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# **An Exploratory Study Of The Effects Of Information And Communication Technology On Customer Relationship Management And Customer Lock-In**

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## **Abstract**

*The rapid expansion of global marketplaces and the recent developments of ICT have led to the greater business opportunities. In their quest to build close relationships with their customers, many businesses have turned to customer relationship management (CRM). This study examines the effects of ICT infusion embodied in three CRM elements on CRM performance, partnership quality and customer lock-in in addressing does the infusion of ICT in CRM affect a business' ability to retain its customers? The results suggest that ICT affects CRM performance, partnership quality and customer lock-in. However, in spite of technology, partnership quality does not appear to influence customer lock-in.*

**Keywords:** Customer relationship management, information and communication technology, market orientation, mass customization

## **1. Introduction**

With one billion users (ZDNet, 2001) and between US\$2.2 to \$5 trillion in global e-commerce revenues (Killen & Associates, 2001; ZDNet, 2001) forecasted for 2005, the Internet and e-commerce pose many new opportunities for businesses. Much of the rapid growth to the information technology (IT)-enabled global marketplace can be attributed to the continual advances in information and telecommunication technology (ICT).

Recent developments of ICT have led to the expansion of their application in business processes. Essentially, ICT covers the technological means for handling information and aiding communication. It involves information and communication channels as well as hardware and software used to generate, prepare, transmit and store data (NORAD, 2002). In seeking new opportunities, many businesses have turned to ICT to strategically position themselves to compete in global electronic marketplaces. Yet, the advantage they create for a business is usually short-term. As a mode of ICT becomes common, it tends to equalize the presence of all competitors. Therefore, businesses must look beyond their mere implementation and seek organizational strategies that exploit and leverage ICT.

In recent years, customer relationship management (CRM) systems have emerged to become a formidable means for building long-term customer-centric relationships between a business and its customers. With the adoption of customer-centric strategies, businesses not only benefit from the creation of greater customer value. The integration of ICT into its business processes helps CRM ensure healthy life-long relationships.

The importance of maintaining a healthy relationship cannot be downplayed. Recent

surveys suggest that maintaining good customer relationships with existing customers sustains profitability (Li et al., 2001; Mercer Market Survey, 2000). Thus, it behooves a business to develop close learning relationships and interact with its customers to gain greater insights into their needs. As a result, many businesses have turned to CRM to manage their relationships (Ryals and Knox, 2001).

Implementing a CRM system looms as a challenging task, and reaping the benefits of CRM does not come immediately. Greater investments in IT and ICT often create positive perceived impacts on productivity and customer service quality. However, the effects of ICT infusion on CRM remain uncertain and the benefits unclear. The purpose of this study is to examine the relationship of ICT with CRM benefits, in particular customer lock-in. The study identifies three CRM elements and examines their effect on CRM performance, partnership quality and customer lock-in. In light of both growing global opportunities and keener competitors, *does the infusion of ICT in CRM affect a business' ability to retain its customers?*

## **2. Background**

### **2.1 CRM and ICT**

CRM involves IT-enabled business processes that identify, develop, integrate and focus a business' competencies on forging valuable long-term relationships that deliver superior value to customers (Plakoyiannaki and Tzokas, 2002). This customer-centric business philosophy driven by the organization's leadership, management and culture (Thompson, 2001) seeks to understand and influence customer behavior through meaningful two-way communication, and improve customer acquisition, retention, loyalty and profitability over time (Day, 2000; Kohli et al., 2001; Swift, 2001). CRM draws upon technology to capture, analyze and disseminate current and prospective customer data to develop deeper and insightful relationships, and identify and more precisely target customer needs.

### **2.2 CRM elements**

The three CRM elements identified in this study that will greatly benefit from ICT infusion include market orientation, mass customization, and IT investment (profile).

#### **2.2.1 Market orientation**

The definition of Deshpande and Farley (1998) presents market orientation as a set of cross-functional process and activities that are directed toward creating and satisfying customer through continuous needs-assessment. It involves the organization-wide responsiveness to marketing intelligence and is characterized by multiple departments sharing information and engaging in activities designed to meet customer needs (Kohli and Jaworski, 1990). Overall, a business' ability to strengthen its market orientation depends largely on its investments in ICT, particularly those for quickly gathering, storing, analyzing and disseminating customer information, and interacting with customers.

#### **2.2.2 Mass Customization**

Customization creates a business' greatest competitive advantages as competitors cannot easily duplicate, imitate or substitute its offerings. Mass customization involves

collaborative processes for the production of products and services tailored to meet the specific needs of customers in a mass market (Selladurai, 2004). For mass customization to succeed, the business must establish an effective means to elicit customers of their needs and transform them into suitable products or services (Zipkin, 2001) that create perceived values (Broekhuizen and Alsem, 2002; Hart, 1996). Most importantly, though, the business must engage in the continuous learning of its customers' needs (Hart, 1996).

### ***2.2.3 IT Investments***

Continual advances in IT are opening new opportunities for businesses and consequently changing the way business is conducted, particularly for gaining competitive advantages (Venkatraman, 1994; Scott Morton, 1991). A business' IT investments reflect its commitment to IT, and involve the development of an IT architecture that defines the organization's capabilities and an IT infrastructure to support it. Together, they represent a master plan and define an array of ICT that will be employed to support its business activities and exploited to achieve a desired result.

### ***2.3 Partnership Quality***

Partnerships allow a business to open channels of communication to its customers (Buzzell and Ortmeyer, 1995; Cannon and Perreault Jr., 1999). Partnership quality involves building customer satisfaction, trust and commitment between a business and its customers. It results through two-way communication and the business' willingness to learn from its customers. Often, customer satisfaction is used to measure partnership quality (Oliver and DeSarbo, 1988). A study conducted by Jones and Suh (2000) suggests that overall satisfaction directly influences repurchase intentions and moderates the relationship between transaction-specific satisfaction and repurchase intentions.

A key element to partnership quality is trust. Moorman et al. (1992) define trust as a willingness to rely on an exchange partner based on confidence. It embodies beliefs of expertise, reliability and intentionality between the partners, and overcomes the perceptions of vulnerability and uncertainty.

### ***2.4 CRM Performance and Customer Lock-in Effect***

CRM performance focuses on the derived relationship benefits, including revenue and profitability, the acquisition and retention of customers, and the ability to customize offerings that better appeal to the individuality of customers (Swift, 2001; Winer, 2001). Over time, CRM performance develops customer loyalty which leads to repeated purchases of products and services (Reichheld and Teal, 1996). Also, a business incurs fewer expenses servicing its loyal customers and can expect higher profit margins from their sales (Storey and Easignwood, 1999). Thus, building customer loyalty helps lock in customers.

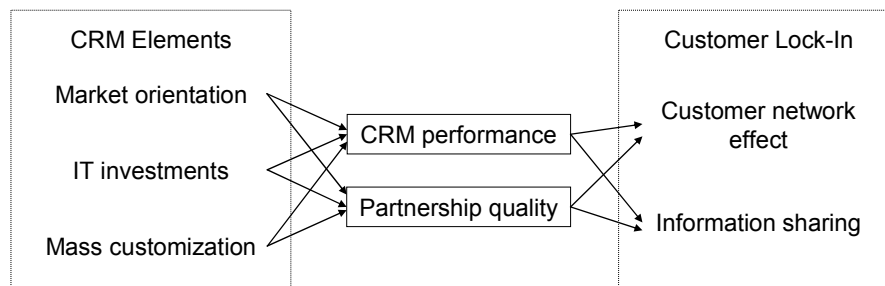
A lock-in effect refers to the extent to which customers are motivated to engage in repeated transactions (Amit and Zott, 2001). It is driven by a customer's preference to minimize immediate (short term) costs while deemphasizing future costs (Zauberman, 2003). Switching costs carry economic implications, such that a search continues while the marginal cost of the search remains lower its expected marginal benefit (Zuaberman, 2003). Lock-in occurs when a perceived economic cost exceeds the expected benefit of switching.

The two components of customer lock-in examined in this study are information sharing and customer network effect. Information sharing occurs after customers have established their trust in the business and sense a benefit in their relationship. It involves the voluntary exchange of personal information (Kolekofski and Heminger, 2003). Lock-in occurs when the benefits from sharing cannot be obtained elsewhere.

A customer network effect occurs when the value of a product or service increases as the number of participants using it increases (Chakravorti and Shah, 2003). It builds on members knowing that others in the segment are benefiting from the relationship. Customers initiate their lock-in when the perceived value or benefit of a replacement does not exceed that of an existing product or service.

### 3. Research Model and Test of Hypothesis

Figure 1 illustrates the research model of this study. The three CRM elements, CRM performance and partnership quality will indirectly and directly affect customer lock-in (network effect, information sharing). As intervening variables, CRM performance and partnership quality will influence the relationship between the CRM elements and lock-in.



**Figure 1.** Research model

Each of the three CRM elements will positively affect CRM performance. Market orientation represents the orchestrated efforts of the business that are directed toward understanding and satisfying its customers' needs, most of which are enhanced through ICT.

IT investments reflect a business' profile and commitment to technology. ICT components are chosen for their different effects on the business and create an IT profile.

Mass customization seeks to achieve a one-to-one marketing advantage through products and services specifically tailored to meet the needs of an individual customer. When products and services are successfully presented in such a way, customer retention will be high.

*H1: CRM elements have a positive relationship with CRM performance*

*H1a: Market orientation has a positive relationship with CRM performance*

*H1b: IT investments have a positive relationship with CRM performance*

*H1c: Mass customization has a positive relationship with CRM performance*

Market orientation will also have a positive effect on partnership quality. Businesses that are dedicated to sensing the needs of its customers will engage in meaningful two-way dialogues with them. Opening channels of communication help build customer satisfaction through feedback and education, and instill trust.

Partnership quality also requires the business to recognize the individuality of its customers. Greater investments in IT to collect, retain, analyze, organizationally share and integrate its customers' information into its production processes will improve the business' ability to reach each customer on a one-to-one basis. Continual advances in IT have lowered the cost of intelligence.

Partnership quality reflects the customers' satisfaction and trust built over time. Mass customization is based upon open communication to create products and services specifically tailored to suit individuals. As the differences among expectations, conformation and performance approach zero, customers will be more willing to engage in further transactions.

*H2: CRM elements have a positive relationship with partnership quality*

*H2a: Market orientation has a positive relationship with partnership quality*

*H2b: IT investments have a positive relationship with partnership quality*

*H2c: Mass customization has a positive relationship with partnership quality*

Two major objectives of CRM are to retain customers through loyalty and increase their switching costs. If a business succeeds with CRM, customer needs and expectations are more precisely met, and lead to greater customer loyalty and the lock-in effect. The actual and perceived benefits customers receive add to the burden of opting out of the relationship.

*H3: CRM performance has a positive relationship with customer lock-in*

*H3a: CRM performance has a positive relationship with customer network effect*

*H3b: CRM performance has a positive relationship with information sharing*

Partnership quality will also affect customer lock-in. Because lock-in is built on trust, satisfaction and loyalty, partnership quality is essential to achieving and sustaining the lock-in effect. When partnership quality is high, customers will be more motivated to engage in future transactions through means, such as incentives and added-value, and switching costs will remain high.

*H4: Partnership quality has a positive relationship with customer lock-in*

*H4a: Partnership quality has a positive relationship with customer network effect*

*H4b: Partnership quality has a positive relationship with information sharing*

Reaping the benefits of customer lock-in requires the business to commitment itself to the three CRM elements. Yet, they alone cannot directly affect the lock-in as it is derived through CRM performance. The infusion of ICT in the CRM elements will have a positive effect on CRM performance, which in turn will have a positive effect on customer lock-in. This suggests that CRM performance mediates the relationship between the CRM elements and customer lock-in.

*H5: CRM performance has a mediating effect on the relationship between CRM elements and customer lock-in*

*H5a: CRM performance has a mediating effect on the relationship between CRM elements and customer network effect*

*H5b: CRM performance has a mediating effect on the relationship between CRM elements and information sharing*

Partnership quality may also have a similar effect on the customer lock-in. It builds a trusting relationship that enhances the customer network effect and information sharing. As in the case of CRM performance, partnership quality improves with ICT investments to the CRM elements. Thus, partnership quality should mediate the effect of the CRM elements on customer lock-in.

H6: *Partnership quality mediates the relationship between CRM elements and customer lock-in*

H6a: *Partnership quality mediates on the relationship between CRM elements and customer network effect*

H6b: *Partnership quality mediates on the relationship between CRM elements and information sharing*

## 4. Methodology

### 4.1 Data Collection

A survey was conducted of Taiwan's 1,000 largest companies reported by the Commonwealth magazine (<http://www.cw.com.tw/index.htm>) for the year 2000. Questionnaires were sent with accompanying letters that briefly explained the purpose of this National Science Council (NSC) of Taiwan funded research project and provided general instructions on its completion.

A total of 120 questionnaires were received for a 12 percent response rate. Seventeen incomplete surveys were discarded and reduced the sample to 103. The sample covers service and manufacturing companies in the banking, insurance, computer and telecommunications industries as well as others.

### 4.2 Measures

Most items were either taken or patterned from previous studies (Table 1) while others were based on interviews with IT and marketing professionals. All were prefaced in the business' abilities attributed to ICT and CRM (i.e., "with CRM, your company is able to...", "the adoption of ICT has..."). The items were operationalized on five-point Likert-type scales from strongly disagree (1) to strongly agree (5). The survey instrument was pre-tested on IT and marketing managers and later refined.

**Table 1.** Item sources

Variables		References
CRM Elements	Market Orientation	Narver & Slates (1990), Jworski and Koli (1993), Day (1994), Moorman and Rust (1999), Han et al. (2001)
	IT Investments	Chou et al. (1998), Doms et al. (1997), Porter and Millar (1985), Weber and Pliskin (1996)
	Mass Customization	Pitta (1998), Silveira et al. (2001), Gilmore and Pine (1997), Kotha, (1995), Pine (1993)
CRM Performance		Storey and Easigwood (1999), Swift (2001), Winer (2001), Reichheld, (1996)
Partnership Quality		Babin and Griffin (1998), Cannon and Perreault (1999), Oliver and DeSarbo (1988)
Lock-In Effect		Amit and Zott (2001), Granovetter and Soong (1986), Katz and Shapiro (1985)

A factor analysis with a varimax rotation (using SAS 8.2) confirmed the existence of the seven hypothesized constructs (Table 2). Although two variables, "valuable information shared with customers" and "customer satisfaction measured" cross-loaded, their higher loadings properly place them on their respective constructs.

Table 2. Factor loadings

	Factor 1 IT Investments	Factor 2 CRM Performance	Factor 3 Market Orientation	Factor 4 Partnership Quality	Factor 5 Mass Customization	Factor 6 Information Sharing	Factor 7 Customer Network Effect
Kaiser's Measure of Sampling Adequacy (MSA) = .798							
Cronbach alpha	0.861	0.855	0.821	0.825	0.745	0.804	0.817
Eigenvalue	7.712	3.265	2.017	1.726	1.625	1.232	1.141
Variable:							
Large IT budget	0.806	.	.	.	.	.	.
Advanced IT used in CRM practices	0.753	.	.	.	.	.	.
Large CRM training budget for IT staff	0.722	.	.	.	.	.	.
IT implementation in CRM practices	0.709	.	.	.	.	.	.
Information integration among business units	0.616	.	.	.	.	.	.
Organizational response and coordination	0.570	.	.	.	.	.	.
Valuable information shared with customers	0.544	.	.	.	.	0.446	.
Reduced marketing cost	.	0.869	.	.	.	.	.
Reduced operations cost	.	0.758	.	.	.	.	.
Increased profits	.	0.741	.	.	.	.	.
Increased revenues	.	0.589	.	.	.	.	.
Customer data analyzed to gain market information	.	.	0.825	.	.	.	.
Customer-centric marketing strategy	.	.	0.789	.	.	.	.
Marketing strategies based on customer information	.	.	0.722	.	.	.	.
Systematic collection of customer information	.	.	0.704	.	.	.	.
Perceived extra value in product and service	.	.	.	0.819	.	.	.
Friendly and interactive customer service	.	.	.	0.768	.	.	.
After sale service support	.	.	.	0.759	.	.	.
Customer satisfaction measured	.	0.443	.	0.593	.	.	.
Customer needs satisfied in products and services	.	.	.	.	0.829	.	.
Easy access to customer information	.	.	.	.	0.693	.	.
Market segmentation and positioning	.	.	.	.	0.692	.	.
Customer buying behavior identified to customize services	.	.	.	.	0.614	.	.
Information sharing between customers and company	.	.	.	.	.	0.839	.
Customers can retrieve desirable information or service	.	.	.	.	.	0.821	.
Other customers influence value placed on product or service	.	.	.	.	.	.	0.884
Other customers influence purchase of product or service	.	.	.	.	.	.	0.878

Values less than .4 not shown



The scores of items loading onto a construct were added to produce aggregate scores which were used in multiple regression models to test the hypotheses. Measures of business capital and the number of employees were included as control variables.

## 5. Analysis and Discussion

Generally, the results indicate that CRM performance plays a mediating role in the relationship between the CRM elements and customer lock-in. However, the same does not hold true for partnership quality. Models I and II (Table 3) summarize the positive relationships between the CRM elements and CRM performance (H1), and partnership quality (H2), respectively. The non-significance of the control variables suggests neither has an effect on the relationships and is consistent with Luneborg and Nielsen's (2003) study. Also, the low variance inflation factors (VIF) reveal no collinearity problems.

**Table 3.** Effects of CRM elements on CRM performance and partnership quality

		Dependent Variables					
		Model I			Model II		
		CRM performance			Partnership Quality		
		Standardized Coefficient	t value	VIF	Standardized Coefficient	t value	VIF
<i>Predictors</i>	Market Orientation	.360	4.24***	1.11	.485	6.28***	1.11
	IT investments	.233	2.60*	1.24	.170	2.09*	1.24
	Mass customization	.208	2.20*	1.38	.266	3.10**	1.38
<i>Control Variables</i>	Business capital	-.202	-1.87	1.81	-.084	-0.85	1.81
	Number of employees	.042	0.38	1.83	.021	0.22	1.83
R-Square		.373			.482		
F value		11.55***			18.02***		
n		103			103		

\*Significant at  $p < .05$  \*\*Significant at  $p < .01$  \*\*\*Significant at  $p < .001$

Models III and IV (Table 4) examined the effects of CRM performance and partnership quality on customer network effect and information sharing, respectively. The data support H3a and H4a, and suggest CRM performance positively affects both customer network effect and information sharing, respectively. However, no relationship appears between partnership quality and customer network effect (H3b) or information sharing (H4b).

**Table 4.** Effects of CRM performance and partnership quality on customer lock-in

		Dependent Variables					
		Model III			Model VI		
		Customer Network Effect			Information Sharing		
		Standardized Coefficient	t value	VIF	Standardized Coefficient	t value	VIF
<i>Predictors</i>	CRM performance	.328	3.07**	1.27	.292	2.75**	1.27
	Partnership Quality	.008	0.08	1.23	.127	1.21	1.23
<i>Control Variables</i>	Business capital	.053	0.41	1.85	-.035	-0.27	1.85
	Number of employees	-.133	-1.04	1.81	.011	0.09	1.81
R-Square		.127			.138		
F value		3.52*			3.88**		
n		103			103		

\*Significant at  $p < .05$  \*\*Significant at  $p < .01$  \*\*\*Significant at  $p < .001$

Hypotheses H5 and H6 examined the mediating effects of CRM performance and partnership quality on the relationships between the CRM elements and customer lock-in. Model V (Table 5) lends support to H5a to suggest that CRM performance mediates the relationship between the CRM elements and customer network effect (H5a). However, the same support cannot be found in model VI (Table 5); CRM performance does not mediate the relationship between the CRM elements and information sharing (H5b). The results of models VII and VIII (Table 6) indicate that partnership quality has no mediating effect; the data do not support H6. Thus, it may be concluded that CRM practices have a greater impact on the customer lock-in than partnership quality.

**Table 5.** Mediating effect of CRM performance

		Dependent Variables					
		Model V			Model VI		
		Customer Network Effect			Information Sharing		
		Standardized Coefficient	t value	VIF	Standardized Coefficient	t value	VIF
<i>Predictors</i>	Market Orientation	-.040	-0.36	1.35	.051	.052	1.35
	IT investments	.013	0.12	1.31	.442	4.59***	1.31
	Mass customization	.093	0.81	1.44	.109	1.08	1.44
	CRM <sup>†</sup> Performance	.306	2.53*	1.60	.108	1.02	1.60
<i>Control Variables</i>	Business capital	.050	0.38	1.90	-.044	-0.38	1.90
	Number of employees	-.123	-0.95	1.84	.020	0.18	1.84
R-Square		.135			.329		
F value		2.46*			7.78***		
n		103			103		

\*Significant at  $p < .05$  \*\*Significant at  $p < .01$  \*\*\*Significant at  $p < .001$

<sup>†</sup>Mediator

**Table 6.** Mediating effect of partnership quality

		Dependent Variables					
		Model VII			Model VIII		
		Customer Network Effect			Information Sharing		
		Standardized Coefficient	T value	VIF	Standardized Coefficient	t value	VIF
<i>Predictors</i>	Market Orientation	.076	0.61	1.59	.122	1.15	1.59
	IT investments	.083	0.75	1.29	.478	5.00***	1.29
	Mass customization	.155	1.28	1.51	.147	1.42	1.51
	Partnership Quality <sup>†</sup>	-.007	-0.05	1.93	-.064	-0.55	1.93
<i>Control Variables</i>	Business capital	-.014	-0.11	1.84	-.072	-0.63	1.84
	Number of employees	-.109	-0.81	1.84	.027	0.23	1.84
R-Square		.076			.324		
F value		1.30			7.60***		
n		103			103		

\*Significant at  $p < .05$  \*\*Significant at  $p < .01$  \*\*\*Significant at  $p < .001$

<sup>†</sup>Mediator

The results suggest that of the three CRM elements market orientation plays a greater role toward ensuring good CRM performance and sound partnership quality. Marketing

intelligence provides the backbone for establishing customer relationships and the infusion of ICT opens many new opportunities to discover knowledge which can be leveraged to better meet (or exceed) the needs and expectations of customers, and consequently secure a competitive edge.

IT investments contribute to CRM performance to a lesser extent. This affirms CRM as an RM solution and not one strictly of IT. Good RM and business practices need to be in place before CRM can be adopted and IT is not substituted for them. Although IT investments enable CRM, they represent a necessary but not sufficient element to CRM performance.

Mass customization benefits from ICT as they serve to open and maintain a crucial learning link between the customer and business. The low contribution to CRM performance indicates mass customization may not be fully pursued due to its higher costs and extended delivery times. Also, businesses may not have fully implemented and/or integrated their means to benefit from mass customization (Zipkin, 2001).

Although the CRM elements affect partnership quality, they do not appear to influence either element of customer lock-in or mediate the relationship between the elements and customer lock-in. Because customer lock-in is oriented more toward short-term (customer) choices rather than the establishment of quality long-term relationships, customers may be more willing to forego trust and satisfaction. Lock-in seeks to achieve repeated transactions, yet both measures focus on immediate economic value and costs.

The low R-squares of the models indicate other factors not included in the model account for a greater portion of the variations. Future studies might examine other factors causing these variations. Although the results do not overwhelmingly support the research model, the study can be viewed as exploratory and the results suggestive of a research area to investigate further, particularly in examining causation.

## **6. Conclusion**

The results of this study suggest that the CRM elements positively affect CRM performance and partnership quality, but only CRM performance mediates the relationship between the elements and customer lock-in, less information sharing. The infusion of ICT influences a business' ability to retain its customers. Hence, businesses seeking to profit from global e-commerce through CRM should understand the role ICT plays in building long-term customer relationships.

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