

# A ROADMAP OF SOA-BASED FRAMEWORK FOR INTERNET-ENABLED CRM

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## ABSTRACT

Because of the changes in the service economy, the service-oriented management (SOM) approach has been adopted widely in contemporary enterprises. Service-oriented management is the operational management of service delivery within a service-oriented architecture (SOA), which allows e-service companies to design customized e-services and combine them dynamically, based on various needs. In this paper, we propose a SOA-based concept called Internet-Enabled CRM, where companies conduct CRM by utilizing devices which can deliver e-services through the Internet. The study, identifies the importance of Internet-Enabled CRM in terms of an e-service value cube and SOA-based CRM framework. The e-service value cube encompasses three dimensions of value: (1) business value, (2) customer perceived value, and (3) social value. The proposed SOA-based CRM framework also provides two perspectives: (1) the customer perspective and (2) the e-service provider perspective. This work indicates the components for Internet-Enabled CRM and provides a roadmap for future e-service industry.

## INTRODUCTION

Because of changes in the service economy, the service-oriented management (SOM) approach has been adopted widely for contemporary enterprises. Service-oriented management is the operational management of service delivery within a service-oriented architecture<sup>1</sup> (SOA), which provides a differentiated service delivery capability during operation. SOA furnishes a basis for e-service composition and delivery over the Internet and allows e-service companies to design customized e-services and combine them dynamically based on their needs (Ordanini and Pasini, 2008). This concept enables firms to manage and serve customers anytime and anywhere via any device, that is, CRM can be executed without the limitations of location, time, device, and service type.

Customer relationship management (CRM) is a significant issue for today's companies. In particular, a good CRM strategy may assist firms to earn advanced profits, increase customer perceived value, and acquire new customers. In this study, CRM is transformed from traditional CRM (face-to-face) to Internet-Enabled CRM (over the Internet). This paper defines Internet-Enabled CRM as conducting CRM by utilizing devices which can deliver e-services through the Internet. The extent of Internet-Enabled CRM includes electronic CRM (E-CRM), mobile CRM (M-CRM), and ubiquitous CRM (U-CRM). The existing CRM framework is based mostly on the company's perspective; for example, it considers how to acquire customers, retain customers, and create profits from customers. Hence, a holistic framework for both sides is still lacking, especially for e-service industry. In this work, we propose a value cube and a SOA-based framework for Internet-Enabled CRM. The proposed value cube indicates the difference between conventional CRM and Internet-Enabled CRM in terms of business value, customer perceived value, and social value.

We divide the SOA-based framework into two parts—the customer perspective and the e-service provider perspective—and identify several components to represent the hierarchy in the framework based on SOA technology. We aim to identify the significant elements of and the value of Internet-Enabled CRM and to provide a roadmap and practical and managerial implications for future CRM.

The rest of this paper is organized as follows. Section 2 discusses the value cube of Internet-Enabled CRM. Section 3 devises a SOA-based CRM framework. Section 4 introduces the value of SOA-based CRM by comparing two different concepts. Section 5 illustrates a taxonomy of CRM e-services. Section 6 provides managerial implications, and the concluding remarks are furnished in Section 7.

## A VALUE CUBE FOR INTERNET-ENABLED CRM

In the era of wireless technology, three dimensions of value are identified for Internet-enabled CRM: (1) business value, (2) customer perceived value, and (3) social value. Business value is generated from companies and is always represented by monetary value (e.g., profits). Firms can easily observe the changes in profit (customer profitability) for a given time period and can modify their CRM strategies accordingly. Customer retention another indicator with which to measure profits. According to the 80/20 rule, 20 percent of customers will generate 80% of a company's profits, so it is important to retain those customers. Internet-enabled CRM provides Internet-based e-services that customers can access anytime and anywhere,

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<sup>1</sup> SOA is a method for systems development and integration in which functionality is grouped around business processes and packaged as interoperable services.

and companies can utilize new technologies (e.g., wireless and mobile devices) to help earn profits based on certain e-services, so Internet-enabled CRM is believed to attain high business value.

Customer perceived value is generated by customers and reflected in their willingness to pay. The concept of willingness-to-pay represents how much customers intend to pay for furnished e-services, and different CRM strategies may result in different behaviors of customers. For example, customers will not pay for the e-services which are inappropriate for them, even if they are delivered. Internet-enabled CRM provides opportunities for customers to acquire the most appropriate e-services when they face problems, and the technology helps companies identify customers' information, such as location, personalized preferences, and behaviors. Thus, Internet-enabled CRM can help attain high customer perceived value.

Social value is generated by collective intelligence—the wisdom of crowds—over the Internet. According to certain theories (e.g., Delphi method, brainstorming), group decision-making is superior to individual decision-making. Internet-enabled CRM allows peers to assist each other in solving problems based on wireless technologies (e.g., agent-based approach). Traditional CRM merely allows firms to decide what services to deliver—a one-way delivery concept—but Internet-enabled CRM allows peers from the social network to collaborate to decide what e-services will be furnished right away. Thus, Internet-enabled CRM is believed to attain high social value.

In short, Internet-enabled CRM facilitates high business value, customer perceived value, and social value in our proposed value cube. Traditional CRM may attain high business value and customer perceived value, but it lacks a social network effect in the e-service delivery process. We believe Internet-enabled CRM is superior to traditional CRM in terms of collaboration for Internet-enabled services. Hence, Internet-enabled CRM is expected to extend social value dimension from low to high and to provide complete solutions for managing customers well.

## **A SOA-BASED CRM FRAMEWORK**

In this research, we define e-services as those that are produced, provided or consumed through the use of ICT-networks, such as Internet-based systems and mobile solutions (Scupola, 2008). E-services have three main characteristics (Hoffman, 2003): (1) the service is accessible via the Internet or other electronic networks, (2) the service is consumed by a person via the Internet or other electronic networks, and (3) the possibility of a fee that the consumer pays the provider for using the e-service. In this section, we propose an innovative SOA-based CRM framework from the customer and e-service provider perspectives. From the customer perspective, the customer profile must be created based on SOA technology. Next, since each customer has a social network (e.g., families, friends), the providers can utilize the power of collective wisdom (collaboration) from the social network to develop a composite of e-services. From the e-service provider perspective, an e-service ontology should be created based on SOA technology. Once the e-service ontology is established, an e-service taxonomy will appear, and e-service providers can discover and re-mix existing e-services in order to match customers' real-time needs. Finally, customer value and e-service quality need to be measured to maintain good relationships between customers and e-service providers. We discuss details of those components in the following sub-sections.

### **Customer Perspective**

In the customer-perspective part of the framework, we identify significant components for customers, including social network, decentralization/collaboration, mashup/personalization, and customer value. These components are particularly crucial and essential in the environment of Internet-Enabled CRM. The following description demonstrates the concepts and rationales of those components.

#### ***Social Network***

The social network component indicates the power of collective wisdom. The effect of word-of-mouth is extremely important for the existing Internet environment. In particular, a collective decision is possible from the virtual world and useful for solving problems. For example, we can send a request to any system over the Internet and call for a group decision-making process immediately based on agent-based technology, meaning that collective decisions can be realized anytime and anywhere. Hence, peers from a specific customer's social network may play an important role in dealing with the customer's real-time problem.

#### ***Decentralization/Collaboration***

Decentralization is the concept of decomposing the efforts of each peer from the social network. Each peer has his or her expertise and can contribute to certain solutions based on a different knowledge base. Decentralization solves the problem of domination by specific peers in the group decision process, and collaboration allows peers to solve problems together collaboratively over the Internet. Peers from a social network discuss and brainstorm with one another to generate solutions. Thus, the proposed solutions will be filtered by peers collaboratively via decentralizing efforts from a group decision-making process (e.g., e-brainstorming, Delphi method).

#### ***Mashup/Personalization***

After the solutions are identified by peers from the social network, the e-services should be organized according to

required hardware (e.g., a hand-held device) and software (e.g., basic e-services). This is the concept of mashup. Moreover, the composited e-services are personalized and identical to the specific customer because peers in the group decision-making process are selected from the specific customer's social network, which means they are familiar with the customer and can realize the customer's preference more accurately. Thus, the composited e-services are not only personalized but helpful to the customer.

### **Customer Value**

Customer value is a specific term in Internet-Enabled CRM, which is not the same with current customer lifetime value (CLV) concept; for example, customer value is based on the e-service environment and should be estimated by perceived value. The basic concept of customer value is to explore the perceived value of e-services a customer uses based on his or her access costs.

$$\text{Customer Value} = \frac{\text{Profit}}{\text{Cost}}$$

The traditional concept of customer lifetime value is no longer helpful in identifying the profit from each customer, especially in an e-service environment. Financial indicators are not the only way to estimate customer value. Many e-services are free (Shampanier, 2007) and customers will not pay for them if the services can not solve their problems over the Internet. Hence, a new measurement of customer value is needed for future e-service industry.

### **E-Service Provider Perspective**

From the perspective of the e-service provider in the framework, we identify significant components for e-service providers, such as e-service ontology, e-service taxonomy, e-service discovery, e-service re-mixture and e-service quality. These components are particularly crucial and essential in the environment of Internet-Enabled CRM. The following descriptions will demonstrate the concepts and rationales of those components.

#### ***E-Service Ontology***

E-service ontology is significant for e-service industry, since e-service providers can follow the format of each e-service based on the e-service ontology. However, e-service ontology is not easy to construct because of domain limitations. For example, entertainment e-services have specific attributes, such as scope, required hardware, and memory of device. Daily-life e-services focus on totally different attributes, including personal preference, schedule, and intended objective. Hence, e-service ontology is important and essential in covering the entire e-service industry based on existing SOA technology.

#### ***E-Service Taxonomy***

Once the e-service ontology is constructed, we can classify the e-services into different categories. An e-service taxonomy is needed to assist e-service providers in determining to what category the delivered e-service belongs (Cook et al., 1999). The e-service providers can also easily identify what kind of e-services still need to improve or be established in the current status. The taxonomy is useful and essential, so more research can focus on this topic in the future.

#### ***E-Service Discovery***

When e-service providers create e-services based on the e-service ontology and position them into appropriate categories according to e-service taxonomy, the providers can easily and quickly discover what e-services they require. Dynamic e-service discovery is a significant part of the e-service delivery process. E-service providers should provide personalized e-services; however, the required e-services need to be composites from different fundamental e-services. Thus, a real-time method to discover e-services is needed to satisfy customer needs at any time.

#### ***E-Service Re-mixture***

An e-service re-mixture component means that e-service providers can reorganize the e-services efficiently. Customer needs are generated according to different contexts; however, work is still need on how to catch up with their needs. The accuracy of delivered e-services is another important issue for e-service re-mixture since, if the e-service providers deliver the wrong e-services, the customer will not use them, resulting in a failed delivery process. If this happens to e-service providers, it will result in poor effectiveness (e.g., do the wrong things) (Robbins and Coulter, 2007). Hence, e-service re-mixture should be efficient and effectiveness.

#### ***E-Service Quality***

E-service quality was originally measured by Zeithaml et al. (2005) from the evolution of the PZB model. E-service has specific attributes (e.g., delivery over the Internet or other electronic networks) and issues (e.g., security, privacy) and will be different from conventional services. Today, e-service quality is measured by customer perceptions. However, a fair third party is still lacking which could monitor e-service providers and the quality of delivered e-services. This third party could also provide a fair instrument for measuring e-service quality, not merely customer perception or e-service provider identification. This issue can be elaborated in greater details in future studies.

## **E-Service Pricing**

Service pricing has become a significant topic in service marketing and has been identified as a potential research issue by Rust and Chung (2006). Zeithaml *et al.* (1985) indicated that cost-oriented pricing was the most popular approach used by service firms. However, while this method offers some advantages, the simplistic nature of cost-oriented pricing is not effective for selling over the Internet. Many researchers have investigated the topic of the pricing of services, and most have emphasized analytical and simulation approaches. However, little has been done on developing appropriate and efficient e-service pricing approaches, even though the existing service pricing method is no longer applicable to the e-service environment. Thus, an appropriate pricing approach is needed for the future e-service industry. Certainly, the pricing method should be based on high customer perceived value and high perceived e-service quality.

## **THE VALUE FOR SOA-BASED CRM**

In this section, we compare traditional customer-oriented CRM with SOA-based CRM in terms of value generation, resources, platform, experience, collaboration, focus, economical potential, and ownership (as shown in Fig. 3). This work identifies the differences between the two types of CRM and the major characteristics of SOA-based CRM. First, value is generated in different ways in the two concepts. Customer-oriented CRM provides what the customer needs (customer creation), while SOA-based CRM co-produces what the customer needs (mutual co-creation). In the meantime, the resources for customer-oriented CRM are atoms because of the limited abilities of providers. However, SOA-based CRM enables e-service providers to cooperate with their specific abilities, so resources are abundant because of the various types of furnished information.

The platforms are also different in the two concepts. Customer-oriented CRM operates based on a traditional concept which relies on call centers. SOA-based CRM improves the ability to operate CRM according to Internet-enabled devices. In particular, the notion of experience is varied. SOA-based CRM can attain personalization, but customer-oriented CRM can only reach mass customization. Thus, Internet technology enables the new CRM concept to get closer to personalization.

Customer-oriented CRM allows the customer and a firm to collaborate at the same time; however, SOA-based CRM strengthens collaboration by getting involved with more roles (e.g., customer, peers from the social network, and e-service providers). Meanwhile, customer-oriented CRM focuses only on customer value in terms of financial perspective, while SOA-based CRM focuses on customer perceived e-service quality. Once the perceived quality is high, the perceived value will be enhanced.

Moreover, customer-oriented CRM generates revenues for firms when the customers are satisfied and become permanent consumers. However, SOA-based CRM moves toward the concept of the free economy, where customers expect free-to-use future e-services, e.g., searching and free information. Based on this particular phenomenon, e-service providers need to discover other ways to earn money. Finally, the firm owns and controls the generated value for customer-oriented CRM, but each customer can own it for SOA-based CRM.

In summary, traditional customer-oriented CRM is in the mainstream today and is successful in earning profits for firms. SOA-based CRM not only enhances the traditional concept but enables companies with more abilities to strengthen their competitive advantages.

## **A TAXONOMY OF CRM E-SERVICES**

In this section, we classify CRM e-services as components based on a SOA framework. The existing CRM e-services consist of four major components: attractive e-service, interacting e-service, analytic e-service, and retaining e-service. Attractive e-service provides e-services which employ marketing methods. For example, blog marketing, experience marketing, and 1-to-1 marketing are extremely suitable for e-services. These attractive e-services can be utilized by firms that appeal to customers using an appropriate approach, and e-service providers can devote traditional marketing methods to the Internet environment.

The second component is interacting e-service, which allows firms and customers interact over the Internet. In this category, e-service providers can furnish post-purchase survey e-services, online responding e-services, and collected FAQ e-services. Post-purchase survey e-services allow firms to get a better understanding of their customers after purchase, and online responding e-service enables customers to obtain real-time answers when they have a problem. For example, some travel agents hire employees to work at home and answer questions via Skype. Collected FAQ e-service furnishes fast self-services to customers anytime and anywhere. The third component is analytic e-service, which is used to analyze customers through two main e-services: statistic analysis and data mining e-services. Statistic analysis employs conventional statistical approaches, like clustering and linear regression, while data mining employs artificial intelligence approaches, like neural networks and genetic algorithms, to analyze customers. Thus, this category provides clues for future e-service

providers by furnishing various analytic approaches dynamically via the Internet.

Finally, retaining e-service includes customer segmentation e-service and performance measurement e-service. In this category, the aim is to help firms retain their customers. Customer segmentation e-service can assist firms to segment their customers, identify key value, and provide retaining strategies. Performance measurement e-service provides various metrics with which to measure performance (e.g., retention rate) and the effectiveness of certain strategies. The proposed taxonomy still needs improvement and further elaboration. The existing categories can be extended by any e-service provider in order to embrace the whole concept of CRM e-services.

### CONCLUDING REMARKS

This study identifies the importance of Internet-Enabled CRM in terms of an e-service value cube and SOA-based CRM framework. Internet-Enabled CRM is a novel concept that allows e-service providers to deliver e-services any time and anywhere. In addition, Internet-Enabled CRM empowers collective intelligence based on the customer's social network. The e-service value cube consists of three dimensions of value: (1) business value, (2) customer perceived value, and (3) social value. We aim to attain high business value, high customer perceived value, and high social value using Internet-Enabled CRM. In addition, the proposed SOA-based CRM framework provides two perspectives: (1) customer perspective and (2) e-service provider perspective. The e-service providers can follow the guidelines for concepts such as e-service ontology and e-service taxonomy to create and position their e-services. They also can discover and remix in real time the existing e-services in order to satisfy customer needs immediately. Customers can utilize their social networks to get help via group decision-making using agent-based technology; that is, the collective wisdom can be realized over our framework. In short, this work identifies the components for Internet-Enabled CRM and provides a roadmap for the future e-service industry.

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