Customer Knowledge Management Framework in E-commerce

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Abstract. This paper aims to present a framework for describing Customer Knowledge Management in online purchase process using two models from literature including consumer online purchase process and E-CKM. Since CKM is a recent concept and little empirical research is available, we will first present the theories from which CKM derives. In the first stage we discuss about e-commerce trend and increasing importance of customer loyalty in today's business environment. Then some related concepts about Knowledge Management, Customer Relationship Management and CKM are presented, in order to provide the reader with a better understanding and clear picture regarding CKM. Finally, providing models representing e-CKM and online purchasing process, we propose a comprehensive procedure to manage customer data and knowledge in e-commerce.

Keywords: e-commerce, Customer Relationship Management, Knowledge Management, Customer Knowledge Management.

1. Introduction

In the mid 20th century the invention of computer and rising need for information led to the emergence of information technology. This trend changes the amount and ways of accessing to the information and caused the formation of the information societies. The wider communication bands allowed: 1) more information to be communicated in the same amount of time (or the same amount in less time) 2) decrease the costs of this communication dramatically. In 1986T, Malone, Yate and Benjamin, issued the Electronic Market Thesis for the first time that is still one of the main discussions in market and electronic commerce. [7]

By the appearance of World Wide Web (WWW) the application of e-commerce emerged in the beginning of 90s. [13]. Online shopping is developing rapidly today and e-commerce initiatives have been found to increase the value of the firm. Researchers, however, agree that in fact the amount of money involved remains very low [5]. Newell suggests that the real value of the firm relies on the value it creates for the customers and also the value that customers bring back to the firm. Hence, it should be point out that the value depends on information and more advanced technologies do not necessarily create value in this area. By the way, customer relationship management, if being conducted properly, is a toll for increasing the profit. If companies convert data from customers to knowledge and then, use this knowledge to build relationship with customers, it can lead to loyalty, which entails profitability.

Yao believes that the advent of internet caused the rapid growth of e-commerce and it is changing the nature of business as well. E-commerce includes advantages for the firms and in order to obtain these advantages, they should use websites which perform with high level of e-commerce.

In this article, we aim to develop a framework describing customer knowledge management process considering the important steps in electronic customer knowledge management and consumer online transaction process consequently.

2. Knowledge Management (KM)

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Distinguishing data, information and knowledge is not easy. In general, data are considered as raw facts, information is regarded as an organized set of data, and knowledge is perceived as meaningful information. Data and information are distinguished based on the "interpretation" [1].

In another definition, knowledge is divided into two categories: explicit and tacit knowledge [8]. The value creation process begins with sharing tacit knowledge by socializing with others or receiving in the form of digital or analogue. Then others will internalize knowledge and this process will create new knowledge and again sharing and the above process is going to repeat. This process could be expressed as "innovation" [6]. Rowley (2002) defined KM as follows: "knowledge management is concerned with the exploitation and development of the knowledge assets of an organization with a view to furthering the organization's objectives. The knowledge to be managed includes both explicit, documented knowledge and tacit, subjective knowledge" [12].

Almost every definition of KM includes the storage of knowledge. KM is about acquisition and storage of employees' knowledge and making information available to other employees within the organization.

3. Customer Relationship Management (CRM)

CRM could be tracked in relational marketing. Shani and Chalasani (1992) define relational marketing as "an integrated effort to indentify, maintain, and build up a network with individual consumers and to continuously strengthen the network for the mutual benefit of both sides, through interactive, individualized and value-added contacts over a long period of time" [14]. In general, CRM is defined as an interactive process which leads to a balance between firm's investments and satisfying customer's needs in order to maximize the profit.

E-CRM is the internet related CRM.E-CRM is defined as a web-centric approach to synchronizing customer relationship across communication channels, business functions and audiences. It enables online ordering, e-mail, a knowledge base that can be used to generate customer profiles, personalized service, the generation of automatic response to e-mail, and automatic help [12].

By the help of E-CRM, customer information could be available at every touch points in the company. The firm's intention to build a one to one, permanent relationship with customers has been referred to as customer relationship management. Since collecting, storing and distributing relevant knowledge for those CRM processes make the deployment of KM techniques necessary, it is evident that an organization's KM capabilities play a key role in CRM success [2].

4. Customer Knowledge Management (CKM)

4.1. Customer Knowledge (CK)

The most important part of managing human interaction-based knowledge is using CK to do something differently. Making customer data widely available to customers and internally is good idea but the proper course of action depends on too many unpredictable factors because of the changing behavior of customers. Sometimes customers become confused regarding their wants. As a consequence, managers must decide when to take a particular item of CK seriously and when to discount it or look for more confirmation [3].

Researchers identified three flows of information in customer knowledge management:
- Knowledge 'for' customers: satisfies customers' requirements for knowledge about products, the market, and other relevant items.
- Knowledge 'about' customers: captures customers' background, motivation, expectation, and preference for products or services.
- Knowledge 'from' customers: understands customers' needs pattern and/or consumption experience of products and/or services [15].

An important aspect of customer knowledge is that is not knowledge owned by the firm, but by others who may or may not be willing to share such knowledge. Furthermore, the ability to design and improve new products is also impacted by the level of customer knowledge flows [9].

4.2. Customer Knowledge Management

In order to maintain a good relationship with customers, it is crucial that a company communicates and interacts with its customers in a satisfactory manner, and provides market offerings that continuously meet customers' changing needs. This requires the deliberate management of 'customer knowledge' [3].

At first glance, CKM may look like another name for customer relationship management, or knowledge management. But customer knowledge managers need a different approach [4]

Gibbert et al. (2002) identified some key variables and on the basis of those variables they have developed the followings table of comparison:

Table 1. Km, CRM and CKM Comparison [4]

	KM	CRM	CKM
Knowledge sought in	Employee, team, company, network of companies.	Customer database.	Customer experience, creativity, and (dis)satisfaction with products/services
Axioms	'If only we knew what we know.'.	'Retention is cheaper than acquisition.'.	'If only we knew what our customers know.'.
Rationale	Unlock and integrate employees' knowledge about customers, sales processes, and R&D..	Mining knowledge about the customer in company's databases.	Gaining knowledge directly from the customer, as well as sharing and expanding this knowledge.
Objectives	Efficiency gains, cost saving, and avoidance of re-inventing the wheel.	Customer base nurturing, maintaining company's customer base..	Collaboration with customers for joint value creation.
Metrics	Performance against budget.	Performance in terms of customer satisfaction and loyalty.	Customer success, innovation, organizational learning..
Recipient of incentives	Employee.	Customer.	Customer.
Role of customer	Passive, recipient of product.	Captive, tied to product/service by loyalty schemes.	Active, partner in value-creation process.
Corporation role	Encourage employees to share their knowledge with their colleagues.	Build lasting relationship with customers.	Emancipate customers from passive recipient of products to active co-creators of value.

5. E-Customer Knowledge Management Framework

Buying, selling, transferring or exchanging products, services or information through computer networks like internet is called electronic commerce. E-commerce has become more and more popular and online purchasing is becoming more widespread. It has affected the business world substantially and provided attractive and new convenient tools for customers and firms.

Web-based customer data become an important source for KM. The volume of qualitive data available via corporate web sites is growing and firms are looking forward to extracting and understanding user's thought processes, wants, needs and purchase intentions [11] through these data.

An E-CKM model is proposed by Su et al. (2006).The expectation from this endeavor is to more articulately delineate knowledge 'for' ,'from' and 'about' customers so that more beneficial products can be delivered to the right group of customers, to prevent, product failure and to ensure commercial success[18].In this model the CKM process includes four stages:

At the first stage, the company identifies perspective product benefits in terms of a customer's perceived value, in the form of feature, functions, and other attributes which can be communicated to the customers. At this stage the company delivers product knowledge for customers. At the second stage, the company acquires knowledge about customers by understanding the customer's background, needs, and preference pattern toward product features [15]. Through communication by a web-based survey, a company is able to make use of knowledge 'for' customers and knowledge 'about' customers, and perform the appropriate market segmentation mission. After the segments are found through data mining techniques, each segment's pattern of needs toward product attributes is defined and the different characteristics of each segment can be recognized and analyzed. Finally, once the segmentation task is completed, the characteristic of customers' needs in each segment are studied in order to extract the needs patterns in each segment. Therefore, the knowledge from customers enables the company to aim the right target market segments and make appropriate strategic business decisions in product variant development plan and marketing activities [15].

The above mentioned E-CKM model is combined with the consumer online transaction process, in which an online consumer goes through three steps to do an online purchase. Consumer-retailer exchange

relationships typically involve several activities. The first step often involves basic data exchange from the retailer to the consumer, such as browsing, gathering information, and making product and price comparisons. The next step usually involves the consumer providing some personal information by registering an e mail address, describing product automatic information exchange that is intentionally or involuntarily captured through cookies, log-data, and data-mining tools. The final step involves provision of private and monetary information, such as credit card information, actual purchase preferences, and payment and address information, in order to complete the purchase of a product or service [10].

Table 2. Proposed CKM model in e-commerce

Categories of CK	Knowledge for customers	knowledge about customers	tacit knowledge conversion	knowledge from customers
Customer knowledge management process	Product features/benefits /identification	Customers' needs categorization	Market segmentation implementation	Segment needs pattern extraction
The Consumer Online Transaction Process	Information retrieval • Browsing • Gathering Information • Making product and price comparison • Learning about products and services	Information Transfer • Describing product prefrences • Registering • Providing feedback • Suplying private information		Product purchase • Providing credit card information • Providing actual product prefrences • Supplying payment and address information
CKM process in e-commerce	Providing effective information about producta and services using tools such as: e-catalogue, and intelligent agents and shopbot.	Gathering basic information about customers and their needs through cookies, forms, web bugs, transaction log, spywares and click stream.	Manipulate customer data sources applying data mining thecniques, in order to extract useful knowlege about customers segments, potential market and needs in each segmen	Applying extracted knowelege from market to designe product and services and revising market strategies.

Based on the above mentioned processes, we introduce a comprehensive process to manage customer knowledge in e-commerce. We also propose useful tools in each stage that facilitate the CKM process. In the first stage, customer contacts with company through its website. In this stage company should provide information for the customers using tools available in the e-commerce process like: search engine, e-catalogue, and intelligent agents and shopbot. By these means customer become familiar with the products and services of the company. In the second stage CKM helps the company to achieve initial information from the consumer through his/her first contact through the website. This information could be used in next stages for further analysis of appropriate information about potential consumers' needs, wants and expectations. Some of well-known digital tools available for this stage are: cookies, forms, web bugs, transaction log, spywares and click stream. At the third stage data extracted from previous stages would be categorized and form databases. With the help of data mining techniques and applications, customer data could be analyzed in order to provide information for improving business performance. Finally, after market segmentation and choosing the right target market, knowledge extracted from previous stages would be applied in offering right products and services to the right customers. It is in this stage that purchase happens and knowledge from target market is gained through e-commerce payment tools like credit cards, smart cards and e-check.

6. Conclusion :

In this study we provided a generic framework for customer knowledge management in e-commerce process to provide basic information for potential customer, achieve information from customer and analyze gathered data to provide better services. The web has created a major opportunity to deliver more quantitive and qualitive information to decision makers. This could lead to increased customer satisfaction, reduced marketing costs and more effective marketing and lower costs for customer acquisition and retention. We considered the general process for customer purchase including the following steps: need recognition, search

for alternatives, and evaluation of alternatives and purchase of selected goods. So our suggested framework could help both customer and company to facilitate data gathering. Proposed framework could help information processing in following manner: It improves both reach and richness of the information provided for the customers at the same time. It also decreases information asymmetry in a way that customer do not need to contact directly with the company in order to realize the exact specifications of the products and services available. At the second step, the outcomes of data mining can enhance market segmentation by dividing a heterogeneous market into smaller, more homogeneous subgroups where marketing efforts can be more specifically targeted and effective. And finally, firms could analyze customer data to focus on profitability levels, numbers, types, or usage of multiple products, product pricing, and total revenue anticipated likelihood of acquiring a new product.

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8. References:

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