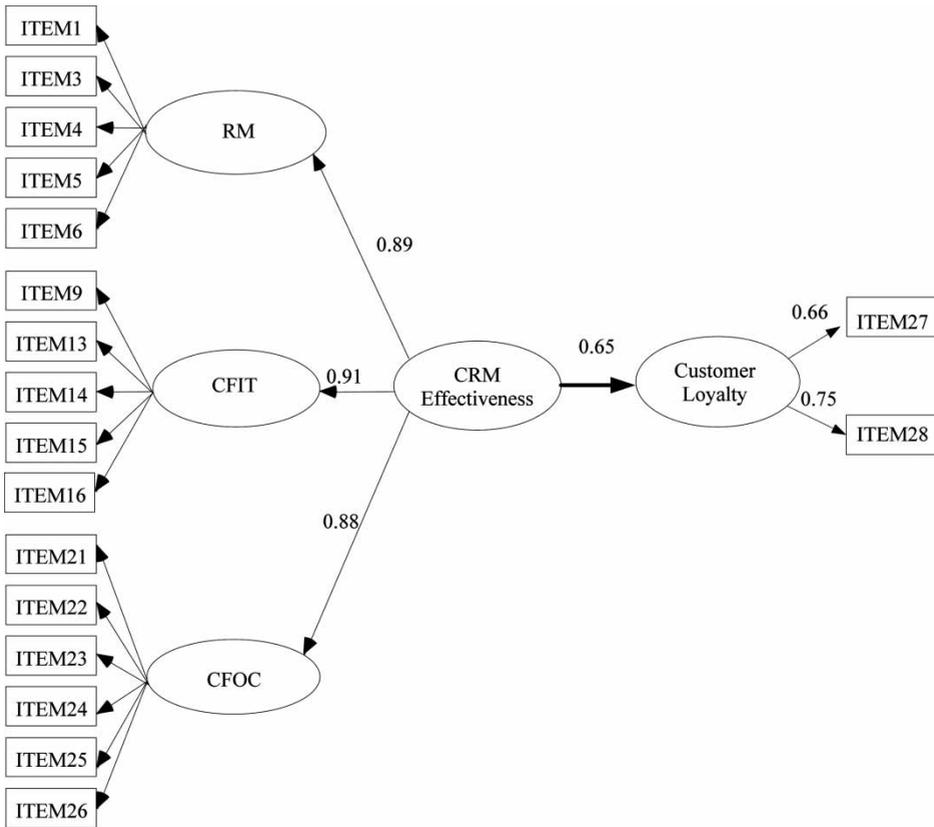


Figure 2. Second-order CRM factor model and test of nomological validity. Notes: Chi-square = 188.477, df = 119, $p < 0.001$. RMSEA = 0.052, GFI = 0.92, AFGI = 0.88, CFI = 0.96. R-square (Customer Loyalty) = 0.42.

that the proposed instrument is exploratory in nature, we consider our results of this analysis adequate and supportive of convergent validity. Table 4 shows the standardised factor loadings (λ) for the 16 items; all are significant at $p = 0.001$.

Third, we performed a series of CFAs and comparisons of chi-square values to evaluate discriminant validity, which is inferred when the correlations between any two constructs are significantly different from unity (Bagozzi et al., 1991). The validation process involves comparing a constrained model that fixes the value of the construct correlation to unity to an unconstrained model that frees the correlation between a pair of constructs. We performed three chi-square tests of differences, and all of them resulted in significant differences (Table 6). The results suggest that the instrument is assessing three separable factors of CRME.

Table 6. Assessment of discriminant validity.

Variable Constrained	Chi-square	df	Chi-square Difference
None	139.360	102	–
RM with:			
CFIT	228.680	103	89.32**
CFOC	258.190	103	118.83**
CFIT with:			
CFOC	226.258	103	86.898**

**Significant at $p < 0.001$.

Finally, we assessed its nomological (predictive) validity. The meaning of the construct can be determined by its antecedents and consequences, in addition to its definition and operationalisation (Sethi & King, 1994). Therefore, nomological validity would be established if the CRME construct could predict the consequence of effective CRM practices. Because effective CRM practices usually result in a greater level of customer loyalty (Chen & Popovich, 2003; Dowling, 2002), we tested nomological validity by examining the degree to which the construct predicts customer loyalty. As shown in Figure 2, CRME significantly predicted customer loyalty, and explained about 42% of the variance in customer loyalty ($\beta = 0.65$; $R^2 = 0.42$). The result supports the nomological validity of the CRME construct.

Discussion

The analyses support the proposed CRME construct and its three underlying dimensions, RM, CFIT and CFOC, indicating the viability of an integrated process-oriented model for CRME. First, CFIT enables a business to collect, retain, retrieve, update, and manipulate massive amounts of data, and conduct customer transactions in a very efficient, timely, real-time, reliable, and accurate manner. It provides the backbone for a business to interact with its customers and disseminate and share information and knowledge throughout the enterprise to support business activities, such as customising products and services to accurately meet customer needs and expectations. As IT continues to advance, businesses will benefit from integrating CFIT into processes, resulting in improved efficiency, market intelligence and value-adding mass customisation. With strong CFIT, a business can leverage better information resources to compete more effectively in the global marketplace and provide services to its customers any time and any place.

Although CFIT provides the technological means for achieving CRME, it involves only the operational side and does not address strategic and tactical issues. These are addressed by RM. Being a marketing paradigm, RM defines the organisational impetuses and practices, including a framework in which problems are viewed and solved. It directs efforts towards delivering appropriate products and services in a timely manner through the best channel to meet customer needs and expectations. Garnering customer satisfaction and support requires a business to focus on developing and applying customer-centric practices, and building long-term relationships with customers. The quick delivery of goods and services is an essential practice under CRM, reflecting an organisation's ability to respond quickly to customer demand. However, customer relations need to run deeper and will require businesses to develop clear understandings of their customers to identify and target those of high value. Moreover, these relationships may help companies anticipate emerging customer priorities, and therefore add value to a customer's experiences via cross- and up-selling. The practices of retaining existing and acquiring new customers also reflect a business's commitment to RM, which includes building trust, maintaining satisfaction, and providing value. Therefore, RM contributes to CRME by providing a road map for CRM staff to follow. Without RM, the direction of CRM would be lost.

Lastly, the CFCO dimension sets a *de facto* standard for employee performance that helps distinguish the business from its competitors through the actions and attitudes of management and employees. In a customer-centric environment, employees play an important role as the first-line liaison between the business and its customers. Perceptions conveyed through their conduct often leave an impression of the value a business places on its customers. Conduct that reflects a customer-oriented climate, such as personal sacrifices and initiative, leads to positive customer relationships that embody loyalty and instil psychological benefits. Thus, CFCO links corporate-level management to individual employees and customers.

In addition to depicting an integrated process-oriented model of CRM, the three dimensions of CRME and their measures offer a parsimonious and practical approach for judging CRME. The CRME construct suggests that investments in CRM should be directed toward boosting RM, enhancing CFIT, and developing a CFCO that fosters customer service. Each dimension helps ensure that the interaction of organisational and technological factors will result in successful CRM. The construct also helps a company identify weaknesses to be addressed and strengths to be leveraged.

Conclusions and recommended practices

CRM is often viewed as a marketing application of IT. In fact, it is not that simple. To achieve business goals successfully (such as customer loyalty, market share and profit), CRM must be recognised as an enterprise-wide endeavour that requires integrating IT with organisational and marketing elements. The present study proposed an instrument for measuring CRME comprising three dimensions, CFIT, RM and CFCO. The results of empirical analyses supported the proposed dimensions. For businesses looking to excel in global commerce, this transpires into examining the organisation to ensure none of the dimensions is neglected or underemphasised. The operational attributes of CRME provided by this study will provide business managers a more complete understanding of CRM, by helping them realise that investment in technology is not the only key to CRM success. This study also lends further support to viewing CRM as an opportunity to leverage IT, rather than an IT solution (Almquist et al., 2002).

We developed a survey instrument of 16 scale items that measure CRME. The evaluation process of CRME in a firm should start with distributing this instrument to managers and senior staff across the organisation, especially in departments such as customer service, sales and marketing, and operations and IT. Their responses will reveal how effectively CRM is practised in the organisation. Based on the results, managers can identify weak practices, and propose actions for improvement. For example, if the scores of scale items 15 and 16 ('Our products are accompanied with value-added information available to our customers' and 'We regularly use our customer information to provide customised products to our customers') are low, more resources should be allocated to CFIT to provide more value-added product information and customised products to customers.

To obtain valid responses, the evaluation should be conducted by an independent expert in CRM practice, and participants must remain anonymous except for the identity of their functional area. By knowing each participant's functional area, top managers could identify response differences among departments, if any; explain the differences; and take any necessary action. Furthermore, CRME evaluation should be conducted periodically to permit top managers to continuously monitor and evaluate the organisation's CRM status, i.e. whether RM is aligning closely to business objectives; whether CFIT is performing well; and whether CFOC is supporting the CRM process harmoniously.

Today's business environment is extremely competitive, and treating customers well is of utmost importance. Therefore, there can never be too much emphasis on managing customer relationships. Taking steps to ensure effective CRM will augment business growth and profit. The instrument proposed by this study is a very useful tool for managing this effort. It allows a business to assess its current CRM practices, predict CRME and formulate corrective actions accordingly.

Limitations and future research

This study only surveyed 221 firms from financial institutions and top 1000 manufacturers in Taiwan; therefore, caution should be taken when applying the findings to firms in other industries or countries. In addition to the need to further refine the factors discovered in this study, future research could focus more on the relationship between CRME factors and other constructs, such as customer benefits and business performance. Much more rigorous studies must be completed to substantiate the antecedent and consequent relationships among all of the variables. Questions about the contribution of each CRME factor to customer benefits and business performance should be answered. It would also be interesting and important to determine the investment required to develop an effective IT infrastructure for CRM, and the benefits that investment would bring. Do the costs outweigh the benefits? Has the effective use of IT become vital to learning more about customers and providing direct and accurate marketing campaigns? The answers to these questions have yet to be discovered.

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Appendix A. Questionnaire and references adopted for developing CRM effectiveness construct

Item	Description	References
RM		
1	We offer friendly and personalised services to our customers.	Blattberg and Deighton
2*	After developing relationships with us, our customers psychologically build up confidence in our company.	(1996); Kaplan and Norton
3	After receiving orders, we quickly deliver goods.	(1996);
4	Our customers are satisfied with our service processes.	Narver and Slater
5	Our customer retention capability is better than our competitors.	(1990); Reichheld and Sasser
6	Our ability to acquire new customers is better than our competitors.	(1990).
7*	We frequently measure customer satisfaction.	
8*	Our business objectives are driven by customer satisfaction.	

(Continued)

Appendix A. Continued

Item	Description	References
<i>CFIT</i>		
9	Customer information can be transferred and utilised among departments.	Applegate et al. (1996); Kalakota and Robinson (2001);
10*	We are capable of systematically collecting customer transaction and interaction data.	Karimi et al. (2001);
11*	Analysing customer data is our routine job.	Swift (2001);
12*	Analysing customer data helps us in making marketing decisions.	Tavinen (1995).
13	We can handle mass interactive data automatically, such as order receiving, information inquiring.	
14	Conducting customer transactions correctly and rapidly is very common for us.	
15	Our products are accompanied with value-added information available to our customers.	
16	We regularly use our customer information to provide customised products to our customers.	
17*	Our sales are able to obtain timely information and make price adjustment accordingly.	
18*	We are able to provide timely and updated information to our customer via multiple channels.	
19*	Facilitating information technology makes our customers easier in product selection.	
20*	We provide identical services to our customers regardless of the customer access points.	
<i>CFOC</i>		
21	Our employees are committed to providing superior service to our customers.	Dietz et al. (2004);
22	Customers are truly valued.	Narver and Slater (1990);
23	We pay close attention to after-sale service.	Rogg et al. (2001);
24	Our customer service culture makes employees say they are proud to work here.	Schneider et al. (1998).
25	When required, employees will make personal sacrifices to serve their customers.	
26	Departments cooperate to effectively and efficiently complete jobs (tasks).	
<i>Customer Loyalty</i>		
27+	Customers will continuously purchase our products/services.	Dowling (2002).
28+	Customers will refer our products/services to their friends.	

Notes: Bold typefaced item is the final instrument item for CRM effectiveness measure.

*: This item was eliminated by the exploratory factor analysis and reliability analysis.

+: Customer loyalty item for validity test.