What is Customer Relationship Management?

- CRM is a strategy which utilizes a combination of:
  - information
  - technology
  - policies
  - business processes,
  - employees

  to develop profitable customers

Objectives of CRM

- to acquire new customers
- to retain good customers
- to develop long-term high-spending customers from casual customers
- to drop bad customers

Three Types of CRM

- Operational: automation of customer-related business processes such as marketing, sales, and customer service
- Collaborative: provides channels for communication with customers (email, video conferencing, internet)
- Analytical: provides understanding of customer behaviour through in-depth analysis of customer data
Closed-Loop CRM

Using knowledge obtained from analytical CRM, collaborative and operational CRM can provide better customer service and more efficient processing.

Analytical CRM

Traditionally, companies focused on operational and collaborative CRM.

- Problems: separate systems and databases that do not share information.
- Analytical CRM consolidates customer data across the enterprise and provides a unified view of the customer.
- Objective: to increase customer profitability through better understanding of customers.

Traditional Enterprise

Functions dominated > data fragmentation > processes ineffective.

Intelligent Enterprise

Information integration > process improvement > business optimization.

Analytical CRM process

Data Collection → Integration → Analysis → Action
- Collection: Collect customer-related data from:
  - customer touchpoints
  - operational systems
  - application forms, reports
  - external data sources (credit agencies, marketing agencies).

Technologies for Analytical CRM

Data warehousing, OLAP and Data Mining provide an
- integrated
- reliable
- historical
- analytical
view of each customer.
### Architecture for Analytical CRM

- Customer Data Warehouse
- OLAP
- Query Reporting
- Predictive and Discovery
- Data Mining
- Customer Contact Points
- OLAP
- Query Reporting
- Prediction and Discovery
- Data Mining

### Analytical CRM process

- **Integration:**
  - Consolidate and integrate collected data into a central repository
- **Analysis:**
  - Analysis of data in the repository including customer profiling, customer profitability, customer retention, customer segmentation etc.
- **Action:**
  - Develop business processes and organisational structures to leverage the derived knowledge

### Data warehouse

- "... a subject-oriented, integrated, time-variant, and non-volatile collection of data used in support of management’s decisions"
  - Inmon and Hackathorn (1994)

### Analytical CRM

- DW integrates customer data collected from across all customer touch-points and systems
- With the emphasis on data quality in a data warehouse, DW can provide a reliable view of customers
- Historical data in DW facilitates analysis of customer behaviour over time
- DW facilitates analytical information processing

### CRM data warehouse

- Customer dimension is critical for effective CRM
- It is the most challenging dimension for any data warehouse
- Can have millions of rows (credit card companies, government agencies exceed 100,000 millions of rows)
- Hundreds of attributes
- One leading marketer maintains 3000 customer attributes
  - Kimball (2002, The data warehouse toolkit, chapter 6)

### Customer Data Warehouse design issues

- Data modelling issues
- Capturing changes
- Consolidation and integration issues
- Data quality
- Storage of unstructured information
- Data storage requirements
- Privacy issues

---

**Notes:**
- Retrospective analysis tools
- Prediction and discovery
- Data Mining
Data modelling for CRM data warehouse

• Typically data for DW is modelled using dimensional modelling (Kimball)

• Does it work for CRM?

Modelling data for CRM DW

• Dimensional model is Behaviour centric (customer sales, bookings, orders etc…)

• CRM data warehouse is customer-centric

• In CRM we want to examine the effect of change in customer circumstances 
  
  (Todman, 2001)

Customer-centric approach

• The emphasis is shifted from behaviour

• More value attached to the customer’s personal circumstances

• Todman proposes General Conceptual Model for customer centric warehouse

General conceptual model for a customer-centric data warehouse

Analysis of customer data

Customer analytics

• On-line analytical processing (OLAP), query and reporting

• Data mining

Analysis of customer data, OLAP

• OLAP offers a set of graphical tools that provide multidimensional view of data and allow users to visualise, summarise, and analyse data

• An objective of OLAP technology is to provide users with the opportunity to perform complex analysis of data in an intuitive and simple way
Analysis of Customer Data

• OLAP, reporting, query

<table>
<thead>
<tr>
<th>Measure</th>
<th>January</th>
<th>February</th>
<th>March</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>100</td>
<td>400</td>
<td>750</td>
</tr>
<tr>
<td>Cost</td>
<td>260</td>
<td>920</td>
<td>670</td>
</tr>
<tr>
<td>Revenue</td>
<td>500</td>
<td>2000</td>
<td>1250</td>
</tr>
</tbody>
</table>

Analysis of Customer Data

Data Mining

• Data mining, or knowledge discovery, is the process of discovering valid, novel and useful patterns in large data sets.

• Predictive versus descriptive data mining
  - Predictive data mining
    • discovering patterns for the purpose of predicting future trends and behaviours (sales forecasting, bankruptcy prediction, propensity models)
  - Descriptive (exploratory) data mining
    • identifying understandable patterns for the purpose of obtaining an insight into the business domain.
    • example: association rules for market basket analysis

Knowledge discovery process

Many iterations may be required!

Data mining tools and techniques

• Neural networks
• Decision trees (C4.5, CART, CHAID)
• Clustering
• Visualisation (aids understanding data and results)
• Rule induction
• Text mining
• Statistics

Neural Networks

• Neural networks are computing systems inspired by the structure and functioning of the brain.
• Neural networks learn patterns in data through the process of training on examples
• Very good prediction/classification tools
• Problems: if NN are used for decision making it is impossible to explain their decisions
Neural Networks

- Good account
- Bad account

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>BALANCE</td>
<td>INCOME</td>
<td>CARD HOLDER D ATA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Decision Trees

- Tree-shaped structures
- Used for prediction, classification, exploration
- Can be converted to rules
  - If State= Vic THEN Response = Low;
  - If State= NSW and Occupation = Sales THEN Response = High;
- Problems tree can become very large - hard to understand

Clustering (unsupervised learning)

- Clustering algorithms group records with similar characteristics
  - Income: very high
  - Sex: M
  - Status: single
  - Age: 25-35
  - Car: sport
  - Income: medium
  - Sex: F
  - Status: single
  - Age: 25-35
  - Car: compact
  - Income: medium
  - Sex: F,M
  - Status: married
  - Age: 35-45
  - Car: family
  - Income: high
  - Sex: M
  - Status: married
  - Age: 35-45
  - Car: luxury

Clustering (unsupervised learning)

- Clusters have to be analysed and classified

Examples of Data mining applications for CRM

- Targeted marketing, marketing campaigns
  - Data mining models (using, for example, neural nets or decision trees) can be built from historical data to predict:
    - which customer segments are more likely to respond to a particular campaign
  - Benefits: increased response rate, savings on marketing campaigns

Churn modelling

- Objective is to reduce attrition rate of valuable customers
- Data mining can be used to predict which customers are likely to leave (propensity to churn)
- Win-back campaigns
Market basket analysis

- Automated extraction of association rules from point-of-sales transaction data
- Example rules:
  - IF bread then milk and bananas
  - IF soy milk then soy cheese
- Problems: too many rules, difficult to identify which one is significant, interesting

Integrating data mining in business processes

- Data mining models have to be evaluated and integrated in business processes
  - campaign management
  - Win-back programs
  - loan management
  - Call centre
  - etc..

Integrating data mining into business processes example: Campaign Management

- Marketing dept. identifies a segment of interest
- The records of customers from the segment are selected from the data warehouse to a separate table
- The customers are then scored using a predictive model
- The score can, for example, represent the probability of responding to a particular promotional offer

Integrating data mining into campaign management

- The customer records are then sorted by their score value
- The top 25% are selected to receive the offer
- The offer is then mailed out (by a mail house) to the selected customers

Trends in CRM

- Event Based Marketing

A Paradigm Shift from Traditional Target Marketing to Event Based Marketing

<table>
<thead>
<tr>
<th>From: Company/product-push</th>
<th>To: Customer/need-pull</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposition</td>
<td>Customer Event</td>
</tr>
<tr>
<td>Segment</td>
<td>Significance</td>
</tr>
<tr>
<td>Propensity</td>
<td>Evaluation</td>
</tr>
<tr>
<td>Offer</td>
<td>Context &amp; LifeStage</td>
</tr>
<tr>
<td></td>
<td>Service Need</td>
</tr>
</tbody>
</table>

Tehan, D., Teradata, 2004
### Types of Events

<table>
<thead>
<tr>
<th>Life-stage Events</th>
<th>Product Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birthday</td>
<td>Maturity</td>
</tr>
<tr>
<td>Anniversary</td>
<td>New Account</td>
</tr>
<tr>
<td>Marriage</td>
<td>Change in channel usage</td>
</tr>
</tbody>
</table>

#### Behavioural Events
- A significant change in a customer's transaction patterns or behaviour that indicates a customer need
- Significant Deposit, Withdrawal, Payment Changes, Change in Purchase Patterns, Increase/Decrease in transactions (Type, Volume and/or Value)

#### Event Based Marketing has a Proven Record in Servicing Customer Needs

<table>
<thead>
<tr>
<th>Traditional Target Marketing</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Select customers who fit a certain criteria</td>
</tr>
<tr>
<td>- Typically executed once (single shot) or quarterly/bi-annually, annually</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer Needs Marketing</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Identify customers who fit a certain criteria AND</td>
</tr>
<tr>
<td>- ONLY Contact those customers whose transaction behaviour suggests they have a need for additional credit</td>
</tr>
</tbody>
</table>

#### Effective CRM
- Develop closed-loop CRM processes to share knowledge obtained as a result of customer data analysis with all relevant business units
- Develop strategy and processes for leveraging this knowledge.

#### Closed-Loop CRM

Using knowledge obtained from analytical CRM, collaborative and operational CRM can provide better customer service and more efficient processing.

#### Why many CRM’s have failed?
- Too much emphasis on technology
- Lack of strategy for developing new and changing old business processes
- Failed to integrate the three types of CRM

#### “Doing CRM Right” - IBM study
- Fewer than 15% of global companies believe they are fully succeeding, 20-30 are having some success
- Key reasons:
  - Too much reliance on technology
  - Underestimating the importance of senior management buy-in
  - Problems with CRM adoption by employees

(For source: www.crm2day.com)
Study Findings

- 75% of companies manage CRM at the functional level (marketing, sales etc.)
  - CRM should be run at the corporate level or with a cross-functional perspective

- Senior management in over 35% of companies regards CRM as useful but not critical
  - Sends wrong message to employees that CRM is not a priority

- Over 75% of companies do not fully use CRM once it is implemented
  - Only 14% of employees fully use CRM

Study recommendations: Successful CRM

- Right culture
- Creating broad acceptance and adoption

Important:

- Viewing CRM as critical by senior management
- Employees understanding of CRM transformation and linking it to organizational objectives
- Aligning CRM objectives with the priorities of employees

"CRM initiatives transform a company culturally, structurally and strategically"


References


Berson A., Smith S., Thearling K (2000), Building Data Mining Applications for CRM,McGrow-Hill

