

A New Approach to Order Management in CRM Applications

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Abstract

Nowadays, application of information technology in supply chain Management has increased the role of the CRM applications in e-Commerce systems. Current surveys show that existing CRM applications are not very successful in managing customer relationships. The main cause of this problem is lack of exact and enough information about the provided organization services and products.

In this paper, we present a new approach to requirement identifications, service presentation and service evolution in a Web-based order management service for CRM applications. In this service, we use the Standard Classification of Goods (SCG) and Standard Classification of Industries (SCI) to implement the service and companies classification respectively. The proposed order management service allows customers to define their orders and manages the received orders to deliver them to related companies. Presented proposals are evaluated and service begins to negotiate with the bidders that have gained an acceptable negotiation ratio. This negotiation increases the utility of both customer and companies. The proposed order management service tries to provide the best possible proposal in specified time duration so it is efficient. The main distinguishing feature of this service related to other existing services in the market is its unique approach to customer requirements identification and its proposal evaluation method.

Keywords: e-commerce, CRM, order management service, negotiation

1. Introduction

Nowadays, e-business revolution has increased sales, efficiency, profits and has reduced the cost of services. Successful companies have recognized the competitive advantages that can be gained from e-business enablement. The figure 1 presents the e-business impact on competitive advantages [1].

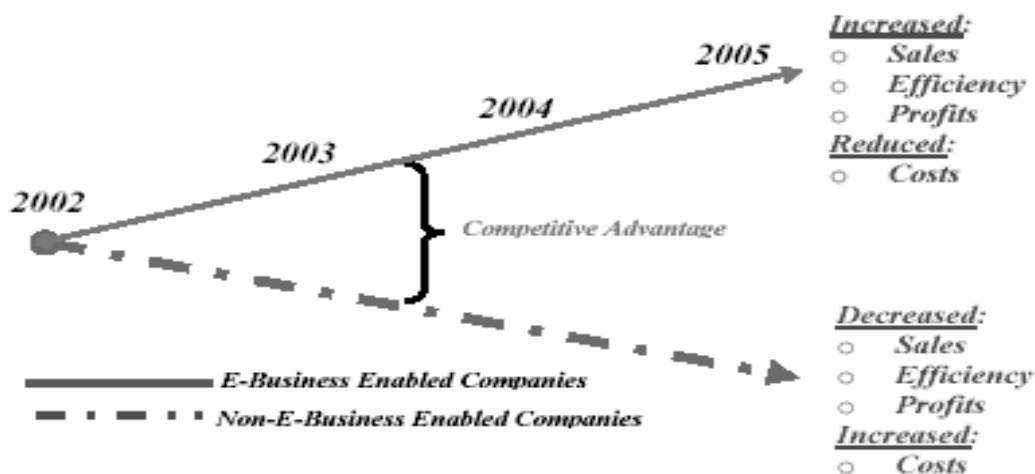


Fig 1. E-Business Impacts on Competitive Advantage [2]

It is required to extend the structure of the new business process network operationally to automate and stream-line communications, transactions, and collaboration with supply partners [3], [4]. Movement of materials, information, and finance among the supply chain elements is called Supply Chain Management (SCM) [5], if SCM focuses on customer as an important element of supply chain¹ and tries to support customer related processes is defined as Customer Relationship Management (CRM). CRM applications should be used to support all of the customer-centric processes within organization in any size and level including marketing, sales and customer support. [7]

According to figure 2, with increasing the usage of information technology, direct supply chain elements interaction is possible, so CRM applications provide real and direct SCM services. E-Commerce systems can support the supply chain elements' relationships, so we can see more quality of service in these electronic systems.

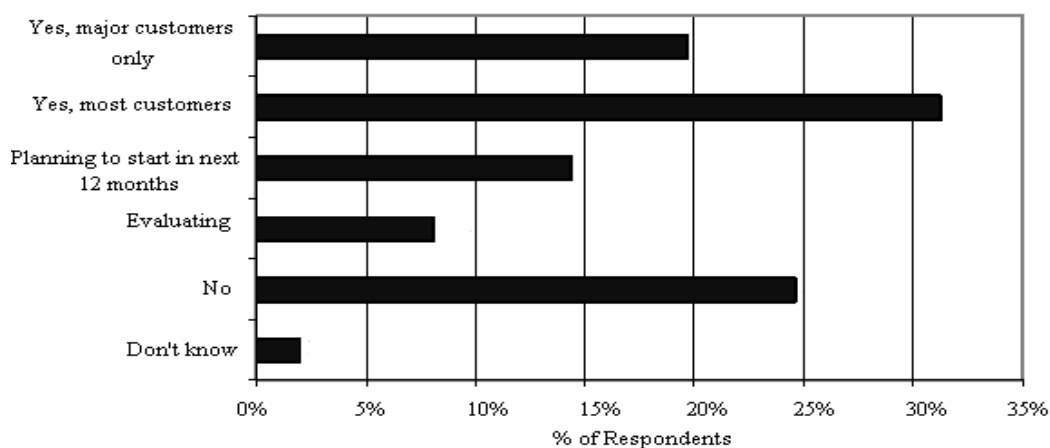


Fig 2: Do you currently have direct online connections to customer for accepting orders? [10] Customer trend investigation shows that CRM applications can not manage the customer demands efficiently, so most of the e-commerce systems can not present the successful

¹ Sam Walton says: "There is only one boss. The customer and he can fire everybody in the company from the chairman on down, simply by spending his money somewhere else." [6]

demand service for their customers. We can say the main cause of this problem is lack of exact and enough information about the organization's products and services.

In this paper, we proposed a new approach to order management service, which can solve the problems demand service of e-commerce systems.

This paper has organized as follows. In section 2, we have glance on current order management services in CRM applications, after we will investigate the statistical survey on suppliers' opinion, customers' trend and lack of exact and enough information for provided services. Finally, we will organize the current order management services in PIECES framework.

Section 3 will describe our proposed approach to order management service, with workflow diagram. In this section general view of our solution will be presented.

In section 4, will focus on development the proposed order management as a CRM service with three-layer implementation and then quality characteristics of the service will be present in special framework, after that we will model the system with UML extension of web applications.

In section 5, we will investigate the case study of our proposed order management service in e-learning system. Our proposed service manages the commercial transactions between companies and some users of e-learning system like lectures and mangers.

In section 6, we will evaluate the proposed service with negotiation, social welfare and efficiency as the negotiation parameters.

2. E-Commerce Applications, CRM and Order Management

In e-Commerce systems, CRM applications implement the order management in three layers:

- Requirement identifications
- Service presentation
- Service evaluation

In available CRM applications, requirement identification has been implemented with service classifications and helps the customers to find the suitable suppliers and services with search engines. Catalog management is a tool for service presentation, and applies specifically to Web-situated product data associated with a transaction [15]. For example, when someone shops at Amazon.com, they see advertisements, promotions and useful information about the selected book. Most of the available CRM applications can not implement the business negotiations, so evaluation phase is base on catalog information.

Customer Relationship Management system of mySAP is one of the famous applications in this field. Requirement Identification has been implemented in Service Order and Request Management modules, in these modules, you must find and choose your wanted service with some search engines and product classifications technique, after that you can see the information about the service and then if you confirm this service you must use the contract management system [19].

According to figure 3-a, the majority of companies (51%) feel that their e-commerce systems are meeting users' demands, and 15% feel that they are exceeding, but according to figure 3-b, only 16% of these companies, most of their customers ask them online services.

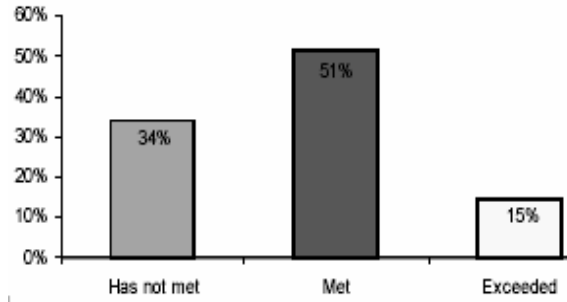


Fig3-a: Has your e-commerce system met users' demands? [18]

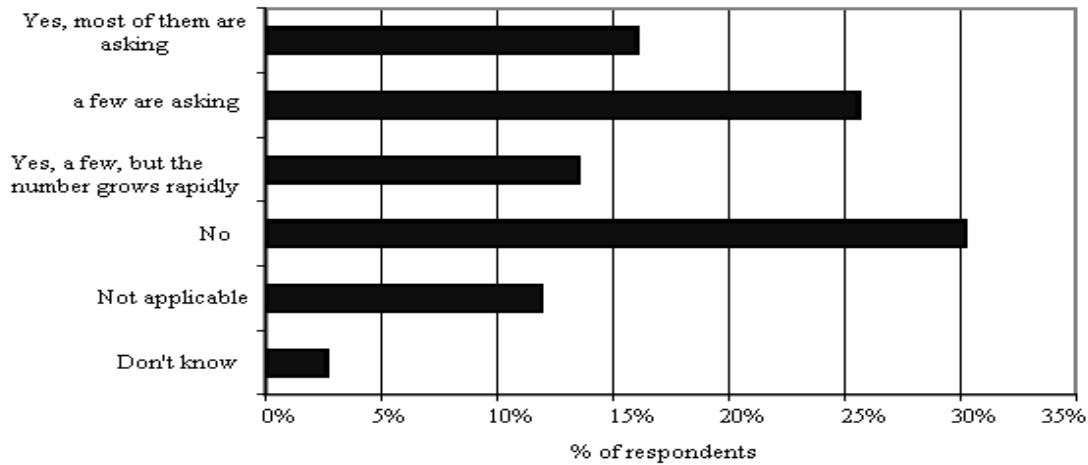


Fig3-b: Are your customers asking you to present online services? [10]

The results show that the customers can not find their demands in e-commerce applications; however his/her request is available.

So why can not many e-commerce systems satisfy their customers? And why is the reason the difference between suppliers and customers belief? We have surveyed and identified the existing problems in e-commerce systems. Table 1 organizes some of these problems according to the PIECES¹ framework. We can say that the main cause of these problems is lack of service information. According to the [10], only 3% of companies provide complete online information about their services. So order management services in available e-commerce systems are not efficient.

Definition	Category
Finding the suitable service provider with best service is difficult.	Performance
Detail information about the services is not available.	Information
Quality of requested service does not clearly, present.	Information
Information is not in useful format for easy search.	Information
Lack of the complete information about the quality of the services makes the extra cost.	Economics
System can not control on forbidden services.	Control
System does not have an efficient marketing.	Efficiency

Table 1: Problems founded with PIESES framework

In the next section, we propose a new approach to order management that tries to solve the above mentioned problems.

¹ Performance, Information, Economics, Control, Efficiency and Service

3. Proposed Order Management System

Presented problems in pervious section made that we change our vision to three layers of order management. In our vision customers present their requirement and companies inform their capabilities with their proposals, after that service tries improving the proposals with negotiation.

According to figure 4, customer presents his/her order and system presents the requested order to related companies. Interested companies in this order present their proposals and system can evaluates these proposals and negotiates with them to improve their proposals automatically. Finally system proposed the better proposal to the customer for choosing one of them.

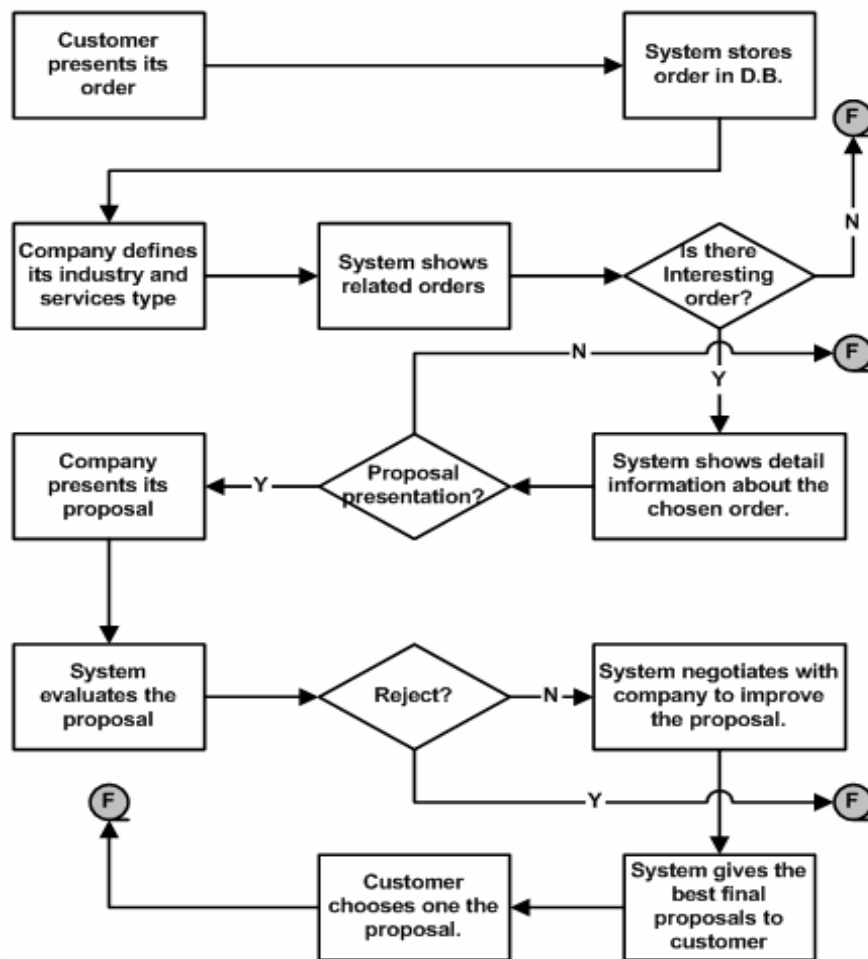


Fig 4. The proposed workflow to order management

4. Development

Software application development in the World Wide Web has been a popular field in industry and research for around 10 years [12]. We have developed our proposed service, based on described workflow in three-layer architecture and with object oriented methodology.

4.1 Order Management as a Service

Service-Oriented Architecture is becoming the prominent paradigm for distributed architecture, creating opportunities for service providers and application developers to develop value-added services by combining web services. [14]

Order management has designed as a service for e-commerce system providers to present the advanced CRM services. We have shown the architecture of this service in figure 5. The architecture of this service has the following three layers:

- *Interface layer*: The reason being that services are composed in a rather ad hoc and opportunistic manner by simply combining their operations and input and output messages, if the requirements of the application change or need to be adjusted, then the service composition will have to be recreated by possibly interlinking additional or modified service interface. The client code is implemented in this layer.
- *Logic layer*: Business logic of the service is implemented in this layer, so changing these rules does not affect content layer, but it may change the interface.
- *Content layer*: transaction components which help the services to connect and work with DBMS are implemented in this layer. If the DBMS is changed you have to only modify the service content layer.

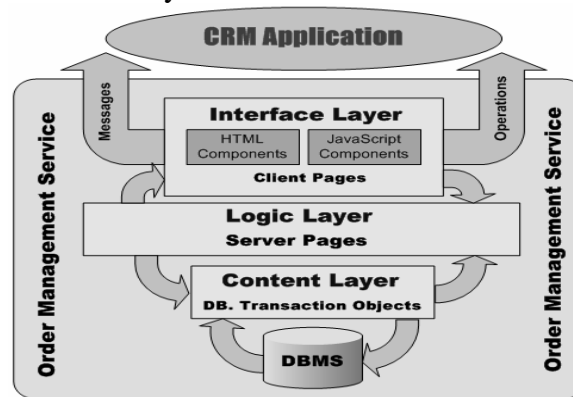


Fig 5. Architecture of the Order Management Service

4.2 Quality Characteristics of Order Management Service

During development of a service we should define its functionality and quality characteristics. The quality characteristics are description of features and constraints that define the satisfactory system [11]. According to table 2, we have defined the quality characteristics in a platform of criteria and their values. (For more information about this framework, please see [13].)

Criteria	Value
Interactivity	Bi-directional
Automation	Human-Machine
Service Coverage	Motivation & Evaluation phase
Usability-Ease of learning	Conformity with expectation
Security-Accessibility	Limited (proportioned with user type)
Platform Independence-Operating system of client	Windows and Linux
Platform Independence-Browser of client	Various versions of IE, Netscape and Opera (supporting JavaScript)
Platform Independence-Hardware of client	Pentium 233 with 64 MB RAM or higher
Platform Independence-Operating system of server	Windows
Platform Independence-Database supported with server	Oracle8i or higher version

Table 2: Quality Characteristics Definition

4.3. Modeling the Proposed Service

This service was developed with Object-Oriented methodology, using UML extension for web applications [16], [17].

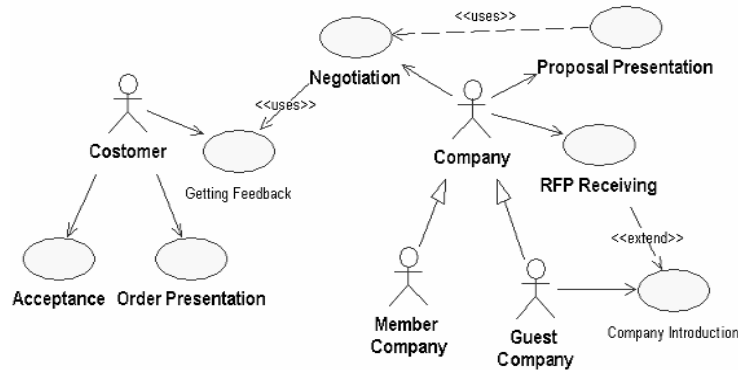


Fig6: Use case model of the proposed order management service

According to Figure 6, the order management service includes following functionalities:

- *Order Presentation:* According to figure 7, at first customer present his/her order with Standard Classification of Goods (SCG) [8] and then answer the some questions, adapted to chosen order. Customer can define and answer his/her own question(s) to determine the order. Finally customer must answer the maximum cost and deadline of the proposal penetration, and adaptation ratio (to reject proposals).

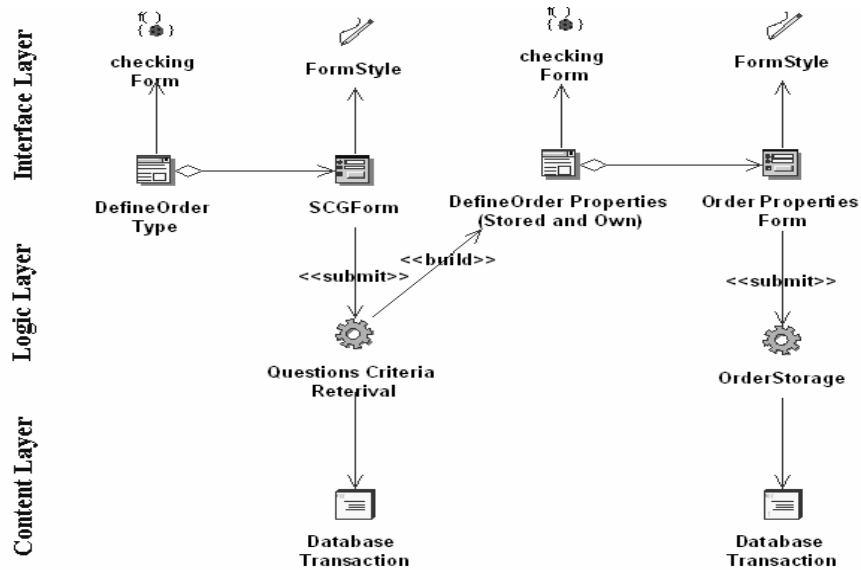


Fig 7: Class Diagram of Order Presentation

- *order Receiving:* According to figure 8, companies at first, define their industries with Standard Classification of Industries(SCI) (For more information, please see [9]) and their products with SCG, and then they were directed to list of related orders, after that with choosing one of them, they can see the detail information of chosen order.

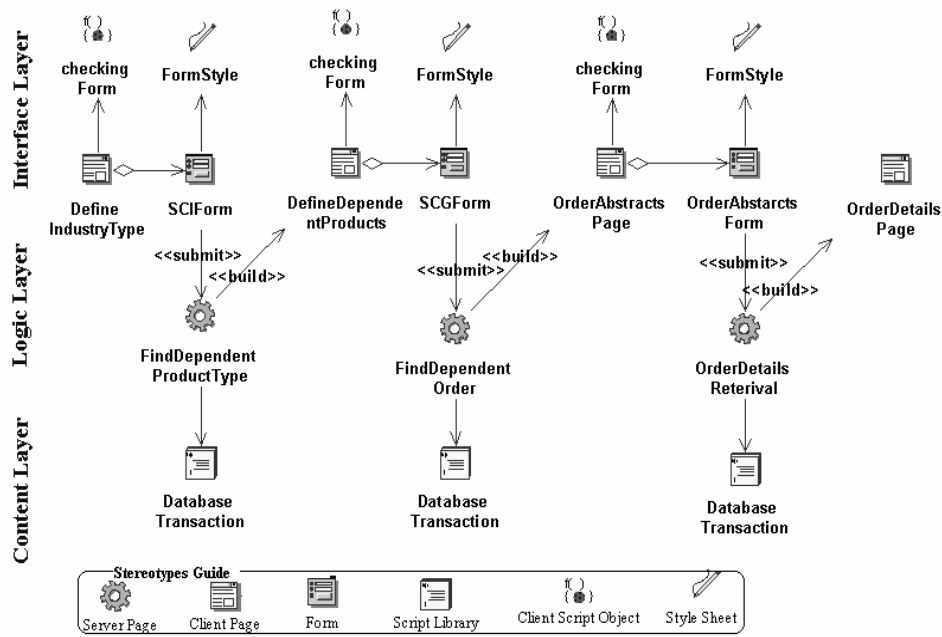


Fig 8: Class Diagram of order Receiving

- *Proposal Presentation:* According to figure 9, after the detail announcement of an order, companies present their proposal with answer of its criteria questions, cost estimation and release date. If they want to present the extra information about their proposals, they can enter it in determined <textarea>.
- *Negotiation:* According to figure 9, after the proposal presentation the system gets grade to the proposal with comparing to customer answers and adoption ratio determines the rejected proposals and for another proposals system checks the date and if remain more than one day to proposal presentation deadline, system compares the proposal to best received one, and then offers the answers of that proposal, which have gotten more grades. This strategy, tries improving the proposal with rationally offers to proposal presenter.

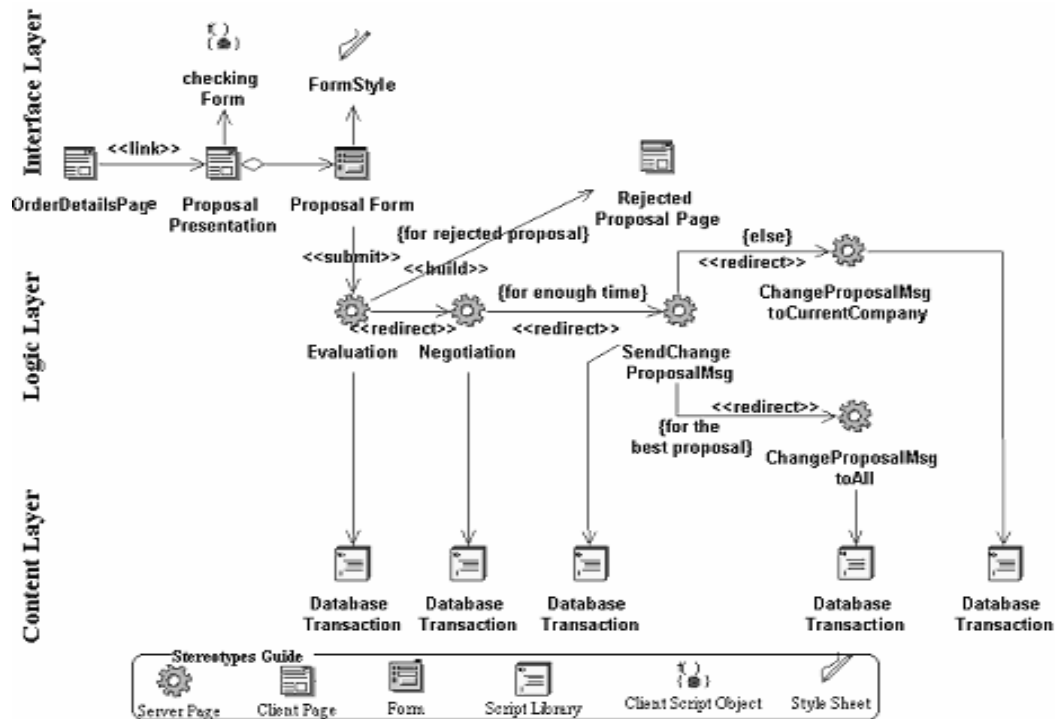


Fig 9: Class Diagram of Order Presentation

- *Acceptance:* Finally, at determined deadline, system sends three top proposals to order presenter and he/she decides, continue the negotiation is necessary or not? Finally, customer chooses the winner and sends his/her decision to contract service.

5. Case Study: Using Proposed Service in e-Learning System

There is a growing trend amongst academics to use the Internet to increase access to educational materials in a variety of ways to support the learning process. Lack of online communication facilities to manage the interactions between the e-learning system and supplier companies make some problems for providing the equipments for this system, so using the CRM application with order management service can help to solve theses problems. In the e-learning system, managers and lectures can order their needed equipments to CRM application and it manages the official transactions like order management, this service is used to present orders and evaluate received proposals.

In order management service, at first orders category must be defined in system. According to Figure 10, this definition implemented with SCG, in category presentation page, you must choose three inputs in `<select>` format. Choosing these three inputs defines the order category.

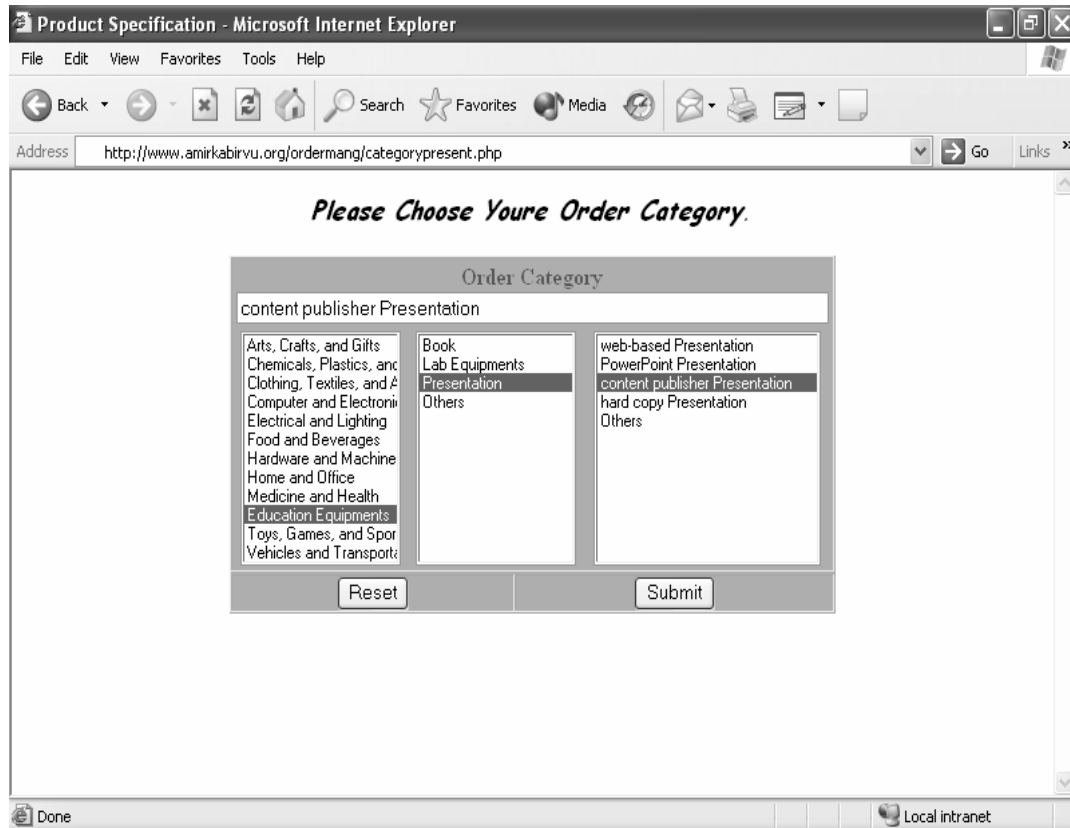


Fig10: Order category presentation Page

After the category presentation, system asks some related questions about the order as criteria. Companies must answer to these criteria if they want to give proposal. Their proposals is evaluated with these answers and then if it can obtain the order ratio, system starts to negotiates to company for improving the proposal. Finally, after the determined deadline system offers the best three proposals and order presenter decides to choose one of them or continue the negotiation.

6. Evaluation of Negotiation in the Proposed Service

One of the benefits of this service is using negotiation to improve the proposal; we investigate the following negotiation parameters in the proposed order management service:

- *Negotiation time:* A successful negotiation must assure the finite time. Proposed service continues the negotiation after the evaluation and acceptance a proposal if it has at least 24 hour (one day), so order presenter with choosing the proposal presentation deadline assures this parameters.
- *Social Welfare:* A suitable negotiation supplies the both sides of the negotiation, in this service improving the proposal help the companies to have more chance for winning and increases the quality of order so it is useful for customer, too.
- *Efficiency:* Proposed service with making the competitive environment among the companies improve the proposals to obtain the best possible proposal in determined time.

7. Conclusion

Order management service is a very important part of CRM applications. An efficient and effective order management service can make much more successful in managing relationships with customers. Our proposed order management service allows the customers to define their requirements and distributed customers to the prospect companies efficiently and effectively. This service can evaluate the proposals and negotiate with companies to increase the benefits of customer and companies.

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