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# An Examination of the Effects of Information and Communication Technology on Customer Relationship Management and Customer Lock-In

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## ABSTRACT

Many businesses have turned to customer relationship management (CRM) to strategically position themselves in electronic marketplaces with information and communication technologies (ICT). With greater emphasis placed on the application of technology, *does the infusion of ICT influence a business' ability to retain its customers?* This study examined the relationships among three CRM elements benefiting from ICT, CRM performance, partnership quality, and customer lock-in. The results suggest that the three elements have positive relationships with CRM performance and partnership quality. However, only positive relationships exist between CRM performance and customer lock-in. None exists between partnership quality and customer lock-in. The findings further suggest that CRM performance mediates the effects of the CRM elements on customer lock-in.

## Keywords

Customer relationship management, information and communication technology, partnership quality, customer lock-in.

## INTRODUCTION

Continual advances in information technology (IT) have led to increased uses of information and communication technologies (ICT) throughout businesses. In seeking new opportunities, many have turned to ICT to strategically position themselves to compete in electronic marketplaces. ICT has begun defining new sets of rules for competition. Because ICT provides only a temporary advantage, businesses must reach beyond ICT and seek other ways they can be used to maintain their customer base.

In marketing, ICT has enabled businesses to understand and exploit marketing knowledge to become customer-centric in their marketing and servicing practices (Roberts, 2000). An emerging technology that addresses this is customer relationship management (CRM) systems. Businesses have adopted CRM as a means to build customer-centric strategies and create greater customer value. Additionally, the emphasis now turns towards retaining existing customers through micro-segmented, tailored products. A recent US survey suggests that businesses need to maintain good customer relationships with their existing customers to sustain profitability (Li et al., 2001). The Mercer Market Survey (2000) reveals that acquiring a new customer can cost five times more than retaining an existing customer, and a five percent increase to the customer retention effort can generate a sixty percent boost in profits. Thus, the shift to customer-centric markets has forced businesses to build closer learning relationships with their customers to gain greater insights into their needs and remain competitive. As a result, many businesses have turned to CRM (Ryals and Knox, 2001).

CRM seeks to understand and influence customer behavior through meaningful two-way communication to improve customer acquisition, retention, loyalty and profitability over time (Day, 2000; Kohli et al., 2001; Peppers et al., 1999; Swift, 2001). A common definition describes CRM as a process that utilizes technology as an enabler to capture, analyze and disseminate current and prospective customer data to develop insightful relationships, and more precisely identify customer needs. Conceptually, CRM embodies the concepts of relationship marketing (RM). Hence, a CRM system can be seen as an information system to assist customer retention and enhance the effectiveness of RM practices.

However, implementing a CRM system looms as a formidable task, and reaping the benefits of CRM do not come quickly. An underlying issue that bears heavily on its implementation is adopting a compatible business strategy. Finding a

compatible business strategy involves strategically leveraging ICT. Prior studies on ICT and business organizations indicate that greater investments in ICT create positive perceived impacts on productivity and customer service quality.

The purpose of this study is to examine the effects of ICT on CRM and their impact on lock-in effects, and propose a model of CRM success. The study identifies three CRM elements, market orientation, mass customization and IT investments, and examines their effect on CRM performance, partnership quality and customer lock-in. In essence, with greater emphasis being placed on the application of technology, *does the infusion of ICT influence a business' ability to retain its customers?*

## **BACKGROUND**

### **CRM and ICT**

CRM can be viewed as an extension of relationship marketing (RM), a marketing paradigm that focuses on satisfying the customers' needs through the development of close personal relationships, interactions and social exchanges, with ICT. Enhancing the business' competitive response to continually changing markets lies at the core of RM (Zineldin, 2000). CRM expands upon RM with its emphasis on information management (Peppard, 2000) and draws upon ICT to enhance its capabilities.

Generally, the application of ICT with CRM can be divided into two categories: (1) marketing process automation and (2) marketing intelligence. Marketing process automation concentrates on building information distribution efficiencies through the use of ICT. In contrast, marketing intelligence involves knowledge discovery techniques.

### **CRM elements**

The three CRM elements identified in this study include market orientation, mass customization, and IT investment (profile).

#### *Market orientation*

Market orientation can be defined as the organization-wide generation, dissemination and responsiveness to market intelligence and is characterized by multiple departments sharing information while engaged in activities designed to meet customer needs. Prior studies suggest that market orientation practices have positive impacts on business performance and new products, and are critical to achieving customer-centric value creation and profitability.

Market-sensing and customer-linking activities are two key cross-functional processes linked to market-driven organizations (Day, 1994), and underlie the customer- and competitor-focus motivation of a business (Deshpande et al., 1993; Day, 1994; Han et al., 2001). Customer-focus seeks to provide the right product to the right customer at the right time and place through the right channel with right amount and the best price. While distant and unattainable in the past, it has become more achievable with current ICT. Customer data can be continuously collected and immediately analyzed to identify customer preferences, and quickly predict or react to market activities. With the insights gained into its customers' preferences, habits and behavior, a business can further enhance its relationships with them.

In contrast, a competitor-focus maintains an awareness of developments in the market and threats. Knowing this information, a business can launch countermeasures to counteract or moderate the effects of the threat, and reevaluate its market segmenting, targeting and position tactics. For both orientations, ICT enables quicker and more efficient intelligence gathering and response actions, and consequently better focused marketing strategies.

#### *Mass Customization*

The objective of mass customization is to provide every customer with products and services specifically tailored to fit his/her needs. Customization creates a business' greatest competitive advantages as competitors cannot easily duplicate, imitate or substitute its offerings. This involves having easy access to customer information to more precisely target market segments and identify customer buying behavior. However, an organization's success hinges on its ability to integrate its customers' feedback into its production processes (Pitta, 1998) in its quest to reach a one-to-one marketing level that takes into account personal differences and *perfectly* meets a customer's needs. With ICT, mass customization is more achievable and feasible as individual customer information can be retained in massive databases and analyzed with a variety of data mining techniques to create customer-centric solutions (Kalakota and Robinson, 2001).

### IT Investments

Continual advances in IT have opened new opportunities and offered new means for gaining a competitive advantage (Venkatraman, 1994; Scott Morton, 1991). A business' IT investments reflect its commitment to and vision of IT. It typically involves developing an IT architecture that defines the organization's capabilities and supporting it with an IT infrastructure that covers hardware, software, applications and people. Together, they represent a master plan and draw a profile of the types of ICT that the business chooses to support its business activities. As it applies to CRM, IT investments focus on integrating and coordinating business activities, opening dialogs with customers to share information, enabling CRM practices and developing employee skills to benefit from CRM. Overall, greater IT investments favorably influence the business performance of an organization.

### Partnership Quality

Partnerships enable a business to reach out to its business partners and open channels of communication to its customers (Buzzell and Ortmeier, 1995; Cannon and Perreault Jr., 1999). Partnership quality involves building satisfaction, trust and commitment between a business and its customers. It results through two-way communication and a willingness to learn from its customers. The added-value and satisfaction customers receive through transactions and interactions often characterize partnership quality (Oliver and DeSarbo, 1998). Thus, partnerships are critical for fostering satisfaction as they promote the exchange of information.

### CRM Performance and Customer Lock-in

CRM performance focuses on derived relationship benefits concerned with revenue and profitability, the acquisition and retention of customers, and the ability to customize product and service offerings (Swift, 2001; Winer, 2001). As the customer-business relationship flourishes, customer loyalty develops and leads to repeated purchases of products and services (Reichheld and Teal, 1996). In contrast to acquiring new customers, businesses usually incur fewer expenses servicing their existing customers and can expect higher profit margins from their sales (Storey and Easignwood, 1999).

A lock-in effect refers to the extent to which customers are motivated to engage in repeat transactions (Amit and Zott, 2001). A customer's preference to minimize immediate costs while deemphasizing future costs drives lock-in (Zauberman, 2003). Often, switching costs carry an information economics implication, such that a search continues while the marginal cost remains lower than the expected marginal benefit (Zauberman, 2003). Lock-in occurs when the 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 is a voluntary act that relies on an individual's attitude, often involves the exchange of personal information and incorporates interpersonal relationships (Kolekofski and Heminger, 2003). This also implies a willingness of the business to grant information and service privileges to its partners. Lock-in occurs when the benefits from sharing cannot be obtained elsewhere, particularly when they are intangible and their value is derived only through continued patronage.

Customers communicating their perceived value and benefits of products and services to others of the segment can also initiate lock-in. A customer network effect builds on the trust of members within the segment that allows them to rely upon each other for *assurances*. Lock-in occurs when the cost of acquiring a new source of information exceeds the perceived value or benefit of a product or service. CRM assists lock-in by identifying and targeting certain customers for specific relationships.

## 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. As intervening variables, CRM performance and partnership quality will influence the relationship between the CRM elements and customer lock-in.

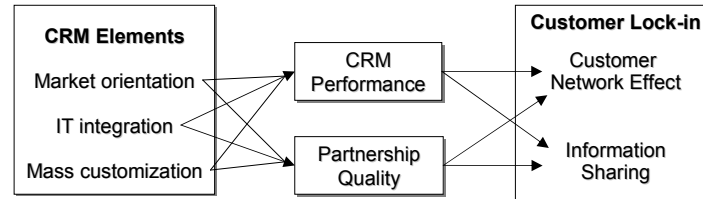


Figure 1. Research model

Each of the elements will positively affect CRM performance. Market orientation represents the coordinated efforts of a business that are directed toward understanding and satisfying its customers' needs. Businesses that are less inclined toward market orientation will not benefit from CRM. In customer-driven and ICT-enabled markets, market orientation is a critical element to CRM performance as it provides direction, particularly through the discovery of knowledge.

IT investments reflect a business' profile and commitment to technology. ICTs are chosen for their different effects on the business, thus creating an IT profile of the organization. Because CRM requires the business to work as one, IT is essential to CRM performance. Businesses that recognize the strategic value of IT, will commit themselves to its adoption to boost their CRM performance.

Mass customization seeks to achieve a one-to-one marketing level. Although the cost of customizing products and services will be higher, the long term benefits and profitability of mass marketing will be greater. The more successful a business is with mass customization, the greater its CRM performance.

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 their customers' needs will be engaged in meaningful two-way dialogues with them. Hence, opening channels of communication helps build customer satisfaction through feedback and education.

Partnership quality also requires the business to recognize its customers' individuality. 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 level. Greater investments to boost IT will improve partnership quality.

Partnership quality reflects the customers' satisfaction built over time. A business' ability to meet the needs and expectations of its customers and recognize their individuality contributes toward forging closer relationships. Mass customization is based upon open communication to create products and services tailored to suit individuals. Consequently, it contributes to satisfaction and trust, and improves increase as partnership quality.

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 a lock-in effect will result. The more successful a business is with establishing close relationships with its customers through CRM, the greater the lock-in effect.

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

Because lock-in is built on trust 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. Therefore, switching costs remain high when the business maintains its partnership.

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 market orientation, IT investments and mass customization. Yet, these alone cannot directly affect the lock-in as it is derived through CRM performance. The infusion of ICT into the CRM elements will have positive effects on CRM performance, which in turn will have positive effects 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. As in the case of CRM performance, partnership quality improves with ICT investments to the CRM elements. Thus, partnership quality mediates the effect of the CRM elements on customer lock-in.

H6: *Partnership quality has a mediating effect on the relationship between CRM elements and customer lock-in*

H6a: *Partnership quality has a mediating effect on the relationship between CRM elements and customer network effect*

H6b: *Partnership quality has a mediating effect on the relationship between CRM elements and information sharing*

CRM elements represent the fundamental components of CRM while CRM performance and partnership quality reflect the organization's dedicated efforts in retaining its customers.

## **METHODOLOGY**

### **Data Collection**

A survey was conducted of Taiwan's 1,000 largest companies as published by the Ministry of Economic Affairs for the year 2000. Questionnaires were sent with accompanying letters that explained the purpose of this National Science Council (NSC) of Taiwan funded research project. Sales and marketing managers, and customer service department heads were specifically targeted.

After placing follow up telephone calls, 120 responses were received (12 percent). Non-responses may be attributed to companies either not currently practicing CRM or having insufficient experience with CRM. Seventeen surveys were incomplete and therefore discarded. This reduced the sample to 103. The sample covers various industries, including commerce and trade (4.5 percent), manufacturing (48.1), construction (6.4), financial services (18.2), transportation and logistics (2.7), real estate and general services (11.8) and others (8.2).

### **Measures**

Items for each variable were either taken or patterned from previous studies (Table 1). Others were based interviews with IT and marketing professionals. All 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 manager, and subsequently refined.

Variables		Operational Definition and Items	References
CRM Elements	Market Orientation	Customer focus Competitor focus	Narver & Slates (1990), Jworski and Koli (1993), Day (1994), Moorman and Rust (1999), Han et al. (2001)
	IT Investment	IT intensity Process integration Information sharing	Chou et al. (1998), Doms et al. (1997), Porter and Millar (1985), Weber and Pliskin (1996)
	Mass Customization	Customized services Customized capability	Pitta (1998), Silveira et al. (2001), Gilmore and Pine (1997), Kotha, (1995), Pine (1993)
CRM Performance		Profit increases, Cost decreases, New opportunities	Storey and Easigwood (1999), Swift (2001), Winer (2001), Reichheld, (1996)
Partnership Quality		Relationship commitment, Trust, Customer satisfaction	Babin and Griffin (1998), Cannon and Perreault (1999), Oliver and DeSarbo (1988)
Lock-In Effect		Current customer effect, Potential customer effect	Amit and Zott (2001), Granovetter and Soong (1986), Katz and Shapiro (1985)

**Table 1. Operational definitions**

A factor analysis with a varimax rotation (using SAS 8.2) confirmed the existence of the seven hypothesized constructs (Table 2). Two variables, “valuable information shared with customers” and “customer satisfaction measured” cross-loaded onto two factors. However, their higher loadings properly place them on their constructs. Other items that describe the acquisition and retention of customers, customization of products and services, and other derived benefits from CRM performance did not load. Since the items loading onto a construct form a linear combination, aggregate scores, which were used in multiple regression models, were produced.

### 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 (CRM elements and) partnership quality (H2), respectively. The non-significance of the control variables suggests neither has an effect on the relationships.

The data support H3 and suggest CRM performance positively affects both customer network effect (H3a) and information sharing (H4a) (Table 4). However, the data support no relationship between partnership quality and customer network effect (H3b) or information sharing (H4b) (Table 4).

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) supports H5a and suggests CRM performance’s role as a mediator. 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 and H6 is not supported. Thus, it may be concluded that CRM practices have a greater impact on the customer lock-in.

The results suggest that of market orientation plays a greater role toward ensuring CRM performance and partnership quality. Marketing intelligence provides the backbone for establishing customer relationships and the infusion of ICT may open new opportunities for businesses. The discovery of knowledge through intelligence can be leveraged to meet or exceed the needs of customers and secure a competitive edge. The process greatly benefits from ICT as quality information can be quickly extracted. As a result CRM performance improves. IT investments contribute to CRM performance to a lesser extent. This affirms CRM as an RM solution and not one strictly of IT. Mass customization benefits from ICT as it serves to open and maintain a crucial *learning* link between the customer and business. Effective two-way dialogues communicate valuable information to the business, which can be used to improve CRM performance.

Partnership quality does not appear to influence either element of customer lock-in nor mediate the relationship between the CRM elements and customer lock-in. This suggests that satisfaction, trust and commitment are not significant contributors to

the customer network effect and information sharing. While customer lock-in orients itself toward short-term economic benefits (Zauberan, 2003), partnership quality develops over time, particularly trust.

The low R-squares indicate other factors not included in the model account for a greater portion of the variations. Also, the size of the survey instrument limits the number of variables to accurately measure the constructs. Although the results of this study do not overwhelmingly support the research model, they can be viewed as exploratory and suggestive of further investigation. Future studies might explore causality, in contrast to the associations demonstrated in this study.

## **CONCLUSION**

As IT continually advances, more businesses will adopt CRM to build closer relationships with their customers. The results of this study suggest that the CRM elements positively affect CRM performance and partnership quality, but only CRM performance mediates the relationship. The infusion of ICT influences a business' ability to retain its customers.



## Kaiser's Measure of Sampling Adequacy (MSA) = .798

	Factor 1 IT Investment	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
<b>Cronbach alpha</b>	0.861	0.855	0.821	0.825	0.745	0.804	0.817
<b>Eigenvalue</b>	7.712	3.265	2.017	1.726	1.625	1.232	1.141
<b>Variable:</b>							
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 for 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

**Table 2. Factor loadings**

		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 investment	.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  $p < .001$

**Table 3. Effects of CRM elements**

		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		102			102		

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

**Table 4. Effects of CRM performance and partnership quality**

		Dependent Variables					
		Model V			Model VI		
		Customer Network Effect			Information Sharing		
		Standardized Coefficient	t value	VIF	Standardized Coefficient	t value	VIF
Predictors	Market Orientation	-.040	-0.36	1.35	.051	0.52	1.35
	IT investment	.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
Control Variables	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		102			102		

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

<sup>†</sup>Mediator

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

		Dependent Variables					
		Model VII			Model VIII		
		Customer Network Effect			Information Sharing		
		Standardized Coefficient	t value	VIF	Standardized Coefficient	t value	VIF
Predictors	Market Orientation	.076	0.61	1.59	.122	1.15	1.59
	IT investment	.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
Control Variables	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		102			102		

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

<sup>†</sup>Mediator

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

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