

Evolutionary System Modeling for online shopping mall: Focusing on the Merchandiser and Producers

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Abstract

As mobile services have been developing, there appears a variety of new ways of business transactions as well as O2O business in commerce. However, most owners of the internet shopping malls have difficulties in adapting to such changes. Especially, those of small shopping malls get in trouble with composing products and with obtaining producers. These days, wireless internet network has been increased, and potential markets have been widened accordingly. In addition, more and more customers use smart devices in purchasing products. These can be a base for both enterprises and small companies to get opportunities to grow in various industry fields. Through the system introduction and open innovation, the way to vitalize internet shopping mall business can be discussed.

Keyword: System analysis, Auction system, E-commerce

INTRODUCTION

Today, the online marketplace of E-commerce field has been widened [1,2]. Individual businessmen make small-sized shopping malls by using various server hosting. Also, they sell products to market places after registering the products. Recently, the shopping malls have been evolved into a business model based on O2O((Online To Offline, Offline To Online). The connection between shopping malls and customers has been widened, and multi-channels of numerous routes have been simplified from the omni channel point of view. This study takes a look at a new system adoption, which is needed for internet shopping malls to be developed.

REVIEW

There are many apparel shopping malls that take clothes from a same wholesale store from the shopping mall operation point of view. Especially, agricultural and marine products are greatly influenced by time and environment in supplying

goods. There happens a stock issue in the internet shopping malls because producers and sellers are different in many cases. If customers cancel an order on a large scale after the preorder, the reliability of the shopping mall is likely to be decreased. In order to solve the problems, such as the influence of natural environment and other surroundings, this study focuses on finding ways to effectively manage the relationship between producers and sellers through the system on the internet shopping malls. In the study, the necessary items for the system are drawn from interviews with those who are in charge of the shopping mall, and the system modeling is based on the interview results after thorough analysis and design. Furthermore, the effectiveness of the system is finally reviewed by the interview with the person in charge of the shopping mall.

CASE STUDY

User interviews were conducted as a case study. Nine interviewees, including three people in charge of shopping malls, three producers, and three customers, gave suggestions to the system. The interviews were individually conducted for two days from August 10 to 11, taking one hour per person given explanations about the purpose of the study.

Merchandiser (MD)

- Influences from other shopping malls

Almost every person in charge of shopping malls has his own list of producers and takes care of them. If other shopping malls start the price-down event, there suddenly occurs a change of order, which results in a stock issue. Because of this risk, MDs tend to preorder the least number of products, and it can be a problem. Also, there can be a loss of stock when the price changes within the period of free cancellation.

- Obtaining new producers

It is necessary to protect customers' information in the internet commerce. In case of shipping from the producer to the customer directly, the shopping mall needs to send the producer all the customer's information, which is necessary to deliver. In this regard, the shopping mall needs to find a trustworthy and system-connected producing company. Plus, it is necessary to simplify the process of registering partner companies

Producers

When the order amount frequently changes, there is a chance of increase in cancellation. In that case, it is difficult to make a plan for production. If possible, producers want to sell their products directly to customers at the retail price. However, it is not easy for a small-sized company to have this kind of process.

Customers

- Prediction about demands

It takes a lot of time to order customized products. Shopping malls need to predict demands. For example, if the price of fruits changes at all times, customers may reorder the fruit after cancellation when the price goes down.

- Sales structure

When people need to buy a large amount of products, they want to get a discount at a wholesale market. There are various shopping malls selling similar products. For customers, however, they get confused about where to buy because each shopping mall provides different information. Shopping malls need to provide customers with more detailed information about the producer as well as the product.

System Analysis and Design

The system requirements were designed based on the results from the interview. The system, as an interface legacy system, plays a role in connecting producers, customers and the shopping mall system [3]. The methodology of this platform aims at heightening the software reusability of business logic [4,5]. Therefore, each operation manager and developer needs to consider making reusable components and unifying the process. In this respect, object-oriented objects and functional modeling are needed. The framework class takes care of error handling and resource acquisition. Specific explanations for each module to be introduced are as follows.

Automobile auction modules

The price of agricultural and marine products dramatically changes, depending on time and season. There are a number of producers, producing goods on a small scale. Auction markets are vitalized in each region. After systematizing these markets, MDs, who are going to check products in each region, directly check and use the auction process within the system. Each partner company and mall presents their price. They have a video conference, depending on conditions such as prices, order amounts, or prepayment. This process is like the figure 1. Automobile auctions need to be connected with shopping malls and partner companies.

Methodology of system development is as follows.

- Each interface is composed of various of interfaces such as interface segregation principle.
- Concrete class is substituted for the super class by the Liskov Substitution Principle.
- In order to use the distributed surroundings of OOP effectively, one common module administrates RMI(Remote Method Invocation), CORBA(Common Object Request Broker Architecture), and EJB((Enterprise Java Beans) [6].
- Observer design patterns are used among soft design patterns. The system can be expanded by separating components into object units [7-9].
- Using java beans, parameter binding is conducted for object conditions. This guarantees stable operations within running time by applying the method to every component.

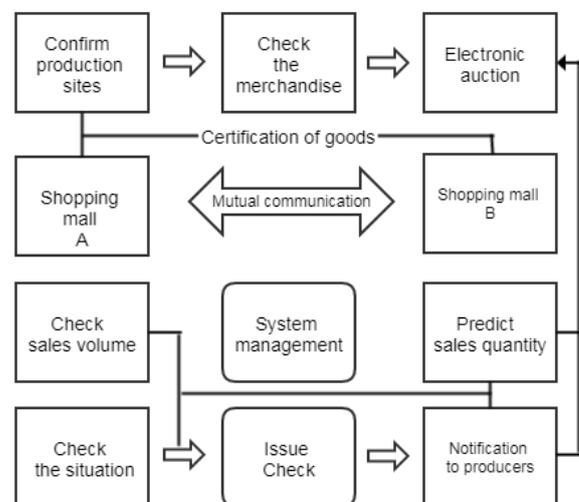


Figure 1: Automobile auction modules

Total stock management modules

Exception management function is added to the general stock management module. When the exceptional situation occurs, conditions of present sales and of products' supply and demand are reported to the person in charge of total management. This makes possible for MDs and producers to prepare in advance, which plays a role as a function of predicting demands. The exception management module prepares for exceptional situations of products supply, including unusual weather or discount sales. When such situations occur, MDs of each shopping mall adjust sales price by providing producers information and consulting with them. Also, MDs provide producers messages about the progress of sales in real time. Events through SNS include additional information about producers and shopping malls. Statistical information of those who access and of those who enter for an event is provided as a multidimensional graph to mobile web services. This systematic process is like the figure 2.

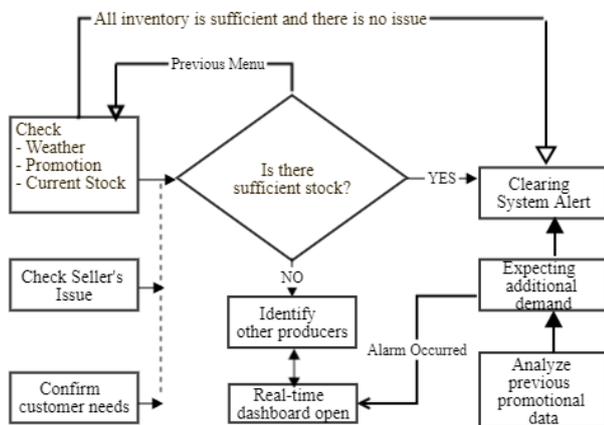


Figure 2: Stock management modules

MVC framework is designed for an effective design in that it combines individual web-tiers of each shopping mall [10]. Each control servlet standard is processed in the framework class. Business operations of each process are handled in the action servlet. Because the access amount of this module is the largest, the performance test and database query tuning are done in regard of min value of Database connection pool.

Product marketing module for off-line

MDs use the O2O method by means of this function. Also, this module can be used as a two-way communication means between producers and customers. MDs promote the products, and check the niche market. MDs display tablet equipment only for shopping malls in off-line stores, and it is provided by each shopping mall through social clouds. When a customer clicks the screen on the equipment, it is automatically moves into the SNS page of the producer. The banner of this page has information about group purchase,

simple link page, social web page, and mobile-web page. It also provides MDs a function of communicating with customers in real time. When a customer with an active response installs the application, the application provides the customer information about the product by using BLE(Bluetooth Low Energy) technology. MDs go over the possibility of expansion of O2O business through statistical data every month. Integration of virtual points of shopping malls with those of off-line stores is necessary to increase the rate of activation. This function makes it possible for each shopping mall to develop a total service, combining on and off-line forms, from traditional service of shipping after purchasing on a smart phone. Furthermore, the function heightens customers' satisfaction by using off-line stores as places for marketing, taking over, and exchange. The systematic process is as the following figure 3.

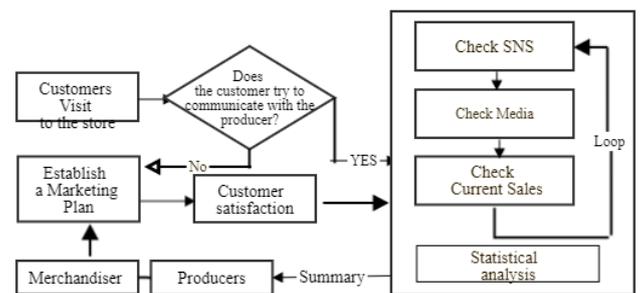


Figure 3: Product marketing module

- Usage examples

- (a) Customers continuously search for better shopping malls in terms of price and quality of products. It would be better if there is a process of evaluating products through customers' participation.
- (b) The process of evaluation by customers is provided by means of VR video. Therefore, it is possible for them to check the product and trust the shopping mall.
- (c) In addition, customers are able to communicate in real time through IPTV, STB, and Digital TV. The system needs to be connected to each tablet equipment. All the application objects have to be simply constructed through JSTL. When constructing the connection interface class, a variety of formats, such as xml, need to be included. Communication between users uses simple object access protocol, and it needs to be possible for all the users of the internet application layer.

CONCLUSION

This paper studies possibilities and ways to develop present shopping malls into the O2O business model at the producers' viewpoint. It is helpful for small and medium-sized companies which are not using ERP and CRM system at present. Those companies are able to be improved if they are

connected with local markets, a kind of organic combination of off-line and on-line shopping malls. More studies on various kinds of malls, as well as small and medium-sized malls, are needed in order to boost e-commerce.

REFERENCE

- [1] Hendra, Christina. "A Design of Integrated O2O (Online to Offline) Smart Retail Application to Support Omni-Channel Retailing." (2015)
- [2] Christin, Nicolas. "Traveling the Silk Road: A measurement analysis of a large anonymous online marketplace." Proceedings of the 22nd international conference on World Wide Web. ACM, 2013.
- [3] Kendall, Kenneth E., et al. Systems analysis and design. Vol. 4. New Jersey: Prentice Hall, 1992.
- [4] Johnson, Rod. Expert one-on-one J2EE design and development. John Wiley & Sons, 2004.
- [5] Kounev, Samuel, and Alejandro P. Buchmann. "Performance modeling and evaluation of large-scale J2EE applications." Int. CMG Conference. 2003.
- [6] Smith, Ben. "Object-oriented programming." Advanced ActionScript 3. Apress, 2015. 1-23.
- [7] Freeman, Eric, et al. Head First Design Patterns: A Brain-Friendly Guide. " O'Reilly Media, Inc.", 2004.
- [8] Duyne, Douglas K. Van, James Landay, and Jason I. Hong. The design of sites: patterns, principles, and processes for crafting a customer-centered Web experience. Addison-Wesley Longman Publishing Co., Inc., 2002.
- [9] Alexandrescu, Andrei. Modern C++ design: generic programming and design patterns applied. Addison-Wesley, 2001.
- [10] Wojciechowski, Jarosław, et al. "MVC model, struts framework and file upload issues in web applications based on J2EE platform." Modern Problems of Radio Engineering, Telecommunications and Computer Science, 2004. Proceedings of the International Conference. IEEE, 2004.