

An Examination of the Effects of IT Intensity and Organizational Absorptive Capacity on CRM Practices

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Abstract

Electronic business (e-business) brings many new opportunities as well as several challenges to business organizations. Many organizations have turned to customer relationship management (CRM) to leverage their market orientation, customize their products and services, and build loyalty programs. However, capitalizing on the opportunities will require organizational investments in information technology (IT) and absorptive capacity. This study examines the effects of investments in IT (IT intensity) and absorptive capacity on CRM practices, particularly market orientation, customization and loyalty programs. The results suggest that a positive relationship exists among them. Thus, organizations should devote resources toward developing their IT investments and absorptive capacity to benefit from their CRM practices.

Keywords: Customer relationship management, information technology, organizational absorptive capacity, market orientation, customization, loyalty programs.

1. Introduction

Electronic business (e-business) brings many new opportunities as well as challenges to business organizations. Its Internet-enabled global reach opens many new marketplaces and as a result draws upon a broader customer base. For 2003, Forrester estimates total worldwide business-to-customer (B2C) spending at US\$133.6 billion worldwide, of which \$78.1 billion will be generated in North America, \$23.9 billion in the Asia-Pacific region and \$29.6 billion in Western Europe. Forecasts expect total B2C spending to reach \$561.8 billion (\$219.8 billion North America, \$185.2 billion Asia-Pacific, \$138.3 billion Western Europe) by 2006. Gartner [8] predicts the current 216.7 million adult worldwide Internet users to double in 2005. Thus, ample opportunities will exist for businesses that pursue global electronic markets.

Yet, with B2C e-business, organizations are finding themselves immersed in highly competitive, consumer-driven markets, often competing against virtual organizations comprised of horizontally or vertically integrated partnerships. Successful e-business organizations must now pay particularly close attention to defining clearly their products and services in such a way that allows them to establish market niches, long term

customer relationships and leadership positions. To move closer toward these advantages, many organizations have turned to customer relationship management (CRM), a marketing concept enabled by information technology (IT) and often described as a competitive tool that permits an organization to stay in tuned with its customers and customize its products and services to meet their needs and expectations.

Much of the success behind e-business and CRM can be attributed to continual advances in IT and organizational knowledge. Generally, greater investments in IT afford greater technical capabilities. However, the investments must be made according to a presiding plan or architecture for the organization to reap its rewards. Hence, IT intensity or the degree to which an organization invests in IT may be a critical determinant to its success with CRM as IT represents the technological means for achieving success.

Yet, possessing IT may not be sufficient. Another critical factor may lie in its *know-how*, knowledge to recognize, understand and apply usable information. Organizational absorptive capacity, an organization's aggregated ability to recognize and assimilate new information, and apply its ensuing knowledge to commercial ends [4], represents the development of organizational knowledge. Often, investments in research and development (R&D) and other learning experiences help build organizational knowledge. Products of absorptive capacity include innovations within internal processes, and innovative products and services [3], [4], [10], and reflect the organization's ability to leverage and exploit its knowledge. As a result, absorptive capacity can strongly influence an organization's business practices.

The purpose of this paper is to examine the relationships among IT intensity, absorptive capacity and CRM practices. CRM practices represent an important aspect of CRM as they define how an organization directs its use of CRM to gain a competitive advantage, and impact its performance with CRM. This study presents and empirically tests a research model of the described relationship.

2. IT Intensity

IT intensity refers to the degree to which an organization invests in its IT infrastructure and applications. Because CRM is an IT-enabled concept that embodies relationship marketing (RM) principles, the IT infrastructure on which it is built plays a critical role as it

defines the extent of its capabilities, particularly its ability to support and promote organization-wide information and knowledge sharing. Henderson and Venkatraman [9] suggest that an IT infrastructure consists of two parts: a technical infrastructure, and a human infrastructure. The technical infrastructure represents the tangible, shared, physical resources, which includes hardware, operating system software, network and telecommunication technologies, data and core software applications [7]. Its objective focuses on effectively integrating and interconnecting the organization to support information sharing via its telecommunication network [30]. Furthermore, the technical infrastructure reflects an organization's IT architecture on which specific business activities and applications are built [5].

In contrast, the human infrastructure addresses the necessary skills and knowledge required to develop and maintain applications, manipulate data, and support end-users. The development and acquisition of these skills allows the organization to benefit from its technical infrastructure [17]. Osterman's [17] survey of organization's adopting new IT reveals differences in productivity gains and quality improvements when human resource policies are supported. The difference between organizations with low commitments to human resource policies, and either low or high investments in new IT was negligible. Thus, the human infrastructure should shadow the technical infrastructure and adjust with the adoption of newer IT.

The influence of IT on marketing activities has steadily grown over the years. IT often allows organizations to introduce continuous improvements to their marketing practices in their quest to secure a competitive advantage, principally in marketing process automation and marketing intelligence [1]. While marketing process automation helps link marketing activities to facilitate information sharing (i.e., efficiencies), marketing intelligence targets enhanced decision making through tools that provide greater insights. Process automation facilitates the coordination and cooperation among business units through the exchange of information. Other applications reduce the human element to improve information flow, including preserving its accuracy and reliability. In contrast, intelligence involves scanning the environment for information on forces that influence the organization's products and services [6], [12], and includes search activities linked to the discovery of new information, forecasts of consumer and market trends, studies in consumer behavior, the competition's offerings or a business partner's new capabilities. In many cases, continual advances in IT have led to more sophisticated marketing applications of IT [14], [15], [33].

IT has helped advance the role of marketing in the organization and opened new opportunities through the exchange and discovery of information. However, these advances come as a result of directed investments in IT, and the development and maintenance of an IT infrastructure.

3. Organizational Absorptive Capacity

Organizational absorptive capacity allows organizations to leverage their knowledge (i.e., recognize and assimilate new information, and apply knowledge) in the form of innovative responses, particularly to benefit from the insights they gather through their experiences and awareness of environmental trends. Cohen and Levinthal [4] state that the absorptive capacity of an organization results from the cumulative learning activities of individuals and the transfer of the ensuing knowledge within the organization through a common language. An organization benefits from these activities as they reinforce existing knowledge and allow further *absorption* of new knowledge. The effect of learning on knowledge development is that knowledge can be applied toward recognizing, acquiring and assimilating new and pertinent information to increase the organization's knowledge capacity, both its breadth and depth. Information can be related to the external, such as market trends and technology breakthroughs, or internal environment. In essence, the more frequently learning occurs, the greater the accumulation process, which in turn increases the organization's opportunity to yield applications of knowledge to new scenarios [2]. Furthermore, the greater the knowledge possessed and shared throughout the organization, the more it will be inclined to *absorb* new knowledge.

Although absorptive capacity is a common element to all organizations, its effect will vary relative to the resources an organization invests in developing it. Without acknowledging or foreseeing the future benefits derived through these investments (i.e., sustained innovativeness), an organization may find itself in a less capable position of achieving a competitive advantage. Thus, absorptive capacity may have an impact on how well an organization benefits from CRM.

4. CRM Practices

CRM practices underlie the extent to which an organization applies CRM to support its marketing activities. In the past, studies have identified market orientation, the customization of products and services, and customer loyalty programs as three important aspects of CRM practices.

4.1 Market Orientation

Market orientation entails the organization-wide generation, dissemination and responsiveness to market intelligence (i.e., opportunities, facts, trends, etc.) and involves information-sharing across business units engaged in orchestrated activities directed toward meeting customer needs and resulting in profits [12]. It plays a vital role in an organization as its impact on business performance has been affirmed in several studies [11], [13], [16], [19], [20], [27], [31], [32], [35], [36]. Because it directs the organization toward using information (i.e., market intelligence) to produce

innovative responses to information gathered through market intelligence and shared throughout the organization, market orientation embodies many of the concepts of organizational absorptive capacity. As Kohli and Jaworski [12] suggest, organizational factors, including senior management, interdepartmental dynamics and organizational systems, foster or discourage market orientation.

4.2 Customization

The objective of customization is to provide tailor-made products and services that appeal and more precisely fit the individual customer's needs and expectations [25]. It seeks to create a learning relationship between the organization and its customers to reach a more intimate level and gain a competitive advantage [23]. The information it gains from the relationship can then be used to customize its products and services, and add value that cannot be obtained elsewhere. Mass customization involves customizing over a broader target market. Pitta [26] suggests that IT enables mass customization as it requires the organization to collect, retain, catalog and mine large volumes of data to extract useful information that will provide it with important insights into its customers. Furthermore, mass customization relies on technology to integrate customers' preferences with the organization's production processes [26] and do it cost-effectively [23].

4.3 Loyalty Programs

In contrast, customer loyalty programs attempt to keep customers through incentives that retain them, increase their switching costs and create barriers that prevent the entry of competitors. The objective is to keep customers. Generally, retaining existing customers tends to be more fruitful and less costly than seeking new ones. Satisfied (existing) customers often purchase more over their lifetime [29], [37]. Additionally, the cost of acquiring new customers may be five times greater than that of satisfying and retaining current customers [28]. Loyalty programs often enhance customer perceptions and lead to more positive customer behaviors and better brand equity [34].

Loyalty programs, such as the frequent flier programs used in the airline industry, tend to make switching more difficult for customers by enticing their repeated business with the premiums based on cumulative *earnings* (i.e., the more points earned, the greater the premium or reward). Unless a competitor can match or exceed the program's incentives, it faces a formidable barrier of entry into the market or task to sway customers away. Thus, the driving force behind loyalty programs is the lifetime value of the relationship; the longer a customer is retained, the more profitable the relationship becomes as a result of increased purchases, reduced operating costs, referrals, price premiums and reduced customer acquisition costs [29].

5. Research Model

This study proposes that an organization's investments in IT and absorptive capacity will have positive effects on CRM practices. As both increase, CRM practices will become more effectively in tuned with meeting the needs of the organization's customers and supportive of gaining competitive advantages, and ultimately lead to achieving greater levels of CRM performance. The importance of the relationships illustrated in Figure 1 lies in the need to gain or retain a competitive advantage, particularly in highly-competitive, global electronic markets. They require organizations to understand their markets and customers (i.e., market intelligence), differentiate their products and services based on their understandings of added-value and making them difficult to duplicate, imitate or substitute, and respond to their customers' needs with innovative offerings. Yet, to achieve this level of competitiveness (i.e., CRM practices), they must geared to compete effectively.

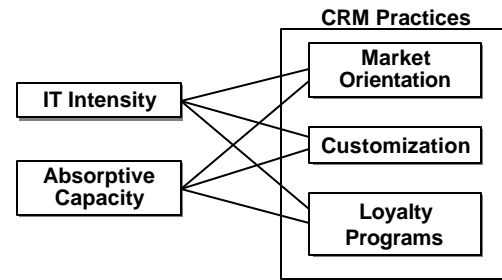


Figure 1. Research model

IT enables organizations to expand their marketing activities through automation and intelligence. In the case of market orientation, the organization must function as an orchestrated unit to maintain a competitive posture. The IT infrastructure facilitates and supports the communication and dissemination of information and knowledge among business units. It helps empower employees to quickly render decisions that are consistent with the goals and objectives of the organization through a common understanding based on shared information and knowledge, and decision support tools. Continual advances in IT have allowed organizations to develop learning relationships with their customers through the collection, retention, categorization and analysis of their information, and subsequently respond more precisely to meeting their needs and expectations. With mass customization, IT ensures customer preferences are cost effectively integrated into the organization's production processes. Knowledge of customers leads to opportunities to build their loyalty through incentives that capitalize on long term relationships. Thus, IT can be seen as an essential element to enable CRM practices that allow the organization to leverage its resources and become more competitive, particularly in global markets. Therefore, an organization's investments in IT (i.e., IT intensity) should directly influence its CRM practices, such that the greater its investments, the greater its ability

to remain competitive.

- H1: *IT intensity has a positive effect on CRM practices.*
- H1a: *IT intensity has a positive effect on market orientation*
- H1b: *IT intensity has a positive effect on customization*
- H1c: *IT intensity has a positive effect on loyalty programs*

While IT intensity represents the technical means for an organization to enable its CRM practices, absorptive capacity embodies the *know-how* or knowledge to compete. It underlies the organization's ability to recognize and apply relevant information toward developing customized products and services that focus on establishing long term relationships, and allows it to build a repository of knowledge that further expands its knowledge. In addition to *learned* knowledge of customers and environmental forces, absorptive capacity draws upon implicit knowledge that emerges from its experiences. Both types of knowledge subsequently become vital organizational resources that benefit and advance the organization when shared and disseminated among its employees. Thus, absorptive capacity tends to enhance market orientation through the directed use of information acquired from market intelligence, and lies beneath the organization's future ability to *absorb* new information. It binds information that leads to successful customization (i.e., knowing how to develop products and services based on information and knowledge) and loyalty programs (i.e., knowing how to develop incentives that improve customer lock-in). Hence, absorptive capacity plays a critical role in allowing the organization to leverage and exploit its knowledge. An organization's investment in developing knowledge will have a direct effect on its CRM practices.

- H2: *Absorptive capacity has a positive effect on CRM practices*
- H2a: *Absorptive capacity has a positive effect on market orientation*
- H2b: *Absorptive capacity has a positive effect on customization*
- H2c: *Absorptive capacity has a positive effect on customer loyalty programs*

The investments an organization places in both developing its IT infrastructure and absorptive capacity should significantly influence its CRM practices. Increases to both will improve its practices of CRM as suggested by the research model. Furthermore, both represent the underlying organizational elements that determine the extent to which an organization will eventually benefit from its CRM, and underscore their importance.

6. Research Methodology

A survey funded by the National Science Council of Taiwan was conducted of 542 financial service institutions in Taiwan. An introduction letter explaining the purpose of the survey and instructing the recipients on the survey's completion accompanied the questionnaire. The highly competitive nature of their markets and the customer-centric orientation make financial service institutions prime adopters of CRM [24].

A standard psychometric scale development procedure of Gerbing and Anderson [8] was followed to generate a series of multiple-item scales that were based on the review of the literature and interviews with several IT and marketing professionals. The items were operationalized on five-point Likert-type scales ranging from strongly disagree (1) to strongly agree (5). Pre-tests were conducted on the survey instrument among five marketing and IT managers, and subsequent refinements were made. Of the questionnaires sent, 164 usable responses were received. Missing response values contained within nine of the surveys further reduced the analysis to 155 observations.

A factor analysis with a varimax rotation (using SAS 8.2) confirmed the existence of the five hypothesized constructs: IT intensity, absorptive capacity, market orientation, customization, and loyalty programs. The factors and loadings appear in Table 1. Although three of the market orientation variables cross-loaded on the customization construct, their larger loadings give stronger support to the market orientation construct. A Kaiser's measure of sampling adequacy (MSA) of .914 strongly supports the appropriateness of the factor analysis, given the sample size of 155.

Non-response biases of the data set were examined with tests that compared the sample and population demographics (i.e., number of employees, capital, age of organization). No significant differences were detected.

7. Analysis and Discussion

Regression models were developed to test the six hypotheses. The models included IT intensity and absorptive capacity as the independent (predictor) variables, and organization capital and number of employees as the control variables to control their effects on the dependent variables. This ensures neither biases the results and helps increase the generalizability of the findings [18]. Because a linear relationship exists among the items of a construct, composite scores were derived from their summated responses and used in the regression models.

The data support the six hypotheses (H1a, H1b, H1c, H2a, H2b and H2c). Table 2 summarizes the results. Model I suggests that IT intensity and absorptive capacity are positively related to market orientation (H1a and H2a). The significance of their standardized coefficients indicates their support of the research model. The non-significance of the control variables (organization capital and number of employees) confirms that neither influences nor biases the results (i.e., neither has a bearing on the relationship). Also, an examination of the

variance inflation factors (VIF) reveals no collinearity problems among the independent variables. Similar results found with Models II (H1b and H2b) and III (H1c and H2c) support the research model and suggest that IT intensity and absorptive capacity are positively related to customization and loyalty programs. Interestingly, the higher standard coefficient for IT intensity in all three models indicates its greater impact on CRM practices over absorptive capacity. Thus, the data generally support the proposed research model. However, the low R-square values strongly suggest that other factors not captured in the models may account for a large portion of the variations in the model. This might be addressed in future studies.

IT intensity forms the foundation on which CRM systems are built. Yet, CRM success cannot be attributed to technology alone. How an organization applies IT as demonstrated in its practices will have a greater impact on its CRM results. The results of this study support the contention that IT investments play a vital role and have a positive effect on CRM practices; greater investments in IT lead to improved CRM practices and ultimately better CRM performance. The IT infrastructure reflects the investments and commitment an organization makes to IT, and ensures IT remains a true organizational resource. However, it is not an end unto itself, but a means to an end, such that it embodies capabilities that lead to desirable results. In particular, investments in IT support CRM in two important aspects: the internal operations and strategic planning tasks. Operationally, IT allows the organization to share data and knowledge across internal boundaries, coordinate its activities in response to market intelligence and respond as a single entity to changes in environmental forces. Strategically, continual advances in IT have opened new opportunities with tools that provide greater insight into market forces and respond competitively with customization and loyalty programs. Thus, CRM practices benefit from the degree to which the organization invests in IT (i.e., intensity).

Having the knowledge to pursue avenues that lead to products and services that better satisfy the needs and expectations of customers also plays a critical role in selecting and adopting successful CRM practices. The results of this study also lend support to the contention that an organization's investments in absorptive capacity are crucial and positively affect its CRM practices. This suggests that as organizations invest more into learning and develop their knowledge, they will be more effective in their CRM practices as they become knowledgeable in asking the right questions and selecting the right methods and information to find the right answers. Thus, absorptive capacity leads to the successful leveraging and exploitation of information. This extends from recognizing new information to expand the existing body of knowledge or capitalize on new opportunities to applying knowledge to develop innovations that ensure the long term relationships an organization cultivates with its customers. As in the case of IT intensity, investments to absorptive capacity lead to future long term benefits.

The Internet's expansive markets have lured many

organizations into e-business. With the transition to e-business, the business paradigm shifts from its emphasis on the management of physical resources to information as the primary resource. In contrast to their *brick and mortar* counterparts, ebusinesses must be capable of using its information and knowledge to effectively compete in the high-stakes IT-enabled marketplace. The study of Phau and Poon [22] explored the applicability of the Peterson et. al [21] classification of products and services to Internet sales, and found that products and services having an intangible (service) value proposition and relying on relatively high differentiation were better suited for the Internet. This suggests that competing in e-business markets will be information and knowledge oriented (or intense), and implies that organizations lacking in these areas may have difficulties achieving success. Although CRM has been used to successfully gain competitive advantages in such markets, the development of its practices looms as a more dominating issue. Thus, it may behoove organizations to invest not only to carefully develop their CRM practices, but to purposefully invest in their IT infrastructure and absorptive capacity as both will affect their CRM practices.

In conclusion, IT intensity and absorptive capacity represent at least two important factors that influence an organization's CRM practices, including market orientation, customization and loyalty programs. The results of this study also suggest that other factors may influence CRM practices. Further examination of the relationships can be made to establish a causal relationship.

8. Summary

This study examined the relationships between IT intensity and absorptive capacity, and three facets of CRM practices: market orientation, customization, and loyalty programs. The analysis of survey results suggests that both (IT intensity and absorptive capacity) have positive effects on market orientation, customization and loyalty programs. Thus, it may be concluded that organizations may derive greater benefits from their CRM practices with greater investments in IT and absorptive capacity. The importance of this conclusion particularly applies to the IT-enabled ebusiness models which emphasize information as the organization's primary resource and the need to effectively compete in global markets.

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Table 1. Rotated factors

Kaiser's Measure of Sampling Adequacy: .914

	<u>Factor 1</u> <u>Absorptive</u> <u>Capacity</u>	<u>Factor 2</u> <u>IT</u> <u>Intensity</u>	<u>Factor 3</u> <u>Market</u> <u>Orientation</u>	<u>Factor 4</u> <u>Customization</u>	<u>Factor 5</u> <u>Loyalty</u> <u>Programs</u>
Cronbach Alpha	.926	.915	.900	.864	.811
Eigenvalue	13.149	3.107	2.350	1.704	1.411
Variables:					
CRM absorptive capacity	0.866	.	.	.	.
CRM employee knowledge	0.838	.	.	.	.
Employee business knowledge	0.814	.	.	.	.
CRM training	0.778	.	.	.	.
CRM training quality	0.742	.	.	.	.
Cross-functional CRM involvement	0.734	.	.	.	.
Help sources	0.724	.	.	.	.
Relationship with IT staff/consultants	0.522	.	.	.	.
IT hardware and software investments	.	0.803	.	.	.
IT management	.	0.781	.	.	.
IT system integration	.	0.749	.	.	.
IT priority	.	0.736	.	.	.
IT competitive advantage	.	0.728	.	.	.
IT recruitment and training	.	0.715	.	.	.
IT information features	.	0.670	.	.	.
Measure and evaluate customer satisfaction	.	.	0.797	.	.
After sales service	.	.	0.736	.	.
Predict customer needs	.	.	0.732	.	.
Customer satisfaction objective	.	.	0.725	.	.
Responses to competitors	.	.	0.557	0.506	.
Share information	.	.	0.533	0.490	.
Cross-functional collaboration	.	.	0.501	0.414	.
Understand competitors	.	.	0.497	.	.
Products and services satisfy customer needs	.	.	.	0.771	.
Customized service	.	.	.	0.738	.
Customer satisfaction over diverse segments	.	.	.	0.620	.
Multiple channels of delivery	.	.	.	0.586	.
Organization able to meet needs of customers	.	.	.	0.566	.
Promotions for customer segments	.	.	.	.	0.773
Distinguish customers with promotions	.	.	.	.	0.672
Rewards for repeat customers	.	.	.	.	0.661
Incentive programs	.	.	.	.	0.650

Values greater than .4 shown

Table 2. Summary of regression models

		Model I Market Orientation		Model II Customization		Model III Loyalty Programs	
R-square		.366		.422		.250	
F value		21.37**		27.03**		12.35**	
Variables:		Standard coefficient	VIF	Standard coefficient	VIF	Standard coefficient	VIF
Predictors	IT Intensity	0.438**	1.427	0.478**	1.427	0.316**	1.427
	Absorptive Capacity	0.243*	1.388	0.251**	1.388	0.255*	1.388
Control Variables	Organization Capital	-0.087	2.907	-0.090	2.907	-0.025	2.907
	Number of Employees	-0.096	2.850	-0.106	2.850	-0.087	2.850

* $p < .01$, ** $p < .001$