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Shari Shang  
*National Chengchi University- Taiwan*

Ya Fen  
*National Chengchi University- Taiwan*

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# Understanding the Technology and Organizational Elements of Customer Relationship Management Systems

**Shari S. C. Shang**

Department of Management Information Systems,  
National Chengchi University, Taiwan  
shari\_shang@yahoo.com

**Ya-Fen Ko**

Department of Management Information Systems,  
National Chengchi University, Taiwan  
92356021@nccu.edu.tw

## ABSTRACT

To build a clear understanding of the management of the technology and organizational elements of CRM systems, this research tries to form propositions based on literature findings and experts' experiences to explain (1) the elements of the technology and organizational sides of a CRM system, and (2) how the technology and organizational elements interrelate to create effective CRM operation. The goal is to build in-depth knowledge of the dynamics of CRM systems and to suggest lasting organizational capabilities that are adaptive to environmental changes.

Adopting the socio-technical view, the technology and organizational elements of CRM are closely interrelated in the operation of a business. The technology elements of an enterprise-wide CRM system can be organized into three parts: communicational CRM that coordinates all channels of customer contacts, execution CRM that consists of all value chain activities that execute customer relationship establishment and maintenance, and intelligent CRM that consolidates business intelligence about customers. The three interrelated elements provide a technical structure for customer value-generation activities. While the organizational resources including structure, processes, culture, and user abilities are elements that need to be aligned and coordinated with CRM technologies. Management of a CRM system, therefore, can be considered as managing an organism that requires interdependent elements to work together to maintain a continuous capability of creating and sustaining customer relationships.

## Keywords

Customer Relationship Management, system integration, organizational alignment.

## INTRODUCTION

A customer relationship management (CRM) system is a combination of people, processes, and technology that seeks to provide understanding of a company's customers and to support a business strategy to build long-term, profitable relationships with customers (Chen and Popovich, 2003; Ling and Yen, 2001). The global revenue of the CRM industry is predicted to grow strongly from 2005 (AMR 2001; IDC 2002; Forrester 2002), with a focus on both technology and organizational efforts to improve customer experiences.

Applying a system view, the technology infrastructure of a CRM system can be organized into three parts: communicational CRM that coordinates all channels of customer contacts, execution CRM that consists of all value chain activities that support customer relationship establishment and maintenance, and the intelligent CRM that consolidates business intelligence about customers. The three interrelated elements provide a technical base upon which the complicated and organic system can operate, and integration of these three elements is critical for a seamless information flow. This "organism" requires that the interdependent elements work together in order to maintain a continuous capability for customer relationship management (Shang and Lin, 2005).

Meanwhile, as with many other IT innovations, aligned business resources including structure, processes, culture, and capabilities are important resources to be managed for the organic system to be run effectively (Shang and Lin, 2005). Many studies have addressed critical factors for CRM implementation, including strategic planning (Bull, 2003; Kotorov, 2003; Yu, 2001), senior management commitment (Croteau and Li, 2003; Kotorov, 2003; McDonnell, 2001), knowledge management capability (Croteau and Li, 2003; Gebert, Geib, Kolbe, and Brenner, 2003), cross-departmental process redesign (Piccoli, O'Connor, Capaccioli, and Alvarez, 2003), and education on customer management capabilities (McDonnell, 2001). However, these factors represent either high-level consensus or suggestions of a particular CRM application. Neither integration issues nor business alignment initiatives are addressed. The lack of detailed knowledge of CRM technical and organizational integration makes it difficult for companies to take best advantage of their large CRM investments.

To build a clear understanding of the management of the technology and organizational elements of CRM, this research strives to seek answers to the following questions.

- What are the technology and organizational elements of a CRM system?
- How should the technology and organizational elements be interrelated to develop effective CRM operation?

The goal is to build a model for managing the dynamics of a CRM system and to build lasting organizational capability that is adaptive to environmental changes.

## RESEARCH PROCESS

Studies of CRM systems involve multiple aspects of management such as marketing management, strategy management, technology management and data management which provide different perceptions from both business and technological views. These findings need to be verified and synthesized. To establish a model that concerns both technological and organizational management of CRM systems this study conducted multiple steps of literature review and analysis and further verified with industry experts.

First, literatures of both organizational and technology issues of CRM management were consolidated. The selected literatures are mainly from top 30 MIS journals ranked by AIS (2006). Next, the selected literatures were consolidated and organized into two major parts of technology and organizational and propositions about the CRM effectiveness were formed. Then, the structure and descriptions of the socio-technical elements were verified by two groups of industry experts. One group of industry experts contained two consultants of CRM systems each had managed more than five CRM systems implementation and use. The other group of industry experts contained four project managers who were involved in the implementation and use of CRM systems. The verification process were performed in two focus meetings: the first meeting had two expert groups working on technology and organizational elements separately, the second meeting had the two groups joint together to build consensus on propositions of the interrelationship between the two major CRM elements. Based on the verified elements of the CRM components, which are the constructs of the propositions, and the propositions a semi-structured questionnaire were developed to test propositions and collect detailed information on the dynamic interrelationships among the technology and organizational elements of CRM systems. A pre-test with business managers of CRM systems is then used to enhance the validity of the instrument.

The next session describes the major elements of CRM systems and the following session explains the preliminary propositions. Multiple case studies are planned in subsequent research projects to test the propositions.

## MAJOR TECHNOLOGY AND ORGANIZATIONAL ELEMENTS OF A CRM SYSTEM

To build a complete understanding of the management of CRM systems, this study applies a socio-technical view that studies the design, uses, and consequences of information technologies and that takes into account their interaction with institutional and cultural contexts (Kling, 1999). In this view, as depicted in Figure 1, optimal organizational performance is achieved by jointly optimizing both the social and technical systems used in production (Mumford, 1997, 2000; Williams and Edge, 1996).

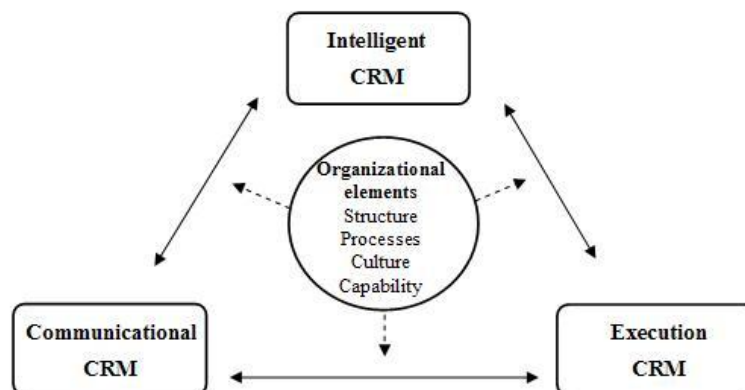


Figure 1. Major Technology and Organizational Elements of a CRM System

## CRM Technology Elements

Based on the literature and field studies (Chan, 2005; Foss, Devonport, and McDaid, 2002), Chen and Shang (2005) proposed an IT infrastructure of a CRM system (depicted in Figure 2) that can help to explain the evolutionary path of CRM implementation from both the IT and organizational perspectives. There are three major components—communicational, execution, and intelligent CRMs—in the architecture explained in the following subsections.

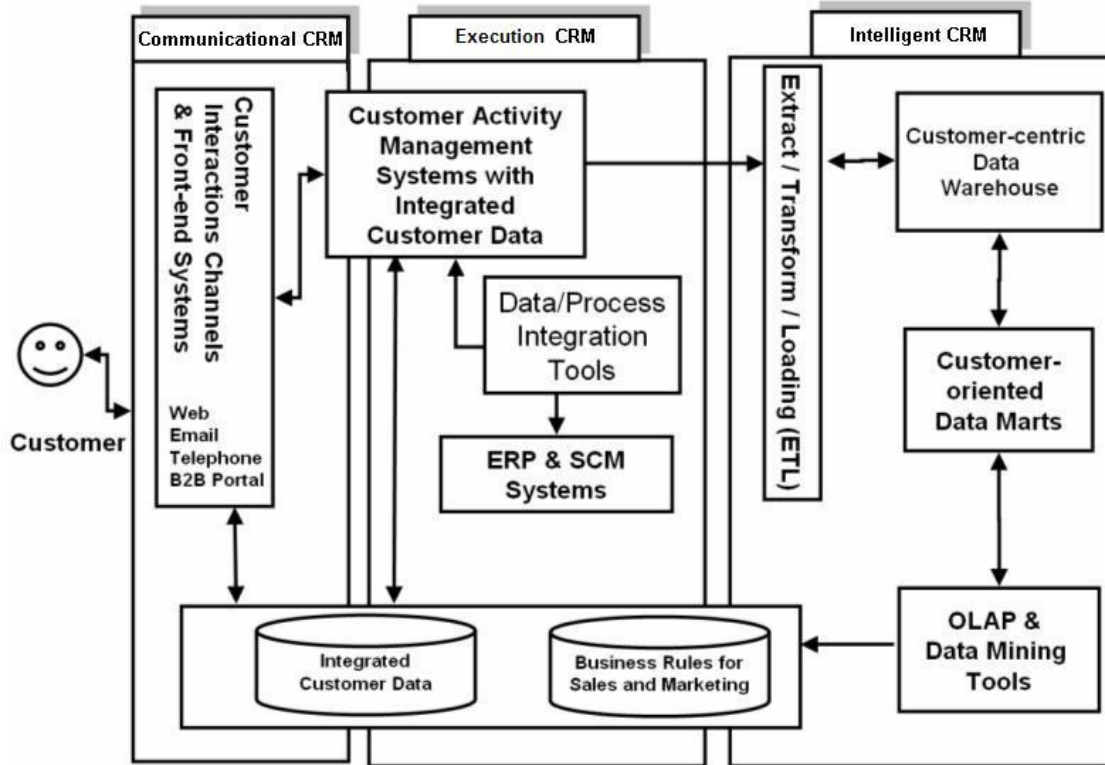


Figure 2. Enterprise-wide CRM IT Infrastructure

### Communicational CRM

Communicational CRM is mainly responsible for managing the interactions with customers through all sales and marketing channels. Most CRM implementation started with simple call center systems handling inbound customer phone calls. Communicational CRM is the front-end application that supports customer-facing processes. It focuses on the *communication* aspect of customer interactions.

Client/server applications to support customer service representatives at call centers represented the first generation of communicational CRM. Voice response systems and computer telephone integration (CTI) are additional technologies that may improve the productivity of customer services. The first step in such CRM implementation is a centralized source for all relevant data that are required for interacting with customers through various touch points (Hyperion, 2001).

With the omnipresence of the Web and the growing popularity of conducting business online, customers often contact companies directly through their Web sites for product information, to place and track orders, and to submit service requests. Direct customer contact with Web-based applications presented both major challenges and opportunities for organizations. Companies needed to adjust from using aggregated customer data for mass marketing to using disaggregated data (i.e., information about individual customers) for personalization and customization. Web interactions with customers directly provided the opportunity to capture, analyze, and act on disaggregated information such as click-stream data, shopping cart abandonment, etc., to provide insights into customer's desires and needs (Chen and Liou, 2002; Peel, 2002). Outbound interactions and marketing via phone calls or e-mail are indications of more matured communicational CRM implementation.

### Execution CRM

Execution CRM supports typical customer management activities (Starkey, Woodcock, and Stone, 2002). The customer activity management systems are applications that support these customer-facing core business processes. Execution CRM focuses on the *transaction* aspect of customers' activities.

Initial implementation of CRM started with basic account management, inquiry management, and the management of such things as billing problems, order tracking, etc. Building an enterprise-wide CRM system requires that execution CRM to be integrated with other enterprise systems such as enterprise resource planning (ERP) and supply chain management (SCM) systems. The integration often occurs at more mature stages of CRM implementation. The data and process integration tools allow CRM systems to be integrated with other enterprise systems to form an integrated e-business system.

Data hub, workflow, and Web services are key enablers for integrating various CRM subsystems (Peel, 2002). Data hub is one approach to providing an integrated view of customers from the data aspect, while workflow systems may be used to manage various activities and interactions required with customers in a timely and orderly manner. Web services are a new enabling technology that supports the exposure of business functions and data through a standard Internet protocol—i.e., simple object access protocol (SOAP). Web services functions are defined in Web service description language (WSDL) so that they can be easily bound and invoked by other applications (Chen, 2003).

### Intelligent CRM

The foundation of intelligent CRM requires the development of a customer-centric data warehouse containing subject area data from orders, problem tickets, etc. Data warehouses include two types—interactive and transactional. An interactive data warehouse contains data about customer queries, such as product queries, account queries, etc. It is mainly used for improving the productivity and service quality of call center or other interactive CRM functions. A transactional data warehouse contains historical customer transaction data that can be used for further analysis. ETL (Extract, Transform and Load) tools are used to move popular operational data stored in the customer activity management systems into the data warehouse. Through online analytical processing (OLAP) and data mining tools, organizations use the information stored in data marts to support sales analysis, profitability analysis, product purchase trends, etc. Advanced data mining tools can be used to analyze customer sales and service data in the data warehouse for customer segmentation based on sales data, account activities, service records, etc. (Liataud, 2001). Intelligent CRM focuses on the *business intelligence* aspect of customer information.

Intelligent CRM is particularly useful in supporting the targeting of new customers or targeting existing customers with new products and services. The business rules and information feedback from intelligent CRM to execution CRM and communicational CRM further improve the effectiveness of customer relationship management.

### CRM Organizational Elements

The aligned organizational elements for a CRM system contain four major parts: structure, processes, culture, and the capability.

#### Structure

Structures represent the formal system of control that embodies knowledge and principles for governance and that represents the embedded system of management in an organization (Hoogervorst, Flier, and Koopman, 2004). In this research, structure is defined as the functions, accountability, measures, and reward mechanism of the organization. Many studies indicate that if the organizational structure is properly aligned the desired effects of CRM will be obtained (Chen and Popovich, 2003; Day, 2003; Goodhue, Wixom, and Watson, 2002; Reinartz, Krafft, and Hoyer, 2004; Rigby, Reichheld, and Scheffer, 2002).

- *Functions*

It is not enough for a company to simply implement CRM processes. The company must organize itself to support these processes (Reinartz et al., 2004). The design of the structure should be focused around customer groups and service processes (rather than products, functions, or geographies) to ensure that their customers have a seamless interaction with all parts of the business (Day, 2003).

- *Accountability, job description, and employee roles*

A seamless connection with customers is often best achieved when accountability for the overall quality of customer relationships is clear (Day, 2003). Meanwhile, changes in job descriptions and employee roles are inevitable in CRM implementation (Goodhue et al., 2002; Kalakota and Robinson, 2000; Rigby et al., 2002), and so these changes should be clearly defined.

- *Performance measures and job evaluations*

With CRM systems, management must ensure that job evaluations are modified on a basis that facilitates customer orientation (Chen and Popovich, 2003). Performance measures must be restructured in order to better meet customers' needs (Rigby et al., 2002). A portfolio of metrics that reveal the long-term profitability of the customers with direct measurements of loyalty and satisfaction - metrics on employee retention, customer complaints, and company performance on attributes (Day, 2003) is one of the common approaches for measuring the performance of CRM systems.

- *Incentive reward and compensation systems*

Several studies have emphasized that incentive structures, compensation programs, and reward systems must be modified on a basis that facilitates customer orientation and promotes CRM (Chen and Popovich, 2003; Day, 2003; Goodhue et al., 2002; Kalakota and Robinson, 2000; Reinartz et al., 2004; Rigby et al., 2002). A critical determinant of an organization's ability to influence CRM-compatible activities and processes is the development of appropriate compensation schemes and organizational structures (Reinartz et al., 2004). Employees must be rewarded for engaging in CRM activities and customer-oriented behaviors (Reinartz et al., 2004).

### *Processes*

CRM is a continuous effort that requires redesigning core business processes, starting from the customer perspective and involving customer feedback (Chen and Popovich, 2003; Piccoli et al., 2003). To become truly "customer-centric" or build better relationships with customers, companies need to build cross-functional processes to better serve customers and address customer needs (Chen and Popovich, 2003; Gebert et al., 2003; Kalakota and Robinson, 2000; Kotorov, 2003; Goodhue et al., 2002; Rigby et al., 2002).

The effectiveness of CRM processes depends on the close link between front-line activities and internal operations such as product development, strategic planning, and financial processes. In addition to increased efficiencies in sales and marketing, service functions need to be fundamentally changed with regard to their competencies relative to the CRM strategy (Tan, Yen, and Fang, 2002). The goal is to make it easy for the front line to carry the voice of the customer deep into the organization and to use this information to guide processes (Kalakota and Robinson, 2000). Based on a content review of 74 reported CRM cases those aligned processes include dynamic R&D, reliable demand forecast, well-planned production, expanded delivery networks and consistent customer service throughout the service cycle (Shang and Lin, 2005). With regard to marketing and sales processes, because these processes are the focal point of CRM, companies should pay more attention to design and execute them according to CRM. Based on Reinartz et al. (2004)'s definition of CRM processes, we consider that marketing and sales should comprise formalized processes to manage the initiation and maintenance of customer relationship. The processes at the customer relationship initiation stage include customer evaluation, customer acquisition, and recovery management, and the processes at the customer relationship maintenance stage include customer evaluation, customer retention, up-selling/cross-selling, and referral management.

### *Culture*

Culture means the shared beliefs, values, attitudes, and behavior that are characteristic of an organization. Implementation of enterprise technology such as CRM requires changes to organizational culture (Shang and Lin 2005; Al-Mashari and Zairi, 2000). CRM is an enterprise-wide, customer-centric business model that must be built around the customer (Chen and Popovich, 2003), and so companies must make a transition from a product-focused culture to a customer-centric culture (Goodhue et al., 2002; Kalakota and Robinson, 2000; Reinartz et al., 2004; Rigby et al., 2002). The most important indicator of an organizational focus on customers is the shared belief that customer retention is a high priority for everyone, not just a concern to be delegated to marketing or sales departments (Day, 2003).

Customer orientation at the team level contains three levels of customer-focused actions (Homburg and Pflesser, 2000; Kohli, Jaworski, and Kumar, 1993): (1) market intelligence generation refers to customer interaction, customer information gathering, and review of environment change; (2) market intelligence dissemination refers to cross-departmental data sharing, formal and informal organization-wide communication, and customer information circulation; and (3) market intelligence responsiveness is reflected in decisions on price and product change, business plans, and customer responsiveness. The important indicator of an organizational focus on customers is the openness of the organization to sharing information about customers (Day, 2003).

Customer orientation at the individual level is reflected in employee empowerment (Shang and Lin 2005). Employee empowerment refers to employees' being more proactive and self-sufficient in assisting an organization to achieve its goals (Herrenkohl, Judson, and Heffner, 1999). In an integrated working environment, people will break out of narrow job specifications to find new and better ways of contributing to key business processes, changing and modifying them in the pursuit of good service, improved quality, and value (Gandz, 1990).

### Capability

Capability means the ability needed to accomplish the CRM-related activities or make CRM function well. A CRM process can involve three fundamental steps (Tan et al., 2002): (1) understanding customers completely, (2) aligning organizational capabilities in order to better deliver what customers may perceive as heightened value, and (3) facilitating the immediacy of information availability both inside and outside of the organization.

Plakoyiannaki and Tzokas (2002) proposed that the a) learning and market-orientation capabilities, b) integration capabilities, c) analytical capabilities, d) operational capabilities, e) direction capabilities determine the success of the CRM system.

## INTEGRATION OF CRM TECHNOLOGY ELEMENTS

### Integration Between Communicational CRM and Execution CRM

The effective management of information has a crucial role to play in CRM (Chen and Popovich, 2003). Information about customers generated from different systems should be integrated and smoothly distributed throughout the organization. The objectives of integration between communicational CRM and execution CRM are to effectively utilize the information from different customer interactions to continuously improve value-generation processes and to provide integrated and real-time support to front-end customer requests and services. The mission of integration between communicational CRM and execution CRM is to integrate the various customer-contacting channels as well as the various customer value-generation applications, as follows.

- *Integration of various customer-contacting channels and operational data*

Several studies have indicated that building a comprehensive, centralized, and integrated repository of all relevant customer data from different sources should be top priority when implementing CRM (Chen and Shang, 2005; Day, 2003; Goodhue et al., 2002; Kalakota and Robinson, 2000; Ling and Yen, 2001). The ability to access, manage, and process all relevant customer content, including structured and unstructured customer data, has emerged as a key requirement for CRM applications today (Kalakota and Robinson, 2000). Non-transactional information is equally as valuable as the transactional data. Such data may include general inquiries, support calls, suggestions, and complaints (Xu and Walton, 2005). The data must be captured, integrated, and stored from all in-bound touch points, including the Web, call centers, stores, and ATMs (Goodhue et al., 2002). Therefore, companies must build a centralized repository and continuously synchronize it with all customer data sources to give users a single view of customers (Chen and Shang, 2005). Integrated customer data should be available through IT systems in all parts of the company. The data infrastructure provides a structure of logical consistency that enables data sharing across the applications and business processes (Goodhue, Wybo and Kirsch, 1992). CRM technologies can help companies to gain a coherent and comprehensive picture of customers, to better organize internal data to cut service costs, to enable sales people close deals faster, and to improve the targeting of marketing programs (Day, 2003).

- *Integration among CRM, ERP, SCM, and other application systems*

Integration among CRM, ERP, and SCM is crucial (Chen and Shang, 2005; Huang, Yen, Chou, and Xu, 2003; Tan et al., 2002). Integration between CRM and ERP allows the sales department to access ERP information to be more aware of what is happening to the customer, and the production department is able to stay better informed about customers' reactions. In addition, CRM may provide information to ERP that will help it to prioritize work processes to optimize services to preferred customers, which can further enhance the relationships with these customers (Huang et al., 2003). Effective SCM facilitates CRM by offering customers good-quality, low-price products through speedy distribution channels (Tan et al., 2002). Successful CRM provides information for SCM's demand forecasting and delivery designing (Tan et al., 2002). Suppliers may also take advantage of the integration to better schedule the delivery of raw materials and to prioritize material flow to enhance service to profitable customers (Huang et al., 2003). All the above operational systems including other customer value-generation applications, must be integrated into the CRM infrastructure to build a complete customer support system (Kalakota and Robinson, 2000).

### Integration Between Execution CRM and Intelligent CRM

The purposes of integration between execution CRM and intelligent CRM include supporting the decision-making process of the entire value chain processes and capturing and consolidating the operational results and feeding them back into the intelligent CRM for critical decisions. To achieve these goals, the integration between execution CRM and intelligent CRM should be accomplished through the following moves.

- *The development of a customer-centric data warehouse completely integrating the operational data sources*

To be successful in the knowledge acquisition phase of CRM, IT will need to integrate many legacy and external data sources, most often through data warehousing technologies (Ling and Yen, 2001). A data warehouse is an information technology management tool that gives business decision makers instant access to information by collecting "islands of customer data" throughout the organization by combining all database and operational systems such as human resources, sales and transaction processing systems, financials, inventory, purchasing, and marketing systems (Chen and Popovich, 2003). Data warehouses extract data from transaction systems and aggregate information so it can be effectively analyzed (Kalakota and Robinson, 2000). A data warehouse supports generic applications such as reporting, queries, OLAP, and data mining, as well as specific applications such as campaign management, churn analysis, propensity scoring, and customer profitability analysis (Goodhue et al., 2002).

- *Integrating analysis tools with operational systems*

The analysis of the data will require tools such as OLAP, data mining, statistical analysis tools, and other complementary tools to report, analyze, and unearth hidden trends in the data (Ling and Yen, 2001). These technologies provide support to determine appropriate customer decisions based on accumulated relationship data. Integrating these technologies with operational front-end and back-end systems provides the necessary seamless collaboration (Ling and Yen, 2001).

### **Integration Between Intelligent CRM and Communicational CRM**

Through the integration between intelligent CRM and communicational CRM, companies can build a complete view of customers and provide quick access to the data, utilize the channel to interact with customers, and quickly update the intelligent CRM with information from the customer front-end. The integration between intelligent CRM and communicational CRM includes two aspects, as follows.

- *The smooth link between the data warehouse and the customer front-end*

In addition to the integrated customer database with customer operational data, call center agents sometimes look into the warehouse to request information on the customers about their purchases, their transaction histories, and their histories of complaints. Therefore, a smooth link between the data warehouse and the customer front-end is necessary for optimal interaction with customers.

- *Good use of CRM activities analysis for better customer interaction*

Customer intelligence facilitates the optimization of customer interactions, which helps in customer retention and in promoting the right mix of product offerings to the right customers, at the right time, and through the right channels (Chan, 2005). The results of business analysis of customer contacts, services, marketing campaign responses, and channel promotions are produced by the intelligent CRM to further improve the effectiveness of the communicational CRM (Chen and Shang, 2005).

### **PROPOSITIONS ON THE INTERRELATIONSHIPS BETWEEN TECHNOLOGY AND ORGANIZATIONAL ELEMENTS**

To realize the best of its customer relationship management, a firm must make enterprise-wide, customer-driven, technology-integrated, cross-functional efforts (Chen and Popovich, 2003). By consolidating literature findings verified by industry experts the following two propositions are formed to explain how businesses manage the technology and organizational elements to obtain lasting value from a complicated CRM system.

#### **Proposition 1: the Greater the Integration Among CRM Technology Elements, the Greater Will be the Value Generated from the Infrastructure**

CRM integrates a number of different technologies, in both data acquisition and analysis, as well as in the creation and maintenance of the many touch points to the customer. This means integrating many technologies, groups, and disciplines to build a successful system (Ling and Yen, 2001). The effectiveness of CRM depends upon the close link between front-line activities and internal operations. The goal is to make it easy for the front line to carry the voice of the customer deep into the organization and to use it to guide processes (Kalakota and Robinson, 2000). The effective management of information is critical for product tailoring, service innovation, consolidated views of customers, and the calculation of customer lifetime value (Peppard, 2000).

On the analytical side, a confluence of multiple disciplines, including a data warehouse, OLAP, data mining, and other complementary technologies, have enabled marketers to sift through mountains of data to extract invaluable information and knowledge about their customer base. Integrating these technologies with operational front-end and back-end systems provides the necessary seamless collaboration and the IT challenge that comes along with it (Ling and Yen, 2001).



Therefore, the integration of CRM technology elements places emphasis on how to make information flow fluently between different CRM technology elements.

**Proposition 2: the Better the Alignment Between Technical and Organizational CRM Elements, the Greater Will be the Value Generated from the Infrastructure**

Organizational transformation is necessary for the organization to take full advantage of the CRM capabilities provided. Changing the technology without transforming the organization will have less than optimal impact (Goodhue et al., 2002). CRM requires companies to adopt customer-centric philosophies, to change their structures and processes, and to alter their corporate cultures accordingly (Rigby et al., 2002). In addition, aligning organizational capabilities in order to better deliver what the firm's customers may perceive as heightened value is a fundamental step in implementing CRM (Tan et al., 2002). To remain competitive and maximize profits, companies must align people, processes, strategy, and technology and search for innovative, cost-effective ways to build, retain, and deepen the lifetime value of customer relationships (Kalakota and Robinson, 2000).

**CONCLUSION**

Managing a CRM system is a combination of technology and organizational forces. It requires integrations of not only technological elements but also aligned social support from the organization. Based on multiple steps of analysis on both academic and practitioners findings this study proposes that the extent of integration among technological elements and aligned organizational elements are related to the value of CRM systems. Although the propositions are to be further enhanced and tested the preliminary findings provide a base for the study of the socio-technical concept of information systems management. The established framework can be useful for providing directions for effective CRM management. It is hoped that the propositions on CRM management can assist effective CRM use by providing understanding of the interrelationships among the technology and organizational elements, and by highlighting pivotal points in developing and retaining continuous value from a CRM system.

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