

7 Knowledge Enabled Customer Relationship Management

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7.1 Introduction

The redesign of business processes and the implementation of standard software for enterprise resource planning (ERP) in recent years has led to significant improvements in both process performance and service quality (cf. Chap. 2.3.1). Now that the classic reengineering trend is slowing down, companies have come to realize that efficiency in itself is no longer sufficient if they are to compete for customers in the 21st century. In many markets we are currently witnessing a major move away from market and product centricity towards a complete realignment of business processes in order to integrate with customer processes, which creates additional customer values and finally leads to lasting customer relations. The efforts directed at building and maintaining long-term relationships with customers are usually summarized as ‘customer relationship management (CRM)’. CRM represents one of the networking strategies in Business Networking (cf. Chap. 4.3.3) and is driven by both business and technology:

7.1.1 Business Trend: Customer Centricity

Although many companies claim to be customer-oriented, even new services are mostly product-centric, i.e. customers have to adapt to the way a company works but not vice versa. In essence, customer centricity is a business strategy which aims for the complete redesign of a firm’s processes to meet customer needs. The main goal of any customer-centric strategy is to solve a customer’s problem in its entirety through the creation of a complete solution package containing all the necessary services and products, and to offer it as part of a one-to-one relationship (cf. Chap. 2.3.6).

An example is *Travelocity*, an Internet-based travel agency which integrates a broad range of vacation planning activities in one platform. Instead of booking a flight with airline X, making a room reservation with hotel Y and looking for a car at rental car agency Z, customers are guided through their entire planning process by an Internet application that seamlessly combines all these services (see Figure 7-1).

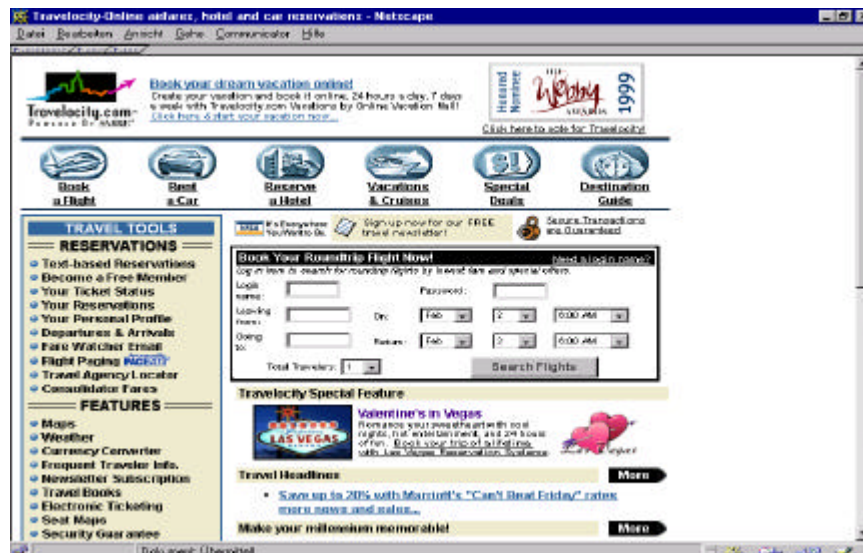


Figure 7-1: Travelocity [www.travelocity.com]

7.1.2 Technology Trend: Tools for Marketing, Sales and Service Automation

Emerging technologies, such as mobile computing and document processing, allow novel applications in the front-office. Sales force representatives have access to transactions and functionalities of the ERP system in their company's headquarter as well as to document repositories and dynamically generated reports. All sales information is available on the road and at the customer's office. Other technologies enable highly sophisticated marketing and service applications, e.g. customer profiling and computer- telephony integration.

For example, the *Siebel Enterprise* software package integrates with existing SAP installations and allows for transaction and document-oriented information processing. Data and documents on accounts, leads, market campaigns etc. can be downloaded to any mobile PC and thus distributed to a company's sales force. The system offers a variety of analysis features and reports on sales activities and customer profiles (see Figure 7-2). Order data can be entered and automatically transferred to an SAP system, where corresponding production processes are triggered.

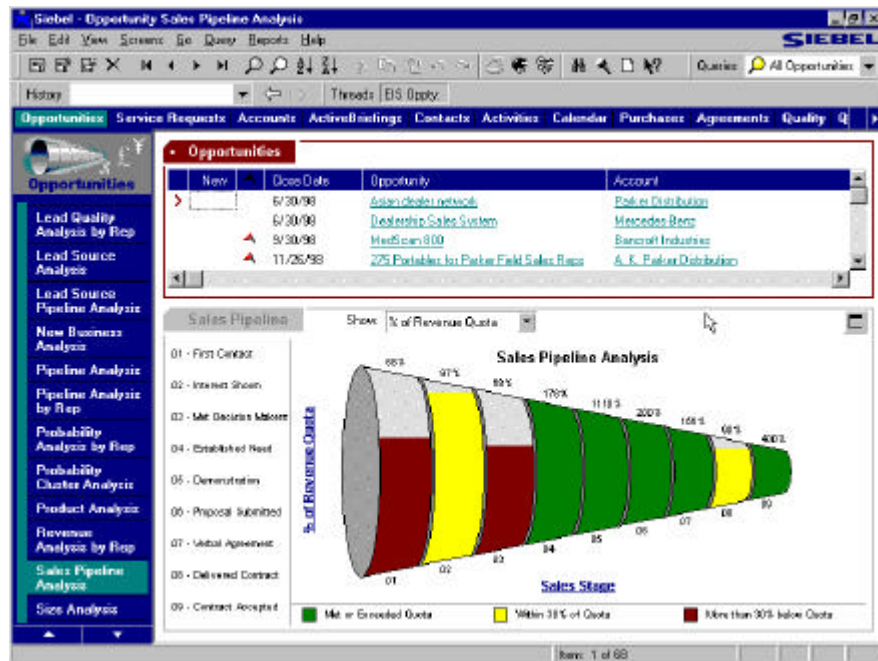


Figure 7-2: Siebel Sales Enterprise [www.siebel.com]

The first step towards CRM in a firm is a complete understanding of customers, their processes, needs and preferences. Processes in the front office are highly unstructured, mostly non-transactional, and are virtually impossible to standardize. Their performance is predominantly influenced by the underlying supply with up-to-date knowledge about products, markets and customers. Therefore the foundation for any customer relationship management initiative is the implementation of an effective knowledge management infrastructure.

In this paper we outline the relevance of knowledge management techniques to the management of customer knowledge and the redesign of the corresponding business processes. Starting with an analysis of the core processes of CRM, we illustrate the underlying knowledge structures and support processes. We also give an overview of the opportunities for IT support in this context. We regard this framework as a first step towards a reference model for customer relationship management.

The CRM framework described in this paper is based on the results of the research project 'Competence Center for Business Knowledge Management (CC BKM)'. CC BKM is part of the research program 'Business Engineering (BE HSG)' at the Institute of Information Management at the University of St. Gallen (cf. Chap. 1.3).

7.2 Case Study: LGT Bank

The LGT Bank in Liechtenstein is an internationally active private bank. In view of the increasing importance of customer orientation in the banking sector, the bank revised its corporate strategy in 1996 with the aim of changing from a product-driven to a customer-centric organization and thus improving client benefits. Banks must increase their focus on the needs of clients if they are to remain competitive in an environment characterized by the globalization of markets, tighter margins due to increasing competitive pressure and the trend towards concentration in order to utilize synergies. As a result, changes became necessary in the bank's structures and processes and new demands were made on its information systems.

The project team started with an analysis of the sales process and other related processes, i.e. product management and market analysis. The information needs of these processes led to a novel knowledge structure, which could then be mapped with existing information systems and other information sources. New roles and support processes had to be designed, e.g. for the publication of market reports. Finally, a set of additional measurements was defined for process controlling purposes (see Figure 7-3).

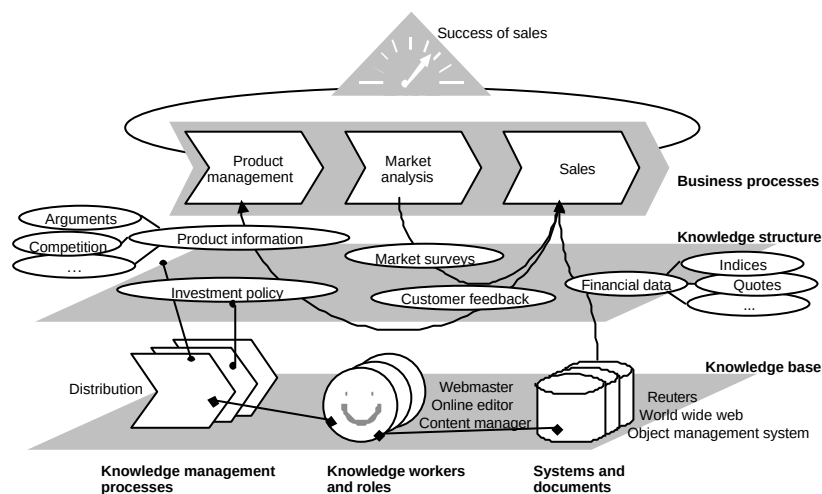


Figure 7-3: Knowledge-oriented Redesign of the Sales Process at the LGT Bank

The bank decided to implement the new concept with an Intranet application and to integrate front and back-office processes via a common information system named the KUNO front system [cf. Kaiser et al. 1998]. The functionality of the applications enables the administration of clients, accounts, custody accounts, portfolios, loans and funds, the processing of orders in the name of the bank or

others and the analysis of market positions and trends. Employees no longer have to be specialists for individual products. Instead they have to serve as generalists and must be able to provide clients with sound, comprehensive advice about the bank's complete range of products and services. The KUNO front system is composed of logical modules as depicted in Figure 7-4.

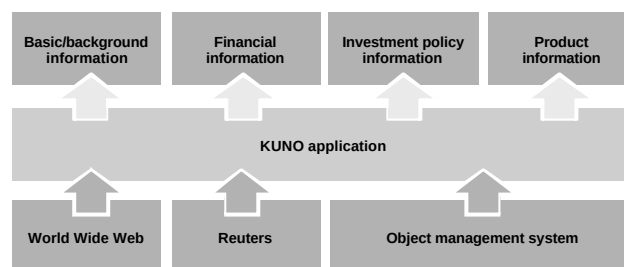


Figure 7-4: Modules of the KUNO Front System

KUNO represents the interface between the bank's sales process and its product management and market analysis processes. Information created by these processes is provided directly via the KUNO front system and called up when required by the client advisor. Conversely, the advisor has the possibility of providing feedback to the product manager and the analyst via the system. The KUNO front system therefore integrates the sales, product management and market analysis processes.

The front system offers quantitative benefits in the field of financial information. So far the bank has maintained approx. 120 Reuters terminals resulting in monthly costs of approx. CHF 500 per connection. Thanks to the integration of information in the front system, the bank expects to reduce the number of Reuters terminals by 50, which would generate savings of about CHF 300,000 per year. The bank also expects to make annual savings of CHF 165,000 in the distribution of printed information material for individual products. In the provision of support for client advisors, the bank hopes to attain substantial capacity savings of up to 30% in the administrative sector.

From the qualitative viewpoint, the client advisor is able to prepare himself far more efficiently for an advisory discussion due to the fact that all the relevant information is integrated under one interface. Moreover, the information is available in electronic form, which substantially simplifies advisory meetings with clients at a location away from the bank because the advisor no longer needs to take large quantities of printed information material with him. For the first time, binding product information is available. Above all, this facilitates the training and familiarization of new employees but also enables clients to be given comprehensive advice in accordance with their actual needs. Placing the responsibility for the information objects within the scope of the staff's work procedures also ensures

that they are kept up to date. The client advisor therefore has a ‘virtual’ expert on call.

7.3 Managing Customer Knowledge

7.3.1 Knowledge Management

Corporate transformation processes take place at the levels of strategy, business processes and information systems [cf. Österle 1995]. From this point of view, instruments for the improved management of knowledge can be categorized as depicted in Figure 7-5:

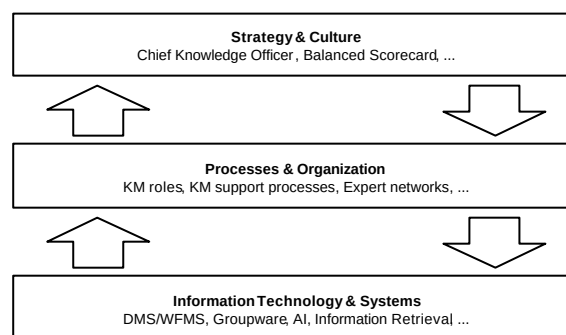


Figure 7-5: Instruments of Corporate Knowledge Management

Strategy

In the area of strategy development, knowledge management belongs to the so-called resource-oriented approaches that began to appear at the beginning of the 1990s as an answer to traditional market-oriented approaches. Instead of a detailed analysis of markets and competitors, the goal of this ‘resource-based view of the firm’ [cf. Collis/Montgomery 1995] is the development of a unique combination of core competencies [cf. Prahalad/Hamel 1990]. At the same time, corporate knowledge was identified as an important or even crucial strategic resource [cf. Nonaka/Takeuchi 1995]. At the strategic level, therefore, the activities of knowledge management aim for the creation of a corporate culture which will promote and enable the acquisition, maintenance and use of knowledge in all departments of an organization. As a result senior management is supported through the definition of knowledge goals and a set of suitable measurements, analogous to conventional financial indicators.

Business Processes

Nearly all established approaches to corporate knowledge management focus on the introduction of new processes or the improvement of existing ones. Their structure is usually based on a generic phase model (e.g. 'building blocks of knowledge management' [Probst et al. 1999], 'knowledge cycle' [Steier et al. 1997], 'operations on knowledge' [van der Spek/Spijkervet 1997]). This view tends to ignore the fact that the primary objective of knowledge management is not the pointless accumulation of knowledge but its use in the context of specific business processes [cf. van Heijst et al. 1996]. Therefore the central starting point needs to be a business process and consideration of the respective information processing activities. For this purpose, methods for analyzing knowledge needs and flows within business processes are required. Other aspects include the design of support processes for knowledge creation, maintenance, distribution, and also the embedding of the corresponding responsibilities within an organization.

Information Systems

The effects of knowledge management initiatives on the IS infrastructure of an organization are manifold due to the lack of integrated systems for knowledge processing. On the other hand, many software producers use the term 'knowledge management' in order to market DMS, WFMS, groupware and other technologies as suitable IT solutions. A clear distinction between knowledge management-oriented tools and conventional systems is barely discernible and usually depends on the respective application domain [cf. Ware/Degoey 1998].

7.3.2 Relationship Marketing

In several markets, products have become indistinguishable due to their technical and qualitative homogeneity. This development has led to weaker relations between customers and vendors. In many industries the creation of long-term relationships therefore requires integrated problem solutions which include value-added services [cf. Meffert 1998].

Whilst it has long been acknowledged that the fundamental purpose of marketing is the 'getting and keeping' of customers, the truth is that more attention has typically been paid to attracting customers than to keeping them. More recently a recognition has emerged that marketing needs to place, but also to develop processes that will enhance long-term customer loyalty. This viewpoint is the foundation for the development of the concept of relationship marketing, at the heart of which lies the proposition that the fundamental purpose of marketing is the creation and development of long-term, profitable relationships [cf. Christopher/McDonald 1995].

It would be incorrect to think that relationship marketing is a replacement for marketing as it has been practiced to date. It is more a case of broadening and refocusing the marketing concept with the emphasis placed upon strategies to enhance customer retention and loyalty. Some of the major differences in emphasis between the traditional approach, which we label ‘transactional’, and the ‘relationship’ focus are shown in Table 7-1.

Transactional Focus	Relationship Focus
• Orientation to single sales • Discontinuous customer contact • Focus on product features • Short time scale • Little emphasis on customer service • Limited commitment to meeting customer expectations • Quality is the concern of production staff	• Orientation to customer retention • Continuous customer contact • Focus on customer value • Long time scale • High customer service emphasis • High commitment to meeting customer expectations • Quality is the concern of all staff

Table 7-1: Shift to Relationship Marketing¹

7.3.3 Knowledge Enabled Customer Relationship Management

The characteristics of knowledge work have already been discussed intensively in the pertinent literature [cf. Shum 1997] and there is a common understanding of knowledge-oriented processes as a set of activities that depend significantly on past experiences, expert knowledge, information from heterogeneous sources etc. At a high level of abstraction, these can be summarized by the following two attributes [cf. Eppler et al. 1999]:

- *Knowledge intensity.* Since we regard knowledge management as an extension of BPR and KM applications and a complement to ERP software, we use a pragmatic definition of knowledge as the totality of information outside existing ERP information systems. From this point of view knowledge intensity is therefore based on the need for knowledge from heterogeneous, not necessarily computational information sources.
- *Process complexity.* Process complexity implies that extensive knowledge is necessary for the execution of the respective process. This can either be caused by the process’s complicated structure or by the absence of clear

¹ [cf. Christopher/McDonald 1995].

structures. Research and development activities are an example of the second category.

Note that there is a strong correlation between these attributes, i.e. processes that combine high complexity with low knowledge intensity or vice versa cannot be found in reality. Thus, we can identify two – usually overlapping – classes of business processes (see Figure 7-6).

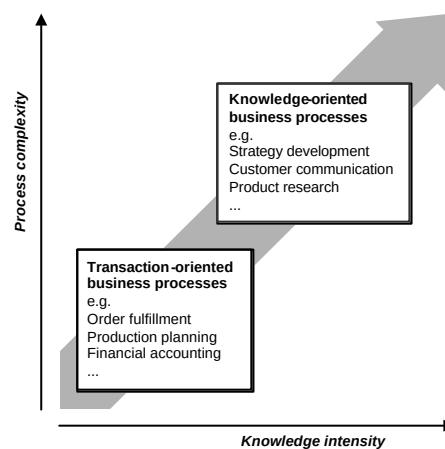


Figure 7-6: Knowledge-oriented Business Processes

As we have demonstrated in the previous chapters, CRM processes can be considered as an example of knowledge-oriented processes as described above. Furthermore, several surveys indicate that the management of customer knowledge is of great concern for most industries (cf. [Delphi 1997], [KPMG 1998], [Murray/Myers 1997], [Skyrme/Abidon 1997]) and also an important factor for the success of knowledge management projects. We can therefore expect further research to be relevant for both science and practice, and it should result in a CRM-specific reference model.

7.4 Towards a CRM Reference Model

Reference models contain consolidated problem solutions which have been derived from empirical knowledge [cf. Reiter 1999]. Typical examples of reference models are process models, IT architecture models, project models and so on. A process-oriented reference model for knowledge management (KM) comprises the following elements [Bach et al. 1999]:

- Descriptions of knowledge-intensive *business processes*.
- *Knowledge structures* and *knowledge flows* on which these processes are based.
- A knowledge infrastructure which consists of *systems and documents*, *knowledge roles* and *support processes*.
- *Knowledge measurements* for knowledge-oriented controlling and leadership.

Advantages of such reference models include

- *Quality*. A reference model can be used as a base for precise project drafts. Since the model can be regarded as a description of an optimal KM solution, it also ensures that all relevant aspects of a KM implementation are taken into account.
- *Cost efficiency*. The reference model enables more efficient project planning and project control activities. It prevents the project team from doing the same work twice or wasting time with unnecessary tasks.
- *Best practices*. Reference models allow standardized documentation and the reuse of experiences from former projects. They can also be used as a tool for the creation of process or architecture reference models.
- *Common language*. The corresponding method manuals guarantee that all project members have the same technical and methodical background and are able to communicate from the very start.

7.4.1 Business Processes

The entire CRM macro process consists of three distinct subprocesses, the marketing process, the sales process and the service process (see Figure 7-7). These subprocesses can be distinguished by the target group at which their activities are directed [cf. Stender/Schulz-Klein 1998]:

- *Marketing process*. The target group consists of an anonymous market, identifiable prospective customers and existing customers of an enterprise. In the case of an initial personal contact between a representative of the market and the enterprise, the anonymous representative becomes a prospective customer. This contact event connects the marketing process to the sales process.
- *Sales process*. Activities of the sales process are directed at prospective customers and existing customers only.
- *Service process*. Once delivery has been completed, the activities of the service process are triggered and are then directed exclusively at existing customers.

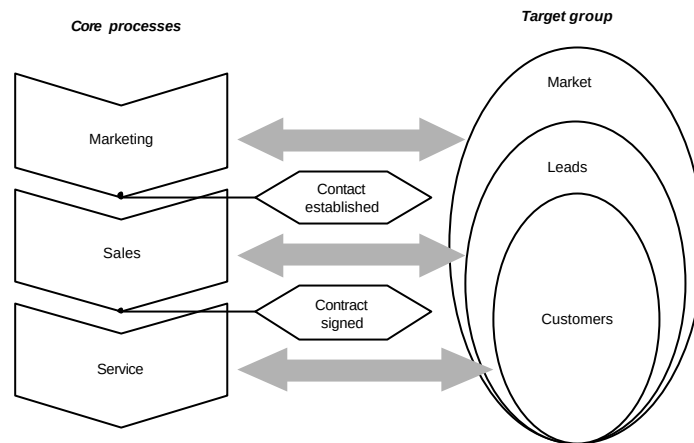


Figure 7-7: Core Processes of CRM

Each process consists of a set of various tasks which can be assigned to one of the following management layers (see Table 7-2):

- *Output management* includes all planning and monitoring tasks that refer to a company's marketing, sales and service activities as a whole, e.g. market segmentation and sales planning.
- *Process coordination* tasks are required for the management of specific process instances, e.g. call planning and field service coordination.
- *Transaction/information handling* summarizes all activities that refer to CRM knowledge bases and transaction-oriented information systems, e.g. information retrieval, contract management etc.

	Marketing	Sales	Service
Output Management	• Product management - Product analysis - Life cycle analysis - Portfolio management • Market segmentation • Market analysis • Campaign planning & analysis	• Sales planning • Sales analysis - Pipeline analysis - Regional analysis • Call center management - Call list assembly - Call statistics • Sales force management - Territory assignment - Activity analysis	• Service planning • Problem analysis • Customer analysis
Process Coordination	• Campaign coordination - Event planning • Market research • Coordination - Call planning	• Call process management - Call planning scripting • Time management - Group scheduling - To-do lists - Activity reporting	• Incident assignment • Escalation • Field service coordination • Time management • Group scheduling - To-do lists - Activity reporting
Transaction / Information Handling	• Customer profiling • Product configuration • Information retrieval - Markets - Branches - Competitors - Products	• Contact handling • Account management - Proposal • Generation • Contract - Order entry - Account history retrieval • Information retrieval - Markets - Branches - Competitors - Products	• Guarantee / service • Contract handling • Solution development • Spare part handling

Table 7-2: Tasks of the CRM Processes

The three CRM processes can be assigned to the four stages of the customer buying cycle. From the recognition of customers needs, via product configuration and price information, purchase handling through to service and support, the customer buying cycle reflects all possible contact points between a company and its customers (see Figure 7-8).

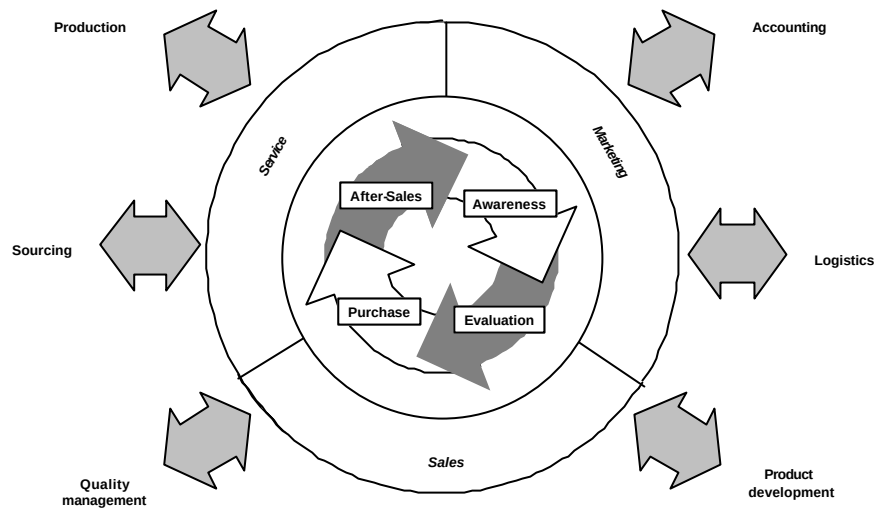


Figure 7-8: Customer Buying Cycle and CRM Reference Model

7.4.2 Knowledge Structure

The design of a KM solution for the CRM processes presented requires in-depth analysis of the underlying knowledge structures. This includes both static and dynamic aspects, i.e. relations between knowledge repositories and a process must be considered as well as knowledge flows between a set of processes. The knowledge needs of the three CRM processes can be distinguished using the following categories:

- *Markets & competitors.* Market news, strategies and products of competitors, market analysis reports etc.
- *Customers.* Contact data, the customer's markets and processes, correspondence etc.
- *Orders & contracts.* Past and current orders and contracts, sales managers responsible, production and delivery status etc.
- *Products.* Data sheets, product configurations, current product research projects etc.
- *Problems & solutions.* Past and current complaints, best practices for solutions, expert maps etc.

Linking these knowledge categories with activities from the CRM processes results in a conceptual knowledge architecture. In a next step, this view must be

extended by a physical layer which contains the actual sources that feed the described knowledge sets. The list of information systems that are relevant for CRM includes a variety of sources, ranging from classic ERP software, additional CRM applications (e.g. sales force automation systems), external sources (e.g. WWW, Reuters) to document management systems and data warehouses (see Figure 7-9).

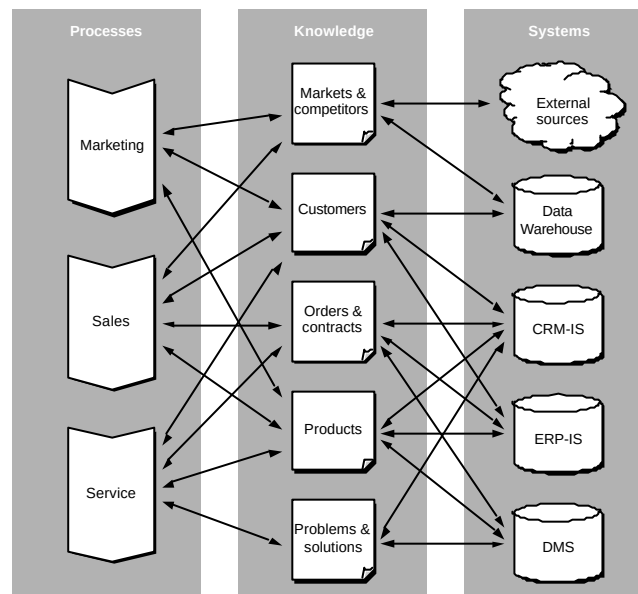


Figure 7-9: CRM Knowledge Repositories

Besides these knowledge repositories, we also need to identify and model knowledge flows between processes in order to optimize knowledge creation and reuse. This analysis is not limited to CRM processes but rather illustrates the relationships with other processes within an organization (see Figure 7-10). It also helps us find 'missing links' between certain activities, e.g. the flow of knowledge about typical complaints from customer service to quality management and back to product development might prove extremely useful for the continuous improvement of a company's products. Another example is the flow of knowledge from customer service to the sales process, where a company can reuse information about customer-specific needs in order to sell additional services or products.

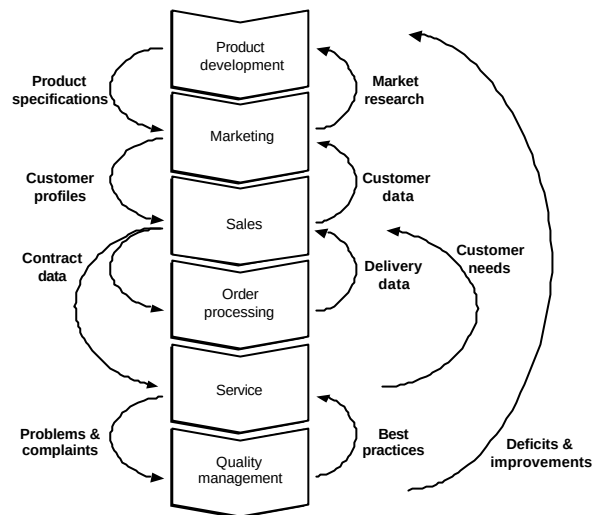


Figure 7-10: Knowledge Flows Between Business Processes

The two resulting diagrams serve as a basis for the creation of a suitable IS infrastructure and the design of a set of KM support processes.

7.4.3 Knowledge Infrastructure

IT Support

IT support for CRM processes includes a broad range of KM technologies and systems, such as:

- *Data warehouse/data mining.* One of the most important reasons for implementing a data warehouse (DW) is the possibility of analyzing the customer information hidden in vast amounts of operational data. Market segmentation and customer profiling are two typical tasks of the marketing process that can be supported by DW tools.
- *Sales force automation.* Systems for sales force automation (SFA) are designed to increase the effectiveness of sales representatives by integrating opportunity management systems, marketing encyclopedias, product configurators and team selling functions across multiple distribution channels. Their purpose is to support the expanded role of the salesperson as sales project coordinator, linking various departments of an enterprise and its information systems in order to satisfy the needs of the customer [cf. Siebel 1996].
- *Document management/optical archives.* During personal customer contact, it is necessary to access many different documents, such as product descrip-

tions, electronic forms, correspondence and so on. All documents should be up to date and must be available as quickly as possible. In addition, modification and distribution of documents must be possible, e.g. if an existing contract should be adapted and the printed document must immediately be handed out to the customer.

- *Workflow management.* Standardized and repetitive activities within the CRM processes can be automated using workflow management systems (WFMS). Typical examples are complaint handling and technical field service tasks.
- *Information retrieval.* As we have illustrated, CRM processes are based on a variety of heterogeneous knowledge repositories. Information retrieval techniques can be used in order to find and reuse the knowledge from past experiences stored in these repositories, e.g. knowledge bases for customer sales and support that contain processed requests and associated activities.

Other examples include artificial intelligence techniques (e.g. case-based reasoning), Internet technology for the integration of external information sources and skill databases. As already mentioned in Chapter 4.3, there is a strong inter-relationship between CRM and electronic commerce. CRM not only supports traditional CRM processes but also allows novel applications, such as Web self-service, customer surveys by e-mail and product configuration, on the Internet which are closely related to electronic commerce solutions.

Knowledge Roles and Support Processes

Besides IT, building a functional knowledge structure also requires the implementation of support processes for knowledge acquisition, filtering, distribution and maintenance. These processes must be designed in order to provide business processes with information and keep knowledge bases up to date. Support processes are associated with knowledge roles, e.g. knowledge editors for the design and maintenance of product data sheets, knowledge scouts for the filtering of information from external sources etc.

7.4.4 Knowledge Measurements

As with other business processes, CRM processes require a set of measurements in order to monitor their performance and efficiency. These measurements include conventional indices (number of fulfilled orders, revenues per sales representative etc.) as well as knowledge-specific indices (number of contributions to the service knowledge base, time reduction for information retrieval etc.).

7.5 Knowledge in Business Networks

Against a background of virtually indistinguishable products and services, the value of long-term customer relationships is destined to become a critical factor for many businesses in the 21st century. Placing the customer at the center of all corporate activities requires innovative concepts for customer relationship management. Newly designed marketing, sales and service processes require a mixture of process innovations, including instruments, such as multi-channel management, Internet self-service, customer profiling methods etc.

As we have demonstrated, knowledge can be regarded as the foundation for the creation of relations between a firm and its customers covering the whole buying process (see Figure 7-11). CRM processes are highly knowledge-oriented business processes, which makes them suitable for the application of knowledge management techniques. Knowledge management should therefore be considered as a crucial aspect of a Business Networking strategy.

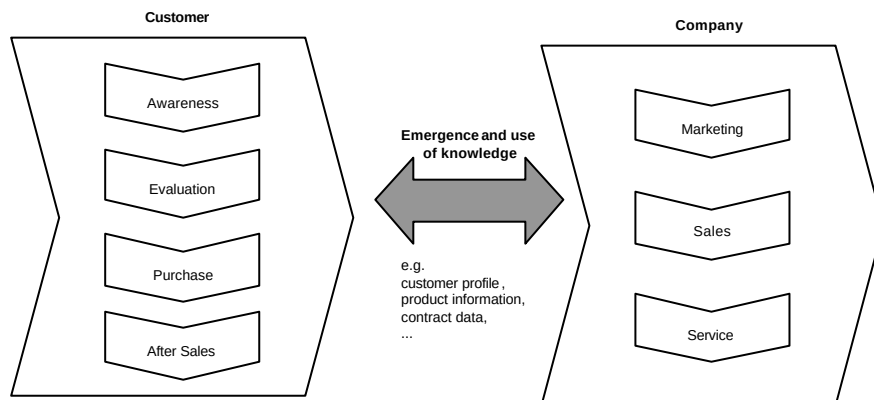


Figure 7-11: Knowledge in Business Networks