The Analytical CRM OLAP Analysis Tools and Data Mining

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Abstract This article focuses on Customer Relationship Management (CRM) or management customer relationship. We discussed this concept by focusing on its dimension analytical orientation justified by the choice of our subject, namely OLAP analysis tools and data mining. As we will see later, analytical CRM relies heavily on computing. Whether at the level of data production, storage or finally the analysis, useful also to optimize processes and decision of decision, IT is omnipresent. We have chosen to sometimes leave aside some aspects, particularly technical. That said, this work hopes to offer a vision most widely possible key issues related to analytical CRM in particular, as well as the management of customer relationships in general.

Keywords CRM · OLAP · Data mining

1 Introduction

Nowadays, technological developments, globalization of markets, and shorter product life cycles make competition ever rough. It becomes very difficult for a company to maintain its market share based only on prices and products.

The strong decline of mass advertising illustrates this difficulty to gain and maintain market share by focusing only on the product. Since the 80s, mass marketing techniques hardly bring positive results business, cede their places to direct marketing, customer-oriented; we must understand and comply with whom to communicate "directly" to optimize the future success of the company. CRM is clearly in this evolution and represents, in some way, the last direct marketing.

As we will see later in the work, the technology takes on a role essential in the CRM. It will allow extracting knowledge from data stored and managed in a data warehouse and then analyzed through OLAP and data mining tools.

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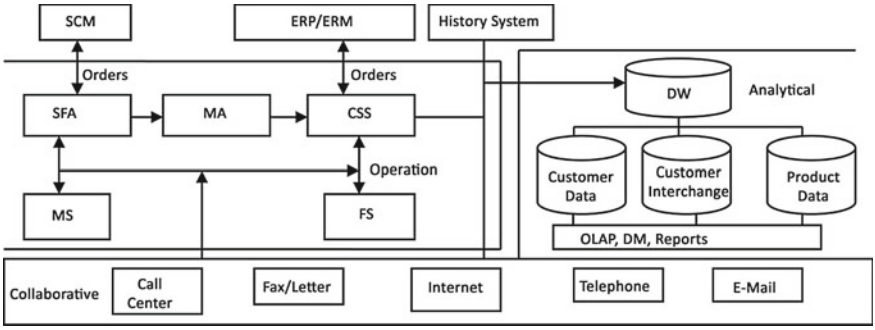

Fig. 1 The designing of CRM based on data warehouse

2 Dimensions of Customer Relationship Management

During our research, we found CRM frequently divided into three interrelated areas of activity: Operational CRM, CRM collaborative, and analytical CRM. The collaboration of these three parties aims to achieve the ultimate objective of the CRM business strategy, that is to say, development and optimization of customer relations. Figure 1 shows schematically the three elements of CRM and their interdependence.

3 Crossroads of Three CRM

Before going forward in analytical CRM in the definition and use of OLAP research tools and data mining, it is important to talk about the fundamental role that holds the data warehouse within the CRM.

Like in Fig. 2, talking about data warehouse or data warehouse is part of a broader concept which is that of systems integration heterogeneous information. The data warehouse refers in this case to integration by the data that are shared by autonomous systems. In observing the diagram, we can see that the data warehouse is literally pivot office between each of CRM elements.

Let's take an example. Whether we speak of the analyst, product manager, the marquetry, or the employee call center, everyone has access, through the warehouse data, the same data source, and to the same information.

The analyst uses its analytical tools to find in the "Customer Data Warehouse" the results of its petitions and new knowledge helps managers or engineers in their decisions as in optimization of the company's various business processes. The Head Product focuses his attention on sales of his product, by region, by period and, often via a data mart.

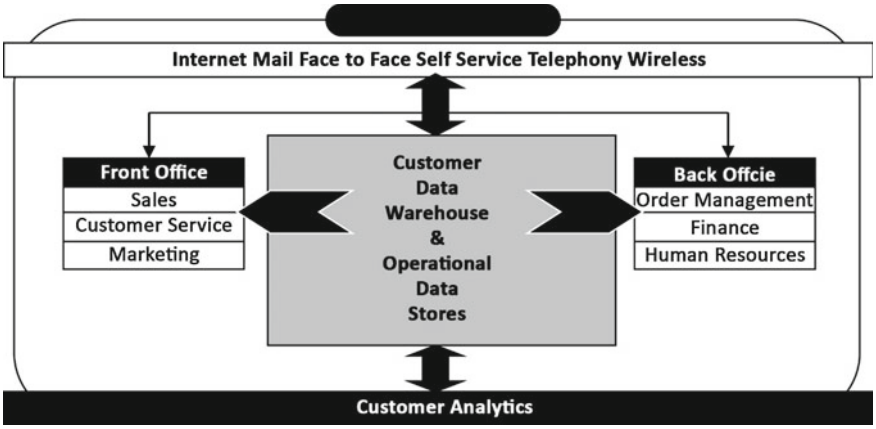

Fig. 2 Customer analytics making the difference in CRM

4 The Data Storage in the Data Warehouse

As noted above, the analytical CRM has the function of allowing the storing and analyzing of the data generated in particular by the steps of marketing, sales, customer service, and information collected on the client during telephone contacts, email, or through questionnaires.

As can be seen in Fig. 3, the step which precedes the analysis is which consists of extracting the data where it is and stored in a data warehouse or a data warehouse. This phase of the process is crucial and has some difficulties and risks which are important to state here.

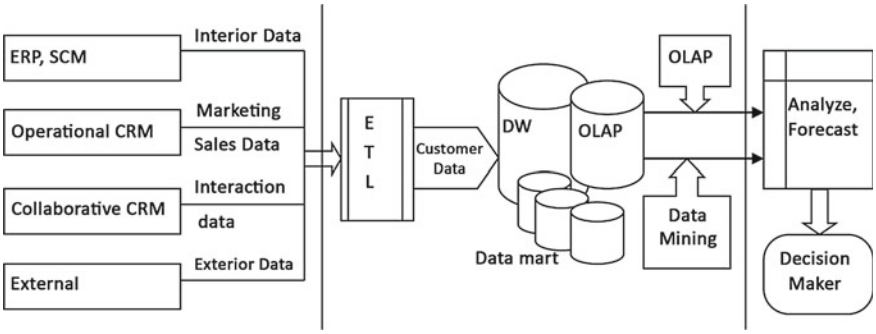

Fig. 3 The designing of CRM based on data warehouse

5 Application Examples OLAP Analysis Tools

For a more pragmatic view of the usefulness of OLAP tools, three practical cases can be exposed in which they are involved and what they can concretely serve. To do this, we will be guided in large part to Article OLAP applications available on the www.olapreport.com site.

Database marketing is the application of OLAP analysis tools, often combined with data mining technology, which is more directly related to customer relationship management. Indeed, it allows, for example the professional identify the best customers and retain them by offering them promotional offers. Conversely, the user can take the opportunity to identify "bad customers" or some customer profiles which an offer is not to be readjusted, it is to abandon it.

The analysis of sales is another essential function of OLAP tools. The latter may actually be profitable for knowledge companies, especially in the consumer goods industry and financial services, commercially details. Some of the questions to which these tools are able to provide response describe the whole point. They are as follows:

1. Are we able to achieve our sales targets by product and region in a given period?
2. Is the sales growth of a new product the same everywhere?
3. Do promotion actions have an effect on sales?, etc.

Analysis of the "click" of the Internet on a website can also be very useful, especially for companies devoted to e-business. Practically, OLAP tools make it possible. For example, demographic data collection, sometimes personal, on the client, identifying the path where he arrived on the company website or calculating the number of "Clicks" that it took to find on the website what he came there for.

6 Data Mining

Data mining literally means "data mining" or "data mining". This method, based on a series of algorithms or data mining models that we will not discuss in this work allows to extract information from data, information which, through analysis, are converted into knowledge. "Data mining is the analysis of a set of observations is intended to find unsuspected relationships and summarize data in a new way, so that they are understandable and useful to their holders" [1]. In other words, it consists in analyzing the information collected in data warehouses to identify relationships that would be a priori impossible to identify without this tool. This is an essential element in customer relations and a decision support system.

6.1 The Tasks

After defining what data mining is, it is appropriate to present the tasks it can perform. These are six in number; each assumes a specific function for analysis and is performed using different algorithms.

The importance of this task is to allow the analyst to interpret the results of a data mining model or an algorithm, the more transparent the more effective. "Thus, the results of data mining model should describe the characteristics clear that can lead to an interpretation and an intuitive explanation. Some methods of data mining are more suitable than others for a transparent interpretation" [2].

6.2 Estimation

After defining what data mining is, it is appropriate to present the tasks it can perform. These are six in number; each assumes a specific function for analysis and is performed using different algorithms.

6.3 Segmentation

Here, the target variable is not digital but categorical, such as income, which can be divided into three categories: low income, middle income, and high income. "The segmentation is to divide customers into homogeneous groups, that then be addressed by specific and appropriate means to characteristics and needs of each group. Members of the same group react the same way to marketing stimuli. They share a mode communication, purchasing behaviors and/or special needs" [3].

6.4 Classification

The classification is different from the segmentation in the sense that there is no target variable to segment. The classification will be interested in reunification data or observations in groups of similar objects. In other words, it will segment the data set to form homogeneous subgroups. These are called clusters, namely classes, which are groups in which data are similar to each other and different for definitions of the other groups.

6.5 Forecasting

The results of the forecast are, as the name suggests, in the future, which differs from the estimate. For the rest, it is similar to these two tasks explained above. The forecast allows for example to predict who will be winners of the Basketball Championship taking into account the comparison of results of each team or to predict what will be the death of decay rate on the road the following year, taking into account the increase of the limitations of speed and stricter measures of reprimand by the police in regard to drinking and driving.

6.6 The Association

This function of data mining to discover which variables go together, what are the rules that will allow to quantify the relationships between two or several variables.

For example, if we look at 500 customers coming to shop at a supermarket on a Friday night and we found that out of these 500 clients, 100 buy fruit and of those, 30 buy milk, and the rule of association is "if you buy fruit, so we buy milk," with a support measuring $100/500 = 20\%$ and a confidence level of $30/100 = 33\%$.

7 Conclusion

The objective of this work was to define the analytical CRM and understand its issues by focusing on OLAP analysis tools and data mining. We have made throughout this work the Customer Relationship Management more like a theory on customer loyalty. Indeed, as the fundamental role that plays computing, CRM is extremely complex and difficult to define. Despite the difficulties, however, we are able to describe basic principles of customer relationship management starting from the subject we chose. We have defined CRM and showed its importance generally.

We then presented the concepts essential to the understanding of the analytical part of CRM to finally reach an example concrete in order to compare theory with practice. Although we have achieved most of our objectives, we felt that by researching and reflecting on the CRM, it seemed to us increasingly blur, vast and difficult to grasp. Indeed, the multiple ways of approaching CRM have prevented us in some ways to have a global vision. Outraged its computer dimension, its strategic interest, or in its place the evolution of marketing in general, it is the corporate culture we choose as the central element of customer relationship management. Whether in level of communication internally or outward, CRM is primarily a philosophy that should ideally help to redefine the set of processes and the company's values.

Without repeating the content of our work, we finally like to mention two important issues that appear in the literature that have haunted us throughout our research: The analytical CRM, defined as fundamental in theory, is it really in practice? Is the CRM not a mere fad promoted by companies wishing to sell their IT solutions?

References

1. Hand D, Heikki M, Padhraic S (2001) Principles of data mining. MIT Press, Cambridge, Massachusetts
2. Larose DT (2005) Discovering knowledge in data. Wiley, Hoboken, New Jersey
3. Peelen E, Montfort KV, Klerkx A, Beltman, R (2006) A study into the foundations of CRM success. NRG Working Paper, SSRN
4. Grenier C, Monk C (2003) Build the information system of the company. Editions Foucher, Paris
5. Lasserre L, Legrand B (2012) CRM, customer expectations. Global Village Press, Paris
6. Morgat P (2000) Build customer loyalty, strategies, tools and RCMP edition organisation, Paris
7. Lehu JM (1999) Customer loyalty. Organizational Edition, Paris
8. Tiwana A (2001) Knowledge management, CRM applications and e-business. CampusPress, Paris
9. Larose DT (2005) Des data to knowledge, an introduction to data mining. Vuibert Computing Editions, Paris
10. Brown S (2006) Customer Relationship Management. Pearson Education, France
11. Mayor P (2003) CRM study of the needs of the segment of business customers. The IIMT University Press, Fribourg/Switzerland