CUSTOMER RELATIONSHIP MANAGEMENT (CRM) TECHNOLOGY, MARKET ORIENTATION, AND ORGANIZATIONAL PERFORMANCE

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ABSTRACT

Customer Relationship Management (CRM) Technology, Market Orientation and Organizational Performance

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This paper investigates the relationship among Customer Relationship Management (CRM) technology, organizational market orientation, perceived customer retention improvement, and perceived performance improvement from using CRM technology. Based on theories of business value of information technology and resource-based view of organization, three research questions are examined: first, is CRM technology related to customer retention improvement and performance improvement? Second, is market orientation a facilitator of CRM technology adoption? Finally, is market orientation related to customer retention improvement and performance improvement? The data collected by mail survey from eighty Canadian organizations was analyzed to understand how organizations achieve benefits from investment in CRM technology. The findings suggest that first, the CRM technology, used to enhance organizational capability of serving customer, is positively linked to perceived customer retention improvement and perceived performance improvement; second, companies with higher level of market orientation are more likely to adopt CRM technology; third, there is a positive link between organizational market orientation and perceived customer retention

improvement and perceived performance improvement. This study contributes to the MIS discipline by demonstrating the enabling role and business value of information technology in customer relationship management, as well as by underscoring market orientation, the organizational resource that can possibly increase the effect of CRM technology on customer retention and overall performance. The managerial implications are significant. When CRM technology is used to enhance organizational capability of serving customers, it can achieve substantial business value. Directions of increasing market orientation are provided for organizations to attain payoffs from CRM technology investment.

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1. Introduction

Today's consumers have more choices and more information about products and services they need than ever before, and they have increasing expectations for accessibility, responsiveness and experience. To companies, this means fewer barriers to switch and a drastic decrease in customer loyalty (Crosby and Johnson 2000). More companies realize that satisfied customers are one of the most important assets. Business strategy must be defined and resource must be allocated to hold on to customer asset base (Morris 1994). Customer relationship management (CRM) information technology systems have attracted great attention. Despite the economic slowdown began in early 2001, Gartner Inc., an information technology research firm observed that financial service companies worldwide spent $825 million on CRM software in 2000, and a predicted $802 million in 2003 (Keenan 2002). However it is reported that "up to two-thirds of CRM projects are labeled failures", which have not delivered desired business results (MacInnis 2002). Corporate executives and consultants are arguing that successful CRM technology initiatives are not just about technologies. Often the case, the CRM technology projects are led by information technology at the expense of the overall culture change required to make them work (Maluhan 2002). A survey of 100 large British organizations reveals that while technology is a critical component of most companies' CRM strategies, the fundamental of CRM is about building a customer centric organization (Fitzgerald and Brown 2001).

MIS literature examines the business value of information technology (IT) from a resource-based perspective, which holds that investment in IT does not necessarily provide sustained advantages, since investments in IT can be easily duplicated by competitors; it is rather how firms use information technology to leverage superior intangible resources affects a firm's overall effectiveness (Kettinger 1994).

The fact that companies cannot improve customer loyalty despite investment in technological power (Karimi et al., 2001) reveals that there is the need for better understanding of the underlying mechanisms that make information technology work with organizational intangible resources and to produce output of performance improvement. This research is intended to understand the enabling role of information technology in the context of customer relationship management, understand the phenomenon of failures of CRM projects, find out what distinguishes companies that achieved benefits from using CRM technology. The significance of this study lies in that a better understanding of business value of CRM technology is needed for decision-making; the correlation between organizational market orientation and performance improvement from using CRM technology would provide helpful managerial implications; the correlation between customer retention improvement and overall performance improvement would help justify the focus of area that CRM technology needed to be implemented.

On the basis of literature review and a field survey, this research investigates the role of information technology in the context of customer relationship management, and market

orientation, one organizational resource that may be a factor in the process of turning investment in CRM technology into performance improvement. Based on theories of business value of information technology and resource-based view of organization, three research questions are examined: first, is CRM technology related to perceived customer retention improvement and performance improvement? Second, is market orientation a facilitator of CRM technology adoption? Finally, is the level of market orientation related to customer retention improvement and performance improvement? This paper explores the links among CRM technology, organizational market orientation, and the perceived actual benefits that organizations received from using CRM technology in terms of customer retention and business performance.

The main findings include that the more companies use CRM technology to enhance their capabilities of serving customers, the more companies attained improvement in customer retention and perceived performance improvement from using CRM technology; organizations that have higher level of market orientation are more likely to adopt CRM technology; companies that have higher level of market orientation achieve more benefits in terms of customer retention and performance.

This study contributes to the MIS study by covering a few theories that are not well developed in the previous studies. It applies theories of IT value to a specific IT application, CRM technology and established direct link between CRM technology and business performance improvement. It explores the role of market orientation as one of organizational resources in the implementation of CRM technology and reveals the link

between market orientation and performance improvement. Customer retention is used to assess the effects of information technology on organizational performance, and is related to performance improvement.

The practical implication of this study is that it recognizes business value of CRM technology and enabling role of information technology in customer relationship management. This can help in decision making about investment in CRM technology. Moreover, an understanding of market orientation may help to explain why some companies are able to exploit CRM technology successfully while others are not. Therefore management can direct attention at cultivating marketing orientation so that CRM technology projects can thrive. Last, customer retention benefits can be used to evaluate CRM technology investment.

The body of this paper is organized as follows. First, relevant previous studies are reviewed. Next, research questions and research model are presented. The subsequent sections describe data collection and data analysis. Then the findings and contribution of the paper are discussed. The paper concludes by providing future research directions.

2. Literature Review

This section reviews some of MIS and marketing management studies, and provides theoretical bases for the four research constructs, i.e., perceived customer retention improvement and perceived performance improvement, CRM technology, and market orientation. This section also synthesizes research findings of relationship among the four constructs.

2.1 Customer Relationship Management

The combined pressures of increasing customer sophistication, more complex and dynamic competition, as well as rapid technological innovations make more companies realize that they must acquire, understand, and manage customers' needs in order to stay ahead in competition. The winners are those who provide the greatest value to their customers, retain their quality customer base and grow it through the building of efficient relationship with their customers (Anonymous 1999). Companies intend to move away from the transaction-based, quick-sell sales approach to one that focuses on genuine relationship building (Jamieson 1994). Customer relationship management (CRM) is a business strategy of understanding customer, supporting desired customer experience and building profitable customer loyalty (Crosby and Johnson 2000). CRM is anticipated to turn an organization from being directed by managerial decisions with little regard to customer needs to being directed by decision based on customer activities and behavioral

information (CRMGURU 2002). Companies learn to develop better communication with customers for branding and understanding customers' latent needs (Winer 2001).

2.2 Customer Retention and Organizational Performance

It is difficult to think of any business that has achieved long-term profitable growth without retaining its customers; customer retention is the real measure of ultimate financial success (Campbell 1999). The high costs of recruiting new customers compared with the costs of keeping existing customers have been well documented over the years (Kotler 2000). Capturing new customers and replacing lost customers come at a high cost, which involves advertising, promotion, sale costs, and start-up operating expenses. Greater degree of service improvement is necessary to make a customer switch from competitors than to retain a current customer (Zeithaml et al., 1996). While new customers are often unprofitable for a period of time after acquisition, customers who remain with a firm for a period of time are more likely to buy additional service and spread favorable communication. It has been established that profit comes from repeat customers; they generate over twice as much gross income as new customers (Winer 2001). The firm also may be able to charge a higher price, because these customers value maintaining the relationship (Zeithaml et al., 1996), and they are less price-sensitive (Appiah-adu 1999). Moreover, the firm can serve them more efficiently; costs to serve customers who are familiar with the service delivery system can be lower than that with new customers (Appiah-adu 1999, Zeithaml et al., 1996). A high level of customer

retention enables the firm to maintain its sales base and expand product line sales to current customers (Appiah-adu 1999, Pelham 1997).

Customer retention is considered a key contributor to increased market share, revenue growth, reduced costs and increased profits (Appiah-adu 1999). For instance, MBNA American Bank resulted in a sixteen-fold increase in profitability by five percent improvement in customer retention (Matanovich 2000). A one percent loss in customer retention can equate to a $20 million loss in income for a large bank (Amato-Mccoy 2002). The link between customer retention and sales revenue and profitability has been studied in previous research, such as those by Rust and Zahorik (1993), and Zeithaml et al. (1996). In the context of CRM technology implementation, the reviewed studies provide some evidence that CRM technology improved customer retention and sales (Amato-Mccoy 2002), nonetheless, the link between improved customer retention and overall performance is not clear.

2.3 Information Technology and Organizational Performance

Ample research has suggested the importance and complexity of measuring IT value. Some MIS studies show information technology can be related to organizational performance in various aspects, such as strategic thrust, business value, productivity, operational efficiency, competitive advantage sustainability, competitive forces (Seith

and King 1994). Others report little or no impact of information technology on firm performance (Mukhopadhyay et al., 1995)

Study shows, as discussed below, that information technology is positively related to firm performance. For instance, firms with better IT infrastructure (a shared information delivery base) can launch innovative IT application faster than the competition (Bharadwaj 2000). More advanced hardware and software technologies, and a more diversified and integrated application portfolio are significantly associated with better performance (Raymond et al., 1994). Cross-industry study also suggested that strategic information systems provided sustainable competitive advantage (Kettinger et al., 1994, Brown et al., 1995). IT investment in computer capital and IT staff has been found to increase firm productivity, and to be positively linked to sales, assets, and equity growth (Bharadwaj 2000, Sircar 2000). Firms in different industries gain benefits from employing specific IT/IS applications, such as Cardlock System in commercial fuel stations (Nault 1995), and EDI in automobile manufacturers (Mukhopadhyay et al., 1995). The link between IT/IS application to firm performance can be direct, such as value-added service (Nault 1995), cost reduction (Mukhopadhyay et al., 1995), and overall superior performance (Kettinger et al., 1994, Brown et al., 1995), or indirect (Andersen and Segars 2001). For instance, IT-enhanced communication may have effect on firm performance through changes in organizational structure, supporting decentralized decision structure, in which individual can take effective action, thus, affecting organizational performance (Andersen and Segars, 2001). In manufacturing sector, Barua et al. (1995) found significant impact of IT on intermediate variables such

as capacity utilization, inventory turnover, and product quality, but found little impact on return on assets or market share.

However, investment in IT does not necessarily provide first-mover advantage for firms. Kettinger et al. (1994) argued that, since information technology is available to all competitors, it may not increase the barriers to entry, rather it is the differences in environmental factors and firm-specific factors that influence a firm's capability to achieve and sustain competitive advantage. To attain sustainable IT-based competitive advantage, firms need to build organizational infrastructure and take innovative action strategies.

Furthermore, the popularization of the phrase "productivity paradox" also reflects the conflicting and inconclusive results in MIS research that attempt to demonstrate the benefits of IT investment (Chan 2000, Sircar 2000). "Delivered computing power in the U.S. economy has increased by more than two orders of magnitude since 1970, yet productivity, especially in the service sector, seems to have stagnated (Brynjolfsson 1993)." Brynjolfsson (1993) suggested "an apparent IT investment paradox with respect to economy-wide productivity (e.g., total IT investment in relation to gross national product), the productivity of IT capital in manufacturing, and the productivity of IT capital in services." IT spending has been found to increase firm-level productivity in an empirical study of 370 American firms over the period of 1988 to 1992 (Hitt and Brynjolfsson 1996). Similarly Brown et al. (1995) found that firms that have successfully invested in strategic information systems achieved higher productivity "than their

industries and individual companies within their industries...except with respective to sales per employee." In Brown et al. (1995)'s study, productivity is itemized by sales per employee, income per employee, accounts receivable turnover, inventory turnover, asset turnover. Yet other researchers challenged the concept of paradox. For example, Thatcher and Oliver's (2001) analytical model shows that "IT productivity paradox is not so much a paradox, but instead a conscious decision by profit-maximizing firms to invest in technologies that may improve profit, but sometimes at the expense of productivity."

2.4 Information Technology and Customer Relationship Management

Information technology is an indispensable factor in customer relationship management, in terms of data warehouse, data mining, decision making, and information sharing between companies and their customers (Winer 2001). To manage customer relationship, adequate information must be at the disposal of managers for planning and allocating resources to different markets, products, and territories. Appiah-adu's (1999) study found that marketing information contributes to customer retention; companies that conduct regular marketing research studies of customers are better positioned to identify changing trends in buyer needs and behavior, therefore are more likely to achieve superior customer retention rates compared with the competition. It is necessary for companies to collect information detailed enough to support and drive a customer retention program (Jamieson 1994).

Information technology has provided tools for companies to know about customers at an individual and collective level, making it possible to simulate and track the outcomes of marketing and business decisions more accurately (Frdericks et al., 2001). An information system that delivers market information to senior managers in a regularly and timely manner could change the strategic direction of the firm (Matanovich 2000). Information technology also enables companies to interact with customers in multiple channels. "By combining the abilities to respond directly to customer requests and to provide the customer with a highly interactive customized experience, companies have a greater ability today to establish, nurture, and sustain long-term customer relationship than ever before" (Winer 2001).

2.5 CRM Technology

Customer Relationship Management (CRM) technology applications are invested as strategic information system by many companies seeking higher profitability and enhanced competitive advantage. The business needs of better understanding customer behavior and interest to focus on customers who can deliver long-term profits have created a worldwide market for CRM technology products and services, a market that is forecasted to grow to $125 billion by 2004 (Winer 2001). According to a comprehensive description of CRM technology (Berson et al., 2000), CRM applications integrate business processes to provide coordination among sales, marketing, customer service, field support, and other vital customer touch points. CRM architecture combines (1)

operational technologies, i.e., transaction-oriented business process management, (2) *analytical technologies*, i.e., data mart-centered business performance management, and (3) *collaborative model*, which establishes cooperative partner networks (e.g., affiliates, portals), and manage consistent interactions (e.g. web, call, e-mail) among customers and business organizations. The *operational* side of the CRM technology consists of "customer facing" applications integrated among the front, back and mobile offices: sales automation, enterprise marketing automation, customer service/support, and miscellaneous components. *Analytical* CRM analyzes the data created by operational CRM and stored in a data warehouse. The results of the data mining are used to refine marketing campaigns. The foundation of CRM architecture is data warehousing. Through all the channels that interact with customers, customers provide information of their preferences, needs, complaints and attributes that can make them life-long members of the organizational network of products and services. This customer information is however often fragmented and incomplete by each piece itself. Data mining holds all pieces together, creating a holistic view of customers. To fully exploit CRM, applications also have to integrate existing ERP and other information systems. *Collaborative model* breaks up barriers of sharing information fuse information and technology. CRM demands systematic approach that provides seamless integration in every area of business, people, process, and technology, so that organizations can increase retention of customers, reduce costs and increase the value of interactions (Fitzgerald and Brown, 2001).

2.6 Resource-Based View of Firm and IT Value

This section discusses resource-based theory and the effect of organizational resources in the realization of information technology investment.

2.6.1 Resource-based Theory

Strategic management provides a perspective referred to as the resource-based view of the firm. Resources are defined as any long-lived productive capability (Clemons 1991). Resource-based theory proposes three characteristics of firm resources that generate sustainable competitive advantage. First, history matters, the firms are constrained by their past choices, which give the firms unique capabilities (Roy 2002). Resources are not mobile, and it takes time to build organization capabilities (Barney 1999). Resources differences among firms may be long-lasting (Clemons 1991). Second, imitation is difficult. It is a multitude of individual elements and interactions between elements that create a unique organization with a distinctive strategic advantage. A competitor cannot reproduce an organization by simple observation (Stalk et al., 1992). Third, strategic resources are precious. A firm's competencies are relatively stable, difficult and potentially expensive to acquire. Companies must focus their investment in the competencies that will bring strategic value (Roy 2002). Unique characteristics of a particular firm can make a difference in terms of profit performance (McGahan and Porter 1991, Nelson 1999, Rumelt 1991). Since the firm's resources and capability are

unique, valuable and inimitable, competitive advantage based on resources and capabilities therefore is potentially more sustainable in uncertain and dynamic competitive environment (Barney 1996, Collis and Montgomery 1995, Grant 1991, Prahalad and Hamel 1990). Resources can be grouped into (1) *tangible assets*, such as physical plant and equipment; (2) *intangible assets*, including intellectual property, brand, company reputation and so on; and (3) *capabilities*, which encompass the skills of individual or groups as well as organizational routines and interactions such as teamwork, organizational culture and trust between management and workers (Fahy 2000).

2.6.2 Resource-based Theory in Information Technology Management

As information technology (IT) and information systems (IS) have been invested to support core business processes and for strategic reasons, the evaluation of economic benefits of IT/IS and competitive advantage provided by IT/IS receive considerable attention and debate among MIS researchers. Resource-based theory has been applied in MIS research. As discussed in the following paragraphs, reviewed literature exhibits that at one hand, organizational resources influence the effectiveness of IT investment; on the other hand, organizations can leverage IT to enable or enhance intangible resources so as to achieve superior business performance and advantages.

Intangible Resources in IT Value Realization

Resource-based theory has been used to explain difference in organizational capability of sustaining IT advantage. "Strategic-resource differences among firms are important in explaining and predicting the competitive outcomes of strategic application of IT" (Brown et al., 1995).

The effectiveness of converting IT investment to business performance improvement is acknowledged by researchers to be affected by the organizational characters. For instance, Weill and Olson (1993) studied IT investment of companies in five different industries and found organizational culture and managers' skills to be major determinants of effectiveness of converting IT investment to business value. A longitudinal study of strategic information systems used by thirty US firms in banking industry and other industries showed that leveraging unique firm attributes with information technology enables companies to realize long-term performance gain and achieve sustainable competitive advantage. The firm foundation factors, such as organizational learning curve and knowledge base, are important antecedents of strategic use of IT (Kettinger et al., 1994). These findings imply that "looking at the totality of the firm is important. Information systems are vital strategic business tools, however, they have to act with internal and external factors to provide benefits to firms" (Clemons 1991). Hence, it is important to study organizational characteristics when examining the benefits of CRM technology investment.

Enabling Role of Information Technology

It has been argued by MIS researchers that firms benefit from IT only when they embed IT in a way that produces valuable, sustainable resource complementarities (Clemons 1986, 1991, Clemons and Row 1991, Powell and Dent-Micallef 1997). When leveraging and enabling pre-existing firm resources and skills, IT becomes a firm's resource and capability that generates competitive value (Bharadwaj 2000). "Customer relationship management is rooted in the core IT capability of the firm" (Bharadwaj 2000). IT enables firms to track and predict changing customer preferences in volatile markets. For example, information warehouse allows Prudential to recognize valuable customer relationship across the entire enterprise; web-based system at National Semiconductor captures customer information online and presents it immediately to manager, resulting in more accurate forecasts of product demand and boosted the sales of key components (Janah 1998). Moreover, integration of information system with management decision-making, and coordination of the functional units are required to achieve efficient processing of information. It is argued that socially complex link between IT and other part of the organization serves as the source of the advantage (Barney 1991, Mata et al., 1995).

The enabling role of information technology is also supported by Day's study (1994). Information technology has the potentiality to enable organizations to do things they could not do before, and thus by leveraging IT, organizations develop new capabilities and skills. Information systems combining shared database, high-speed communication

network, and automatic product identification and tracking can "fundamentally transform both the market sensing and customer linking capability" (Day 1994). Large-scale market research database facilitates the integration and coordination of dispersed marketing, sales, and service groups, as well as enhances learning by disseminating information rapidly and holding it ready in central memories for easy access (Cespedes 1993). Closer customer and channel links are now possible, because information networks have dramatically reduced the cost of handling what were formerly paper transactions between parties. Information technology permits much closer and error-free integration of customer and supplier function. Marketing and sales productivity systems link marketing databases together with the distribution system as well as direct marketing, telemarketing, and other sales systems. These integrated systems allow careful monitoring of all sales and distribution processes, plus track the lifetime value of customers to guide resource allocation decisions. These examples demonstrate that IT advances enable firms to reconfigure business processes and offer new service (Day 1994).

2.7 Market Orientation

This section discusses the concept of market orientation and resource-based perspective of market orientation.

2.7.1 Definition

Marketing theorists have addressed the construct of market orientation over decades (Wrenn 1997). It has been used to describe the implementation of the marketing concept, which holds that a firm is to "satisfy the long-term needs of its customer coalition" (Anderson 1982), as well as that " for a company to be successful, customer should be the dominant driving force" (Howard 1983).

Two operational definitions of marketing orientation became distinct since early 1990's. On one hand, Kohli and Jaworski (1990) described market orientation as a set of behaviors and activities in an organization: "Market orientation is the organization-wide generation of market intelligence pertaining to current and future needs (i.e. customer philosophy), dissemination of the intelligence across departments (i.e. integrated marketing organization), and organization-wide responsiveness to it (i.e. goal attainment)." This definition describes activities that have to do with collecting and acting on information about customer needs. On the other hand, Narver and Slater (1990) define market orientation as comprising three behavioral components and dealing concerns with both customers and competitors. "Market orientation consists of three behavioral components--- customer orientation, competitor orientation and inter-functional coordination. Customer orientation and competitor orientation include all of the activities involved in acquiring information about the buyer and competitors in the target market and disseminating it throughout the business. Inter-functional coordination is based on the customer and competitor information and comprises the business's

coordinated efforts, typically involving more the marketing, to create superior value for the buyers." This definition deals with understanding target market, competition and coordinated utilization of company resources to create superior customer value (Day 1994). Furthermore, Narver and Slater (1990) argued that market orientation is "organizational culture that effectively and efficiently creates behaviors." A later article by the same authors (Slater and Narver 1995) states, "a market orientation is the culture that (1) places the highest priority on the profitable creation and maintenance of superior customer value while considering the interests of other key stakeholders; and (2) provides norms for behavior regarding the organizational development of and responsiveness to market information." A market-driven culture supports the value of thorough market intelligence and the necessity of functionally coordinated actions directed at gaining a competitive advantage (Day 1994). Thereby market orientation can be seen from higher and more strategic level (Uncles 2000).

These two definitions have received considerable attention. Some researchers attempted to synthesize the two definitions. For example, Deng and Dart (1994) suggested that market orientation describes "the generation of appropriate market intelligence pertaining to current and future customer needs, and the relative abilities of competitive entities to satisfy these needs; the integration and dissemination of such intelligence across departments; and the coordinated design and execution of the organization's strategic response to market opportunities." Cadogan and Diamantopoulos (1995) pointed out that there is a high degree of overlap between the two definitions at the conceptual and operational level. Deshpande and Farley (1998) defined market orientation as a set of

cross-functional process and activities directed at creating and satisfying customer through continuous needs-assessment. This definition emphasized that the core of market orientation is the continuous creation of superior value for customers (Narver and Slater 1998).

2.7.2 Market Orientation as a Firm Resource

Market orientation concerns the creation of superior customer value (Narver and Slater 1998), and value to customers is an essential element of competitive advantage. Since a firm's resource is a potential source of competitive advantage, market orientation constitutes an organizational capability, and thus one of firm's resources (Fahy 2000, Vorhies and Harker 2000). Market orientation, as an organizational capability, develops through a process where employees apply individual and collective knowledge and skills, integrating other tangible and intangible resources to solving the firm's problems of meeting customers' needs. The idiosyncratic way in which individuals within a firm integrate their particular knowledge and skills as well as the way in which they coordinate value-added activities cannot be easily imitated by competitors and substituted for anther capability (Vorhies and Harker 2000). As a result, market orientation enables firms to improve its efficiency and effectiveness by meeting the needs of customers, thus forms a potential source of competitive advantage (Fahy 2000, Vorhies and Harker 2000). The previous studies observed significant and positive link between market orientation and superior performance, in terms of overall firm performance (Jaworski and

Kohli 1993), sales growth (Matsuno and Mentzer 2000), new product performance (Matsuno and Mentzer 2000), customer retention (Deshpande and Farley 1998), market share (Matsuno and Mentzer 2000), profitability (return on investment and return on assets) (Narver and Slater 1990, Slater and Narver 1994, Deng and Dart 1994, Pelham 1997, Gray et al., 1998, Dawes 2000). These findings are summarized in Appendix A, Measure of market orientation (page 99).

2.8 Summary of Literature Review and Development of Research Questions

This section summarizes reviewed studies and discusses issues to be addressed in this study.

2.8.1 Summary of Reviewed Previous Studies

In an age when deployment of information systems and infrastructure are expected to support improvement in business performance, great challenges remain ahead in the research of relationships between IT/IS and firm performance. While previous research on IT value has examined some important concepts, key gaps in the reviewed MIS literature are discussed below.

Few Studies about Individual Information Systems

Reviewed studies, as discussed above, though only small portion of MIS research, treat the organization's information systems as one cohesive entity, and relate overall IT infrastructure and management to firm performance. The limitation of such an approach is pointed out by Murhopadhyay et al. (1995): "Given the complexity of the technology and the difficulty of implementing it in organizations, some systems may be effective, while others may bring negative returns. Therefore, by aggregating over all systems, the favorable impact of effective systems may be nullified by poorly designed systems." Admittedly, the difficulties of isolating and measuring the contribution of a particular IT application to firm performance come from the confounding influence of internal and external factors to the firm. Nonetheless, the investment decision for an IT application is based on the evaluation of the benefits that are expected from this specific IT application. Identifying the benefits to organization gained by the use of an individual information system application is vital to management (Ragowsky et al., 1996). "Every project, program or initiative within a business ultimately is intended to improve the profit potential of the business" (Matanovich 2000). Therefore many MIS studies fail to serve the needs of IT practices.

Few Studies Using Customer Retention as a Measure of IT Value

Reviewed published studies, such as Brown et al. (1995)'s and Kettinger et al. (1994)'s measure IT value on firm performance by financial ratios. While information systems have been implemented for strategic objectives, criteria of performance evaluation have not reflected the wider business performance implications brought by IT (Weill and Olson 1989). Today, more and more companies are recognizing the importance of satisfying and retaining customers, and they invest in IT to deliver quality service (Anonymous 1999). More attention has been focused on enhancing customer retention due to the fact that acquiring new customers can cost five to ten times more than the costs involved in satisfying and retaining current customers (Koltler 2000), and the company can dramatically increase its profits by keeping loyal customers from moving to a competitor. Nonetheless, it seems that in reviewed MIS research, there are not many studies that examined firm's performance improvement from the perspective of satisfying and retaining customers.

Few Studies about CRM Technology

Businesses are focusing on gaining holistic view of customer and cultivating customer relationship, and implementing CRM has been identified as one of top IT priorities globally (Gartner 2001). Nonetheless, academic MIS studies of CRM technology are rare.

A better understanding of the relationship between CRM technology and business performance is needed.

Few Studies about Market Orientation as Organizational Resources in IT Value Realization

Although it has been proposed that companies can use information technology to leverage or enhance intangible resources for competitive advantages (Bharadwaj 2000), the relationships between organizational resources, in this case, market orientation, and performance benefits of IT investment are largely undetermined and have not been operationalized empirically. The reviewed studies have investigated the interaction of type of business strategy and culture with information technology, such as Croteau and Bergeron (2001)'s and Weill and Olson (1989)'s, but none of these organizational elements articulate the attitude of the organization toward its customers. However this mindset is particularly important in implementing CRM technology, in which most companies invest to hold on to their customer base and maximize the company's opportunity to grow in competition (MacInnis 2002).

2.8.2 Issues to be Addressed in Current Study

The above-mentioned gaps in the reviewed MIS literature suggest research areas. Research needs to be broadened and findings need to be interrelated to provide more precise interpretation of phenomenon of information technology/ information systems utilization in customer relationship management.

Possible Effect of CRM Technology on Organizaitonal Capability of Serving Customer

Synthesizing previous studies, such as Winer (2001)'s, Bharadwaj (2000)'s, and Berson et al. (2000)'s, CRM technology can possibly influence organizational capability of serving customer in several ways. First, since an understanding of current and potential customers is fundamental to the survival and prosperity of a company, there is a need for companies to acquire a deep appreciation of needs and wants of customers. Information gathering is a key activity for organizations to understand customers. CRM technology enables companies to capture customer information in more timely and consistent manner. Second, CRM technology enables companies to be more flexible and responsive in volatile market. Companies can use CRM technology to analyze customer data, target desired market, monitor changes of competitor, technology and market environment. Third, CRM technology enables wide and synergistic information distribution, equipping employees with critical access to customer information and business knowledge (product and service knowledge), hence developing organizational interactive capability of

keeping customers engaged. Forth, CRM technology enables companies to develop product and service shaped to customers' needs.

To conclude, CRM technology can play the role of enabler or enhancer in the process of serving customers. Customer relationship management as a management philosophy can be enabled by sophisticated data management technology (Crmguru 2002). It is postulated that CRM technology can be related to customer retention improvement and overall performance improvement.

Possible Relationship between Market Orientation and Benefits of CRM Technology

This study attempts to study market orientation as one of firm resources that may be related to the effectiveness of IT investment on business performance. Market orientation is seen as a part of the organizational culture that values customers and seeks at satisfying customers' needs (Narver and Slater, 1990). This culture manifests itself through behaviors of market intelligence generation, dissemination and organization-wide responsiveness. It is expected that the presence of high level of market orientation can be a critical success factor in the use of CRM technology. Given the argument that IT enables firms to leverage or exploit pre-existing organizational intangibles via co-presence and complimentary (Bharadwaj 2000), it is possible that companies with higher level of market orientation can use CRM technology more effectively and thus achieve more performance improvement. It is reasoned that since market-oriented organizations,

i.e. organizations with high level of market orientation, are good at responding to information about market forces and market conditions, (Uncles 2000), and gathering, interpreting and using market information are in a systematic, thoughtful, and anticipatory process (Day 1994), compared with other less market-oriented organizations that also implemented similar CRM systems, market-oriented organizations can have even better understanding of its environment and customers, and act even more effectively on events and trends in present and prospective market, thus attain more performance benefits from investment in CRM technology. It is the goal of this study to understand the role of market orientation in the relationship between the use of CRM technology and performance improvement.

Market Orientation as a Possible Facilitator of CRM Technology Adoption

King and Thompson (1996) suggest that the factors that distinguish companies that adopt strategic information systems from companies that do not include innovative needs, competitive position, environment, economies of scales, and top management guidance. It is expected that the degree of market orientation can possibly influence an organization's decision to use CRM technology applications for strategic purposes. King and Thompson's study also identifies the research direction of examining facilitator and inhibitors for specific type of strategic IT application. Therefore, market orientation will be investigated to see whether it is a facilitator of CRM technology adoption.

Possible Relationship among CRM Technology, Customer Retention Improvement and Business Performance Improvement

Since CRM technology aims at increasing effectiveness of customer relationship management, it can be expected that the use of CRM technology applications can be related to measures of customer relationship management and organization performance. Karimi et al. (2001) argued that given all possible benefits that CRM technology might bring to organizations, "despite huge CRM technology investments, organizations have been unable to increase their customer satisfaction index ratings." The complexity of demonstrating the effects of CRM technology investment derives from the fact that customer relationship management not only rely on information technology, but more important, on the implementation of customer-centric business strategy, redesign of functional activities, and re-engineering of work processes (Galimi 2000, Nelson et al., 2000, Close et al., 2000). From an IT investment effectiveness perspective, it is important to study the relationship among CRM technology and the benefits of using CRM technology in terms of customer retention and business performance.

The Link between Customer Retention Improvement and Business Performance Improvement

Since the link between customer retention and business performance has been studied in previous study, it is one of the goals of this study to extend the argument and inquire

whether CRM technology can be related to business performance improvement through customer retention improvement. This has not been done in the reviewed studies. The finding would help understand the mechanism that enables organizations to achieve benefits from investment in CRM technology.

To conclude, companies are building their future on opportunities brought by IT, and the actual benefits and potential benefits of IT are placed high on business strategic agenda. Much additional research needs to be done before we know how whether IT/IS provide measurable benefits for firms. The objective of the current research is to establish links among CRM technology, market orientation, benefits of CRM technology in terms of customer retention and performance. The current study uses a correlational research design and primary quantitative data.

3. Research Model

This section discusses the research questions, research models, the definitions of constructs and hypotheses to be tested in this study.

3.1 Research Questions

The following research questions are derived from above discussion. The primary research questions are: Is CRM technology, used to enhance capability of serving

customers, related to organizational benefits from using CRM technology in terms of customer retention and business performance? Is market orientation a facilitator of CRM technology adoption? Finally, is market orientation related to organizational benefits from using CRM technology in terms of customer retention and business performance?

3.2 Research Model

The research questions are graphically represented in research model as in the following Figure 1. The approach of this model is adapted partially from Andersen and Segars' study (2001) of relations among information technology, decision structure, and firm performance, as well as from Iacovou et al. (1995)'s EDI adoption model. The links between market orientation, customer retention and performance are drawn from the following research on intangible resources in IT value realization: Brown et al. (1995), Weill and Olson (1993), Kettinger et al. (1994), and Clemons (1991).

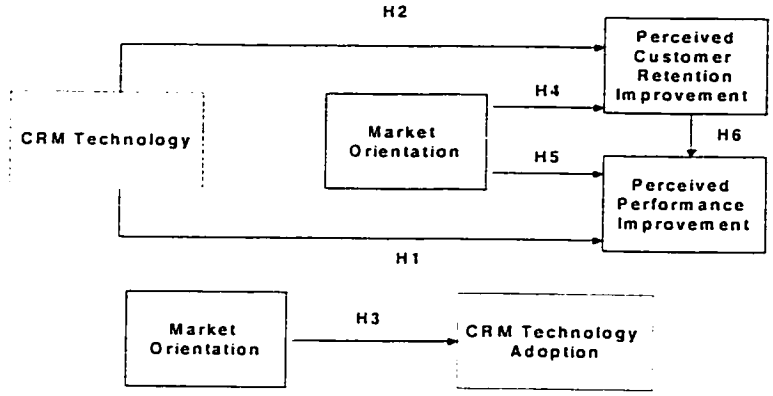


Figure 1. Research Model

The above-mentioned two models are presented here for reference.

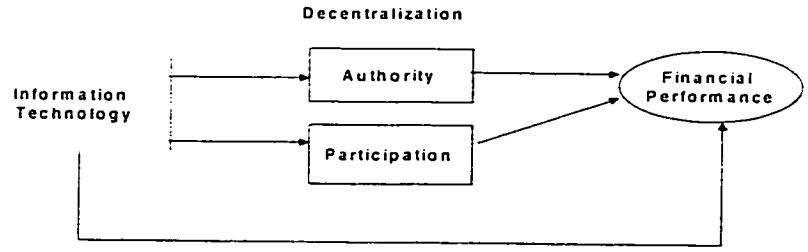


Figure 2. Research model of Andersen and Segars (2001): The impact of IT on decision structure and firm performance

Andersen and Segars' (2001) model suggests that IT-enhanced communication influences the degree of decentralization, which is captured by two indicators: authority and

participation. The more decentralized the organization's decision structure, the higher the financial performance. The use of IT to enhance communication across the organization's functional areas has direct effect on organizational financial performance. The current study adopts direct link between IT and performance, and argues that the use of CRM technology to enhance company's ability of serving customers has can be linked to performance improvement from using CRM Technology, as well as customer retention improvement.

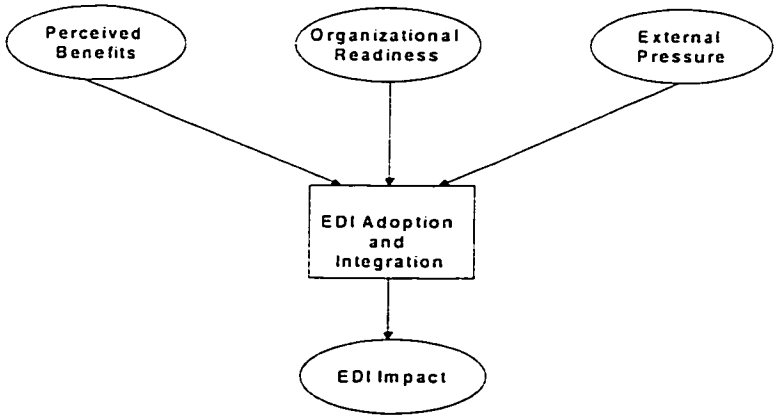


Figure 3. Research model of Iacovou et al. (1995): Electronic data interchange and small organizations: Adoption and impact of technology.

Iacovou et al.'s model points out that three factors could explain the EDI adoption behavior of small firms and the actual benefits adopters receive from utilizing EDI. The

current research model embraces the link between EDI Adoption and Integration and EDI Impact in Iacovou et al.'s model, and postulates the link between CRM technology and actual performance benefits from using CRM technology, as well as customer retention improvement.

3.3 Variable Definition

3.3.1 CRM Technology

In this study, CRM technology refers to the use of CRM technology to enhance an organization's capability of serving customer. This definition is derived from the theory of enabling role of IT with respect to customer relationship management (Winer 2000). The construct reflects the firm's capability to track and predict changing customer preference, as well as respond to customers' needs (Bharadwaj 2000).

3.3.2 Market Orientation

Slater and Naver's (1994) definition of market orientation is adopted in current study. Market orientation consists of three behavioral components: *customer orientation, competitor orientation, and inter-functional coordination. Customer orientation* is the sufficient understanding of one's target buyers and wherefrom, the sufficient response to

their needs, through which, other things being equal, one continuously creates superior value for the buyers. *Competitor orientation* refers to the understanding of short-term strengths and weakness, as well as long-term capabilities and strategies of both the key current competitors and the key potential competitors, in order to create greater value for buyers than its competitors. *Inter-functional coordination* addresses orchestra of company resources; individual at any function in a seller's firm can contribute to the creation of value for buyers. A seller must integrate its entire human and other capital resources.

3.3.3 Perceived Customer Retention Improvement

In this study perceived customer retention improvement refers to managers' perception of the actual customer retention benefits from using CRM technology in terms of maintaining customer base, increasing sales to current customers and reducing service cost. Gartner Group (Gartner 2001) suggested that the effects of CRM technology should be measured by customer retention. A customer-focused evaluation framework of customer metrics has been proposed by Jutla et al. (2001) to measure the effectiveness of CRM technology, customer retention is one of the measures. Customer retention as one of measures of customer relationship management has been placed emphasis because it gives managers a better idea of how the company is performing at the customer level (Winer 2001).

3.3.4 Perceived Performance Improvement

Perceived performance improvement deals with managers' perception of the actual benefits from using CRM technology at organizational level in terms of sales growth, market share and profitability.

3.4 Research Hypotheses

Drawing on reviewed literature, the following hypotheses are derived.

H1: There is a positive link between CRM technology and perceived performance improvement.

The assumption is that the CRM technology used to enhance organizational capability of serving customers can be related to the business performance benefits from using CRM technology. This hypothesis is based on previous studies on relation between information technology and business performance as discussed in 2.3.

H2: There is a positive link between CRM technology and perceived customer retention improvement.

The assumption is that CRM technology used to enhance organizational capability of serving customers can be related to the customer retention benefits from using CRM

technology. This hypothesis is based on previous studies on relation between information technology and business performance, as well as that between information technology and customer relationship management, as discussed in 2.3 and 2.4.

H3: There is a positive link between market orientation and CRM technology adoption.
The assumption is that high level of market orientation facilitates adoption of CRM technology; organizations that have higher level of market orientation are more likely to adopt CRM technology. This hypothesis is based on previous studies on facilitators of strategic use of information technology, as discussed in 2.8.2.

H4: There is a positive link between market orientation and perceived customer retention improvement.
The assumption is that with the implementation of CRM technology, the degree of market orientation of an organization can be related to the customer retention benefits from using CRM technology. This hypothesis is based on previous studies on relation between information technology and business performance from firm resource perspective, as discussed in 2.6.

H5: There is a positive link between market orientation and perceived performance improvement.
The assumption is that with the implementation of CRM technology, the degree of market orientation of an organization can be related to business performance benefits from using CRM technology. This hypothesis is based on previous studies on relation

between information technology and business performance from firm resource perspective, as discussed in 2.6.

H6: There is a positive link between perceived customer retention improvement and perceived performance improvement.

The assumption is that customer retention benefits from using CRM technology can be related to business performance benefits from using CRM technology. This hypothesis is based on previous studies on customer relationship management and the relationship between customer retention and organizational performance, as discussed in 2.1 and 2.2.

4. Methodology

This section describes the major research activities with regards to, the operationalization of the research model constructs, the data collection method, the sample population, the questionnaire pretest and the layout of the measurement instruments.

4.1 Construct Operationalization

Whenever possible, well-validated measures from prior empirical research literature were adopted in the questionnaire. The references of measures are listed in the following Table 1. They are discussed in the following sections. The measure of the construct CRM

Technology was developed from previous academic measurement approaches that have been identified as appropriately pertinent to CRM technology.

Table 1. Construct Operationalization

Constructs	**Section in the Questionnaire**	**Number of Items**	**Questions**	**Measure References**
CRM Technology	Section 3 I	7	1-7	Andersen and Segars 2001, Tallon et al., 2000, Bharadwaj 2000, Winer 2001
Market Orientation	Section 1	12	1-12	Narver and Slater 1994
Customer Orientation		4	1-4	
Competitor Orientation		4	5-8	
Inter-function Coordination		4	9-12	
Perceived Customer Retention Improvement	Section 3 II	3	1, 2, 9	Moorman and Rust 1999, Pelham 1997, Deshpande and Farley 1998, Appiah-adu 1999, Zeithaml et al 1996
Perceived Performance Improvement	Section 3 III	3	1-3	Sethi and King 1994

4.1.1 CRM Technology

Seven items measure the extent to which a company's use CRM technology applications to enhance organization's capability of serving customer. This approach is adapted from Andersen and Segars' (2001) study of using information technology to enhance

communication within organization, as well as from Tallon et al., (2000) study of business value of IT. The items emerge from Bharadwaj's (2000) study addressing IT-enabled organizational intangible resources, particularly specific to customer relationship management. Winer's (2001) customer relationship management model also implies the role of information technology in developing a complete customer relationship management prospective. In addition, the items were identified in the literature on CRM referring to the basic and general utilities of CRM technology to companies, regardless the specific type of application is used. Five-point scale is used, with 1 indicating "not at all", and 5 indicating "to great extent." Since no previously validated measure was available for this study, the items were composed and tested in pilot test for content validity. The questions are shown in Appendix D questionnaire section 3 part I (page 114).

4.1.2 Market Orientation

The level of an organization's market orientation is assessed by Slater and Narver's (1994) scale. The measure is uni-dimensional and multi-facet, consisting of 14 items in three components, i.e. customer orientation, competitor orientation, and inter-functional coordination. Five-point Likert scale is used for each item of the measure, with 1 indicating that the business does not engage in the practice at all, and 5 indicating the organization engages in it to a very great extent. The questions are shown in Appendix D

questionnaire section 1 (page 114). This measure is adopted because of its reliability and validity demonstrated in the previous study, as discussed in the following paragraphs.

Reliability And Validity Of Market Orientation Measure

The following discussion may refer to Narver and Slater (1990) scale, it is composite of fifteen questions, whereas their 1994 (Slater and Narver 1994) scale, used in the current study contains fourteen questions of the original fifteen questions. Both scales have been verified in previous studies.

Reliability

The market orientation measure adopted in this study was first developed in the study of the effect of market orientation on business profitability (Narver and Slater 1990). Based on the data from 140 strategic business units (SBUs) of a US forest corporation, the reliability of the measure was acceptable, for coefficient alpha for each component (0.87, 0.72, 0.73), is over 0.70, which is the generally accepted cutoff value. The resultant measure was made of 15 questions. In 1994 this study was replicated with a SBUs sample and a cross-validation sample of SBUs in a diversified manufacturing corporation (Slater and Narver 1994). The reliability test produced similar acceptable result, for coefficient alpha of each component is respectively 0.88, .073, and 0.77. The measure was refined to

14 questions. Deng and Dart (1994) tested the measure with multi-industries data in Canadian business setting, with a sample of 248 firms, the reliability Cronbach alphas for three original components all exceeded 0.70. When applied to samples of service industries, this measure also showed high reliability. Han's study (Han et al., 1998) used the measure to collect data from 134 US banks; reliability test of the measure revealed that each component of the measure is consistent, with coefficient alphas 0.83, 0.79, and 0.79. The same measure with three new items showed high split-half reliability, 0.93 in Chang and Chen's study (Chang and Chen 1998) of 116 retail stock brokerage firms in Taiwan. Further evidence of measure reliability is found in Pelham's study (Pelham 1997), which surveyed presidents and sales managers of US industrial manufacture; the reliability test of its market orientation measure showed that Slater and Narver's scale is consistent, with coefficient alpha of all items 0.96, individual component alpha of 0.88, 0.95, and 0.94. A meta-data study (Deshpande and Farley 1998) compared three market-orientation scales on the same multi-industry, multi-nation sample of 82 marketing executives from 27 companies. Their conclusion was that Narver and Slater's scale has acceptable level of reliability, with Cronbach alpha 0.90. Moreover, for generalizability, they confirmed that geography and industry have little or no effect on market orientation measure. More relevant information is summarized in Appendix A, Measure of market orientation (page 99).

Validity

Validity tests of market orientation measure with Canadian data (Deng and Dart 1994) yielded acceptable results. Convergent validity is suggested by (1) all correlations among four components of the measure exceed 0.75 and are all significant at $P < .001$; (2) high Cronbach alpha (0.8010) attained when scores on the four components are combined into a single scale; (3) one factor solution in an exploratory factor analysis (eigenvalue=2.4697, 61.7% of the variance explained). Discriminant validity is demonstrated by the substantially higher correlation between market orientation measure and the marketing orientation philosophy than the correlations with other business philosophies. Construct validity test of the measure in Han's study (Han et al., 1998) found high loading (over 0.5, 0.52-0.73) of items in each component. Deshpande and Farley's (1998) meta-analysis found that Narver and Slater's scale correlated significantly and positively with an organizational climate scale, indicating strong discriminant validity. More relevant details are summarized in Appendix A. Measure of market orientation (page 99).

4.1.3 Perceived Customer Retention Improvement

A five-point subjective scale is used to assess executives' perceptions on actual customer retention benefits received from using CRM technology. Although no established measure was found from literature review, the previous studies stress the importance of

customer retention to business performance through retaining existing customer, increasing sales to existing customers, and reducing service cost. Accordingly three items were constructed to assess possible customer retention benefits by using CRM technology. The questions are shown in Appendix D, question 1, 2 and 9 of questionnaire section 3 part II (page 115).

4.1.4 Perceived Performance Improvement

MIS literature provides rich dimensions of organizational-level performance measures for assessing business values of information technology. Objective approach uses financial indicators from financial reports or database to measure economic value of IT, such as sales growth, equity, profitability, market share, ROA and ROS, among many others (Bharadwaj 2000, Brown et al., 1995, Kettinger et al., 1994, Sircar 2000). Alternative approach based on subjective measures of managers' perception of organizational performance has been also used in the previous MIS studies. For example, Tallon et al.(2000) measured executives' perception of business value of IT; the subject measure was employed to examine relationship among IT, business strategy, organizational structure and firm performance (Croteau and Bergeron 2001, Raymond et al., 1994). The merits of subjective measures were rationalized that managers may be reluctant to disclose actual performance data if they consider it to be sensitive or confidential (Dess and Robinson 1984). Dawes (1999) pointed out that subjective measures are maybe more appropriate that objective measures for comparing profit performance in cross-industry

studies, because profit levels can vary considerably across industries, and obscure any relationship between the independent variables and company performance. When subjective measures are used, managers can take the relative performance of their industry into account when providing a response. Similar conclusion is found in MIS literature. Results obtained by objective and subjective measurement are comparable and significant, and subjective perception of performance compare well to evaluations of firm performance relative to competitors (Croteau and Bergeron 2001). Therefore this study used three subjective measures, i.e. sales growth, market share and profitability when measuring the performance benefits from using CRM technology.

Perceived performance improvement in this study is assessed by managers' perception of actual performance improvement received through the use of CRM technology. The construct is composed of three items, i.e., sales growth, market share, and profitability in terms of return on investment (ROI) with five-point Likert scale. These items are most frequently used to measure business performance in the above-mentioned reviewed studies; they are used here to understand whether CRM technology has effects on business' bottom line performance. The questions are shown in Appendix D questionnaire section 3 part III (page 115). Although other performance measures are numerous in MIS literature, this study just adopts three items that are indicators of actual bottom line performance benefits of CRM technology.

4.2 Target Respondents of Data Collection

Data has been collected by means of self-administered mail survey. The target respondents are chief executives or general managers of Canadian firms. Due to their seniority, chief executives are in a position to have opinions of center constructs. The choice of target respondents is supported by MIS studies (Tallon et al., 2000) and marketing studies (Narver and Slater 1990, Jaworski and Kohli 1993, Deng and Dart 1994, Pitt et al., 1996, Deshpande and Farley 1998). DeLone and McLean (1992) argue that executives are ideally positioned to act as key informants in a qualitative assessment of IT impacts in their corporations. In addition, executives are often the sponsors of such organization-wide IT initiatives as the implementation of CRM technology, they expectedly can have the access to the information related to business values of CRM technology; therefore they are appropriate to answer the questionnaire.

4.3 Sample Population

The sample consists of nationwide Canadian firms that were extracted from Dun and Bradstreet's database of 2002. The first selection criterion against Dun and Bradstreet's database is that geography of companies covers all provinces of Canada. This study intends to be applied to Canadian firms of all locations. The second criterion is business size; Canadian companies that employ 250 or more employees were chosen. The assumption is that a company of smaller size than this criterion is not likely to have

adopted CRM technology, which may costs millions of dollars. The third selection criterion is the industry of business. Initially, the study focused on financial service firms, because service sector, particularly financial service is information-intensive industry, in which information technology plays a strategic role (Karimi et al., 2001). Earlier study suggested services accounts for about 85% of all IT investment in US (Quinn and Baily 1994). In the financial service and retail banking sectors, many applications of IT are considered strategic necessities (Clemon and Row 1991, Dos Santos et al., 1993, McFarlan 1984, Sager 1988, Venkatraman and Zaheer 1990). The differentiation of service quality, and introduction of new service through IT investment provides competitive advantage. Information technology often becomes the means of delivery of goods and services. However, the search of Canadian firms in finance and insurance categories yielded only 160 companies. Considering the low rate of CRM adoption in Canadian organizations and the generally low response rate of questionnaire survey, more business categories have been included to optimize the opportunity of acquiring sufficient number of responses. In addition, CRM literature reveals that more often than not, companies use CRM technology to analyze data of individual customers to refine marketing strategies, hence, companies sampled in this study are those companies whose customers are individual consumers (B2C), rather than other business (B2B). The seven hundred companies in the final sample are grouped by using Standard Industrial Classification (SIC) as Table 2.

Table 2. Industries in sample

Industries	SIC	Number of Companies in the Sample
Finance, insurance	60xx-64xx, 67xx	154
Service, including business services	70xx, 73xx, 89xx	188
Wholesale trade, retail trade, furniture, home furnishings, and equipment stores, miscellaneous retail	50xx, 51xx, 52xx, 53xx, 54xx, 57xx, 59xx	181
Telecommunication	48xx	22
Electric, gas, and sanitary service	49xx	38
Transportation by air, transportation services	45xx, 47xx, 42xx	53
Others (e.g. manufacturing, construction)	Miscellaneous	64

4.4 Layout of Questionnaire

The main body of the questionnaire consists of the following four parts. The final version of the questionnaire is included in Appendix D (page 112).

Section I Market orientation. This section has twelve questions to measure the degree of market orientation. The respondents were asked to provide their opinions concerning the organization or business unit they are responsible. A five-point Likert-type scale was used, with 1 for "Not at all", and 5 for "To an extreme extent."

Section II This section provides the definition of CRM technology used in this study and asks whether the participating company has implemented any CRM technology application. If the answer is No, the respondents were asked to explain the reason, and fill out the section 4 that deals with the general information.

Section III Use of CRM technology. This section was intended only for organizations that have fully or partially implemented CRM technology applications. This section has four parts.

Part 1 asks respondents to indicate how the use of CRM technology applications affects the ability of their organizations to perform some activities interacting with customers. A five-point Likert-type scale is used, with 1 for "Greatly decreased", 3 for "No impact" and 5 for "Greatly increased".

Part 2 asks respondents to indicate the actual benefits their organizations received through the use of CRM technology. Three questions, i.e. question 1, 2, and 9, are related to customer retention. A five-point Likert-type scale is used, with 1 for "Not at all", and 5 for "To an extreme extent".

Part 3 asks respondents to indicate the impact of CRM technology on the performance of their organizations. A five-point Likert-type scale is used, with 1 for "Greatly decreased", 3 for "No imapct", and 5 for "Greatly increased".

Part 4 asks respondents to provide some information about how CRM technology is deployed in their organizations. The questions are of either multiple selections type or open-ended type.

Section IV General Information. This section collects demographic background information of respondents and their organizations.

4.5 Pretest of Questionnaire

Prior to mailing the questionnaire to participating organizations, two faculty members and one PhD student who are familiar with the topic of this study were consulted to evaluate the content of the questionnaire. Then the face validity of the survey instrument was assessed by a panel of 7 managers whose organizations have implemented or are in the process of implementing CRM solutions, and 6 business consultants in CRM area. The business managers were from organizations that represent the sample companies, as well as they were approximately representative of future respondents. The pre-testing group was asked for advise about wording of items and data-gathering plan. This pilot study ensured that the survey instrument was clear, concise, easy to reply, and the measurement items expressed their intended meaning and were not misleading. The cover letter and the questionnaire draft were sent to the pre-testing group by e-mail or fax, explaining the purpose of the study and asking them to reply to a set of questions concerning the quality of the questionnaire itself. A total of 13 persons out of 36 in the

pre-testing group replied. The feedback addressed the layout of questionnaire, phrasing of the questions, the measurement scales, and the suitability of the questions. Also new questions were suggested to be included in the questionnaire. The feedback was carefully analyzed and subsequently some changes were made to the questionnaire.

Most significant changes are discussed below. The first change concerns the measure of market orientation. Although the measure, including the original questions and scale were adopted from previous studies and were well validated, several replies in pretest commented that each of two specific questions had two dimensions, and that should be separated into two questions. For this reason, additional questions were included to avoid double-barrel questions and ensure the clarity of reply. Twelve of original fourteen questions remained in the final version of the survey instrument. Some minor changes in the wording of the questions were made. Moreover, original measure used seven-point Likert scale, which was deemed difficult to work with by pretest respondents. Therefore five-point scale was adopted. Similar approach is not unusual in previous studies, in which established measures have been modified to fit for a particular study sample. The consequent data analysis in such situations did not reveal adverse effect because of five-point scale (Deng and Dart 1994). Section 4 asked the respondents to indicate the number of employees and annual revenue. Since this information was reported to be sensitive; check boxes of ranges were used instead. The pilot participants also expressed some concerns that CRM technology may mean differently to different respondents, therefore a definition was added to clarify what information systems applications should be taken

into consideration when responding to the questionnaire. The final versions of the questionnaire can be found in Appendix D (page 112).

4.6 Data Collection

The pre-tested questionnaires together with the cover letter were mailed to target respondents. The cover letter, as in Appendix B (page 108), stated the nature and purpose of the study, as well as ensured the voluntariness of participation, confidentiality of information collected and anonymity of respondents. 700 questionnaires were sent out in the first week of May 2002. One week later, follow up letters, showed in Appendix C (page 110), were sent to the same target respondents. An electronic version of the questionnaire was uploaded on a website provided by Concordia University, this enabled respondents to download in case they did not have the questionnaire available to them due to lost mail or other reasons.

Among the 700 mails distributed, twenty-seven were returned because of incorrect addresses. Eleven organizations replied by mail, fax, phone or email that they could not participate to the survey due to corporate policy, or personnel change, or unavailability of executives before the specified return date, which was two weeks after the first mail date. A total of 94 questionnaires were received, this yielded an initial response rate of 14.0%. Among them, three responses were not included in the analysis because too many questions were not completed or not properly filled. The remaining 91 responses were

categorized as 52 CRM adopters and 39 non-adopters. Eleven of non-adopters were self-reported as public service agencies or regulated monopolies in the market, thus some questions that describe the behaviors of organizations seeking profitability or competitive advantages were not applicable to them. This portion of responses was not included in the analysis. Hence there are 80 useful observations left, with 52 CRM adopters and 28 non-adopters.

Possible reasons for low response rate are (1) CRM technology implementation is in the early stage, majority of sample companies may have not used CRM technology and may not consider to gain helpful results from participating in the study; (2) questionnaires were sent to senior managers or executives who normally have busy agenda, therefore could not find time to reply or because they could not meet the specified return date.

In order to check for non-response bias, the primary industry of respondents was compared with that of the companies in the whole sample. This information is taken from the respondents' answer to one background information question, as well as from the SIC (standard industrial classification) codes of individual company in the sample. It is discerned that in the response, financial service industrial section is more represented than it is in the surveyed sample, 33.8% of the total responses versus 22% of the sample; the same is true for retail trade, 21.3% versus 16.9%; and business service are less represented, 16.3% versus 25.7%. The rest of industrial sections, i.e., transportation, energy utility, telecommunication, wholesale, have their fair representatives in the responses. Their frequency percentages in the response are very close to those in the

surveyed sample. Therefore it can be argued that non-response bias is minor. In other word, those who did respond to the questionnaire were the representatives of the surveyed sample. Alternatively, the relatively high response from financial service section confirmed the conclusion from previous studies and initial proposition that this industrial section invest more actively in information technology in transforming business operations to attain cost-effectiveness.

5. Data Analysis

This section reviews the procedures and processes that were used to evaluate and analyze the collected data. The contents covered include demographics of the collected data, the chosen statistical analysis and structural modeling tools used in this study, and the assessment of the measurement model using the Structural Equation Modeling techniques.

5.1 Demographic Analysis

This section describes the general background information of respondents and their organizations.

5.1.1. Respondent Information

Among the eighty responses that were analyzed, 58% of them came from top executives holding positions with titles such as president, vice president, CEO or general manager. The count and percentage of each job title held by the respondents are listed in Table 3.

Table 3 Respondent Job Title

Job Title	Frequency	Percent
President / CEO	17	21.30
Marketing / Sales Vice President / Manager	18	22.50
Store / Branch Manager	11	13.80
Customer Service Director / Manager	8	10.00
General Manager	7	8.80
Information Technology /Systems Vice President / Manager	4	5.00
Others	14	17.70
Unknown	1	1.30
Total	80	100.00

Seventy-nine of these eighty respondents reported the length that they have held their positions. The maximum tenure is thirty-five years, while the minimum is four months. The average tenure is 5.5 years, with 75% of all respondents have held their position for the last six years. Therefore, these respondents are in good positions for describing characteristics of their organizations.

5.1.2 Company Information

The responding companies also reported their industrial sections according to their major activities. Companies in financial service take more than one third of analyzed data cases. and retail companies make the second largest group. The count and frequency of companies' industry are listed in Table 4 (page 56) Company Information. Two of eighty companies did not specify their industrial section.

Nearly 40% of responding companies has between 250 and 500 employees, 8.8% of companies is large ones with employees more than 5,000. About 43% of companies have employees numbering between 1,000 and 5,000. The count and frequency of companies' employee number are listed in Table 4 Company Information. Two of eighty companies did not specify their employee number.

The size of responding companies in terms of annual revenue fell into 4 groups. About 70% of companies reported that their annual revenue was between 25 million to 1 billion Canadian dollars. The count and frequency of companies' annual revenue are listed in Table 4 Company Information. Five of eighty companies did not specify their employee number.

Table 4. Company Information

Primary Industry

Primary Industry	Frequency	Percent
Financial Service	27	33.80
Retail	17	21.30
Business Service	13	16.30
Transportation	7	8.80
Energy Utility	4	5.00
Telecommunication	2	2.50
Pharmaceutical	1	1.30
Whole Sale	1	1.30
Others	6	7.50
Unknown	2	2.50
Total	80	100.00

Employee Number

Employee Number	Frequency	Percent
250---500	31	38.80
501---1000	13	16.30
More than 5000	7	8.80
1501---2000	6	7.50
1001---1500	5	6.30
Less than 250	5	6.30
2001---3000	3	3.80
3001---4000	1	1.30
4001---5000	3	3.80
1001-1500	2	2.50
1501-2000	1	1.30
4001-5000	1	1.30
Unknown	2	2.50
Total	80	100.00

Annual Revenue

Annual Revenue	Frequency	Percent
CAN$25 to $100 million	32	40.00
CAN$100 million to $1 billion	24	30.00
More than CAN$1 billion	14	17.50
Less than CAN$25 million	5	6.30
Unknown	5	6.30
Total	80	100.00

5.1.3 Use of CRM Technology

The respondents reported the functional areas (i.e. Customer support and service, Sales, Marketing or other functions) where CRM applications have been implemented. Among 52 CRM adopter companies, 84% has CRM applications in more than one function. Forty-eight of fifty-two companies have more than one type of CRM application (i.e. Campaign management, Sales force automation, Customer data warehouse/data mining, Interaction network including web, call center or email). 40% of companies adopted hybrid development method, developing in-house together with vendor or customizing off-the-shelf package. Nineteen of fifty companies have developed CRM applications only by its own IT personnel, while eight companies only used off-the-shelf packages.

The survey instrument included an open-end question asking the respondents to list the top three business objectives of their CRM technology application projects. Based on the frequencies in the responses, the most common objectives are: colleting customer information and understanding customers' needs, 29% of respondents; enhancing service consistency and improving customer experience, 27%; increasing marketing capability for better targeting, campaign managing, 25%; increasing customer retention and loyalty, 17%; increasing sales 13%; improving efficiency, 10%; and sharing information with customers 10%.

5.2 Measurement Assessment

Five of fifty-two CRM adopter companies reported that it was too soon for them to evaluate the benefits and performance impact of CRM technology; the relevant section in the questionnaire were not completely filled. The data of these companies were not included in the measurement and regression models for testing hypotheses. Hence 47 observations were analyzed. In order to preserve as many observations in the sample for analysis as possible, mean replacement of missing data was performed on a case-by-case basis. Individual missing values were replaced with the mean of items within the same construct. In total three missing data were replaced.

5.2.1 Data Distribution

Since normality of variable distribution is the assumption of statistical tests, it is important to examine data distribution. Outliers can have potentially dramatic effects on distribution. Checking outlier was accomplished by visual examination of the plots of each measured variable. No observation that was three standard deviations from the mean of the distribution and not close to other observations was identified.

The non normal distributions are characterized by skewness and kurtosis. Nonzero skewness is indicative of a departure from symmetry; negative skewness indicates a distribution with an elongated left-hand tails. The skewness for a normal distribution is

zero. Kurtosis indicates the extent to which the height of the curve (probability density) differs from that of the normal curve. Positive kurtosis is associated with distribution with long thin tails. The kurtosis for a standard normal distribution is three. Skewness of all measure items, as in Appendix E (page 118), is between −1.030 and 0.472, Kurtosis is between −1.077 and 1.841. It is decided that the distributions of items are approximately normal distribution.

5.2.2 Measure Reliability and Validity

The two parts of this section starts by discussing the methods of assessing reliability and validity of measures used, and then the results of assessment are discussed.

Assessing Reliability

Consistency among items indicates reliability when a measuring instrument uses the multiple items to assess a trait. Cronbach α is normally used as an indicator of the degree to which responses to the items on a measure are similar. It is widely agreed that 0.70 is an acceptable reliability coefficient (Nunnally 1978).

First-order factor analysis was conducted for each construct. The number of factor to extract is subject to theory of each construct. Extraction method is maximum likelihood,

and rotation method is direct oblimin. These two methods are consistent with previous studies. The loadings of items of factors were examined to determine whether the item should be retained. Items with loading that is less than 0.5 were removed. Confirmatory factor analysis (CFA) was performed using structural equation modeling software EQS program to validate the measures. CFA is suitable when there is evidence from previous research that the items have factored correctly (Bollen 1989). Since items of market orientation measure had been extensively tested in the previous surveys, using CFA for this measure was justified. At the same time, CFA was also used to confirm the items of the measure of CRM technology developed from previous studies.

EQS provides several goodness-of-fit indexes that address statistical and practical fit, as well as model parsimony. One of main concerns using EQS program is the sample size, which may distort the result if too small. The commonly accepted limit is that the sample size should be at least ten times of the number of variables in the model. Given the sample size of this study, namely forty-seven, it is viable to use EQS to do reliability and validity assessment for the measures of constructs, but it would be inappropriate to use EQS program to test the hypotheses. When some or all variables of the measures of constructs would be included in the model to test the hypotheses, the required sample size of which would exceed the size of available sample.

The parameter estimation method is Maximum likelihood (ML Robust in EQS), which has been the most commonly used approach in structural equation modeling. ML is derived under normal distribution assumptions, and its estimates have been found to be

quite robust to the violation of normality. ML is recommended for smaller sample size (<200), when data are not multivariate normal, yet the distributions are not substantially non-normal (Bentler 1992a, Bentler and Wu 1993, Finch and Curran 1995).

Traditionally overall model fit has been based on the χ^2 statistic; however given the known sensitivity of χ^2 to variations of sample size, numerous alternative indexes of fit were consulted with the reference to the statistical power of the test.

The χ^2 goodness-of-fit test indicates the degree to which the pattern of parameters specified in a model is consistent with the pattern of variances and covariances from a set of observed data. The null hypothesis H_0 Σ (θ) (model covariance) =Σ (population covariance matrix) is rejected if the value of the T statistic, T=F*(N-1) exceeds a T_α in the χ^2 distribution at an α level of significance (0.05). F is the fitting function, and N is sample size. Comparative Fit Index CFI indicates the relative reduction in lack of fit as estimated by the non-central χ^2 of a target model versus a baseline model (Bentler 1990).

Smaller values of the χ^2 goodness-of-fit test indicate better fit (Hoyle 1995); its values are evaluated relative to the number of degree of freedom available for the test available for the test. However, ML can produce χ^2 values that become too large when the data become increasingly nonnormal; or when sample size is small, even when multivariate normality is present (Finch and Curran 1995). Since the sample size of this study is small, χ^2 values are discussed when necessary.

CFI varies between 0 and 1.0, and 0.90 is widely agreed as a value that the index should exceed before a model can be viewed as consistent with the observed data from which it is estimated (Hoyle 1995). Though the larger values are more desirable, CFI values are not statistics; there is no definitive critical value. Non-normal data distribution has small downward bias (3-4%) (Finch and Curran1995).

To assess feasibility of parameter estimates, the first step is to review the fit of individual parameters by determining the plausibility of their estimated values. Any estimates falling outside the admissible range signal that either the model is wrong or the input matrix lacks sufficient information. Examples of parameters exhibiting unreasonable estimates are: (1) out-of-range covariances (standardized estimates greater than 1.0); (2) standard errors that are abnormally large or small, a standard error approaching zero usually results from the linear dependence of the related parameter with some other parameters in the model; (3) negative error variance. The second step is to check statistical significance of parameter estimates. The test statistic represents the parameter estimate divided by its standard error; as such, it operates as a z-statistic in testing that the estimate is statistically different from zero. Based on an α lever of 0.05, the test statistic needs to be greater than 1.96 in absolute value before the hypothesis, which states the estimate equals 0, can be rejected. Based on above methods and processes, measure of each construct in the research model was evaluated.

CRM Technology

The construct is measured by 7-item scale. The reliability of the scale was verified with Cronbach α value, which is 0.777. First-order factor analysis result, as in Appendix F (page 119), indicates that two items have low loading, less than 0.5, on the factor, and they were removed. The remaining five items were tested in one-factor model, χ^2 (df=4, N=47)= 4.173, p=0.383, CFI=0.997. All parameters are significant. The model was considered adequate. The reliability of five-item scale is satisfactory with Cronbach α value 0.776. The correlations among five final items are significant, as in Appendix G (page 120). While average absolute standardized residuals (AASR) and largest standardized residuals were examined, it was found removing one item would not weaken overall fit of model, $\chi 2$ (df=1, N=47)= 0.65, p=0.42, CFI=1.00, with all parameters significant, in addition reducing AASR to 0.01, well below 0.05. The remaining 4-item scale has acceptable correlation coefficient Cronbach α of 0.772. The global score of this construct was calculated as the average of four items' scores.

Market orientation

The measure was adopted from Slater and Narver's (1994) scale, and was modified based on feedback of the pilot test. Though the scale was well established by previous studies, it is worthwhile to revisit its properties due to the modification. This should ensure the key premises that the hypotheses rest on.

The analysis methods followed those used in Slater and Narver's study, as well as other studies in the same stream. The conceptualization of market orientation is a uni-dimensional construct with three components (customer orientation, competitor orientation, and interfunctional coordination).

The reliability of 12-item scale was estimated by Cronbach α value. Since the overall α is 0.825, which is over the generally accepted threshold value 0.7 (Nunnally, 1978), the measure indicates a high level of internal consistency.

To determine whether the three dimensions of market orientation hold in this study and whether items selected as measures of these three dimensions were appropriate, all twelve items were put into first-order factor analysis with a direct oblimin rotation. The loading for three factors shows some discontinuity for three factors, as in Appendix H (page 121), but four of twelve items have concurrent low loading (<0.5). The result reveals that the items exhibited an inability to discriminate among the three hypothesized dimensions of market orientation. This suggested that three factors should not be retained. After removing these four items, confirmatory factor analysis was used to test three-factor model. The overall model seemed to be fit, χ^2 (df=13, N=47)= 26. 487, $p<0.05$ (0.0146), CFI=0.845, not all parameters were significant. Hence three-factor model was not adequate.

Since previous studies have suggested that market orientation can be a one-factor unidimentional construct (Bhuian and Abdul-Gader, 1997), a new factor analysis was

performed. As in Appendix H (page 122), only one factor was extracted, eight of twelve items had loadings over 0.5, and one-factor model has an overall fit, with χ^2 (df=19, N=47)= 32.644, p<0.05 (0.0264), CFI=0.856, and all parameters are significant. Upon an examination of standardized residuals, two items with largest standardized residuals were omitted, and resulting final one-factor six-item model produces strong measures of fit between the data and the proposed measurement model, with χ^2 (df=8, N=47)= 11.46, p=0.18, CFI=0.95, all parameters are significant and have reasonable values, between 0 and 1.0, and average absolute standardized residuals=0.0390.

The reliability of final six-item scale is 0.757, which is still acceptable. Sixty percent correlations among the six items are significant, as in Appendix I (page 123).

Thus, the final result confirmed the unidimensionality of the scale. The scale was accepted as one-dimensional construct, and this operationalization is consistent with that by Narver and Slater (1990), Slater and Narver (1994), Jaworski and Kohli (1994). Among the final six items as in Appendix I (page 123), two items are from original customer orientation component, one from competitor orientation component, and three from interfunctional cooperation component. Hence the remaining six items capture the essence of the conceptual construct. The overall market orientation score was calculated as the average of six items as in the above-mentioned previous studies.

It is noted that from factor loading, three-factor solution seems to be a better choice over one-factor solution. However, three-factor model has poor model fit, whereas one-factor

solution provides seemingly acceptable model fit. Admittedly, due to the small sample size of this study, the analysis may not produce an accurate assessment of the measure, consequently it is realistic that the results of analysis should be interpreted with caution, and the conclusion may not be definitive.

Perceived Customer Retention Improvement

A three-item scale measures this construct. All of the three customer retention items have loading over 0.5 in first-order factor analysis, as in Appendix J (page 124). Cronbach α value is 0.790, suggesting acceptable reliability. Three items correlate to each other significantly, as in Appendix K (page 125). The global score of this construct was calculated as the average of three items' scores.

Perceived Performance Improvement

All of the three performance items have loading over 0.5 in first-order factor analysis, as in Appendix L (page 126). Cronbach α value of 0.841 assures the reliability of the scale. All correlations among three items are significant, as in Appendix M (page 127). The global score of this construct was calculated as the average of three items' scores.
To conclude the assessment of measure reliability, the retained items in each measures appeared to provide better measurement of constructs.

Assessing Validity

The validity of a measure is its degree of accuracy. A perfectly valid measure assesses the trait it is supposed to assess, assesses all aspects of the trait, and assesses only that trait. Content validity depends on how well items over the content domain of the variable being measured (Nunally 1978). Discriminant validity provides evidence that a measure does not assess what it is not supposed to assess. Convergent validity refers to the degree to which the measure assess what it is designed to assess.

Content Validity

The items of main constructs are based on a comprehensive literature review and/or have been validated in previous empirical studies. The measures were also validated in the pretest described earlier. Although a subjective judgment, the items appear to have high content validity.

Discriminant Validity

Given the presence of multiple constructs in the research model, discriminant validity need also be assessed to find out the extent to which the constructs as measured are unique from each other. When item discriminant validity was examined, as in Appendix

N (page 128), all items of four main constructs correlate significantly higher with the constructs they were presumed to measure than with any other constructs. Construct discriminant validity was verified whether the correlation between any two constructs is significantly different from unity. If the confidence interval around the correlation excludes 1.0, then the discriminant validity is considered to be at an acceptable level.

As in Appendix O (page 129), the correlation between market orientation and customer retention business value is the largest, with a value of 0.625. The 99% confidence interval for the correlation coefficient ranges from 0.34 to 0.81, and thus excludes 1.0. The construct measures are discrimnant valid.

Convergent Validity

Correlation matrix of items of the constructs, as in Appendix G, I, K, and M (page 120, 123, 125, 127), shows strong correlation among the items, indicating a converging validity. Moreover, as shown in Appendix N (page 128), items have high item-scale correlations, which far exceeds 0.40, the correlation score generally accepted as the minimum standard, suggesting that items converge to their respective common construct. The significant values of the tests for the parameter estimates of the items also suggested the presence of convergent validity.

5.3 Hypotheses Tests

The hypotheses were tested by linear regression analysis, since the available sample size is too small for hypotheses model to be tested with EQS as discussed in 5.2.2. Due to the fact that 10% respondent whose company adopted CRM technology reported that they could not evaluate benefits of CRM technology, because their CRM technology implementation was in early stage, it was speculated that there is a time lag for business value of CRM technology actually can be measured. Moreover, typically the participating companies reported that their CRM project is completed by 59%; and 25% companies claimed that the reasons why they have not achieved expected benefits from their CRM technology projects were ones such as "too early to judge", "still working on the processes", "ongoing process". Therefore, project completion percentage was included as control variable when testing the relation between constructs. Nonetheless, it did not show a positive significant effect on the relations among constructs. Additional tests revealed that the company size and primary industry have insignificant regression coefficient, affecting little the direction and strength of the relations between main constructs. To confirm this conclusion, the interaction terms were tested and did not show significance. Therefore, project completion percentage, industry type and company size do not moderate the relations between main constructs.

Table 5 Hypotheses Test

Independent / Dependent	Perceived Performance Improvement	Perceived Performance Improvement	Perceived Customer Retention Improvement	Perceived Customer Retention Improvement	Perceived Performance Improvement
Market Orientation	0.559 (0.150)**		0.932 (0.194)**		
Perceived Customer Retention Improvement					0.424 (0.087)**
CRM Technology		0.326 (0.133)*		0.608 (0.175)**	
Covariate					
Project Completion Percentage	0.100	0.183	0.194	0.282	0.022
R^2	0.283*	0.170*	0.425**	0.313**	0.386**
Adjusted R^2	0.251	0.132	0.399	0.282	0.358

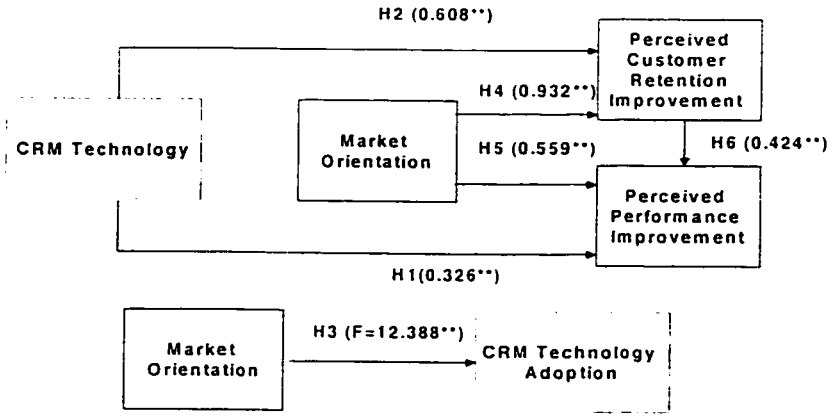
Number in the Table is unstandardized coefficient and standard error in bracket.

*P<0.05, **P<0.01

Table 5 indicates that Hypothesis 1 was accepted, hence there is a significant and positive association between CRM technology and perceived performance improvement. Hypothesis 2 was supported; this means there is a significant and positive association between CRM technology and perceived customer retention improvement. Hypothesis 4 concerning a significant and positive link between market orientation and perceived customer retention improvement was supported. Hypothesis 5 is supported; there is a positive link between market orientation and perceived performance improvement. Hypothesis 6 was supported; this means there is a positive and significant relation between perceived customer retention improvement and perceived performance improvement. In all cases, the regression models are highly significant, with independent variables explaining significant amount of variance.

For Hypothesis 3, one-way ANOVA was used to test the difference in the means of market orientation scores between CRM technology adopter group and non-adopter group. The mean of non-adopter group is 3.3103, adopter group 3.7680. The test of homogeneity of variances Levene F test shows that at significance level 0.05, market orientation scores of two groups have equal variances. Based on the valid assumption of equality of variance, one-way ANOVA produced $F=12.388$, $P<0.05$, hence the means of two groups are not equal. This implies that the market orientation score of the adopter group is significantly higher than that of the non-adopter group.

To conclude hypotheses tests, all hypotheses in the research framework were supported as shown in the Figure 4.



P<0.05, ** P<0.01

Figure 4. Results of hypotheses tests.

6. Discussion

This section deals with elaboration of the findings in this study, conclusions, contributions, limitations and future research.

6.1 Findings

This section discusses the results of the hypotheses tests.

6.1.1 CRM Technology, Perceived Customer Retention Improvement, and Perceived Performance Improvement

In this study, surveyed companies achieved performance improvement when using CRM technology to enhance capability of serving customers. Looking at the survey questionnaire section III part 1, the questions, remained in the data analysis disclosed the four ways that companies using CRM technology to enhance their abilities to serve customers, namely (1) find out customers' future needs for product/service; (2) develop customized offerings (3) detect changes in customers' preference; (4) select desired customer segments to focus. The study suggests that when companies use CRM technology to enhance their capabilities of serving customers by better understanding customers and responding to customer information, companies can expect improvement

in customer retention and performance. The finding of CRM performance benefits is in consistent with some of previous studies about IT value. For example, investing in IT leads to organizational profitability (Devaraj and Kohli 2000); the use of strategic information systems resulted positively in market share growth and profitability (Brown et al., 1995, Kettinger et al., 1994); particular IT/IS applications demonstrated business value (Nault 1995, Mukhopadhyay et al., 1995).

6.1.2 Market Orientation as a Facilitator for the Adoption of CRM Technology

It might be inferred from the data analysis that one of major reasons why non-adopter group is not implementing CRM technology is the lack of high level of market orientation. The reply of survey questionnaire provided some support to this inference. When asked why CRM application has not yet been implemented, 25% respondents gave reasons such as, "managers don't believe there is a single customer that needs anything special", "the value of CRM has not been universally accepted by the executives of the company", "lacking management commitment". These replies suggest that to certain extent, companies that have not adopt CRM technology might not have actively focused on business thinking and environmental events that are likely to affect their ability to maximize customer value relative to competitors.

6.1.3 Market Orientation, Perceived Customer Retention Improvement, and Perceived Performance Improvement

The support for the links of market orientation---perceived performance improvement and market orientation---perceived customer retention improvement answers one of the research questions, i.e. is the level of market orientation related to performance benefits from implementing CRM technology. This suggests that a market-oriented company may gain more performance benefits from its investment of CRM technology in terms of sales growth, market share and profitability. This illustrates the importance of market orientation in implementing CRM technology aiming to improve business performance.

The result of this study suggests that market-oriented companies share some characteristics. Looking at the survey questionnaire section 1, the questions, remained in the data analysis disclosed the six ways that companies deal with customers, competitors, and inter-functional coordination, namely (1) constantly monitor their employees' commitment to serving customers' needs; (2) their strategies are driven by the beliefs of creating greater value for customers; (3) they rapidly respond to competitive actions that threaten them; (4) they freely communicate information about their unsuccessful customer experience across all business functions; (5) all of their business functions are integrated in serving the needs of target markets; and (6) all of their managers understand how everyone in their business can contribute to creating customer value. Since market orientation is related to customer retention improvement and performance improvement, a lesson can be learned about changing organizational culture and increasing market orientation to attain more benefits from investment in CRM technology. The fact

revealed in this study, that is, companies that have these characteristics are more likely to achieve performance benefits from implementing CRM technology, confirms the speculation posed at the beginning of the study. This provides preliminary evidence that market orientation can be recognized as one firm-specific factor that explains difference between companies in terms of actual benefits received from using CRM technology. This conclusion is consistent with previous research (Kettinger et al., 1994, Brown et al., 1995) on relations between firm resources and the benefits of IT investment. Based on this study, it seems that to make CRM technology bring improvement to customer retention and overall performance, market orientation is one of organizational resources that companies can leverage to take advantage of investment in CRM technology.

Three themes of market orientation emerge from the six items of market orientation. The first theme is derived from items 1 and 2, that is, the management commitment to customer value creation, and customer is in the center of the organizations thinking about strategy and operation. This is important to CRM technology implementation, because information systems cannot think or feel; it is people in the organization that make the technology work. It is reasonable that management commitment to creation of customer value is requires a deep understanding and an interest in customers. If customer focus is shared and become a norm throughout the whole company, the management and employees may pay attention to a new system that provides tools to understand and serve customers. Hence the new systems may be less difficult to be accepted by the organization and may be used properly. As a result, the organization may get benefits from investment in CRM technology in terms of customer retention and overall

performance. The second theme of market orientation is derived from items 4, 5, and 6, that is, inter-functional coordination. Understanding and responding to customers' needs and competitors capabilities are done in a systematic and synergetic manner. It can be argued that inter-functional coordination is important in implementing CRM technology, because a collaborative organization aligns the organization around a common vision and supports employees in managing the change surrounding a CRM initiative. Since employees and management communicate openly when things with customers did not go well, such an organization might also have better chance to learn from mistakes and make necessary changes in deploying CRM information systems. Moreover, since in these organizations functions are integrated for customer needs, and value of individuals are recognized by management, it might be argued that in such organizations business partners, IT staffs, customer service and sales representatives might join in developing and implementing of CRM applications. Thus there would be communication and knowledge sharing that maintain support at all levels of the organizations. Previous research also supported the finding that inter-functional coordination is vital in CRM technology implementation (McDonnell 2001).

The third theme of market orientation is derived from item 3, i.e. rapid response to competitors' actions. The interpretation of this theme in the implementation of CRM technology is not obvious. It is possible that companies invest in CRM technology once they realize that their competitors are doing so and are changing the landscape of competition. And market oriented companies may learn from their competitors' experience of implementing CRM technology and thus attain performance improvement.

6.1.4 Perceived Customer Retention Improvement and Perceived Performance Improvement

The link between customer retention and performance measures has been established in previous studies. For example, there is a positive and significant relation between customer retention as part of firm effectiveness and profitability (Pelham 1997). Therefore it is not surprising to find that perceived customer retention improvement is related to perceived performance improvement. A possible interpretation of this link is that when a company can keep customer engaged in its product and service in more efficient and profitable way by suing CRM technology, they may have better chance to achieve business performance improvement. It is reported in the survey that as a result of deploying CRM technology, 69% respondents can better measure customer retention; 67% respondents can better measure customer value. This information corroborates the conclusion that customer retention is used by companies to signify the benefits of CRM technology.

6.2 Conclusion

This study has achieved four objectives. First, the CRM technology used to enhance organizational capability of serving customer is linked to customer retention improvement and performance improvement. Second, high level of market orientation is related to the adoption of CRM technology. Third, the organizational market orientation

is related to perceived customer retention improvement and perceived performance improvement. Fourth, improvement of customer retention is linked to performance improvement. The findings of this study should serve as healthy reminders to managers that a market orientation culture should be considered when evaluating effectiveness of investment in CRM technology. As implied, besides implementing CRM technology, the entire organization must embrace the value of continuous creation of superior value for customer: all business processes should be directed at discovering latent needs of customers and providing benefits to offer to the customers. The attainment of CRM-technology-based performance improvement may be more of a process of enhancing a norm of cross-functional customer value creation. This study also recognized the business value of CRM technology and the enabling role of CRM technology in customer relationship management. And last customer retention can be used as a measure of the effects of CRM technology.

6.3 Contributions of This Study

This section discusses the implications of this study to academic research and management of information technology.

6.3.1 Academic Implications

Given the novelty of CRM technology and paucity of research in the field of CRM and on Canadian firms, this research contributes to existing knowledge in several ways. The current research adds to theoretical and practical understanding of business value of information technology. The organizational implications associated with managing information technology are recognized. This study covers the areas overlooked in the prior MIS and marketing management studies. The findings establish the approach of relating the following important constructs, i.e., CRM technology, market orientation, and customer retention improvement and firm performance improvement. The significance of this study is that it applies theories of IT value to a specific IT application, CRM technology. Importance of this study is also demonstrated in that it explores the role of market orientation as one of firm resources in the implementation of CRM technology. To a certain extent, the link between market orientation and performance improvement found in the study filled the gap identified in the reviewed previous research. In addition, customer retention is used to assess the effects of information technology on firm performance, whereas in MIS studies, customer-based performance measures are not placed sufficient emphasis.

This study establishes a direct link between CRM technology and business performance improvement. Previous studies attempted to investigate the value of IT investment by linking IT and business performance and interpreting the link as IT effect on business

performance. This study takes a different route and demonstrates the link between CRM technology and business performance benefits.

This study uses an intermediate performance measure, i.e. perceived customer retention improvement, which has not been widely used in the reviewed previous studies as a measure of benefits from IT investment. The result confirmed the practical relevance of such choice. The survey indicates that customer retention and sales growth are relevant measures to evaluate effect of CRM technology.

The previous studies of market orientation are largely done with US organizations (Uncles 2000). Development of related concepts in different countries have been worked by researchers, such as Dawes (2000) in Australia, Au and Tse (1995) in Hong Kong and New Zealand. The current study replicates the conceptual model of market orientation within Canadian business environment, and hence it is an extension of previous studies. Although features of Canadian business did not change the significance of the measure market orientation, current study showed that the original items could be improved by, for example, removing double-barrel type questions.

6.3.2 Managerial Implications

This study addresses current technological and business issues, especially CRM technology application, which is still given extensive consideration by organizations

when deciding IT investment. Customers of Internet era expect speed, convenience, control and personalization. Companies will have to achieve new heights of customer relationship management and service excellence. The effective use of enabling technology such as CRM is already a strategic differentiator (Sivinski 2002).

This study focuses on one specific information technology application, i.e. CRM technology. The findings can help in management decision making when questioning whether CRM technology will be cost-effective. One lesson can be learned from this study: company can benefit from CRM technology when it is used to enhance capability of serving customers.

This study points to an organizational factor related to CRM success, identifying the link between market orientation and performance improvement in CRM technology implementation. An understanding of market orientation may help to explain why some companies are able to exploit CRM technology successfully while others are not. Thus management can direct attention at cultivating marketing orientation and building an desired organizational culture, so that CRM technology projects can thrive. "Unless the desired customer-value commitments and behaviors emanate from the organization's culture, the commitments and behaviors will not endure, not to mention command the attention and allegiance of all functions in the organization (Narver et al., 1998)." Customer relationship management requires a deep understanding of customers; it takes very often a culture change to serve customer properly. A market orientation is a business culture, in which the core value is that all employees are committed to the continuous

creation of superior value for customers. Values guide action and attitudes, key values concerning behaviors and the way things are in an organization are shared across units and levels (Chatman 1991). Hence in order to create a market orientation, it is required first to implanting the core value of an organizational commitment to continuously create superior value for customers; and second to develop the requisite resources, incentives, skills, and continuous learning to implement the core value (Narver et al., 1998). The six characteristics of firms that achieved more measurable benefits from CRM technology provide some directions of enhancing market orientation. According to this study companies could monitor employees' commitment to serving customers' needs, examine whether their strategies are based on creating greater values for customers, integrate business functions to serve customers, encourage open communication about problems in serving customers, and recognize individual's contribution to creating customer values.

Furthermore, the link between customer retention improvement and performance improvement suggests that when deploying their CRM technology, company may prioritize applications and focus on processes that can contribute to maintaining existing customer base, increasing sales to current customers and reducing service cost. The customer retention improvement can also used to evaluate CRM technology investment.

Last, companies that have not implemented CRM technology, but wish to do so, might consider taking appropriate actions to encourage the presence of customer-centered behavior and attitude, so that organizations can be prepared for the change required for

the adoption of CRM technology. Companies can bring about organizational changes and implant the desired norm of continuously creating superior value for customers.

6.4 Limitations

This research is limited in several respects. First, ideally the sample size should be larger for data analysis to attain more robust conclusion.

The measures of main constructs such as CRM technology, customer retention improvement were inferred from other IT value studies or derived from theories; their reliability and validity can be sample-specific for this study. The absence of multiple samples to confirm the measurement models might make the hypothesis test results tentative.

This research uses respondents' perception as proxy measures for realized performance improvement from using CRM technology. The legitimacy of perceptual measures is open to debate. Executives may exaggerate their views on CRM technology. The complexity of cooperation operation and market uncertainty complicates the task of giving an accurate assessment of the "true" payoff from CRM technology. Nonetheless, it is aware that objective assessments can be used to provide support to the conclusion.

Cross-sectional data was used, and it could not be controlled for potentially unobservable firm-specific effects. A selection bias is to be expected in this study. For example, companies have better results of CRM implementation may be more likely to respond to the survey. Moreover, the use of key informant has its own problem. A common respondent provides information about both independent and dependent constructs, thus introducing a halo-effect. Senior managerial staff can have holistic view of entire business, while lower –level staff are closer to customers and the business operational process. Hence multiple respondents would help collect views of different and more comprehensive facets of business, yet that might create other difficulties such as representing and reconciling possibly conflicting viewpoints (Uncles 2000).

Possibly, many factors influence performance improvement from using CRM technology, however in survey-based fieldwork, it is hard, if not impossible to control for these other factors. In-depth personal interviews may generate more reliable data than self-completion mailed questionnaires.

The current study relies on cross-sectional studies, while literature suggests there can be a time lag between investment on IT and realized benefits. Though in this study project completion percentage did not show significant effect in the links between main constructs, the fact that majority of sample companies have not completed their CRM application projects indicates that the findings are just one snapshot of whole CRM implementation process, and might not explicate the clear relationship among CRM

technology, market orientation and performance improvement from using CRM technology.

6.5 Future Research Directions

Although the preliminary nature of the results of this study must be acknowledged, a number of important issues do emerge and these can serve as a framework for future research in this area.

There is always a challenge in measuring the benefits of the return of IT investment. This study explores one of organizational intangible resources market orientation, yet other organizational resources such as knowledge asset and organizational synergy could also be linked to effect of CRM implementation. Concerning the IT- enabled intangible resources and enabling role of IT discussed in literature review, it seems reasonable that CRM technology could be a factor in achieving high level of market orientation. However, it may take considerably long time to bring out the changes if market orientation is seen from organizational resources perspective. Future research can conduct a longitudinal study and investigate the enabling role of CRM technology in changing market orientation.

Performance measures that are aligned with strategic goals should warrant investigation. Some of them emerged from the current survey, such as customer knowledge

management, service consistency, marketing capability and quality of communication with customers. In future research of CRM technology, these business objectives can be translated to dependent variables or other intermediate performance measures between information technology investment and bottom line financial performance indicators. Measures such as Return on Relationship, Customer Life Time Value are the two among others that have been widely discussed by CRM practitioners but have not been found in MIS research work. Since a CRM system is different from its predecessor information systems in a way that it focuses more on enhancing customer-facing capability than streamlining internal business processes, more customer-focused performance measures need to be studied in order to better understand business value of such information systems.

Longitudinal studies also help understand whether CRM technology initiatives sustain business performance improvement. The pooling of time series and cross-sectional information should allow researchers to test and control firm-specific factors, thus yielding a better picture of the relationship among constructs across all firms.

The study employed some measures to assess the enabling role of CRM technology in enhancing organization's capability of serving customers, market orientation, and the business value of CRM technology in terms of customer retention and business performance improvement. These measures need to be further refined to represent the constructs' domain. Future research using a larger sample can test the result of measurement model analysis.

From a practical point of view, there are still few organizations that have truly profited from CRM technology. The companies surveyed in this study completed only on average nearly 60% of their CRM implementation. Another survey result published in 2002 indicated that CRM software is too young to measure (Perez 2002). As of today, the adoption rate of this technology application has not been high in Canada. Yet this provides promising opportunities for future research.

7. References

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8. Appendixes

Appendix A Measures of market orientation (MO)

	Narver and Slater (1990)	Jaworski and Kohli (1993)
Data Collection Method	Mail questionnaire survey	Mail questionnaire survey
Respondent	Top management team member	Marketing executive and non-marketing executive
Informant	Multiple	Multiple
Sample Industry	Strategic business units (commodity, specialty product, distribution, export business) in the forest product division of a major corporation	Multiple industries
Geography of Sample	US	US
Company Size	NA	D&B top 1000, two samples
Moderating / Mediating Variable	Moderating: Business-specific factors: relative cost, size. Market-level factors: growth, concentration, entry barriers, buyer power, seller power, technological change	Moderating: Environment: market turbulence, competitive intensity, technological turbulence
Performance Measures	Subjective relative measure: profitability (ROA)	Judgmental relative overall performance, objective absolute market share
MO-performance Finding	Non-liner positive significant link between MO and ROA	Significant link when using judgmental performance measure, sample I b=.023 p<0.01, sample II b=0.36, p<0.001, not objective market share
Other Findings	Market growth is determinant of profitability	Antecedents of MO: top management, interdepartmental dynamics, organizational systems. Strong link between MO and employees' organizational commitment
MO Scale Sources	Newly developed	Newly developed
MO Scale	Reliability: customer orientation 0.87, competitor orientation 0.72, inter-functional coordination 0.73	NA

Appendix A Continued

	Slater and Narver (1994)
Data Collection Method	Mail questionnaire survey
Respondent	Top management team member
Informant	Multiple
Sample Industry	Sample I: strategic business units (commodity, specialty product, distribution, export business) in the forest product division of a major corporation. Sample II: SBU in a diversified manufacturing corporation
Geography of Sample	US
Sample Industry	Fortune 500, largest industrial firms.
Moderating / Mediating Variable	Moderating: Environment: market turbulence, competitive intensity, technological turbulence. Market growth, buyer power, competitor concentration, competitor hostility
Performance Measures	Subjective relative measure: profitability (ROA), sales growth, new product success
MO-performance Finding	Significant positive link between MO and all three performance measure
Other Findings	Limited support for environmental moderator effect on MO-performance and emphases on customer or competitor
MO Scale Sources	Narver and Slater (1990)
MO Scale	Reliability: customer orientation 0.88, competitor orientation 0.73, inter-functional coordination 0.77

Appendix A Continued

	Deng and Dart (1994)
Data Collection Method	Mail questionnaire survey
Respondent	General manager or marketing manager
Informant	Single
Sample Industry	Multiple industries
Geography of Sample	Canada
Sample Industry	All sizes
Moderating / Mediating Variable	NA
Performance Measures	Objective/absolute measures: overall financial performance, liquidity, sales, market share, penetration of US market, sales in other export markets, new product development, quality improvements, productivity
MO-performance Finding	Positive link (MO-performance 0.79)
Other Findings	
MO Scale Sources	Narver and Slater 1991, and new items
MO Scale	Result MO: 4 components, customer orientation, competitor orientation, inter-functional coordination, profit orientation. Reliability Cronbach alpha for each components all exceed 0.70 (0.7388-0.7890). Content validity (Criterion validity): multiple correlation coefficient of performance and MO: 0.79, high degree of criterion-related validity. Construct validity-convergent validity: correlation among four components of MO >0.75 at $p<0.001$, Cronbach alpha 0.8010 for single scale. Discriminant validity: higher correlation between MO and marketing oriented philosophy, than with other business philosophy.

Appendix A Continued

	Pelham (1997)
Data Collection Method	Mail questionnaire survey
Respondent	President and sales manager
Informant	Multiple
Sample Industry	Industrial manufacture: 50% commodity, 50% specialty, wholly owned
Geography of Sample	US
Sample Industry	$20-$200 million in sales
Moderating / Mediating Variable	Environment: market turbulence, competitive intensity, technological turbulence. Differentiation, growth/differentiation strategy, low cost strategy
Performance Measures	Subjective relative measures: firm effectiveness (relative product quality, new product success, customer retention), growth/ share (sales level, growth rate, target market share), profitability (ROE, gross margin, ROI)
MO-performance Finding	Positive significant link between MO and firm effectiveness, firm effectiveness is a mediating variable in the relationship between MO and profitability
Other Findings	Environment variables did not influence MO-performance relationship.
MO Scale Sources	Narver and Slater (1990), Jaworsk and Kohli (1991)
MO Scale	Reliability: MO, 0.96, component: customer understanding 0.88, customer satisfaction 0.95, competitive 0.94 (8 of 9 were from Narver and Slater (1990))

Appendix A Continued

	Deshpande and Farley (1998)
Data Collection Method	Mail questionnaire survey
Respondent	Marketing executives
Informant	Multiple
Sample Industry	Multiple industries
Geography of Sample	19 American, 8 European
Sample Industry	NA
Moderating / Mediating Variable	NA
Performance Measures	Perceived customer retention, sales growth, ROI, ROS, relative to principle competitors
MO-performance Finding	Positive link
Other Findings	
MO Scale Sources	Narver and Slater 1990; Kohli et al.1993; Deshpande et al.1993
MO Scale	Reliability: Cronbach alpha, Narver and Slater 1990, 0.90; Kohli et al.1993, 0.51; Deshpande et al.1993, 0.72. Validity check: three scales correlated significantly and positvely with MO. Discriminant validity: strong discriminant validity. Predictive validity: all scales show significant correlation with performance measure. All three scales show strong reliability in both European and American samples. No significant differences between means of American and European firms on MO or performance. MO-performance link is the same in Europe and U. S. Industry has little or no effect on performance and MO

Appendix A Continued

	Gray et al. (1998)
Data Collection Method	Mail questionnaire survey
Respondent	Senior executive
Informant	Single
Sample Industry	Multiple industries
Geography of Sample	New Zealand
Sample Industry	Medium-sized 44.8% 10-50 million gross revenue
Moderating / Mediating Variable	Moderating: Market environment
Performance Measures	Objective/absolute ROI, relative/subjective brand awareness, customer satisfaction, loyalty
MO-performance Finding	Positive moderate link. The strongest link MO-customer satisfaction. Spearman correlation 0.2514($p<0.001$). Weak links: MO-brand awareness, customer loyalty, ROI
Other Findings	Inter-functional coordination/information sharing has correlation with performance
MO Scale Sources	Narver and Slater 1990; Kohli et al.1993, Deng and Dart 1994
MO Scale	Result MO (20 items): customer orientation(reliability Cronbach alpha 0.746), competitor orientation(0.797), inter-function cooperation(0.777), profit emphasis(0.831), response design(0.660). (criterion or external) Validity check: Spearman correlation coefficients show significant moderate link between MO and performance. Construct validity check (discriminant validity): Spearman correlation coefficients shows MO more closely allied to marketing philosophy than any other business philosophy

Appendix A Continued

	Pitt et al. (1996)	Egeren and O'Connor (1998)
Data Collection Method	Mail questionnaire survey	Personal interview, questionnaire
Respondent	Marketing director	Top management team
Informant	Single	Multiple
Sample Industry	Service firm in UK, firms of multiple types in Malta	Large standalone service firms (auto glass replacement, medical clinics, accounting, advertising, plumbing wholesalers)
Geography of Sample	UK, Malta	UK
Sample Industry	Largest service firms; largest Maltese firms	>$10 million annual sales
Moderating / Mediating Variable	NA	NA
Performance Measures	Subjective/relative ROCE, sales growth, overall performance in the past five years	Perceptual relative financial performance
MO-performance Finding	Positive link, R square 0.10, 0.09($p<0.01$)	Positive significant, chi-square 0.60,p=3.97
Other Findings		Antecedents of MO: TMT cohesiveness, communications, heterogeneity, environmental munificence, dynamism
MO Scale Sources	Kohli et al. 1993, changed to 7-point scale	Narver and Slater 1990
MO Scale	Reliability Cronbach alpha, 0.87 in UK, 0.83 in Malta, the scale shows internal consistency in varying cultures and countries. Convergent validity: regression of sum of MO with a measure of overall impression of MO, R square 0.28 in UK, 0.23 in Malta at $P<0.01$	NA

Appendix A Continued

	Han et al. 1998	Chang and Chen (1998)
Data Collection Method	Mail questionnaire survey	Interview
Respondent	Senior marketing manager	Vice president or senior manager
Informant	Single	Single
Sample Industry	Banks	Retail stock brokerage firms
Geography of Sample	US	Taiwan
Sample Industry	NA	>US$7.3 million for brokerage operations
Moderating / Mediating Variable	Moderating variable: market turbulence, technological turbulence. Mediating variable: organization innovation: technical innovation, administrative innovation	Mediating: service quality: tangibility, reliability, responsiveness, assurance, empathy. Covariates for performance: industry factors (market size), firm factor (market share, sales volume, conglomerate, relationship), respondent factor (seniority).
Performance Measures	Objective absolute measure: net income growth, ROA	Subjective relative profitability
MO-performance Finding	Customer orientation is significant for organizational innovation, which positively influence business performance	Positive link
Other Findings	When the level of technological turbulence is high, MO is conductive to facilitate innovations	MO-service quality, service quality-performance links are supported. Market size shows positive significant effect. MO does not affect performance solely through service quality
MO Scale Sources	Narver and Slater 1990	Narver and Slater 1990 with three new items
MO Scale	Reliability: customer orientation 0.83, competitor orientation 0.79, inter-functional coordination 0.79. Construct validity (Unidimensionality): high loading of items in each component	Reliability for MO: 0.94, split-half reliability: 0.93. Convergent validity: 0.51. MO scale is accepted as one-dimensional, multi-component construct.

Appendix A Continued

	Matsuno and Mentzer (2000)	Dawes (2000)
Data Collection Method	Mail questionnaire survey	Interview, longitudinal study 1997-1998
Respondent	Marketing executive	Chief executive
Informant	Single	Multiple
Sample Industry	Manufacturing companies in multiple industries	42% manufacturers
Geography of Sample	US	South Australia
Sample Industry	All sizes	All sizes
Moderating / Mediating Variable	Business strategy, 3 types of Miles and Snows	Moderating: relative size, cost, annual growth rate of industry sales, barriers to entry , buyer power, supplier power, technological change, intensity of competition, market turbulence
Performance Measures	Perceived relative market share, relative sales growth, percentage of new product sales to total sales, ROI	Absolute subjective profitability
MO-performance Finding	Positive link	Factoring in moderating variables (relative size, barriers to entry), positive link between competitor orientation and profitability. No support for link between other components of MO and performance.
Other Findings	Strategy has moderating effect. Market orientation and prospector strategy positively link to performance	Examine components of MO separately. Lack of link between market information sharing and performance
MO Scale Sources	Jaworski and Kohli (1993), and newly developed items	Narver and Slater (1990); Kohli et al.(1993); Deshpande et al.(1993), Deng & Dart (1994), and newly developed items
MO Scale	Reliability coefficient 0.84. Information generation, dissemination, response	Reliability: customer analysis 0.88, customer responsiveness 0.87, market information sharing, NA, competitor orientation, 0.82. Unidimensionality and discriminant validity, concurrent validity (correlation between MO and global statement) exhibit acceptable psychometric properties

Appendix B Survey cover letter

Date:

Name, Title
Company name

Subject: Study to investigate market orientation, the use of CRM technology and business performance

Dear Sir or Madam,

I am a graduate student at John Molson School of Business, Concordia University in Montreal, completing a Master of Science degree with a specialization in Management Information Systems. I am currently conducting a study to investigate the links among market orientation, the use of Customer Relationship Management (CRM) technology and business performance in Canadian organizations. Dr. Dennis Kira supervises my study.

This study aims at helping organizations identify business values of CRM technology on business performance, and better understand how to achieve benefits from CRM technology.

I would ask you for your help by answering this carefully designed questionnaire. Your participation is voluntary, however, your view on this topic is highly appreciated and is essential to the completion of my master degree. The responding should not take more than 15 minutes of your time. All the information you provide to us will be kept confidential and the results will not disclose your identity. Please kindly return your duly-filled questionnaire by **Friday June 7th**, using the enclosed envelope.

Thank you in advance for your time and cooperation. If you have any comment or question regarding this matter, please feel free to contact us.

Best regards,

Sincerely,

Francesca Wei Wu
MSc/MIS, John Molson School of Business
Concordia University
Tel: (514) 932-8788, (780) 433-7162
Fax: (780) 433-7162
Email: w_wu@jmsb.concordia.ca

Dr. Dennis Kira
Thesis supervisor
Tel: (514) 848-2767

Appendix C Survey follow-up letter

Date:

Name, title
Company Name

Subject: Study to investigate market orientation, the use of CRM technology and business performance

Dear Sir or Madam,

I am a graduate student at John Molson School of Business, Concordia University in Montreal, completing a Master of Science degree with a specialization in Management Information Systems. I am currently conducting a study to investigate the links among market orientation, the use of Customer Relationship Management (CRM) technology and business performance in Canadian organizations. Dr. Dennis Kira supervises my study.

This study aims at helping organizations identify impacts of CRM technology on business performance, and better understand how to achieve benefits from CRM technology.

I would ask you for your help by answering this carefully designed questionnaire. Your participation is voluntary, however, your view on this topic is highly appreciated and is essential to the completion of my master degree. The responding should not take more than 15 minutes of your time. All the information you provide to us will be kept confidential and the results will not disclose your identity. Please kindly return your duly-filled questionnaire by **Friday May 17th**, using the enclosed envelope.

Thank you in advance for your time and cooperation. If you have any comment or question regarding this matter, please feel free to contact us.

Best regards,

Sincerely,

Francesca Wei Wu
MSc/MIS, John Molson School of Business
Concordia University
Tel: (514) 932-8788, (780) 433-7162
Fax: (780) 433-7162
Email: w_wu@jmsb.concordia.ca

Dr. Dennis Kira
Thesis supervisor
Tel: (514) 848-2767

Appendix D Survey questionnaire

Customer Relationship Management Performance Survey

Section 1 **Market Orientation** **S.1**

Market orientation refers to cross-functional processes and activities directed at creating and satisfying customers through continuous needs assessment.

Instruction: In answering, please use the following response scale and circle the numbers that best represent your opinion concerning the organization / business unit(s) you are responsible for.

Not at all	To a small extent	To a moderate extent	To a great extent	To an extreme extent
1	2	3	4	5

1. We constantly monitor our employees' commitment to serving customers' needs.	1	2	3	4	5
2. Our strategy for competitive advantage is based on our understanding of customers' needs.	1	2	3	4	5
3. Our business strategies are driven by our beliefs about how we can create greater value for customers.	1	2	3	4	5
4. We measure customer satisfaction systematically.	1	2	3	4	5
5. Our sales people regularly share information within our organization concerning competitors' strategies.	1	2	3	4	5
6. We rapidly respond to competitive actions that threaten us.	1	2	3	4	5
7. Senior management regularly discusses competitors' strengths and strategies.	1	2	3	4	5
8. We target our customers where we have an opportunity for competitive advantage.	1	2	3	4	5
9. We freely communicate information about our *successful* customer experience across all business functions.	1	2	3	4	5
10. We freely communicate information about our *unsuccessful* customer experience across all business functions.	1	2	3	4	5
11. All of our business functions are integrated in serving the needs of our target markets.	1	2	3	4	5
12. All of our managers understand how everyone in our business can contribute to creating customer value.	1	2	3	4	5

Section 2 **S.2**

CRM technology consists of software applications and information systems that capture and analyze customer data; automate and integrate marketing, sales and customer service.

Has your organization / business unit(s) implemented any CRM technology application?

Yes ***Please continue to*** *Section 3 Use of CRM Technology.*

No ***Please explain why CRM application has not been implemented yet, and continue to*** *Section 4 General Information (Page 4)*

Section 3 Use of Customer Relationship Management (CRM) Technology **S.3**

Instruction: Please proceed with this section if your organization / business unit(s) has fully or partially implemented CRM technology applications.

I. Please indicate how much the use of CRM technology applications affects the ability of your organization / business unit(s) to perform the following activities. Please circle the numbers that best represent your opinion.

Greatly decreased	Moderately decreased	No business value	Moderately increased	Greatly increased
1	2	3	4	5

1. Capture customer data	1	2	3	4	5
2. Survey customers' future need of product/ service	1	2	3	4	5
3. Develop customized product/service offering	1	2	3	4	5
4. Detect changes in customer preference	1	2	3	4	5
5. Select target customer segments	1	2	3	4	5
6. Disseminate customer knowledge across all business units	1	2	3	4	5
7. Establish value-added interactions with individual customer	1	2	3	4	5

II. Please indicate the actual benefits your organization / business unit(s) received through the use of CRM technology applications. Please circle the numbers that best represent your opinion.

Not at all	To a small extent	To a moderate extent	To a great extent	To an extreme extent
1	2	3	4	5

1. We increased customer retention rate.	1	2	3	4	5
2. We increased sales to existing customers.	1	2	3	4	5
3. We increased customer satisfaction.	1	2	3	4	5
4. We improved employees' productivity.	1	2	3	4	5
5. We identified new customer opportunities.	1	2	3	4	5
6. We provided better customer service in terms of					
a) increasing speed of response;	1	2	3	4	5
b) increasing accuracy of response.	1	2	3	4	5
7. We improved customer perception of service.	1	2	3	4	5
8. We reduced the selling costs.	1	2	3	4	5
9. We reduced the service costs.	1	2	3	4	5

III. Please indicate the business value of CRM technology applications on the performance of your organization / business unit(s). Please circle the numbers that best represent your opinion.

Greatly decreased	Moderately decreased	No business value	Moderately increased	Greatly increased
1	2	3	4	5

Sales growth	1	2	3	4	5
Market share	1	2	3	4	5
Profitability (Return on investment)	1	2	3	4	5

IV. Please provide some information about how CRM technology is deployed in your organization / business unit(s)

1. Please indicate the functional areas where CRM applications have been implemented in your organization / business unit(s). Please check as many as applies.

☐ Customer support and service ☐ Sales ☐ Marketing

☐ Others, please specify _____

2. Please indicate what CRM applications have been implemented in your organization / business unit(s). Please check as many as applies.

Campaign management	Sales force automation
Customer data warehouse/data mining	Interaction channels (e.g. web, call center, email)

Others, please specify _____

3. What are the two or three most important business objectives of your CRM technology applications deployment projects?

_____

_____

4. To what extent have your CRM projects achieved your stated objectives?_____%

5. What benefits from CRM technology did you expect to get but haven't got yet? Why?

_____

_____

_____

6. ***Can you measure* customer retention *better as a result of deploying CRM technology?*** *Yes* *No*

7. ***Can you measure* customer value *better as a result of deploying CRM technology?*** *Yes* *No*

8. How are your CRM technology software applications developed?

In-house developed Out sourced Off-the-shelf package

Others, please specify _____

9. To what extent have your CRM projects been completed?_____%

Section 4 General Information **S.4**

Please provide some background information for our analysis

1. What is your job title? _____
2. How long have you held this position? _____
3. In what industry does your organization / business unit(s) perform primary business activity?

Financial service	Business services
Pharmaceutical	Telecommunication
Retail	Transportation

Others, please specify _____

4. How many employees work in the organization / business unit(s) that you are responsible for?

250---500	501-1000	1001---1500	1501---2000
2001-3000	3001---4000	4001---5000	More than 5000

5. What is your organization / business unit(s) estimated annual revenue?

Less than CAN$25 million	CAN$25 to $100 million
CAN$100 million to $1 billion	More than CAN $1 billion

- Please return this questionnaire using the prepaid envelope.
- If you wish to obtain an executive summary of this research, please enclose your business card in the return envelope.
- If you have any comments or questions, please feel free to contact me:
  tel: (514) 932 8788, (780) 433 7162, fax: (780) 433 7162,
  e-mail: w_wu@jmsb.concordia.ca

Appendix E Descriptive statistics

	Range	Minimum	Maximum	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
CO1	2	3	5	3.87	8.93E-02	.61	.375	.069	.347	-.266	.681
CO2	3	2	5	4.36	9.82E-02	.67	.453	-1.030	.347	1.841	.681
CO3	2	3	5	4.38	9.40E-02	.64	.415	-.559	.347	-.583	.681
CO4	3	2	5	4.00	.11	.72	.522	-.361	.347	.070	.681
CP1	3	2	5	3.32	.13	.89	.787	.286	.347	-.522	.681
CP2	3	2	5	3.68	.12	.81	.657	.147	.347	-.653	.681
CP3	3	2	5	3.72	.13	.90	.813	-.154	.347	-.731	.681
CP4	3	2	5	3.91	.12	.86	.732	-.703	.347	.214	.681
IC1	3	2	5	3.89	.12	.84	.706	-.252	.347	-.621	.681
IC2	3	2	5	3.47	.15	1.02	1.037	-.039	.347	-1.077	.681
IC3	3	2	5	3.66	.11	.79	.621	-.139	.347	-.284	.681
IC4	3	2	5	3.81	.14	.95	.897	-.239	.347	-.899	.681
CRM1	2	3	5	4.49	8.53E-02	.59	.342	-.638	.347	-.524	.681
CRM2	3	2	5	3.79	.12	.83	.693	.189	.347	-1.074	.681
CRM3	3	2	5	3.81	.11	.74	.549	-.008	.347	-.477	.681
CRM4	4	1	5	3.77	.12	.84	.705	-.446	.347	1.047	.681
CRM5	3	2	5	4.16	.13	.90	.804	-.698	.347	-.502	.681
CRM6	2	3	5	3.98	9.85E-02	.68	.456	.025	.347	-.709	.681
CRM7	3	2	5	3.98	.11	.74	.543	-.307	.347	-.142	.681
CSR1	4	1	5	3.11	.14	.98	.967	-.221	.347	-.081	.681
CSR2	4	1	5	3.23	.15	1.03	1.053	-.370	.347	-.179	.681
CSR9	4	1	5	2.57	.17	1.16	1.337	.472	.347	-.263	.681
PI1	2	3	5	3.79	.11	.72	.519	.346	.347	-.975	.681
PI2	2	3	5	3.79	.11	.72	.519	.346	.347	-.975	.681
PI3	2	3	5	3.72	9.47E-02	.65	.422	.339	.347	-.652	.681
RPROCOM	80	20	100	58.98	2.92	20.03	401.282	.206	.347	-.122	.681
Valid N (listwise)											

Appendix F First-order factor analysis for the measure of CRM technology

FACTOR LOADINGS (DIRECT OBLIMIN SOLUTION)
Converge after 1 iterations

	FACTOR 1
CRM1	0.5410
CRM2	0.5811
CRM3	0.6789
CRM4	0.6680
CRM5	0.6797
CRM6	0.3978
CRM7	0.4981

Eigen Values

1	3.062
2	0.991
3	0.844
4	0.768
5	0.628
6	0.435
7	0.271

Constant for non-selected eigenvalues= 0.656

Appendix G Correlations among items of the measure of CRM technology

		CRM2	CRM3	CRM4	CRM5
CRM2	Pearson Correlation	1.000			
	Sig. (2-tailed)	.			
CRM3	Pearson Correlation	.391**	1.000		
	Sig. (2-tailed)	.007	.		
CRM4	Pearson Correlation	.363*	.485**	1.000	
	Sig. (2-tailed)	.012	.001	.	
CRM5	Pearson Correlation	.351*	.604**	.559**	1.000
	Sig. (2-tailed)	.016	.000	.000	.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

N=47

Appendix H First-order factor analysis for the measure of market orientation

FACTOR LOADINGS (DIRECT OBLIMIN SOLUTION)
Converge after 17 iterations

	FACTOR 1	FACTOR 2	FACTOR 3
CO1	0.6075	0.0349	0.1207
CO2	0.2091	-0.2825	0.4343
CO3	0.3017	-0.3048	0.4436
CO4	0.6655	-0.0675	-0.0802
CP1	-0.0244	-0.0284	0.6922
CP2	0.0305	0.2769	0.4669
CP3	-0.0601	0.1532	0.7032
CP4	0.4813	0.0535	-0.0044
IC1	0.1844	0.6630	0.0280
IC2	0.1978	0.5587	0.1878
IC3	0.5594	0.1432	0.2727
IC4	0.6667	0.1489	-0.0534

Eigen Values

1	4.215
2	1.536
3	1.228
4	1.116
5	0.918
6	0.769
7	0.649
8	0.538
9	0.346
10	0.258
11	0.253
12	0.174

Constant for non-selected eigenvalues= 0.558

FACTOR LOADINGS (DIRECT OBLIMIN SOLUTION)
Converge after 1 iterations

	FACTOR 1
CO1	0.6382
CO2	0.4296
CO3	0.5096
CO4	0.4903
CP1	0.5253
CP2	0.5018
CP3	0.5685
CP4	0.4346
IC1	0.4217
IC2	0.5244
IC3	0.7577
IC4	0.5908

Eigen Values

1	4.215
2	1.536
3	1.228
4	1.116
5	0.918
6	0.769
7	0.649
8	0.538
9	0.346
10	0.258
11	0.253
12	0.174

Constant for non-selected eigenvalues= 0.708

Appendix I Correlations among items of the measure of market orientation

		CO1	CO3	CP2	IC2	IC3	IC4
CO1	Pearson Correlation	1.000					
	Sig. (2-tailed)	.					
CO3	Pearson Correlation	.457**	1.000				
	Sig. (2-tailed)	.001	.				
CP2	Pearson Correlation	.267	.197	1.000			
	Sig. (2-tailed)	.070	.183	.			
IC2	Pearson Correlation	.342*	.118	.211	1.000		
	Sig. (2-tailed)	.019	.428	.154	.		
IC3	Pearson Correlation	.449**	.434**	.371*	.420**	1.000	
	Sig. (2-tailed)	.002	.002	.010	.003	.	
IC4	Pearson Correlation	.407**	.194	.258	.298*	.697**	1.000
	Sig. (2-tailed)	.005	.191	.079	.042	.000	.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

N=47

Appendix J First-order factor analysis for the measure of perceived customer retention improvement

FACTOR LOADINGS (DIRECT OBLIMIN SOLUTION)
Converge after 1 iterations

	FACTOR 1
CSR1	0.8190
CSR2	0.7846
CSR9	0.6384

Eigen Values

1	2.129
2	0.653
3	0.218

Constant for non-selected eigenvalues= 0.435

Appendix K Correlation among items of the measure of perceived customer retention improvement

		CSR1	CSR2	CSR9
CSR1	Pearson Correlation	1.000		
	Sig. (2-tailed)	.		
CSR2	Pearson Correlation	.772**	1.000	
	Sig. (2-tailed)	.000	.	
CSR9	Pearson Correlation	.500**	.397**	1.000
	Sig. (2-tailed)	.000	.006	.

** Correlation is significant at the 0.01 level (2-tailed).

N=47

Appendix L First-order factor analysis for the measure of perceived performance improvement

FACTOR LOADINGS (DIRECT OBLIMIN SOLUTION)
Converge after 1 iterations

	FACTOR 1
PI1	0.8605
PI2	0.8744
PI3	0.6662

Eigen Values

1	2.299
2	0.619
3	0.082

Constant for non-selected eigenvalues= 0.350

Appendix M Correlation among items of the measure of perceived performance improvement

		PI1	PI2	PI3
PI1	Pearson Correlation	1.000		
	Sig. (2-tailed)	.		
PI2	Pearson Correlation	.916**	1.000	
	Sig. (2-tailed)	.000	.	
PI3	Pearson Correlation	.476**	.522**	1.000
	Sig. (2-tailed)	.001	.000	.

** Correlation is significant at the 0.01 level (2-tailed).

N=47

Appendix N Correlations of items scale and item-cross-scale

Items	CSRI	MKO	PI	CRMT
CSR1	.890**	.523**	.514**	.449**
	.000	.000	.000	.002
CSR2	.849**	.578**	.553**	.437**
	.000	.000	.000	.002
CSR9	.777**	.472**	.493**	.341*
	.000	.001	.000	.019
CO1	.624**	.682**	.345*	.350*
	.000	.000	.017	.016
CO3	.224	.534**	.030	.187
	.131	.000	.840	.208
CP2	.423**	.572**	.418**	.350*
	.003	.000	.003	.016
IC2	.290*	.644**	.367*	.307*
	.048	.000	.011	.036
IC3	.476**	.842**	.419*	.339*
	.001	.000	.003	.020
IC4	.514**	.735**	.448**	.424**
	.000	.000	.002	.003
PI1	.481**	.454**	.924**	.363**
	.001	.001	.000	.012
PI2	.527**	.528**	.940**	.386**
	.000	.000	.000	.007
PI3	.632**	.386**	.748**	.213
	.000	.007	.000	.151
CRM2	.367*	.264	.257	.682**
	.011	.073	.081	.000
CRM3	.369*	.379**	.396**	.790**
	.011	.009	.006	.000
CRM4	.304*	.308*	.146	.785**
	.038	.035	.329	.000
CRM5	.453**	.558**	.353*	.825**
	.001	.000	.015	.000

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Appendix O Correlations among constructs

		CRMT	MKO	CSRI	PI
CRMT	Pearson Correlation	1.000			
	Sig. (2-tailed)	.			
MKO	Pearson Correlation	.493**	1.000		
	Sig. (2-tailed)	.000	.		
CSRI	Pearson Correlation	.486**	.625**	1.000	
	Sig. (2-tailed)	.001	.000	.	
PI	Pearson Correlation	.371*	.524**	.621*	1.000
	Sig. (2-tailed)	.010	.000	.000	.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

N=47

CRMT: CRM technology

MKO: Market orientation

CSRI: Perceived customer retention improvement

PI: Perceived performance improvement

Appendix P Descriptive statistics of constructs

	Range	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
CRMT	2.50	2.50	5.00	3.8807	.6379	.407	.145	.347	-.588	.681
MKO	2.50	2.50	5.00	3.8121	.5402	.292	-.077	.347	.054	.681
CSRI	3.67	1.00	4.67	2.9716	.8815	.777	-.213	.347	-.211	.681
PI	2.00	3.00	5.00	3.7660	.6096	.372	.517	.347	-.482	.681
Valid N (listwise)										

N=47

CRMT: CRM technology

MKO: Market orientation

CSRI: Perceived customer retention improvement

PI: Perceived performance improvement