Data mining with its role in marketing, sales support and customer identification data analysis

Mohammed Bin Ali Al Atif a,1,*, Ahmed H. Shakir b,2, Ahmed Kateb Jumaah Al Nussairi c,3, Jamal Mohammed d,4, Ali Saad Alwan Almusawi e,5

a Information Science Dept. - College of Arts and Humanities, King Abdul-Aziz University, Jeddah, Saudi Arabia
b Business Administration Department, Al-Mustaqbal University College, Babylon, 51001, Iraq
c Al-Manara College for Medical Sciences, Maysan, 62001, Iraq
d Communication Technical Eng. Dept., College of Technical Engineering, Al-Farahidi University, Baghdad, 10022, Iraq
e Department of Business Administration, Kut University College, Al Kut, Wasit, 52001, Iraq

1 dgs.scholarship@kau.edu.sa; 2 ahmed.hasan@mustaqbal-college.edu.iq; 3 ahmedkateb@uomanara.edu.iq; 4 jamal.mohammed@alfarahidiuc.edu.iq; 5 ali.s.al-musawi@alkutcollege.edu.iq

* corresponding author

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ABSTRACT

In the current times, large amounts of data are collected in databases in various fields for example the retail market, banking, and medical care. However, for users, complete information is not necessarily helpful. Along these lines, separate helpful data from a lot of information. This valuable information extraction measure is called information mining or information disclosure and information measure (KDD). The entire course of finding and deciphering designs from information incorporates many advances, like choice, pre-preparing, change, information extraction and translation. Information mining supports venture promoting. Also nowadays, it is no longer possible for a company to succeed without relying on data-driven statistics to understand the needs of customers in this rapidly evolving world. Henceforth, there has become an urgent need to analyze data in order to develop products based on customer needs and desires. Companies can no longer be satisfied with just advertising campaigns to attract or retain customers. Data analysis also helps to reshape relationships and interactions with customers, and to market products more effectively, which leads to stimulating and increasing sales. This article aimed not only at identifying the role of data analysis and its use in the field of marketing and sales, but also at revealing the extent of the impact of data analysis and exploration on marketing and sales. It also showed that the forces of competition that pervade the business world are the ones that exert pressure over the market operating companies to work efficiently and effectively to maintain and increase their market share, and then achieve profitability and therefore the benefit of shareholders. To achieve the study objectives, the researcher used the descriptive method and a critical review of the theoretical literature and previous studies related to the topic. The study found that data analysis technology plays an essential role for every element of customer relationship management. Through data analysis applications, the project can transform the vast number of records in its clients' database into an integrated picture of its clients. The study also recommended companies that deal with huge amounts of data to use data mining techniques because of their analytical capabilities that help the company convert its customers’ data into useful information to be used in making relationship management decisions with them.

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1. Introduction

There are numerous information mining methods and calculations that can be utilized to find significant examples and bases. These strategies have been examined by Saurkar et al. There are various methodologies as follows: Classification: In grouping, the qualities of recently arising organic entities are first checked and appointed to a pre-characterized class, for instance, credit candidates are ordered into low, medium and high danger. 5 Correlation: The principle reason for connection is to build up the connection between the components on the lookout. Common instances of connection demonstrating are market container investigation and strategically pitching methods. The mining affiliation rulebook instruments incorporate the apriori calculation and the weka toolbox. Forecast: In this work, some obscure or missing property estimations are anticipated dependent on other data. For instance: Predict deals for the following week dependent on existing information. Bunching: For this situation, information mining coordinates the information into significant subsets (groups) with the goal that the focuses in the gathering are like one another and as various as conceivable from the focuses in different gatherings. It is an uncensored rating. Verma and colleagues proposed an efficient unsupervised dynamic grouping algorithm for shopping cart analysis. External analysis: In this case, data mining is used to identify and explain anomalies. For example, in analyzing shopping cart data, outliers can be some abnormal transactions [1].

The business environment has created a necessary and decisive condition for companies wishing to continue and grow, which is changing their convictions and way of thinking. The customer is no longer obliged to buy from a specific company or to stay loyal to it, and competitors are doing their best to attract other companies’ clients. Therefore, it is necessary to rely on long-term marketing plans based on building a solid and strong relationship with the profitable customer to retain him as a loyal customer of the company’s products and services. Moreover, providing high-quality products is no longer sufficient alone to maintain customers, as the ease of products imitation, copying and quoting can easily overcome such a comparative advantage.

In fact, companies owning a customer database is a very important competitive advantage because breaching customer databases creates a gap in the marketing performance of companies. These data are used in the process of targeting customers, as the modern trend of focused (individual) marketing instead of prolific mass marketing has created an urgent need to provide data on current and potential customers in the market, and different sales forces can be used to collect this data. (Ahmad, 2009) (Lahwal et al. 2015) pointed out to the contribution of marketing information systems to the production of knowledge by relying on the subsystems where the system begins by extracting the information produced from the daily operations databases and uses the information stored in the databases interactively as a data repository. These interactions are completed by the marketing decision support systems with the data warehouse using data analysis techniques [2]. Marketing is considered one of the important departments in the organization. So, increasing the intelligence of marketing operations in view of different dimensions of the organization’s sales performance is the main goal of operations data warehouses that helps to improve marketing efforts such as promotion and performance (Joyce, 2007). As well, the marketing research system provides information on marketing mix elements and other performance measures (information on current sales volume, market share, the image of the organization in the consumer’s mind ...) [3].

On the other hand, it has been noticed in the recent years the rapid movement and change of the economic activity which created many marketing opportunities. The economic problems were also complicated, which created many marketing risks and challenges. Among the most important factors driving movement and economic change, and then changes in the market, is the increase in global competition, and the technological, economic and demographic developments. All the factors of change, competition, opportunities, problems and challenges led to an inflated data required to produce goods and services, which in turn led to a growth in the price of the data-based product. The data required to produce goods and services needs the communication channels the customer uses to interact with the company. It is also based on the principle that all the elements of the organization have one image of the customer. Good management of the relationship with the customer requires knowledge the clients and knowing what they like and what they do not like, which requires identifying the desires of customers and then initiating the fulfillment of these needs and desires.
Indeed, by providing customer databases, companies are able to cope with the constant changes in the consumer tastes and habits, which generates a kind of direct response, such as designing products based on the general preferences and desires of customers and building a long-term relationship between the customer and the company. The forces of competition that prevail in the business world pressure the companies operating in the market to work efficiently and effectively to retain and increase their market share, thus achieving profitability and achieving the benefit of shareholders [4].

One of the most important means to achieve the previous goals is the optimal use of the information owned by companies about the surrounding business environment, and the generation of an added value information from what they possess. Actually, it is clear that there is no limit for the information used in business management, which led to this big explosion in the development and application of technology used in storing, retrieving, processing, analyzing, publishing and communicating data. Achieving an added value information helps to raise the level of business information needed by the employees of the company at different levels and in different activities, and helps decision-makers to better use data in developing and implementing strategies (Li, H., et al. 2020).

Because of the challenges that the market ripples with due to competition and the speed of change, the goal of the smart marketer is not only to obtain a customer, but to retain the customer, i.e. establish a lasting relationship with the customer. In order for the relationships between the organization and the customer to be effective, lasting and profitable for both parties, the organization needs to make effective decisions. Therefore, this study came to clarify the role of data in marketing and sales.

According to what the researcher observed, all the studies reviewed in this work use different tools to mine data and stimulate interest in implementing customer relationship management [5]. The importance of the study stems from the fact that data analysis for sales of goods is very important in marketing. Moreover, the use of mining in customer data is of great importance for commercial companies. Therefore, the importance of the study is represented in demonstrating the impact of data analysis and mining in the field of marketing and sales, and stating the characteristics of the mining environment. This study adds to the Arab library a scientific study on the subject of the impact of data analysis on marketing and sales.

From this standpoint, the idea of this work emerged, which was the main question: What is the impact of data analysis on marketing and sales in commercial companies? using the descriptive approach through literature and related studies review.

The forces of competition that prevail in the business world exert pressure on the companies operating in the market to operate efficiently and effectively to maintain and increase their market share, thus achieving profitability and promoting the benefit of shareholders. One of the most important means to achieve the previous goals is the optimal use of the information owned by companies about the surrounding business environment, and the generation of added value information from what they possess. The actual reality shows that there is no limit for the information used in business management, which led to this big explosion in the development and application of technology used in storing, retrieving, processing, analyzing, publishing and communicating information.

The problem of that study can be therefore formulated in the following question: What is the impact of data analysis on marketing and sales in commercial companies? Although data mining is becoming very popular as an emerging technology, there are still some problems that must be solved in order to make it work in various fields. Issues encountered in data mining include data quality, interoperability, security, and privacy. The main problem with data mining is the lack of real-time data analysis [6]. With the changing trend of data, cyclical mining arises at the historical moment. Cyclic mining refers to mining data after a specified period of time. For example, the Miners Association rules supermarkets every three months to discover the current buying behavior of customers.

With the spread of information and technology systems, companies are increasingly able to accumulate huge amounts of customer data in large databases, so the objectives of the study came to clarify this as following:
• Emphasize the importance of data analysis and its use in the field of marketing and sales.
• Detecting the impact of data analysis and mining on marketing and sales

2. Literature Review

The researcher presented the previous studies and research related to this study and he found that despite their diversity and the different quality of their elements, all of them revolved around the topic of benefiting from the analysis and mining of data in the field of marketing and sales. The study is based on the previous scientific progress as the researcher started from where the others ended, and he inferred important terms or basic evident conclusions in the research problem.

(Hailin’s., 2020) entitled “Time is Money: Mining of Time Series Data Based on a Dynamic Model of Correlation Analysis of Commodity Sales” [7]. Demonstrates that relationship investigation of ware deals is vital in cross-promoting. So strategies have been proposed to perform time-series information mining dependent on a powerful model to investigate deals connections between various wares. The powerful model incorporates some distance models in the different watch windows of the time series information base that have been moved from the ware exchanges data set. There is a connection of deals in double-cross series on various occasions, and this might lead to significant bases and information for the people who wish to rehearse cross-advertising and accomplish more noteworthy benefits. This implies that time points of perception that demonstrate when the business relationship happens comprise significant data for a unique model that exploits inborn innovations. Information mining through time series can uncover which kinds of products have similar deals patterns and how these business patterns change throughout a given timeframe, which demonstrates that the “right” merchandise can be lauded for the right clients “exactly on schedule. Also, a few periods have been utilized to characterize comparative deals. Examples can be utilized to recover more important data, which can be utilized to expand deals of related products, further develop a portion of the overall industry, and increment benefits. The consequences of the examination of retail product informational collections demonstrate that the proposed technique requires some investment factor and can uncover fascinating deals designs that will work on the nature of in general promoting. Besides, the calculation can be considered as a keen part of the proposal in promoting frameworks with the goal that the human-PC communication framework can settle on a wise choice.

The study of (D’Haen et al. 2012) entitled “Predicting Customer Profitability During possession taking: Searching for the Optimal Combination of Data Source and Data Mining Technique”[8]. First focusses on researching the prescient exhibition of two kinds of information: web information and accessible information. Second, it centers around the assessment of the prescient exhibition of different information mining methods. Client drawing in and holding is by and large viewed as an unhappy assignment for agents. Luckily, there are models that assist them with picking the “client” to follow and there are two elements assuming a part in this cycle: First: the chance of transforming into productivity once the possibility is really a client. Second: The likelihood that this client might be a connection to different customers. The consequences of the review were that the information is being utilized to acquire clients with an increment of 35% in client productivity.

The study of (Farooq & Raze 2011) entitled "A comprehensive study of customer relationship management through data extraction technology, and the proceedings of the national conference" [9] has endeavored to introduce another viewpoint on client relationship the executives through information mining innovation by zeroing in on the issue of information mining applications, openings and difficulties in CRM. It covers points like client maintenance, client administrations, hazard appraisal, extortion recognition and a few information mining devices broadly utilized in CRM. The investigation discovered that the utilization of the client relationship the board device in business gives another measurement. It likewise demonstrated helpful however the utilization of information mining in CRM was more useful.

The study of Chopra,[10] titled "Implementing Data Mining Techniques for Strategic Customer Relationship Management Issues" uncovers knowledge into the fundamental development and perspective usages of data mining in CRM. Data mining procedures can be particularly useful to the relationship in doing what needs to be done issues by finding stowed away
models, affiliations, and associations in business information set aside in informational collections. Affiliations can use data mining techniques to look at customer buying practices as time goes on for better support and relationship, find emerging examples to embrace a proactive procedure in a significantly genuine market, and add much more important impetus for existing things and organizations and the dispatch of new thing and organization groups. This audit induced that the fundamental development and perspective applications for data mining in customer relationship the

The main focus of the study of Kraljević & Gotovac (2010) titled “Modeling Data Mining Applications for Predicting Prepaid Transition in Communication Services” [11] was to identify a successful model for predicting potential prepayment pumps, where the main part was to characterize the arrangement of information factors that was sufficiently high to make the forecast model exact and dependable. A few models were produced and thought about based on various information extraction techniques and calculations (neural organizations, choice trees, and strategic relapse). For demonstrating models, the WEKA Analysis Tool was utilized. The review tracked down a bunch of results, including:

- The prepayment definition and app modeling is more complicated than the similar task for postpaid users.
- A successful prepaid occurrence expectation and counteraction model in telecom organizations can decidedly influence the general benefit of organizations since significantly less cash is needed to put resources into fostering a prescient model for information mining and a preparatory showcasing measure to hold clients contrasted with the potential misfortune brought about by these clients.

The study of (Michael., 1997) titled " Data mining technique for marketing, sales and customer support " [12]. Showed that the spread of information and technology systems increases the ability of organizations to aggregate colossal measures of client information in enormous data sets. Notwithstanding, numerous gainful promoting experiences for customers, for example, their qualities and purchasing behaviors are covered up and generally undiscovered. The current spotlight on customer relationship makes the executives and the promoting capacity an ideal space of utilization for utilizing the utilization of information digging instruments for choice help. A strategy has been recommended that utilizes procedures for information extraction, information the board, promoting information the executives, and showcasing choices support. This system can be the reason for fortifying client relationship the executives. The results of the study were to make greater use of the analysis and mining of data in the field of marketing and sales such as supporting the capabilities of dealing with customers and the ability to classify customers according to demographic variables, forecast sales and measure customer trends.

Most of the previous studies agree that data should be used in solving customer and sales problems such as [7], [9], [10], [13]. Most of the studies also agreed about the importance of data mining, analysis and use in sales and customers. The studies differed in the application environment, modeling the programs used and structuring data within the organization despite the similarity in industry[9]–[11], [13]. The current study differed from the rest of the previous studies in that it dealt with the use of data mining in both marketing and sales, and this is what distinguishes it.

3. Research Methodology

The descriptive and scientific technique was utilized in this review contingent upon the investigation of real reality or wonder as it exists actually and is worried about being an exact depiction that communicates it in a subjective or quantitative manner. The subjective articulation depicts the wonder for us and clarifies its qualities, while the quantitative articulation gives us a mathematical portrayal that shows the volume of this marvel or its size and the levels of its connection with different marvels.

We have utilized such examination approach as it is uniqueness of clear exploration somewhat lies in its capacity to investigate both quantitative and subjective exploration techniques. Subsequently, when leading graphic exploration, specialists have the chance to utilize a wide assortment of methods that helps the examination interaction. At last, Descriptive exploration
investigates research issues inside and out, past the surface level in this way giving a point by point portrayal of the examination subject [14].

3.1. Data as the basis for marketing data systems

Marketing data systems (MDS) or "Marketing Information System" are considered as a modern concept in marketing. This concept emerged because of applying the general theory of marketing systems and the inability of marketing research to provide all the data necessary to make marketing decisions, in addition to focusing its attention on research related to non-recurring problems without making optimum use of the current wealth of data. Thus, the marketing data system is a systematic method for collecting and processing useful data and information on marketing that is characterized by accuracy and confidence, which enables the management to take the necessary decisions.

Kotler defines the marketing data system as a complex network of relationships in a structure of individuals, devices and procedures designed for organizing the appropriate data flow received from internal and external sources for the organization and directed to serve marketing decision-making centers [15]. In another definition the marketing data system is considered to be an ongoing and organized process of collecting and recording, classifying, saving and analyzing past, current or future data related to the institution’s business and the influencing elements. It also works to retrieve this data to obtain the necessary information to make marketing decisions in a timely and appropriate form with appropriate accuracy and to achieve the objectives of the institution [16]. Accordingly, the marketing data system in enterprises begins by collecting the data produced from their data from the internal and external environment through their subsystems represented by the system of records, daily reports, the marketing intelligence system, in addition to the marketing research system.

3.2. Internal records and reports system:

The internal records and periodic reports issued by the organization are a major source of much regular and up-to-date data. This data can cover several aspects, the most important of which are total sales at the level of paths, regions and customers, distances, costs and cash flows, financial models for the accounting system, and reactions to customer satisfaction or dissatisfaction with the services provided by the institution.

The data available from the internal records and reports system helps to achieve accuracy and speed not only in the relationship of institutions with their customers, but equally in achieving the required flow of information between the various departments within the organization, in addition to knowing the weaknesses of the marketing activity and working to address them.

3.3. Marketing Intelligence

While internal records and reporting systems provide data on the results of the generated data, marketing intelligence provides data on the events this data shows. A marketing intelligence system can be defined as a set of sources and procedures through which marketing managers can obtain daily data on developments in the external marketing environment (Kotler & Dubois, 2004). It is also defined as a set of ethical activities that the Marketing Department carries out to collect confidential data about competitors in the market to amend its marketing strategies accordingly [17].

The importance of this data increases with the intensity of competition and the institution’s keenness to know competitors' strategies in order to be able to provide higher levels of customer satisfaction. For this purpose, it adopts advanced systems of confidential marketing information about its competitors. The institution may rely on many sources to obtain such data like employment centers and employees working in competing institutions, the institution’s employees themselves including managers, engineers, scientists and researchers, customers and distributors who deal with competitors, reports and published data on competitors, and observing competitors' behavior and analyzing material evidence about it.

3.4. Marketing Research System

Marketing research has become one of the distinguishing features of successful contemporary organizations of all types and nature of their activities, as it is one of the important subsystems of the data system in any organization. This importance is due to the increasing importance of the role of marketing itself in organizations and its role in directing their activities, in addition to the increasing
trend towards adopting modern marketing concepts and their role in uncovering competitive advantages.

Research is useful in identifying clients who usually differ in their needs, perceptions, and preferences. Marketing research is considered one of the most prominent marketing activities and one of the operational tools for the marketing concept aimed at reconciling the needs and requirements of customers and the capabilities and goals of the organizations. It also helps the latter by transforming some, most or all of the restrictions and threats into positive elements that support the performance of the institution and its goals, in addition to providing data to uncover opportunities and exploit them to achieve competitive advantages and distinction over competitors.

The data provided by the marketing research system is represented in the various data related to the environment analysis that includes demand analysis (customer characteristics and behavior, market characteristics), competition (data on competitors, their characteristics, strengths and weaknesses, and characteristics of the competitive environment), the general environment (general trends in economic conditions, legislation, laws, technology and other influences on the institution's decisions), and the internal environment (the resources and capabilities available to the organization in its various functions and future directions). This system also provides information on the elements of the marketing mix and other aspects of performance measures (information about current sales volume, market share, the organization's image in the consumer's mind ...).

3.5. Analyzing customer identification data

Because of the challenges that the market ripples with due to competition and the speed of change, the goal of the smart marketer is not only to obtain a customer, but also to retain the customer, i.e. establish a lasting relationship with the customer. In order for the relationships between the organization and the customer to be effective, lasting and profitable for both parties, the organization needs to make effective decisions to manage these relationships effectively that is currently called Customer Relationship Management CRM). In fact, CRM helps the organization to address each member of the marketing segment according to its characteristics, needs and expectations in the sense of dealing with customers as individuals[18].

To sum up, the customer relationship management process aims at helping the organization answer the question that the organization must be keen on raising constantly, which is: What is the reaction of each consumer to the elements of the marketing mix that we provide? Which is known as One to One Marketing. This system helps to raise the level of customer satisfaction and enable the company to retain them, and benefit for all parties, marketers and consumers, i.e. achieving the principle of win-win for everyone, as shown in Figure (1).

The method of managing customer relations requires the use of a new concept of the company's relationship with its customers. It also requires that the organization define new objectives, use new methods to measure their success, and consider a different view of its customers. Therefore, marketers who use this method are interested in their share of the customer, consider it one of the company’s assets, and focus on establishing a permanent relationship with the customer i.e a Life time Value of Customers, especially the most valuable customers of the company (High Value Customers.) [19].
In recent years, it has been noticed the rapid movement and change of economic activity, which created a lot of marketing opportunities. On the other hand, economic problems have become complicated, which has created many marketing risks and challenges for decision-makers in managing customer relations. All the factors of change, competition, opportunities, problems and challenges have led to an inflated data required to produce goods and services, which in turn led to an increase in the cost of the data-based product. The data required to produce goods and services requires a turn-over cost.

The cost of data required to make marketing decisions is constantly increasing because the Information Life Cycle has become shorter in the applied fields, which creates the problem of Time Pressure on decisions made based on a high degree of knowledge due to rapidly knowledge obsolescence.

To meet these challenges, companies have to rethink their data management policies [20], knowledge management policies. Moreover, they have to use new methods to support some of the strategic functions, such as the customer relationship management function to respond to market demand that is facing continuous and rapid changes and increasing complexities.

Given that the basic idea of the analysis method is to extract meaningful models [21]. it has become a useful tool for any field of activity that deals with a large amount of data that needs to be studied and analyzed and to draw conclusions and ideas from it. The same applies to the field of business administration.

Within the framework of the customer relationship management philosophy, data analytics technology plays an essential role in supporting every component of customer relationship management [22]. In fact, by using data analysis applications (Figure 2), the project can achieve the following:

- Converting the vast amount of records in its customer database into an integrated picture of its customer profiling.

- Data analysis provides the core technology that helps achieve competitive advantages by providing the highest value of return on investment in data collection and the establishment of Data Warehouse or Data Marts.

- Customer-focused data analysis technology provides insights into the customer's attributes and behavior. The analysis in the data can identify the customers most likely to buy a particular product, and determine who will buy the product and the products accompanying this product, or what is called Collateral Purchases.
The data analysis can extract the characteristics and aspects of the customers who represent the opportunities available to the project, which saves many expenses. As a result, direct selling marketers use many data analysis techniques to reduce expenses based on the marketing principle that reaching a few of the best customers is less expensive than direct marketing to all customers.

Fig. 2. Correlation analysis process of commodity sales based on time-series data - mining

(Hailin Li. 2020) Time is cash: Dynamic-model-based time series information digging for connection investigation of product deals

- Fraud detection's potential data analysis technologies can detect fraud and deception.
- It can estimate the customer’s expected value.
- The company can predict the risks of the customer’s turning away from it and ending his consumer churn. It can also predict the potential risks of the customer’s stopping the payment of his customer solvency.
- It can be used to determine the future needs of clients using time series.
- Data analysis technology provides an Expected Response Model, which reduces the cost of contacting the potential customer and increases its return.

Market Segmentation Models are a popular application of data mining that aims at providing products, services and marketing messages according to the characteristics and behavior of each segment of the market.

- Data analytics technology plays an important role in estimating Prospective Customer Value.
- Data analysis techniques provide a description of the customer (Customer Profiling) that represents effective indicators for predicting whether the customer will continue with the company or he/she is on his/her way to shift away from the company in the sense of the attrition of the connection between the client and the organization.
- Client description techniques support Customer Interaction Center programs.

The relationship of data analytics technology to marketing

- Marketing is considered one of the most successful applications of data analysis, especially in the field of marketing databases. Data analysis technology is used in marketing in the field of costs and returns, and the marketing database aims at collecting data to achieve cost objectives, as well as require a return on this cost. The cost of the data required to make marketing decisions increases because the Information Life cycle of the data has become shorter in the applied fields. The aging of each innovation happens at an amazing speed, which creates the problem of time pressure on decisions made based on a high amount of knowledge due to the speed of knowledge aging.

• To face these challenges, companies have to rethink their data management policy.
• In light of the above facts, the researcher believes that organizations must use new methods and ways to support some of their strategic functions, such as the function of managing the marketing process to respond to changes in market demand, which is facing continuous and rapid changes and increasing complexities.

4. Results and Discussion

We can conclude through this study that data analysis technology plays a fundamental role for every element of managing the relationship with the customer, and as one of the previous studies (Bolbol, 2011), already mentioned previously, concluded that there is a strong impact of 79.25% among the areas of study that focus on customers, CRM organization, knowledge management, technology solutions, and loyalty level according to Jawwal employees [24]. It recommended that more attention should be given to implementing customer relationship management, and that it has an initiative to communicate with its customers in order to strengthen the relationship with them by specifying their desires and preferences regarding its services. It also agrees with the study of [5], which clarified the importance of the sales record in studying customer purchasing behavior and predicting future sales to reach results that help in making marketing decisions for products with the aim of correctly identifying the best-selling and least-selling products and marketing them correctly and determining the volume of sales.

The use of classification techniques in data mining: Applied to the sales department of Al-Neelain Engineering Company.
The customer relationship management project through data analysis applications can transform the vast amount of records in its customer database into an integrated profile of its customers, which helps the company to learn from all its observations on customer behavior that are stored in its data warehouse about customers, which represent the company’s memory.

Fig. 5. Shows the expected sales of the company during the month of January 2016

The use of classification techniques in data mining: Applied to the sales department of Al-Neelain Engineering Company.

5. Conclusion

Numerous information mining calculations have been created and applied to various process problems. In any case, cyclic mining is another method of mining information, and it has acquired expanding interest lately. Because of the necessities of various applications and the impediments of information mining, this field is creating. This will upgrade the abilities of existing information mining advances. Recognizing designs because of changes in information itself is an intriguing region worth investigating would you be able to help in:

- Look for interesting designs from large amounts of data.
- The track changing facts from past data; Due to this feature, it may assist fraud detection.
- Predict future correlation rules and give us the right way to find outliers.

The author believes that there are still some areas that need attention. First of all, the manual score threshold has more influence on the results, and the threshold needs to be automated to better define outliers. Second, this method is specific to shopping cart data, and may extend to other areas.

Marketing is one of the most successful data analysis fields, especially in relation to marketing databases. Data analysis technology is used in marketing in the field of costs and benefits, and organizations must use new methods and ways to support some of their strategic functions, such as the marketing process management function to respond to changes in market demand, which is facing continuous and rapid changes and increasing complexities. The study found that data analysis technology plays an essential role for every element of managing the relationship with the customer and that retaining the highest valued customer is a strategic goal for companies that deal with huge amounts of information. In fact, using information mining techniques, because of their analytical capabilities, help the company to convert the data they have on their customers into useful information.

Business organizations should be concerned with customer data problems and one of their strategic goals should be to increase the added value of their data. The study also recommends that decision-makers move away from traditional decision-making tools and turn to the use of smart business management tools based on the combination of analytical technologies in decision-making to discover the relationships between the data available to them and to be able to predict it.

Henceforth, this study recommends the following:
• Retaining the customer of the highest value is a strategic goal and companies should use new standards to measure their success, and among these measures is the degree of their success in retaining the customer and managing relationships with him/her. The study also recommends that companies use smart business management tools in studying the cost and return of information in order to raise the added value of data.

• The companies that deal with huge amounts of information should use the techniques of information mining because of their analytical capabilities that help the company convert its customer’s data into useful information used in making relationship management decisions with its customers.

• Companies should provide a strong technical and administrative environment to search for information so that it can be used as a smart tool to activate the use of data in making decisions to manage the relationship with the customer.

In the future, there could be some studies such as using data mining to build a strategic marketing plan in companies and the role of data mining in improving customer service quality.

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