

4. Packaged analysis creator who provides analysis of raw data.
5. Search services; intermediary information brokers who provide industry-wide searches of all electronic commercial storages and sites.
6. Information consumer.

Among those companies one can recognize the following information service providers: Knowledge Index, Dow Jones news, Datatimes, NEWSNET, BRS/After dark, EASYNET, and Lexis and Nexis (legal information).

Among consumer information services providers one can mention Internet Portals such Yahoo! and America Online (AOL) with 30+ million users. Their menus are similar. For example, some of AOL's categories are as follows:

Mail	Stock Quotes Area
News & Finance	Top News of the Day
People Connection	Directory of Services
Lifestyles & Interests	What is New Area
Entertainment	Download Manager
Learning & Reference	File Search/Software
Travel & Shopping	Forums
Computing & Software	Members' On-line Support

The most popular service is "Forums," which provides message-based and real-time conference areas for the special-interest groups.

SCM-SUPPLY CHAIN MANAGEMENT – *INTER-OFFICE AUTOMATION*

The supply chain includes all functions involved in filling a customer request. These functions include: suppliers, transportation, distributors, new product development, manufacturing, marketing, finance, accounting, retailers, customers, customer service, etc. For example, when a customer buys online a Dell computer, the supply chain embraces the customer, the Web page that acquires the customer's order, Dell's manufacturing plant, and, going backwards, all of the seller's suppliers and their suppliers and distributors.

A set of involved companies in fulfilling the customer's order creates a supply chain management system (SCM) that operates as a single company. The SCM system coordinates the smooth flow of information, materials, and money among all the participating companies. This integrational, inter-enterprise effort aims at:

1. The improved production and delivery efficiency and effectiveness, leading to higher profitability through revenue growth and cost reduction (greater volumes from increased scope and enhanced sales capabilities leverage scale economies),
2. Better competitive advantage, which requires proactive management and rapid competitive responsiveness,
3. Better customer responsiveness through smooth service delivery, customer service, and data management (improved data gathering, warehousing, data mining, and lower transaction costs),
4. Improved organizational effectiveness that can be achieved if finite resources are better allocated toward high-value activities. It allows companies to pursue their most profitable customer segments. With well-defined SCM strategy, individual employees have a better understanding of their acquisition-transaction-servicing responsibilities. Properly designed incentive and performance indicators should substantially improve organizational effectiveness.

Typical quantified improvement benefits from integrating the Supply Chain, according to PRITIVIS C Benchmark Study (www.supplychain.org/html/slide1.cfm?SR=30), are as follows:

• Delivery performance	16%-28% improvement
• Inventory reduction	25%-60% improvement
• Fulfillment cycle time	30%-50% improvement
• Forecast accuracy	25%-80% improvement
• Overall productivity	19%-16% improvement
• Lower SCM costs	25%-50% improvement
• Fill rates	20%-30% improvement
• Improved capacity realization	10%-20% improvement

Companies are forced to create SCM systems since they are under pressure from the marketplace, where:

- Customers increasingly demand anytime, anyplace access to products and services,
- Customers are conducting significantly more transactions across a wider variety of channels,
- Increasingly knowledgeable customers demand higher value for the cost,
- Dichotomy grows between advice-oriented and self-directed customers; the latter are more sophisticated who seek the best value from the transaction.

A typical integrated SCM system has two components:

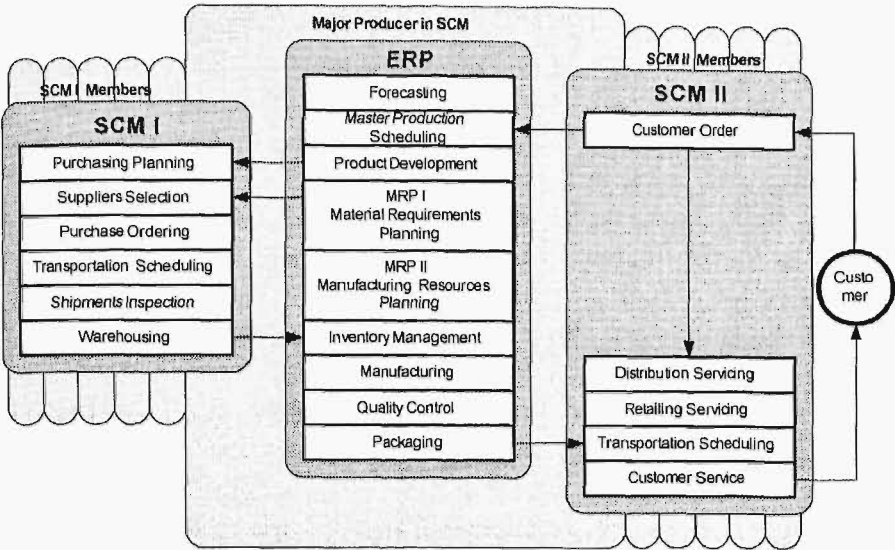
- Supply Chain Management (SCM I), which operates at the input (backward chaining) stage (called also *procurement*) and includes all incoming materials, and information and money flows among suppliers, distributors, producers, and transporters,
- Selling Chain Management (SCM II), which operates at the output (forward chaining) stage and includes all outgoing materials, information, and money flows among producers, distributors, retailers, transporters, and customers.

The SCM systems interact informationally with the ERP system, Enterprise Information Portal (EIP), and Customer Service Management system as is shown in Figure 4-15. The information flow is supported by the Extranet, which authorizes all stakeholders to access and process information about customers, their related orders, and their conditions leading to a successful fulfillment through all stages of logistic processes. The focal point of information gathering and sharing among SCM's stakeholders is the Enterprise Information Portal.

The functional integration of SCM I and II and ERP systems is illustrated in Figure 4-16.

Most of the buzz around e-commerce focuses on the transaction itself, when the buyer clicks through the seller's checkout process. But what happens

Figure 4-16: The Functional Integration of SCM and ERP Systems



before and after that transaction has more impact on the way work is done. Businesses are tearing down the walls of communication that separate their employees from partners, customers, and suppliers to provide an environment in which all can collaborate and share. A digital workplace can complement an enterprise's investment in transaction systems by providing a place where functions such as product development, requirements planning, and contract negotiations can occur. An e-Room allows for team members to communicate in real-time online conferences. Everyone in the supply chain can meet in an e-room using a browser and Web technology. Ford Motor Co. is using e-Room to work closely with suppliers, partners, and customers. Any team can create an e-Room to share documents, hold online discussions and vote on a proposal. Participants are selected from Ford's intranet or extranet directories, so every e-Room is B2B ready. In addition, every intranet user receives his/her own personal e-Room that is intended to facilitate ad hoc collaboration.

Internet-based logistic systems offer several compelling sources of value. In particular, electronic capabilities make it possible to integrate logistic processes and deliver them in new ways. They facilitate information searches and comparison shopping, they allow electronic payments and software-based advisory services, and they make possible customizing services down to segments of one.

SCM systems are based on the Business Process Integration (BPRI) architecture (described in Chapter 7) and B2B model as is illustrated in Figure 4-17.

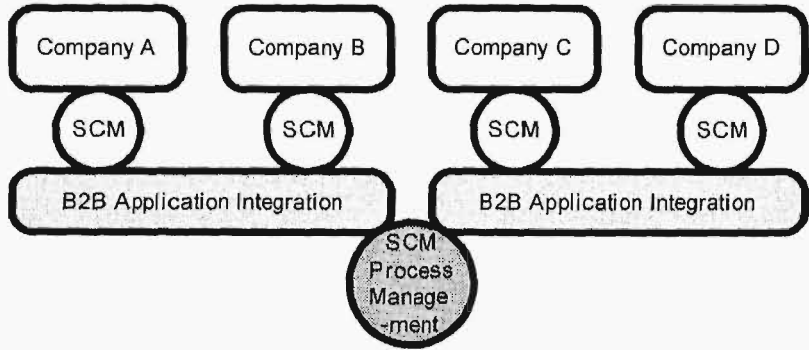
The SCM system can be electronically integrated at the two following levels:

1. Cross-enterprise logistic process application integration through middleware software which connects companies' ERP's with SCM's and SCM's of collaborating companies,
2. Cross-enterprise process data integration via such standards as XML.

In practice, different industries develop specific solutions of SCM; for example:

- The High-Tech industry – implements the SCM *build-to-order* model which supports mass-customization and the customer's ability to customize the ordered configuration of a product such as a computer (a case of Dell, Compaq, HP, Intel),

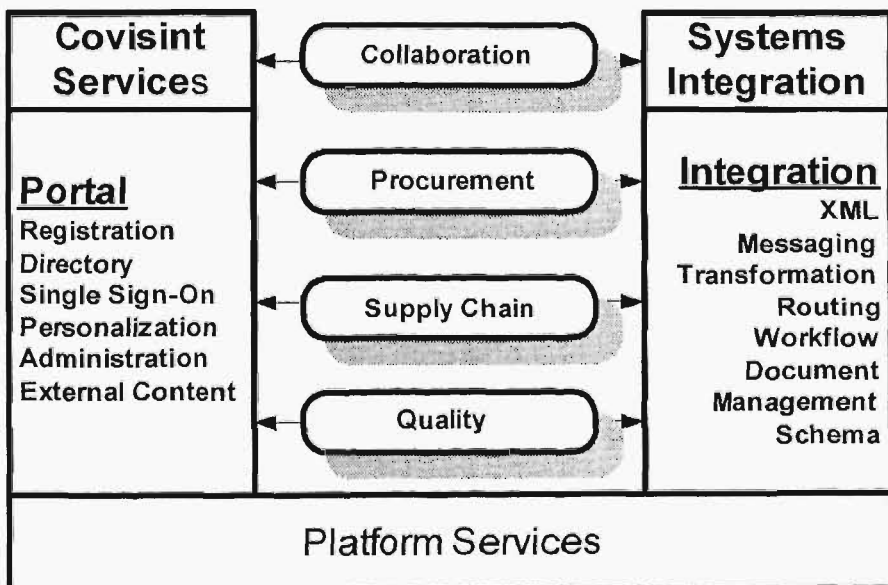
Figure 4-17: BPRI and B2B Application Integration Create the Inter-enterprise Infrastructure that Supports SCM to Work in the Integrated Environment



- The consumer packaged goods industry – applies the SCM *continuous replenishment* model which supports collaboration of all SCM members (such as Proctor & Gamble and Wal-Mart) to optimize the stores' stocks,
- The food processing industry – develops the SCM *make-to-stock* model which is enterprise-centric (e.g., Kellogg, Nabisco, Coca-Cola, General Mills) to speed up the delivery of products (based on forecasts, not customer orders), better utilize plants, and minimize their own inventories of raw materials, semi-products, and products.

A good example of SCM systems is provided by Covisint, which is the automotive industry exchange where OEM's and suppliers of all sizes come together to do business in a single business environment using the same tools and user interface, plus one user id and password. Among funding companies are GM, DaimlerChrysler, Ford, Renault, and Nissan. Covisint's infrastructure provides a basis for industry connectivity, as is shown in Figure 4-18.

Figure 4-18: Covisint's Information Infrastructure



The application of Covisint's services secures effects presented in Table 4-2.

Table 4-2: The Effects of Covisint's Services

SERVICES	ROI	BUYER VALUE	SELLER VALUE
Collaboration Manager	ROI<2 months 15% time savings	Reduce non-value added work Eliminate disparate system friction	Customer information visibility Improve quality of decisions
Quote Manager	ROI<2 quotes	Accelerate supplier selection Reduce the cost of bidding process	Accelerate the FRQ cycle Reduce the cost of RFQ responses
Auctions	+400% ROI 70% process savings	Reduce negotiation time Improved decision-making	Access to true market data
Catalog	100% ROI 73% process savings	Controlled buying Reduced purchasing costs	Real-time content management
Supplier Fulfillment	<6 months Avg 1 st year 166%	Multi-tier visibility	Inventory reductions Premium freight cost reduction
Problem Solver		Increased speed to closure Track cost of quality	Standard response format Systemic problem solving method

Covinst's global metrics is as follows (on September 21, 2001):

- Auctions: More than 1,000 online bidding events and over \$45 billion in transactions;
- Catalogs: More than 250 catalogs, more than 2.5 million individual items, more than 61,000 transactions;
- Quote Manager/Virtual Project Workspace: more than 500 seats sold and in use;
- Supply Chain: More than 2,300 seats sold and in use by 1,500 companies;
- Registration: More than 2,600 companies registered.

Today's supply chain practice can be characterized as follows:

- Out-of-date information flow from thousands of companies in multiple formats;
- Missed sales trends or profit eating rebates;
- Overstocked inventories;
- Half-empty loads;
- Fax and phone-based communication.

These negative practices are a target for Covinst's solutions. Covinst provides the information infrastructure, which enables:

- Electronic connections between users and systems with secure and scalable technology, enabling common communications and processes via a portal as a single integration point to partners' ERP systems;
- Integration and optimization of automotive product development such as design, sourcing, production, and fulfillment;
- Real-time access to partners' information which triggers their visibility;
- Gaining advantage by smooth execution.



According to Covinst's data, North American motor OEM's spend on IT per car about \$650, European OEM's spend about \$400, and Asian OEM's spend only \$150. Today, North American OEM's still focus on cost and in the future will focus on cost and response time.

Covinst aims at the optimization of the sourcing lead-time for suppliers, which has some room for improvements, according to the following data (www.amrresearch.com):

- Sales – 14%
- Supply Chain – 25%

- Manufacturing – 13%
- Rework and Analysis – 32%
- Queuing – 16%

CRM-CUSTOMER RELATION MANAGEMENT – *FRONT-OFFICE AUTOMATION*

In business, success is about customers. It is about fully understanding and anticipating what they need, and meeting those needs in ways that keep your company profitable. From local shop owners using grass-roots efforts to connect suppliers with customers, to global companies using sophisticated applications, the momentum to win customers and profits continues into the 21st century.

Customer Relationship Management (CRM) software plays a large role in retaining profitable customers, and it is a hot ROI (*return-on-investment*) concept. According to recent studies, companies can expect an average revenue boost of 8% after implementing a CRM system. Between 1996 and 2000, according to Forrester Research, corporate investment in CRM technology grew at a compound annual rate of 54%. The Gartner Group projected the total CRM market for 2000 at nearly \$13 billion, rising to \$40 billion in 2004.

CRM evolves through the following stages:

- 1980's – "*point solutions*" identified the buyers-centric approach for specific departments, which aimed at adaptive selling and building long-term relationships with customers through "account executives." At this stage, the first specialized software was called SFA (Sales Force Automation) which included stand-alone, task-oriented tools, such as personal organizers, appointment calendars, and address/telephone directories, which were user-friendly, particularly on Apple computers,
- 1990's – "*enterprise CRM*" identified the ERP approach to capture customer information across marketing, sales, service, and support functions. This is also referred to as "*collaborative CRM*," where your company and your customers work together to resolve their needs. At this stage the strategy was to collaborate and consult with the customers about

how to solve problems and guide them about how to grow with vendors' products and services. This second evolutionary stage trapped most SFA vendors. Their packages were second-generation SFA software which focused on enhancing the office productivity of salespersons by automating such activities as contact management, opportunity management, sales forecasting, commission tracking, and teleselling management. SFA software, at this stage, could analyze, "How long it takes to answer support calls," or, "How long it takes to close the contract," but that is not something a company could turn into profitable transactions and loyal relationships.

- 2000's – "*e-CRM*" combines traditional and collaborative CRM approaches with analysis to provide accurate insights into the wants and preferences of the customer, supplier, or employee. SFA software transforms into a true CRM software, which draws from the enterprise data warehouse, the repository of organizational memory, raw company data and transforms this input into business intelligence.

Nowadays, in the new e-business world-wide practice, the extended enterprise is composed of employees, suppliers, partners, and customers collaborating as a team of stakeholders. This means that customers are transforming into commissioned salespersons through bonuses, rebates, or credit programs. On the other hand, employees are becoming customers and competitors are turning into partners.

Appropriate customer relationships are key factors to any good business. According to Sybase Customer Asset Management Solution (www.sybase.com), the following data illustrate this premise⁷:

- It costs six times more to sell to a new customer than to sell to an existing one,
- A typical dissatisfied customer will tell eight to ten people about his/her experience,
- A company can boost its profits by 85% by increasing its annual customer retention by only 5%,
- The odds of selling a product to a new customer are 15%, whereas the odds of selling a product to an existing customer are 50%,

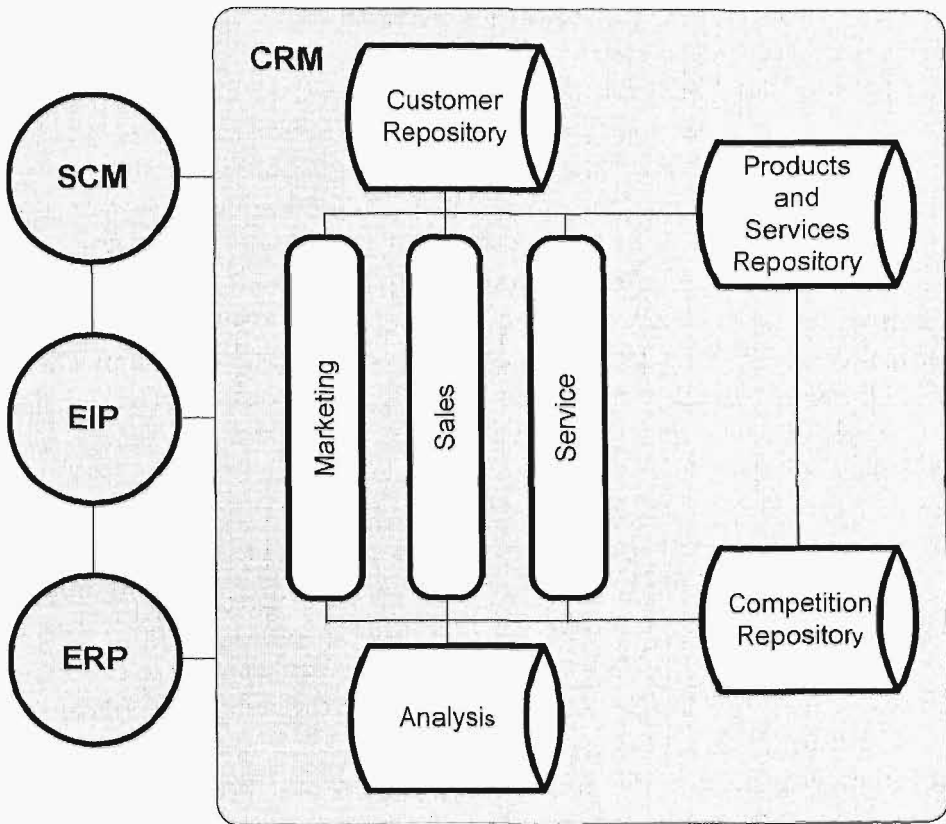
- 70% of complaining customers will do business with the company again if it quickly takes care of a service,
- More than 90% of existing companies don't have the necessary sales and service integration to support e-commerce.

CRM is about automating and informing the customer-centric business processes of Marketing, Sales, and Service. A CRM system ensures that front-office applications improve:

1. Customer satisfaction, resulting in added customer loyalty and retention through better identification of the most profitable customers and treating them accordingly (20-80 rule), and better understanding their needs, which can be satisfied by more efficient coordination of activities of all stakeholders of a business (*integrating back-office with front-office and inter-enterprise offices*),
2. Profitability by increasing profits per sale through offering the correct products (cross-sell/up-sell),
3. Reducing marketing costs by developing effective, targeted campaigns,
4. Reducing selling costs by improved control of a sales cycle and workflow,
5. Leveraging on previous contracts with other customers for the current interaction,
6. Estimating future sales, marketing, and service activities based on analysis and customer data sharing among all stakeholders of a business (*integrating back-office with front-office and inter-enterprise offices*),
7. Other.

There is almost uniform agreement among industry analysts that CRM includes: Marketing, Sales, Marketing, where the customer makes contacts with the business, either in the pre-sale, sale, or post-sale situation. However, many software companies add mission-critical repositories, such as Customer Repository, Products and Services Repository, and Competition Repository and Analysis, which help to informate the decision-making process about

Figure 4-19: The Generic Model of Customer Relationship Management – CRM System (EIP–Enterprise Information Portal)



customers. These inter-linked generic areas of functionality are illustrated in Figure 4-19. The Repository of Products and Services is linked with the Competitor's Repository, so that if a company is not offering specific products and services to a given client, then this company knows who does. Also, if a company hears in the news that competitor X is either going out of business or was fired by the client, then it is time for that company to move in with a new offer.

Marketing is that business function which identifies a relationship between a product and customer which triggers the whole business process. Marketing activities are quickly evolving from traditional telemarketing to Web and e-mail campaigns. These Web-based marketing activities give prospects for the better customer experience, allowing the relevant information to be retrieved by the prospects on their own terms and their own time.

Sales is the fastest growing component of CRM. The interaction of the sales force with the prospect, turning the prospect into a customer and then maintaining a loyal relationship, is a core business concern for the business' success. The sales process must be coordinated across business functions through such systems as ERP and SCM.

Service is probably the most crucial element when it comes to customer relationship management. The quality of customer service that an enterprise provides is key to its ability to maintain satisfied and loyal customers. Today's call centers are evolving into contact centers handling an assortment of communication media. Telephone interaction must be coordinated with e-mail, fax, Web, and any other communication media. Self-service is a fast growing requirement, as more customers are making their way to the Web and want to look up their order status or make queries via their browsers. Customer service undoubtedly reaches beyond the traditional help desk. The term "Customer Care" is being used today to broaden the business' responsibility toward the customer.

Customer Repository is absolutely critical for a CRM system to have the customer data available to all customer-centric business functions of an enterprise (ERP, SCM) and also for its stakeholders. This database eliminates duplication, and conflicting or out-of-date information. Consistency in addressing the customer across all business functions is important in the following domains:

- **Customer data** – should include business profile, financial and demographic information, and outstanding issues with the customer, because the customer should not have to repeat a story or supply answers previously given to another representative.
- **Business rules** – should include policies that are applied to customers in their different aggregations in order to eliminate inconsistency in treating the same types of customers with different rules.
- **News** – about customers.

Products and Services Repository should include:

- **Company and product/service information** – should include product/service catalogues, marketing campaigns, press releases, company's history, etc. It is inconceivable that the website will offer a product that

customer service knows nothing about, or that a price quote given by a sales-person contradicts a special offer advertised on the Web.

Competition Repository should include:

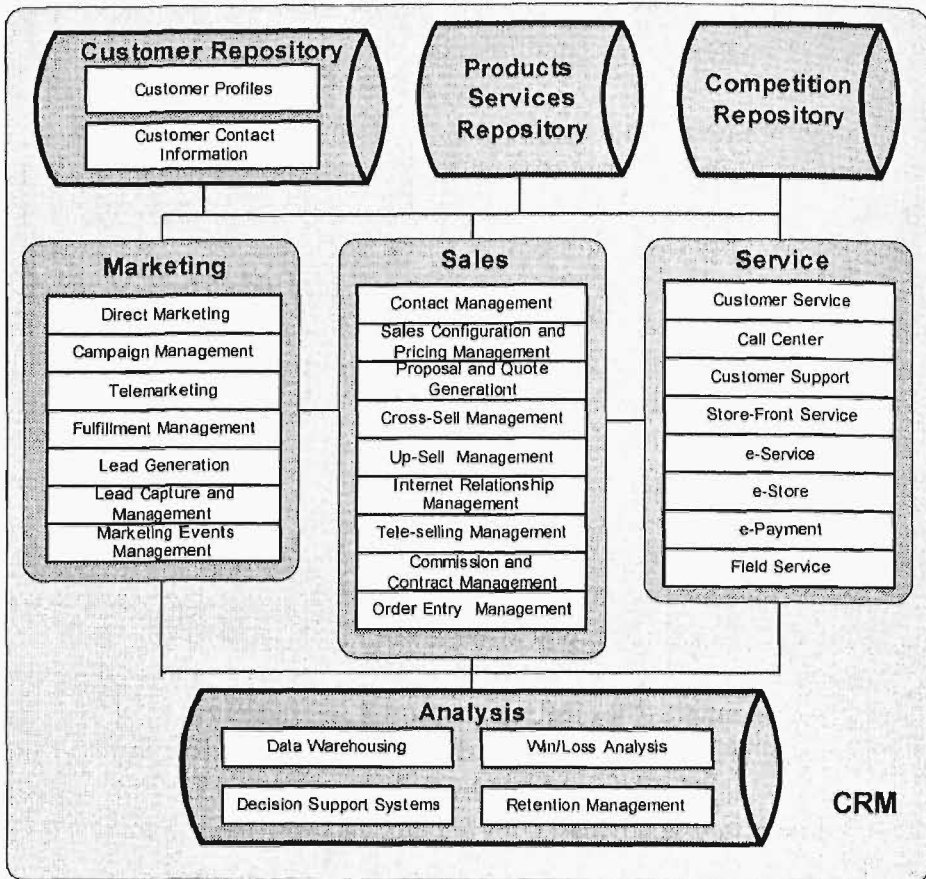
- Intelligence data about competitors, including their products/services offerings, market analysis, news, business performance reports, customer satisfaction reports, etc.

A n a l y s i s is a module which informs CRM in real-time evaluation of sales, applying quantitative and qualitative techniques. Particularly, win/loss analysis and customer retention analysis are performed based on data mining of a data warehouse and are associated with ERP and SCM. Data mining is one example of methods that are applied by Decision Support Systems (DSS) for this purpose.

The functional model of CRM is depicted in Figure 4-20. The CRM functions have been defined within software packages as a result of the Internet and in general Web/extranet technology applications. Among electronic solutions one can mention the following:

- **e-Service**—enables the customer to search databases to report and solve problems, view their pricing and ordering information, subscribe to product-related information such as white papers, and review status of warranty claims. A business can communicate with the customers via text chats, the Internet-driven telephone, and Web pages. Customers' questions, problems, and requests are automatically routed to the right source for a quick and accurate response.
- **e-Store**—provides an online catalog personalized for business customers (e.g., Amazon.com). Customers can maintain a list of favorite products, check the business' inventory in real-time, and check the status of their orders.
- **e-Payment**—allows a business to track the status of an outstanding invoice and chat online with its customer regarding the invoice.

The scope of the business internetization may be expanded into a company's information portal, which can offer e-mail, discussion boards, and up-to-date content. The goal of the internetization should be to translate customer contact

Figure 4-20: The Functional Model of CRM System

into sales. The latter should provide a more satisfying buying experience than in the physical world.

CRM is becoming a very popular software solution that perhaps will surpass ERP popularity and will become one of the largest application segments ever. This trend should change the business models of the enterprise. As products become commodities, and all other things being equal, the added value provided by CRM will define the success or failure of one business player over another.

ERP vendors such as SAP, Peoplesoft, Oracle, Baan, and others are attempting to expand their software packages as saturation is reached in the back-office applications. These vendors merge or acquire CRM vendors, as

evidenced in these some examples: Siebel & IBM, Peoplesoft & Vantive, Nortell & Clarify, HP & Oracle. Systems Integrators (e.g., KPMG, E & Y) are offering their services to integrate CRM with other enterprise applications. The hardware and networking infrastructure, particularly in the area of extranets, mobilized such companies as CTI, Cisco, HP, IBM, Lucenet, Nortell, Geneysis, and Quintus towards the development of solutions for CRM.

WFS-WORKFLOW SYSTEMS

Workflow systems have evolved to integrate the applications and tools being used in workgroup environments on networked enterprise information infrastructures. Their purpose is to speed up a task's completion through the collaboration of several workers. A workflow system is composed of:

- business processes; e.g., loan approval,
- cases; e.g., a customer application for a car loan,
- folders; e.g., a customer's e-folder, containing documents from different sources, including text and images,
- rules; e.g., about size of collateral for a loan,
- definitions; e.g., descriptions of participants in terms of locations, job function, supervisor, and security level,
- routing; e.g., sequential, parallel (with rendezvous point), or dynamic/conditional, depending upon dynamically occurring conditions.

The core component of a WFS is the workflow engine. It is a software responsible for process creation and control of the activity scheduling in an operational process and interaction with tools or human resources. WFS very often operates across many computer platforms and applications over wide geographic areas. The workflow engine exchanges controls among different applications via COBRA, Dynamic Data Exchange (DDE), OLE, or R/3's Business Application Programming Interfaces (BAPI's) standards. A good example of WFS is Lotus Notes for a groupware environment.