Research of CRM Based on Customer Intelligence Engine

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Abstract The discipline of business intelligence addresses a broad range of functional activities from data mining and statistical analysis to predictive modeling and reporting, and customer intelligence is the actionable output from an intelligence eco-system. In order to focus enterprise’s attention on their customers satisfaction in the customer relationship management and make CRM system run more efficiently, a new concept of customer intelligence engine (CIE) is proposed at first time in the paper; the architecture of CIE is structured, the trigger of CIE is defined and described, the CIE-based CRM eco-system is also discussed.

Key words customer intelligence (CI); customer intelligence engine (CIE); business intelligence (BI); customer relationship management (CRM)

Success depends on the customer, 21st century business is finally realizing. Instead of regarding their customers as a faceless mob, big companies are trying to develop relationships with them. More and more people have realized the fact that customer relationship management (CRM) is vital for every enterprise. At the same time, the concept and the application of business intelligence (BI) are also widespread with frequently used computers and quickly developed information technologies. In the customer-centric times, customer intelligence (CI), as the core of CRM, is a relative new concept and not fully discussed. The objective of the paper is to build up a structural outline profile from the point of view of customer intelligence. Realizing the design of customer intelligence engine (CIE) we can manage the CIE-based CRM system more efficiently and success in enhancing both customer’s satisfaction and enterprise’s profitability.

1 Introduction
1.1 CRM and Business Intelligence
We define CRM as the core business strategy that integrates internal processes and functions, and external networks, to create and deliver value to targeted customers at a profit[1]. It is grounded on high-quality customer data and enabled by IT.

BI technology is often positioned as enabling an organization to understand how it’s currently performing. Usually, this is from a historical perspective with retrospective reporting. BI tools primarily generate three valuable results:
• Easy-to-understand information
• Fast, attractive reporting
• Visualization with an intuitive interface for pivoting and slicing/dicing.

The main functions of BI tools should include:
• Generate a single, consistent business view
• Offer interpretation and analysis
• Recommend process and action[2]

BI tools typically don’t provide a process or actual interpretation and analysis—these are usually intensive mental tasks. Intelligence must be actionable by way of a clearly defined process with authority and responsibility for action. For it to be effective, information should feed into a process that identifies specific actions, which in turn should impact some area of the business.

BI is applied not only in the CRM system, but also in other business applications. BI always takes a key position in an analytical CRM system.
1.2 **Customer Intelligence and Business Intelligence**

Some incorrectly use the term customer intelligence as a synonym for IT-based business intelligence. Perhaps this is because the traditional view of BI does not provide all that is needed to understand or develop insight into what customers want or require.

Customer intelligence is the actionable output from an intelligence eco-system that provides a secure and managed environment within which resources and processes can interact. The actionable output includes guidance, recommendations, reports and briefings that will be used for planning, with the primary purpose of making decisions and taking action by both the organization and its customers [2].

Customer intelligence reflects a company’s emphasis on customer interactions, and represents a fundamental shift from a product-centric mindset to one that revolves around the customer. The customer-focused strategy becomes the foundation on which an organization builds capacity to understand customer activity as it relates to its success, optimize its activities with respect to customer interactions, and align individual and group performance to maximize the value of all customer interactions.

The distinct differences between BI and CI are listed as in following table (See Tab. 1) [3].

<table>
<thead>
<tr>
<th>It-based Business Intelligence</th>
<th>Customer Intelligence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Driven</td>
<td>Intent Driven</td>
</tr>
<tr>
<td>Customer Action</td>
<td>Customer Motivation</td>
</tr>
<tr>
<td>Reactive</td>
<td>Proactive</td>
</tr>
<tr>
<td>Internally(Organization)Focused</td>
<td>Externally(customer) Focused</td>
</tr>
<tr>
<td>Structured Data</td>
<td>Interpreted Analysis</td>
</tr>
<tr>
<td>Information Oriented</td>
<td>Action Oriented</td>
</tr>
<tr>
<td>Product</td>
<td>Process</td>
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</table>

1.3 **Necessity of CI in CRM**

CRM is at the root of customer intelligence. In recent years, there has been considerable emphasis on “the customer,” which has led to the widespread adoption of CRM techniques. Yet many companies still struggle to put the customer at the center of their processes and activities.

Critics say CRM is not the panacea it promised to be. It is clear that CRM alone is not enough for organizations to succeed in achieving true customer centricity. Customer intelligence provides the processes and actions that are required to nurture relationships.

The enduring appeal of CRM is the illusion that amorphous companies can have relationships with people, and that the companies determine the depth and the scope of these relationships. In reality, companies tend to cherry-pick new customers they want to have relationships with or cross-sell to existing customers to increase revenue.

Many customers say they would like to have a “better” relationship with the organizations they deal with. Customers would also like to know how their information is being used and what value/benefit they can expect to receive for sharing their information. Customer intelligence provides the framework and ecosystem for relationships to develop in both directions, with both parties deriving benefit.

With technology like information portals and account aggregation, power is being released more and more into the hands of the customer. In the future, customers will control their own destinies in terms of how they relate to businesses, leading to customer-managed relationships. Organizations must understand these relationships and attempt to influence behaviors and decisions that affect both sides of the relationship.

1.4 **The Role of CI in the CRM**

To understand the role customer intelligence plays in developing customer relationships, it helps to examine the processes and technology a company must implement to support effective customer relationships.

Customers want things from your company, which is in business to provide them. They want the goods and services the company sells, but they also want information about those products. So they come to your Web site or store, or they call on the phone. The more you know about them and what they want from your company, the better you can make their decisions.
experience. In other words, you must offer an effective personalization solution to your customers.

Once customers get the information they need, they are ready to make a purchase on your Web site through your e-commerce solution. If they want to call customer service with problems or questions they can't resolve on their own — or if your sales force wishes to interact with them, you need a CRM solution, which will support customer care and provide sales force automation.

By gathering information about your customers, you can determine which customers are the most valuable to you, and which you can make more valuable by providing additional value to them. The information enables you to segment your customer base — and ideally to determine the campaigns you should run to increase the value of certain customer segments, using technology called a campaign management solution\(^4\).

When customers who belong to a targeted market segment return to your Web site or store or call again, you can identify them and provide promotions or products specifically chosen to increase those customers' value to you.

Many companies find that their most valuable customers like to interact with them through multiple channels. One customer, for example, may use a Web site to get product information but make a purchase in a store. Another customer may call for information and then purchase online. The company must understand each of these customers as individuals to be able to build relationships with them.

In addition to static information about customers (name, address, company information), companies must collect longitudinal information (inquiry history, sales history). Some of this information is for human consumption — for example, for the sales force or customer care to review when talking with a customer (or a prospect). However, the automated use of longitudinal information is a more complex and potentially very lucrative application of CI.

To get online personalization right, a Web site must do the three things:

- Ask customers what they want
- Understand their answers and then
- Act appropriately upon those answers

Computers are not known for their ability to understand, but analytical software applications go a long way in helping companies to automate the process of understanding customer desires. Giving customers what they actually want — not just what you think they want or what you'd like them to want — is even more difficult. It takes actual intelligence on the part of the company. This is the reason why we call it customer intelligence.

2 Customer Intelligence Engine

We define Customer Intelligence Engine as an integration of customer knowledge-based concept, method, process, data and software, which can provides a fully integrated solution for gathering customer information from every touch-point in the enterprise. It provides decision-makers with the detailed analytical tools to identify the most value-added customers and enables organizations to tailor product and service offerings to suit different customer types. Through detailed customer profitability, retention, and lifecycle analyses, Customer Intelligence Engine is a strategic weapon for organizations focused on enhancing both short-term and long-term profitability.

There should not be two different systems: One is BIS, another is CIS. Customer Intelligence is an inseparable part of customer relationship system, so that we should build a customer intelligence engine and this engine should be embedded into customer relationship system. This engine should have the abilities as following: to interact with business partners including customers, supplier and others; analyze and avoid customer churn; communicate with MIS, CRM, SCM, ERP and legacy system.

3 The CIE-Based CRM Ecosystem

The customer intelligence engine (CIE) plays a pivotal role in the CRM system. The CIE-based CRM ecosystem discussed here is made up of three fundamental components (see Fig.1):
CIE-Based Analytical CRM

1) Data warehouse (DWH): This is a collection of integrated, subject-oriented, time-variant and non-volatile data supporting decision processes. The customer-centric data warehouse is the core of the customer intelligence engine.

2) Datamarts: These are smaller archives fed by the DWH and suitably designed to face particular business problems. CRM applications mainly use the customer and service/Product datamarts. Other data-marts can be developed if particular analyses need to be carried out.

3) Other vertical applications: Reporting systems and other systems aimed at monitoring particular situations connected with the bank’s business, e.g. data mining systems and OLAP (online analytical process) belong to this category. Such systems can be used to uncover hidden relationships between data. Data mining, or knowledge discovery and data mining for instance, allows better understanding of customer needs and combination of the most appropriate products and delivery channels for each client.

The main components of analytical CRM are all customer contact channels; a CIE-based informational environment manages each interaction point.

3.1 The CIE-based Analytical Component

The company’s data and information on customers are analyzed, the objective being management and enhancement of business performances. In the analytical component, data warehouse and the datamarts (on customers, products, campaigns, etc.) play the main part. Data are turned into systematized information leading to a better comprehension of business events. Using business intelligence tools in data analysis, we are able to divide the customers into homogeneous groups, building up profiles and creating behavior models through evaluation of a number of parameters, such as loyalty, profitability, solvency and, last but not least, sensitivity to particular marketing actions, which can therefore be effectively planned and monitored.

The following list contains the main elements of what is known as analytical CRM. The fundamental subsystems of the analytical component are:

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3.2 The CIE-Based Operational Component

Business decisions taken in the analytical context are then carried out in the operational dimension, where operations take place. CIE-based CRM operational technologies include customer interaction and applications.

3.3 The Collaborative Component

CIE-based Collaborative CRM allows for simplification of customer-bank contacts through

Fig.1 CIE-based CRM Ecosystem
definition of the most suitable channels and products/services for each individual customer.

All marketing initiatives, which were formerly carried out directly in the branches, now require thorough revisiting of the customer management process.

3.4 Customer Intelligences in CIE-based CRM

From the point of view of customer management, we should find that Customer Intelligences exist everywhere in CIE-based CRM system (see Tab.2)[7].

<table>
<thead>
<tr>
<th>Phrase</th>
<th>Customer Intelligences</th>
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<tbody>
<tr>
<td>Customer Acquisition</td>
<td>Marketing intelligence</td>
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<tr>
<td></td>
<td>Sales intelligence</td>
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<tr>
<td></td>
<td>Customer segment intelligence</td>
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<td></td>
<td>Channel analysis</td>
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<tr>
<td>Customer Contact</td>
<td>Customer self-service intelligence</td>
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<td></td>
<td>Analysis response of customer support</td>
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<td></td>
<td>Analysis of customer retention risk</td>
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<td>Analysis of Customer profitability</td>
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<td></td>
<td>Analysis of product service</td>
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<td></td>
<td>Analysis of product maintenance</td>
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<tr>
<td></td>
<td>Analysis of customer need</td>
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<tr>
<td>Customer Retention</td>
<td>Cross/ up-sales intelligence</td>
</tr>
</tbody>
</table>

Tab.2  Customer intelligences

4 Features of CIE

4.1 The Components of CIE

CIE has four main components (See Fig.2):

4.1.1 Trigger of CIE

CIE has many touch-points with external system such as Customer Support System, Marketing Automation System, Sales Automation System and internal systems such as ERP, Supply Chain Management System, Order Processing System and other legacy systems within enterprise. A lot of data and information coming from every touch-point needs to be processed by different system. Basically, CIE is an analytical part in the CRM system, so that CIE and transactional processing unit has different task. CIE focuses on analytical, strategic problem relating to decision making, and the later mainly deals with routine and transactional problem. The trigger of CIE is designed to intelligently and automatically identify the type of the problem and decide the direction of the coming data and transaction flow. This is the reason why we call it “Trigger of CIE”.

4.1.2 Advanced Analytical Tools

This part includes advanced analytical tools like OLAP (Online Analytical Processing), KDD (Knowledge Discovery and Data Mining) and other Decision Support System.

4.1.3 Analytical Database

Advanced analytical tools are support by analytical database including Rule Database, Business Model Database Knowledge Database. These databases are the source of customer intelligence and they are continuously updated during interacting with internal and external system of enterprise.

4.1.4 Customer-Centric Data Warehouse

The Customer-Centric Data Warehouse is the fundamental of CIE. Customer knowledge, evaluation of customer value and forecast of customer behavior, all of them come from customer-centric data warehouse. There are frequently and automatically data exchanging between Customer-Centric Data Warehouse and other data warehouse and data marts. CCDW is also continuously updated during interacting with internal and external systems of enterprise[9].

4.2 The Main Functions of CIE

CIE should have the following capabilities:
4.2.1 Efficient Interaction with other Systems
The ability to interact automatically and efficiently in every touch point with other system is a key feature for a customer intelligence engine, because all of the following functions will not work unless it does have the ability.

4.2.2 Customer Data Management
It should have the ability to extract, transfer and load the customer data from different data sources; the ability to store and maintain efficiently the massive customer data in order to supply enterprise with a unified customer view and build a good environment with high quality for data analysis and knowledge discovery.

4.2.3 Data Analysis
It should have the ability to carry out data analysis like OLAP, DSS system, information inquire, reporting and data visualization.

4.2.4 Discovery of Customer Knowledge
It should have the ability to extract the customer knowledge interested by users, and the knowledge should be beforehand hidden, unknown, and potentially useful.

4.2.5 Enterprise Modeling
It should also have the ability to collect, generate, retain, distribute and use the knowledge of customer, so as to build a customer-centric organizational frame with high effectiveness, quick responsibility, and scientific decision making for enterprise.

5 Conclusions
Here we proposed only conceptual architecture of customer intelligence engine. Although it is more difficult to fully realize the ideal of CIE, the CIE should become a hot topic in the domain of customer-centric CRM. The operational mechanism of CIE, the technical problem of how to be seamlessly embedded into CRM system, and interoperability with other information system need to be further studied.