BOTTLENECK IDENTIFICATION AND CRITICAL FAILURE FACTORS IN DATA MINING PROJECTS OF CRM

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Abstract- Competition to acquire and maintain valuable customers is significantly increased among companies. Many studies have investigated the maintenance and growth of customers to improve the performance indicators such as retention rate, collection and organization of customers' data, creating customers' profiles and modeling the users. With the occurrence of changes in the business environment, markets have saturated and the volume and growth rate of data have increased as well as decisions must be made as quick as possible and with maximum knowledge. Use of data mining methods is increasing. At present, Customer relationship management (CRM) and data mining projects as well as the wrong choice of methods and tools are very costly and many of these projects fail. Aim of this article is investigate concepts of CRM, data mining and the relationship between them as well as the reasons for their success or failure so that we have identified bottlenecks and offered solutions to prevent them.

Keywords- CRM; Data Mining; Bottleneck Identification; Data warehouse; Critical Failure Factors (CFF).

I. INTRODUCTION

Competition to acquire and maintain valuable customers has increased highly among companies and many studies are done on the subject of customer retention [1]. The focus has changed from production-oriented mode to the customer-oriented mode as well as the focus of data collection and warehouse and the use of data mining methods have changed towards better decisions [2]. In the past, efforts for segmentation of customers and providing goods or services with higher quality and better price were made based on market segmentation. At present, companies have moved towards providing services and meeting the needs of individual and one by one. With the progress of technology, storage capacity increases and become cheaper. On average, most of the companies in the period of 6 months to one year increase their capacity of data storage 2 times. The positive outcome of this issue is that having this huge amount of data, we identify information and the behavior of customer and design the products and services in accordance with it. Its negative consequence is the problem of handling a large amount of data, because this huge volume of data leads to wrong analysis, incorrect results and wrong decisions [3].

Data mining is the extraction and analysis of large amounts of data to discover meaningful patterns and rules in them. The main objective of data mining is extracting patterns of data, increasing their main values and transferring data as knowledge. Data mining is one of the main factors of success and part of CRM [4]. Data mining technology for large companies can be an effective sales strategy [5]. To absorb, preserve and promote the best customers, we need broad capabilities in part of one CRM system, which usually divides into operational and analytical CRMs. Analytical CRM means that companies know their customers and can convert them to valuable customers [6]. For remaining in the path of a successful business, we need recognition of customers and their needs by CRM and data mining is an essential guide [7].

According to the studies, 70% of CRM projects have failed and the setup and implementation costs of these projects are very heavy [8]. Thus, the reasons for the failure and success of these projects are important and effective on decision making by companies. The application of data mining in CRM is important and essential, because companies identify the needs of their customers using data mining and accordingly provide services.

II. PROBLEM STATEMENT

2.1 CRM

CRM receives customers' data, simultaneously interact with customers and for each of the different groups of customer follow certain strategies. It aims at better relationship with profitable customers and finding new customers as well as finding a solution for customers that are not profitable enough [3].

In other hands, the aim of CRM is not only offering excellent products and services to customers, but also obtaining and preserving good customers [9].

2.2 Data mining

Data mining is the use of techniques such as modeling and data analysis for the prediction of needs and basic orientations as well as offering the best products to the best customers [7]. Extraction of knowledge from huge volume of information and uncompleted operational, marketing and service data of customers through the analysis and separation of useful data out of the huge volume of data for making

business decisions is called data mining. Data mining is called the process of knowledge discovery, which depends largely on information and statistics, artificial intelligence, technology and information science as well as automatically analysis of massive data for making deductive reasoning and exploring potential models as well as future predictions and events. Data mining helps decision support systems to reduce risk and choose the right decisions.

In today's competitive environment, organizations to stay in the competition need to maintain valuable customers. One of the techniques that can be used for more loyalty from customers is providing personalized services to customers. Such services not only meet the needs of the customers, but also lead to their loyalty. E-commerce websites are organizations with large volumes of customers' information that can use this information to personalize services for valuable customers. Data mining is a new approach to resolve these needs. This information includes various kinds of online data, new kinds of knowledge domains as well as the use of business intelligence. All concepts are examined based on real-world experiences and structures [10].

Applications of data mining in the classification of customers, the analysis of customer acquisition and retention rates, the analysis of customer loyalty, cross-sale, i. e. selling the new product or service to existing customers, and customer profitability analysis [2].

2.3 Preliminary steps for the effective use of data mining in CRM

The preliminary and necessary steps to perform data mining include:

- identification of the goal and the problem of business, e. g. increasing the response rate or value of customers,
- Creating DB of marketing,
- Performing ETL,
- Data warehouse, which takes up to 50-90% of total time,
- Exploring and summarizing the data,
- Preparation of data for modeling, and
- Developing the model and repeating the cycle [7].

2.4 Problems

High costs are associated to the implementation of CRM systems by using data mining. Creation of data warehouse is one of main and time-consuming stages. As well as heterogeneous data and good data cleansing are prerequisites for a good data mining. According to the previous studies, most efforts for the establishment of CRM have not been successful in the implementation stage and finally have failed [11].

III. LITERATURE REVIEW

In the conducted studies, important factors and reasons for failure or success of CRM projects are reviewed and in some cases we have mentioned the reasons and technologic problems in more detail as well as we have taken into consideration the importance of appropriateness of data.

According to The Data Warehousing Institute (TDWI) in 2002, almost 70% of failure in CRM project is due the uncertainty of the data and low quality data cost close to 600 million dollars a year to companies [12].

Alt and Puschmann (2004) concluded that successful CRM projects are rarely technical presented the following factors as effective on the success of CRM projects: stepwise evolution, straightforward implementation and long term project, organizational redesign, integrated system architecture of standard components, change management, and top management support [13].

Roberts, et al. (2005) suggested technology as one of the requirements for the implementation of CRM, which is not alone enough for its success [14].

For successful implementation of CRM projects in companies by using data mining, Ranjan and Bhatnagar (2008) suggested various factors for decision-making that the most important one was Critical Success Factors (CSF). CSF has various forms in different companies and in the following its general and common forms are mentioned: CRM customer centric approach, Top management commitment, Skillful personnel, Project schedule and plan, Monitoring and feedback, Communication, Privacy and security, Cost involved in the project [15]

Foss et al. (2008) showed significant relationship between scope, size, complexity and duration of the CRM projects from one hand and the poor planning, ambiguity of tasks and failure in recognition of the core needs of the business. The latter is the main reason for the failure of CRM projects in companies [16].

Alshawi et al. (2011) examined the role of three factors including organization, technology and data quality in the implementation of CRM and found close relationship between the quality and reliability of data and their large correlation with the success of CRM projects [17].

Khaleghy Bayegy et al. (2014) reviewing CRM projects determined the main factors influencing the failure of CRM projects and validated and approved them after statistical analysis. Executive factors in organizations and technological, cultural, managerial and cost factors include five categories of factors that are determined as the main and effective factors affecting the failure of CRM projects [11].

Determined factors	Effect
Executive factors	high
Technological factors	high
Cultural factors	Very high
Managerial factors	high
Cost factors	high

IV. SUGGESTED APPROACH

In this study, we attempted to find factors affecting the implementation of CRM projects using data mining. Finding appropriate methods that are useful and prevent from falling into the trap is of great importance. Implementation of a CRM project is costly and in most cases, its implementation is time-consuming. One of the factors affecting the failure and success of CRM is the use of technology. The use of data mining methods in CRM projects is growing and one of the Key steps in data mining is the stage of preparing and creating data warehouse and data cleansing. Doing these tasks is time consuming and as a result increases the costs. The cost and time have great roles in managerial factors and bring challenges to the executive factors. Therefore, with increasing rate of data volume, time and cost increase and its impact on the implementation of relevant projects become critical and of a key nature such that becoming it a bottleneck in the implementation of CRM projects using data mining.

This article suggests creating data warehouse when designing the database of CRM systems and providing this facility in the main software. Usually in the design of database, methods such as normalization with a focus on reducing data redundancy, reducing the volume of database and increasing the speed of access to data are used. With proper design of data warehouse, at the beginning of the project the volume of stored data volume increases, but instead, at the time of data mining we can valuable time, which reduces the total cost of the project. In addition, by growing increase in the volume of data, the effect of time in this step and the cost associated to it will become clearer.

CONCLUSIONS

Most of the CRM systems after implementation have failed and lost cost and time. This study aimed to identify bottlenecks in implementation of data mining in CRM by examining the Critical Failure Factors (CFF) in these projects and it has focused on avoiding the use of inappropriate methods. According to investigation in this study, time and cost were determined as bottlenecks in the identified relevant projects so that the preparation of data due to its increasing volume plays a significant role of the success in CRM systems. By creation of the data warehouse when designing database of data relating to CRM systems, we have benefit in this method, although increasing the storage volume, but spending time in data mining at this stage, which reduces the total cost of projects. Given great time needed in the stage of data cleansing, we suggested new techniques and methods or a combination of them when performing data mining in this stage to decrease the time. We proposed further studies and future research in this area is necessary and finding appropriate solutions is promising.

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