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A TECHNICAL MODEL FOR IMPROVING CUSTOMER LOYALTY WITH M-COMMERCE: MOBILE SERVICE PROVIDERS

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ABSTRACT

Mobile telecommunications companies face the issues, including sever competition, and market saturation. Increasing customer loyalty has been introduced as a key solution, to guarantee the success of the business. Several researchers have explored that customer satisfaction and switching barriers are influential elements of customer loyalty. They introduced several factor, which are essential to satisfy customers, and form switching barriers. This study introduces m-commerce as a new opportunity that causes more loyalty of customers. In order to rationalize the use of m-commerce in the mobile telecommunication industry, a solution is proposed. This solution is based on the process of knowledge discovery in database, which describes phases of data gathering, data preprocessing, data transforming into profiles, and finally knowledge extracting. In addition, it is discussed how the solution can help enterprises to achieve the introduced factors. Therefore, the solution tends to an increase in customer satisfaction, and switching barrier, and hence customer loyalty. Finally, in order to present an applicable implementation of the solution, phase of data transforming is realized by using the XML.

KEYWORDS:

Customer Loyalty, m-Commerce, Customer Satisfaction, Switching Barriers, Business Model

1. INTRODUCTION

The communication approaches have been evolved during centuries. Mobile phone is the recent communication technology and is known as the fastest adopted one. Particularly, the evolution of the mobile and wireless technology causes that customers expect more value added services. Thus, it is difficult for the mobile telecommunication companies to retain their customers, and in turn, there is an intensive competition between mobile telecommunication companies (Shin *et al.*, 2004). In order to survive in the mobile communication market, the enterprises have been pressured to shift their own business model to a "customer-centric"

approach to improve their customer services (Wang *et al.*, 2004; Wu *et al.*, 2004; Yang, 2005). For this purpose, the enterprises have looked for various strategies and solutions, including ecommerce, which is going to be evolved by rapid development of new technologies such as wireless (Wu *et al.*, 2004; Yang, 2005). According to Yang (2005), Wang (2004) and Wu (2004), commerce through a variety of mobile equipment over a wireless telecommunication network (e.g., cellular phones, hand-held or palm-sized computers) is referred as mcommerce. The capabilities of m-commerce lead to rapid increase in its application in the last little while (Wang *et al.*, 2004; Wu *et al.*, 2004; Yang, 2005). Various statistical analyses illustrate that enterprises and peoples are eager to adopt the new mobile technologies (Bruner *et al.*, 2005; Mahatanankoon *et al.*, 2004). According to Yang (2005), there were 94.9 million m-commerce users in 2003 and it will exceed than 1.67 billion by 2008. In addition, Yang mentioned that the revenue of m-commerce was \$6.86 billion in 2003 and it will exceed more than \$ 554.37 billion in 2008.

Moreover, the mobile technologies, which use global phone communications has a potential to create new opportunities and add more benefits for businesses and consumers by providing a cheap, fast, smart and personalized services about anytime and anywhere (Lumpkin *et al.*, 2004; Nam *et al.*, 2004; Wu *et al.*, 2004; Wua *et al.*, 2004; Yang, 2005). Furthermore, it is possible to create user profiles, and then process them to have knowledge about customers' prospect (Figge, 2004; Gerstheimer *et al.*, 2004).

However, there is a limited academic research on the impact of m-commerce on customer loyalty. In a conceptual study, this paper seeks to understand how the m-commerce can improve the customer loyalty, and then profitability. For this purpose, an interpretivist approach is followed to explore m-commerce and its implications in the mobile telecommunication industry. The review of related literature reveals how telecommunication companies could enhance the customer loyalty. Then, a solution based on the m-commerce is presented, which potentially can bring more benefits in mobile telecommunication business. Indeed, it makes possible to know the customers' prospect and have an increase in customer satisfaction.

This solution is based on the process of knowledge discovery in database (KDD), which describes phases of data gathering, data preprocessing, data transforming into profiles, and finally knowledge extracting. In the solution, 1- data are gathered, 2- data are preprocessed, 3- data transformed into profiles, which produced knowledge about customers. In addition, the process of the profiles helps the enterprises in decision-making in order to offer more value-added services. Finally, for the purpose of demonstrating the applicability of the solution, a realization of the phase of transforming data into profiles are presented.

2. CUSTOMER LOYALTY IN TELECOMMUNICATION COMPANIES

As competition between businesses increases, many enterprises always face to costly challenges in acquisition and retention of customers (Burnham *et al.*, 2003). On the other hand, it is proved that customer acquisition costs more than customer retention. In addition, individual customer's profitability increases each year that the customer is retained (Burnham *et al.*, 2003). Therefore, a long-term business relationship with the customers of any enterprises is essential to keep customers as long as possible, which are the subject matter in

the customer retention process (Gerpott *et al.*, 2001; Hwang *et al.*, 2004; Kim *et al.*, 2004). Furthermore, this relationship is directly affected by an important factor: customer loyalty. Now, the enterprises attempt to find new solutions and strategies that lead to increase the loyalty of their customers, and hence enhance their profits. This new prospect has changed the enterprises' business models from traditional "make-to-stock" production model to "build-to-demand" customer service model (Chung *et al.*, 2004) as its concept is demonstrated diagrammatically in the Figure 1.



Figure 1. The concept of make-to-stock and build-to-demand

The above-mentioned challenges satisfy in the field of telecommunication industry. For example, the acquisition cost of a new mobile service subscriber is something about \$300 to \$600 in the processes of sale, support, marketing, advertising and commissions (Shin *et al.*, 2004). Furthermore, the number of subscribers would be reached its saturation point, and then, the marketing strategy of the company must be trying to retain the existing customers (Dyea *et al.*, 2002; Gerpott *et al.*, 2001; Kim *et al.*, 2004). Therefore, customer care and loyalty are of greater importance to the success of the company in the competition battlefield (Burnham *et al.*, 2003; Vividence, 2002).

Previous studies have been conducted to extract critical factors in customer loyalty of telecommunication industries. In this paper, two main researches, which studied the implications of customer loyalty in the in the telecommunication industry, are considered: Torsten J. Gerpott et al (2001) studies in German and Kim et al (2004) in Korea. By using a survey method, Gerpott (2001) and Kim (2004) found factors, which influence customer loyalty in mobile telecommunication companies. These factors are illustrated in Figure 2 in which each box shows the name of factor (variable), the meaning of factor (operational definition), and factors' attributes (measurement items).



Figure 2. The influential factors in customer loyalty for telecommunication industries.

As illustrated in the Figure 2, customer loyalty is significantly influenced by customer satisfaction and switching barriers. In other words, the customer loyalty directly depends on the switching barriers, when the level of customer satisfaction is the same for all service providers. Customer satisfaction directly depends on the level of quality of provided services. Switching barriers means that it is difficult for the customer to switch to another service provider because of financial, social or psychological reasons (Gerpott *et al.*, 2001; Kim *et al.*, 2004).

The customer satisfaction depends on call quality, value added services and customer support. Call quality is based on the call clarity and network coverage according to customer perception. A research at Vividence Corporation (2002) found that 35% of customers switch to another carrier just because of better coverage. Value added services are based on the variety of services and up-to-dating of services. For example, high-speed data and multimedia communications are required in telecommunication companies as well as voice communication. Again, the Vividence research illustrates that 28% of customers for better customer service, 31% percent of customers for special promotion and 19% of customers for free phone switch the service providers. Finally, customer support is based on the variety of customer support systems, speed of complaint processing, ease of reporting complaint and friendliness when reporting complaint. According to Vividence, 53% of customers switch the carrier for better price (Hwang *et al.*, 2004; Kim *et al.*, 2004; Moynihan, 2005; Shin *et al.*, 2004; Vividence, 2002).

The switching barriers depend on loss cost, move-in-cost, and interpersonal relationship. Loss cost refers to loss in social status and performance associated with switching to another service provider. Difficulty of changing number and loss of benefits such as mileage program are good example of loss cost. Move-in-cost refers to economic cost associated with switching to a new carrier. Finally, interpersonal relationship refers to social and psychological rapport with carrier based on customer perception, which is based on carrier's care for customers, trust toward carrier and level of communication with carrier (Hwang *et al.*, 2004; Kim *et al.*, 2004; Moynihan, 2005; Shin *et al.*, 2004; Vividence, 2002).

The end-level measurement items can be classified in the technological and nontechnological groups. Call clarity and network coverage place in the technological group and other items place in the non-technological group. In the following section, it is explored that m-commerce can improve non-technological group and then enhance switching barriers and customer satisfaction.

3. THE IMPLICATIONS OF M-COMMERCE ON CUSTOMER LOYALTY

For non-technological group, it is essential for telecommunication businesses to have an accurate knowledge of their customers to be able to: 1- recognize their customers' needs, and 2- make a good relationship with their customers. It is possible for the carriers to gather their customer information, analyze the data and produce the customers' prospects. For this purpose, a technological solution has been presented in the following section, which enables the carriers to reach the customer's prospect. In addition, through this solution, they can determine customers' needs individually and provide personalized value-added services.

3.1 The Proposed Solution

To improve the customer loyalty in a mobile telecommunication company, it is necessary to have knowledge about the customer. The knowledge would be obtained through the process of customer information. In addition, accurate and continuous information flow guarantees success of improving the customer relationship.

In this research, an operational solution based on m-commerce, is introduced. Through the realization this solution, gathering and processing the data, and producing the required knowledge of the customer should be provided. In this solution, the mobile telecommunication company should implement the solution, in which it is essential to:

- 1. Implement a database for its customers. This warehouses required information and creates an information infrastructure that its process can produce knowledge about the customer.
- 2. Extract three profiles for each customer, by preprocessing raw data, as acquiring the new customer. Those are generic profile, time profile and location profile. Generic profile consists of personal information, favorites and interests of the customer. Additionally, the history of customer complaints and contacts with the carrier stores in this profile. This profile indicates if



Figure 3. A solution for using the m-commerce in the mobile telecommunication company

the customer is a profitable customer or not. Based on the customer level, it is possible to plan for making loyal customers. Time profile warehouses the occasion of the most frequently contacted numbers via voice communication, text or multimedia services. In addition, it indicates the average duration of the customer's contact, which is necessary in determining level of customer. Location profile warehouses the location of the most

frequently contacted numbers via voice communication, text or multimedia services. Moreover, it can show the source/destination's location of the most contacts.



Figure 4. Technical Reference Model of the m-Commerce System

3. Extract the required knowledge of customers behaviors based on strategies and policies of the enterprise, by processing the customers' profiles with data mining techniques. In other words, it should produce customers' prospect. For example, the most dialed and received, frequent message sent and received or used for multimedia numbers of the customer

should be extracted from profiles. In addition, it is possible to extract the schedule of customer trips by processing the location of customer in specific time.

The above-mentioned requirements prepare an infrastructure for produced knowledge to improve the relationship with customers. As it is illustrated in the solution (Figure 3), the offered m-commerce solution covers all phases of customer relationship management.

3.2 Realization of the Solution

The proposed solution can be implemented and exploited in any mobile telecommunication company. Figure 4 demonstrates a comprehensive view of required system

Box 1 - The XML Schema of Generic Profile

for storing customers' prospects, extracting knowledge and providing individual services. Distribution view defines the application and data distribution capability for gathering customers' data from various locations. In the data view, the customers' data are cleansed and classified based on the defined database architecture. Furthermore, data view describes data management rules. Data will be processed to extract customers' prospect based on the three

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema id="XMLSchemal" targetNamespace=http://tempuri.org/XMLSchemal.xsd</pre>
elementFormDefault="qualified" xmlns=http://tempuri.org/XMLSchemal.xsd
xmlns:mstns=http://tempuri.org/XMLSchemal.xsd
xmlns:xs="http://www.w3.org/2001/XMLSchema">
       <xs:complexType name="CustomerInfo">
               <xs:sequence>
                      <xs:element name="CustomerID" type="IDType" />
                       <xs:element name="CustomerName" type="xs:string" />
                       <xs:element name="TelNo" type="xs:string" />
                       <xs:element name="CustomerLevel" type="xs:short" />
                       <xs:element name="FavoriteServices"</pre>
                       type="CustomerServices" />
                       <xs:element name="MostContactNo" type="xs:string" />
                       <xs:element name="CommentsHistory"</pre>
                      type="CustomerFeedback" />
               </xs:sequence>
       </xs:complexType>
       <xs:complexType name="CustomerServices">
               <xs:sequence> <xs:sequence>
                              <xs:element name="ServiceID" type="IDType" />
                              <xs:element name="ServiceName" type="xs:string"/>
               </xs:sequence> </xs:sequence>
       </xs:complexType>
       <xs:simpleType name="IDType">
               <xs:restriction base="xs:nonNegativeInteger" />
       </xs:simpleType>
       <xs:complexType name="CustomerFeedback">
               <xs:sequence> <xs:sequence>
                              <xs:element name="CommentDate" type="xs:dateTime"</pre>
                               1>
                              <xs:element name="CommentType" type="xs:short" />
                              <xs:element name="Subject" type="xs:string" />
                              <xs:element name="Description" type="xs:string"/>
               </xs:sequence> </xs:sequence>
       </xs:complexType>
</xs:schema>
```

mentioned profiles, and provide required knowledge to specify individual added value services, which are presented to the customer via possible channels. Furthermore, we have realized the part of producing customer's profiles of the solution by using XML that is a realization approach. This realization have been illustrated in three following box for generic (Box 1), location (Box 2) and time profiles (Box 3).

Each box illustrates the development phase of relevant profile in the solution. In fact, some required variables for each profile are considered and their XML schemas are presented.

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema id="LocationProfile"</pre>
targetNamespace="http://tempuri.org/LocationProfile.xsd"
elementFormDefault="qualified"
       xmlns="http://tempuri.org/LocationProfile.xsd"
xmlns:mstns="http://tempuri.org/LocationProfile.xsd"
       xmlns:xs="http://www.w3.org/2001/XMLSchema">
       <xs:simpleType name="IDType">
               <xs:restriction base="xs:nonNegativeInteger" />
       </xs:simpleType>
       <xs:complexType name="CustomerInfo"> <xs:sequence>
                       <xs:element name="CustomerID" type="IDType" />
                       <xs:element name="FrequentContactSrcs"</pre>
                       type="ContactLocations" />
                       <xs:element name="FrequentContactDests"</pre>
                       type="ContactLocations" />
       </xs:sequence> </xs:complexType>
       <xs:complexType name="ContactLocations">
               <xs:sequence> <xs:sequence>
                      <xs:element name="LocationCode" type="xs:string" />
                       <xs:element name="LocationName" type="xs:string" />
               </xs:sequence> </xs:sequence>
       </xs:complexType>
</xs:schema>
```

Box 2. The XML Schema of Location Profile



Box 3. The XML Schema of Time Profile

3.3 Implications of the Solution

The offered solution for using m-commerce in a mobile telecommunication business produces the timely and accurate information flow. This is extracted through the use of data mining techniques to produce customer knowledge. Finally, the customer prospect is a base for making decision in business. In the result of this approach, a personalized business is realized and the loyalty of customers can be guaranteed.

The process of customers' complaints reveals that customers are not satisfied with the communication network and then carrier should improve the communication network (call quality in Figure 2. However, the flow of information cannot directly improve the technological needs of the customer. In fact, the process of generic, time and location profiles cannot directly lead to improve the quality of call, network coverage and speed of communication.

As mentioned in the literature review, customers look for lower price. Absolutely, the customer pays attention to get lower price for the most contact. The proposed solution gives the potential of analyzing the behavior of various customers to personalize the customer care. For example, the most contacts of a customer may occur in special times. Another customer may often dial to several contacts in a specific location. The process of time and location profiles can produce the required knowledge in personalizing business.

In addition, it is possible to analyze what is the favorite service of the customer in mobile communication that may be voice communication, text or multimedia services. The favorite service of a customer can determine the personalized bonus. Furthermore, it is possible to extract information of customer like the schedule of customer travels by processing time and location of its contacts. This enables the carrier to cooperate with other companies to offer "cross-services" (value added in Figure 2).

The carrier can dedicate a channel to receive customers' complaints directly. The carrier then should process and response those to meet the customer needs in an accurate and timely manner. The stored information can be a basis for improving the customer care (customer support in Figure 2).

Personalized services makes more switching barriers for the customer, since the carrier have made an intelligent interaction with the customer, which hence make more loss cost and move-in-cost (switching barriers elements in Figure 2).

Finally, processing of gathered information leads to a better knowledge of the customer, which in turn, causes an enhancement in personalized value added services. Consequently, the level of customer's loyalty will be enhanced. This guarantees an increase in the profits of the company.

4. CONCLUSION AND FUTURE RESEARCH.

In this paper, we show that m-commerce can bring efficiency in customer loyalty in mobile telecommunication company. This is illustrated by investigating the previous studies on the implications of the customer loyalty in the telecommunication businesses. The measurement items and influential factors in customer loyalty have been classified.

Then, a solution introduced to guarantee that the required knowledge of customer would be produced in a mobile telecommunication company. This solution gathers customer information in three generic, time and location profiles. These profiles prepare some vital

information of customers' interests and behaviors. In this case, layer this information will be processed through the use of data mining rules to produce the customer prospect. The top layer makes the carrier enable to plan and make decisions based on the customer prospect, which makes possible to personalize the services. A technical reference model of the solution is provided to explore the implementation possibility and requirements.

Further research could be conducted to investigate if customized model can be effective in enhancing customer loyalty in other kind of businesses. Then, it is possible to provide a general-purpose model for m-commerce that brings efficiency in customer relationship management in each enterprise. In addition, the privacy should be investigated in the mcommerce solution that is a critical issue for customers.

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