

Learning Resource

CRM, Data Warehouses and Data Mining/Analytics

Introduction to CRM

Customer relationship management (CRM) is a foundation element for business knowledge/intelligence. We will describe how CRM can be used, what makes it work and who is using it, and whether it has been as successful as many had hoped.

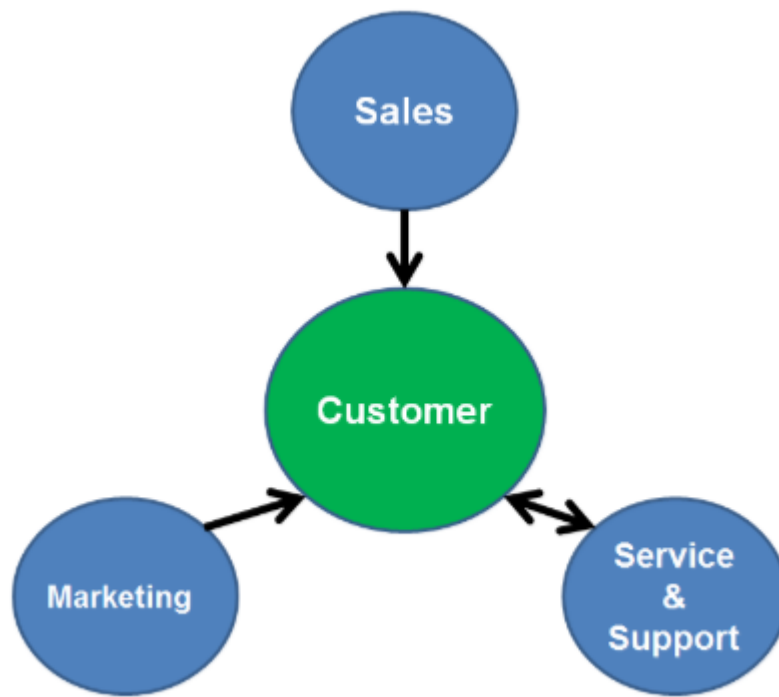
Observing Consumer Patterns

A man walks into a convenience store to pick up diapers at his wife's request. While he's there, he happens to pick up a six-pack of soda as well. Meanwhile, back at the convenience store headquarters, a data analyst poring through data in a data warehouse sees this and recognizes that this pairing is emerging as a pattern.

Opportunity? You bet. The data analyst makes two recommendations to the marketing department. First, move the diapers and the soda closer together. Second, place similar items that men in this age group might also be inclined to purchase in between the diapers and the soda.

Welcome to the world of customer relationship management, or CRM.

Traditional CRM



Traditional CRM

Source: Janet Zimmer, Creative Commons

Customer relationship management (CRM), a strategy used by companies, also goes by the name of *relationship marketing* or *customer management*. The definition of CRM is broad because it includes many facets of business-to-customer relationships. Robust CRM systems are supported by software suites that help with the management of all the data acquired and used by the system. But the following might be considered the primary focus of any CRM system (Rouse, Ehrens, & Kiwak, 2006):

- providing a company's marketing department with information needed to identify and target the company's best customers, design effective marketing campaigns, and provide the sales team with quality leads
- optimizing the information shared among departments, which results in an increased number of sales and new accounts, better management of existing accounts, and supporting the use of the latest communication devices (for example, allowing orders to be made over mobile phones)
- improving customer satisfaction by supporting the development of individualized relationships with customers; might also include providing the highest level of service to the most profitable customers
- obtaining and sharing with employees the information and processes necessary for them to effectively build relationships with their customers through understanding and identifying the customer's needs

In summary, the primary applications that are supported by a CRM are:

- acquisition—obtaining new customers
- retention—retaining current customers
- loyalty—developing customer loyalty to the company/product
- profitability—increasing company profits by serving the customer
- service—addressing customer inquiries and resolving issues

Relationships Among CRM, Data Warehouses, and Data Mining



Data Warehouse Relationship Diagram

Source: Janet Zimmer, Creative Commons

The example cited in the introduction is one facet of CRM—data mining customers' purchasing patterns. Data mining is the process of looking at the data stored in a company's database to determine if statistically relevant trends exist. By identifying these trends and patterns, companies can develop strategies to better serve customers and increase sales.

Another example of CRM might be the evaluation of data purchased from a company that specializes in collecting demographic data on purchasers, including location, age, gender, ethnicity, home ownership, employment status, and income level, to determine which individuals might want the company's product or services.

CRM can improve services and products in other ways. For instance, if an organization offers a call center that provides customer support, tracking the kind of support that is provided most frequently might lead to solutions that could prevent the problems from occurring in the first place.

Data Analytics—How It Works

Almost all CRM applications involve using a large relational database, sometimes referred to as a **data warehouse**. This is where the raw data about customers, products, transactions, demographics, and other information is stored. Typically, the data warehouse gets its information in real time, or nearly so, from systems used to conduct transactions between the company and the customer—point-of-sale (POS) systems, e-commerce web applications, inventory management systems, and others.

Data from the data warehouse is retrieved, organized into categories, and reviewed to support identification and analysis of data patterns. So data analytics is referred to as "qualitative and quantitative techniques and processes used to enhance productivity and business gain" ("Data analytics," n.d.).

Data analytics is primarily used in applications that involve the business-to-customer environment and includes information about customers, business processes, market economics, or practical experience.

Using complex statistical analysis software programs known as **data mining tools**, data analysts are able to query the data warehouse in many ways. For instance, an analyst might ask the data mining tool to retrieve from the database all purchases made during the week of June 15 in which two specific products were purchased together in stores on the East Coast. Once the records are returned, the analyst would ask the tool to show only those purchases in which a statistically relevant correlation between the two items existed.

Sound fascinating? That is only the beginning. Consider this: Why not design the data mining tool to run specific queries such as this one on all data, once a day, and send an email to the analyst if anything interesting turns up? In other words, why not build "triggers" into the system that alert the analyst to anything that might be considered an anomaly, good or bad? Why not have the data mining tool do all the work?

By now, you have probably determined that sophisticated CRM data mining tools do just that. Although you may have never heard of these data analysis tools, here is a list of the most commonly used ones (Vohra, 2017):

Open Source Analytics Tools

Commercial Analytics Tools

Open Source Analytics Tools

Commercial Analytics Tools

R: The most popular big data analytics tool. It integrates well with big data platforms with large data sets. R is known for a steep learning curve.

SAS: For a long time, the leading data analytics tool (but costly). It is versatile and easy to learn and provides specialized modules SAS analytics for IOT (Internet of things), SAS Anti-money Laundering, and SAS Analytics Pro for Midsize Business.

Python: Released in the early 1990s, Python covers a host of statistical and mathematical functions. Useful in the analysis phase of analytics, Python can also be used as a data-gathering tool on the internet using a technique known as "web scraping." Data can be extracted or gathered from nearly any website to analyze content, but data-centric websites and social media sites are often the focus of web scraping. The analysis phase of social media data is also known as **social media analytics**.

Tableau: Great for creating visualizations and dashboards. More robust in visualizations and can handle much more data than Excel.

Apache Spark: Its focus is on unstructured data or huge data volumes. It integrates easily with Hadoop, an open-source Java-based framework that supports large data sets (Rouse, Stedman, & Bigelow, n.d.).

Excel: Most widely used analytics tool. More accessible for nonanalytics professionals, who will usually not have access to tools like SAS or R on their machines.

Apache Storm: Used for moving data or when the data is continuous. Works well with real-time analytics or stream processing.

QlikView: Another popular visualization tool.

Pig and Hive: Most companies that work with Big Data and leverage the Hadoop platform use Pig and/or Hive.

Splunk: Visualization tool with a web interface that makes it easy to use.

CRM Is Big Business

Offering good customer service and cultivating customer relationships makes good business sense. It is more cost-effective to retain current customers than to attract new ones, and companies that make good customer experience a priority have found that the practice leads to higher profits. Establishing and maintaining a good relationship with customers is critical.

What are major benefits for a company that uses CRM to improve relationships with customers?

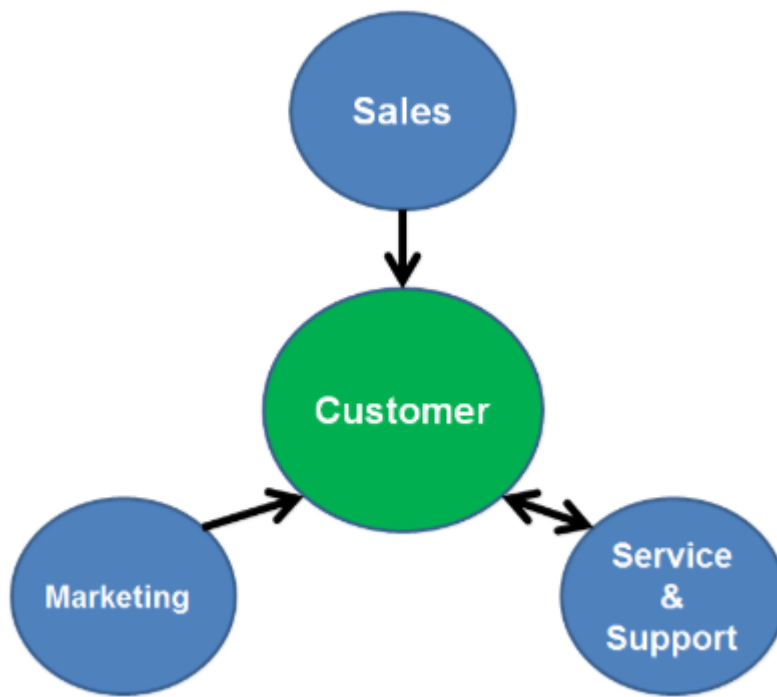
- CRM software can be used to monitor how long customers have been with a company, as well as their purchases and use of the company's services. Rewarding customer loyalty can improve the company's financial picture (Salesforce.com, n.d.). Think about credit cards, frequent flyer programs, special offers for loyal customers, and other rewards programs.
- Customers assess a company on more than products and services—they also gauge how the company deals with complaints and other issues. CRM systems allow for a more rapid response since customer questions can go quickly to the proper department, so employees can help (Salesforce.com, n.d.)

This ability to resolve complaints gives customers a positive perception. For customers who have had a negative experience with customer service, over 70 percent will decrease business with that company or even switch companies altogether (Barbier, Noronha, & Dixit, 2013). So it is even possible that a company might forego profits in order to address customer satisfaction first. For example, product recalls and timely fixes or product replacements by a manufacturer might result in a loss of profitability. Beyond just the safety considerations, however, customers who feel they have been served well by the recall/replacement may return to the same manufacturer for their next product.

Traditional CRM Versus Social CRM (SCRM)

Customers can now communicate with companies through chat on a website and even social media accounts such as Facebook and Twitter. CRM systems that include social media integration are now a must for many companies (Salesforce.com, n.d.). These systems are known as **social CRM**, or **SCRM**. An article in *Harvard Business Review* indicates that 79 percent of businesses already use social media or are planning a presence, although not all of them feel they are using such a vehicle effectively (Geek4Green, n.d.).

Traditional CRM

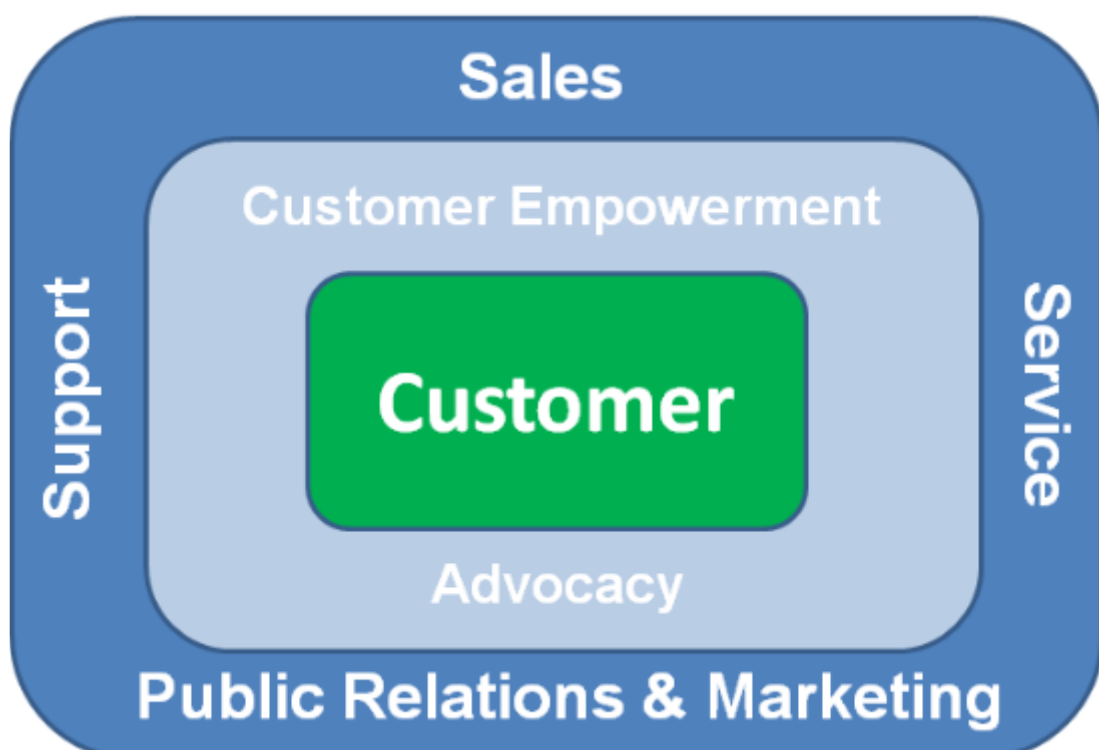


Traditional CRM

Source: Janet Zimmer, Creative Commons

In traditional CRM, there is little collaboration between the customer and the company. Marketing's focus is to push messages to the customers to generate sales. There is definitely a service and support component, of course, which does involve the customer directly.

Social CRM (SCRM)



Social CRM

Source: Janet Zimmer, Creative Commons

In contrast, SCRM invites the customer to collaborate with the company in solving business problems, primarily through interaction with online social media sites. This format empowers customers to shape their own experiences and build customer relationships directly with the company. Companies such as Coca-Cola and Dell maintain such sites. Dell reports that customers had posted over 18,000 new product ideas and almost 100,000 comments. Nearly 500 of the ideas had actually been implemented by Dell (Reynolds, 2012).

SCRM is a vehicle for direct and indirect advertising as well. Some social media sites display banner ads promoting companies or services. These ads can be directed to everyone who visits the site, or just to certain visitors who match particular demographics. Another marketing technique is the use of "fans" of a particular site, product, or company. When you "like" or "friend" a certain page on Facebook, for example, you are added to a fan base which, in turn, promotes awareness about the company or product.

Participation by companies in the social media environment has resulted in a newer branch of CRM called customer experience management (CEM). Online surveys filled out after purchasing products online or using services such as an airline flight feed into the company's management of the customer experience. Loyalty or reward programs are also a means of managing the customer experience. The customer is no longer a passive recipient of the company's services but an integral part of the customer experience and relationship development.

Various social media advertising strategies are available for a company that employs such sites—its own or others—for promoting the company and its products and services. Among these are (Reynolds, 2012):

- **direct advertising** via banner ads on social media sites
- **sending ads to a person's network of friends** or other contacts
- **increasing brand awareness through groups or fans** of a particular site or product
- **using the company's own social networking site**
- **viral marketing**, in which individuals pass along embedded marketing ads to others, promoting the tool being used to send the message

Here are some examples:

- Businesses pay Facebook to show ads to people who might be interested in their message. This would be an example of **direct advertising**.

- Each time a user sends a message using Twitter, a note is attached to the end suggesting that the recipient create a Twitter account. You might consider this **viral marketing**.
- When you sign onto your favorite social networking site, you see a message from your friend, Mike, who just went to see an Oscar-nominated movie and thought it was a "must see!" This would be considered **sending ads to a person's network of friends**.
- A company with an easily recognized product brand has a Facebook page where fans of the product can "friend" the page and post comments. Friending or liking a page is an example of **increasing brand awareness through groups or fans** of a particular site or product
- An example of **using the company's own social networking site** might involve asking someone visiting an online ordering site to link to the business's Facebook page where additional ads or links may be found for similar products.

Trends for the Future of CRM

CRM and the software that supports it is not a static product. To address changes in customer expectations, companies that use CRMs must be sensitive to the following issues and tasks in making sure the CRM system is effective and efficient:

- **Customers expect more.** Members of Generation Y—the children of Baby Boomers, born between 1977 and 1994 and coming of age between 1998 and 2006—often demand ways to contact a company beyond a phone call. Those interaction vehicles include web chat, smartphone applications, and social media, according to a 2013-2014 study from Dimension Data, whose author, Andrew McNair, noted that "Generation Y customers are now reporting that the telephone is their fourth choice" when dealing with customer support (Earls, 2014).
- **Keeping valuable staff.** Experienced customer service staff are leaving their positions, according to McNair in the study (Earls, 2014), and McNair noted that training, support, and up-to-date tools are needed to retain CRM staff (Earls, 2014). Because customers are increasingly relying on the use of mobile devices and social media, both for communication and for sharing thoughts (including positive or negative reviews of a company, its products, and its service record), call center agents, service representatives, and sales personnel will see a corresponding increase in duties because they are no longer answering only telephone calls. An agent, whether in customer service or sales, needs to know how to handle the various means by which customers interact with the company personnel and use the consumer's information accordingly to solve problems (Earls, 2014; McKoen, 2012).
- **Privacy.** Companies are learning more from their customers based on digital interactions, and users may be willing to give up that data if they understand why and

how it is being used. But they also expect the data to be protected. Companies need to foster trust with those customers (Earls, 2014).

- **Mining the social media inputs.** On social media, customers often post honest insights about products and services. Ordinarily, companies pay for surveys to gather this same data, which is available for free if the content can be extracted from these postings. Thus, **social media analytics**, the gathering of data from blogs and social media websites for analysis in order to make business decisions, is gaining importance. These tools help marketers, sales personnel, and contact center agents observe customers' social output and respond accordingly to any talk about their brand (McKoen, 2012).
- **Cleaning up the data.** Organizations need to invest in efforts into cleaning up CRM data. Data that is inaccurate or duplicative can hamper call center or sales employees (Earls, 2014).

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