

# Knowledge-enabled customer relationship management: integrating customer relationship management and knowledge management concepts[1]

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*Abstract* The concepts of customer relationship management (CRM) and knowledge management (KM) both focus on allocating resources to supportive business activities in order to gain competitive advantages. CRM focuses on managing the relationship between a company and its current and prospective customer base as a key to success, while KM recognizes the knowledge available to a company as a major success factor. From a business process manager's perspective both the CRM and KM approaches promise a positive impact on cost structures and revenue streams in return for the allocation of resources. However, investments in CRM and KM projects are not without risk, as demonstrated by many failed projects. In this paper we show that the benefit of using CRM and KM can be enhanced and the risk of failure reduced by integrating both approaches into a customer knowledge management (CKM) model. In this regard, managing relationships requires managing customer knowledge – knowledge about as well as from and for customers. In CKM, KM plays the role of a service provider, managing the four knowledge aspects: content, competence, collaboration and composition. Our findings are based on a literature analysis and six years of action research, supplemented by case studies and surveys.

*Keywords* Knowledge management, Customer relations, Process management

## Introduction

The concepts of customer relationship management (CRM) and knowledge management (KM) have recently gained wide attention in business and academia. Both approaches focus on allocating resources to supportive business activities in order to gain competitive advantages. Although these concepts are currently mostly regarded as separate research areas, we see a high synergy potential in an integrated approach.

To build good relationships with customers, it is necessary to serve each customer in his preferred way, therefore requiring the management of "customer knowledge" (Davenport *et al.*, 2001). Many knowledge management approaches, as presented by KM models, regard managing knowledge as independent of the supported business processes. Knowledge and its management are seen as inherently valuable, a view not generally shared by the process owners who have to bear the costs of the supportive activities, but are measured by their ability to generate revenue and control costs. In many cases the latter is not measured in knowledge, but in services or products (Demarest, 1997).

In this paper we show that the integration of CRM and KM concepts on a process level is beneficial to both management approaches. On the one hand, customer-oriented knowledge

management focuses on the knowledge most valuable to the company: customer knowledge. On the other hand, knowledge-oriented customer relationship management can use a conceptual framework to manage the knowledge required for high quality relationships in a cost-effective way. We thus derived a customer knowledge management (CKM) model that describes the basic elements for successful knowledge management in customer-oriented processes. This model serves as a frame of reference for integrated CKM activities on both the enterprise and project level.

In order to integrate KM and CRM on the process level, both resource-oriented concepts should be aligned with the business-oriented process view – an alignment based on an analysis of literature. In addition, we describe the implications of the integration approach and a case study which provides tangible recommendations for practitioners.

The CKM model is based on the foundations of business engineering (BE), a research approach developed at the Institute of Information Management (IWI-HSG) at the University of St Gallen (Österle, 1995). Business engineering differentiates between strategy, process and system levels. The research described in this paper concentrates on the CRM, KM and, subsequently, CKM process level, while interdependencies with the system level are discussed at different stages.

The primary research approach was “action research” as defined by Gummesson (2000). This foundation was enriched by complementing, in-depth case studies that help to validate the research questions, align existing models with reality, and finally prompt new research challenges. The CKM model is therefore based on nearly six years of research with corporate research partners AGI (the IT service provider for cantonal Swiss banks), Asean Brown Boveri (ABB), Bank Austria, BASF, Credit Suisse, Deutsche Telekom, DKV Insurance, Helsana Insurance, the state bank of Baden-Wuerttemberg (LBBW), St Gallen cantonal bank, Swisscom IT Services, Union Investment and Winterthur Life & Pensions[2].

The paper is structured into three main sections: the theoretical foundation analyzes some current approaches in the fields of CRM and KM and identifies relevant elements concerning integration. Thereafter the required modification of current approaches and the main elements of the integrated model are discussed. Finally, we describe a sample application of the model in a business environment, based on a report of the action research conducted with a corporate research partner. The paper concludes with a summary, a critical reflection and an outlook on further research opportunities.

### Knowledge in customer-oriented processes

Increasing competition and decreasing customer loyalty have led to the emergence of concepts that focus on the nurturing of customer relationships. Customer relationship management (CRM) emerged as an amalgamation of different management and information system approaches, in particular relationship marketing and technology-oriented approaches such as computer aided selling (CAS) and sales force automation (SFA). Following Shaw (1999), we define CRM as an interactive process that achieves an optimum balance between corporate investments and the satisfaction of customer needs to generate the maximum profit. It entails:

- measuring both inputs across all functions – including marketing, sales and service costs – and outputs in terms of customer revenue, profit and value;
- acquiring and continuously updating knowledge on customer needs, motivations and behavior over the lifetime of the relationship;
- applying customer knowledge to continuously improve performance through a process of learning from successes and failures;
- integrating marketing, sales and service activities to achieve a common goal;
- the implementation of appropriate systems to support customer knowledge acquisition, sharing and the measurement of CRM effectiveness; and
- constantly contrasting the balance between marketing, sales, and service inputs with changing customer needs in order to maximize profit.



## “ CRM requires the strong integration of business processes which involve customers. ”

To integrate marketing, sales, and service activities, CRM requires the strong integration of business processes which involve customers. These customer-oriented CRM processes are mostly unstructured and non-transactional, and their performance is predominantly influenced by the underlying supply of knowledge on products, markets, and customers (Day, 2000; Schulze *et al.*, 2000; Garcia-Murillo and Annabi, 2002).

CRM processes can therefore be considered knowledge-oriented processes with the following, strongly correlated, characteristics (Eppler *et al.*, 1999):

- **Knowledge intensity** – CRM processes require knowledge from heterogeneous, not necessarily computational, sources to pursue process goals.
- **Process complexity** – CRM processes mostly have complex structures or even no clear structure at all. This implies that a high degree of knowledge is necessary for the execution of a process.

Knowledge flows in CRM processes can be classified into three categories:

- (1) **Knowledge for customers** is required in CRM processes to satisfy customers' knowledge needs. Examples include knowledge on products, markets and suppliers (Garcia-Murillo and Annabi, 2002).
- (2) **Knowledge about customers** is accumulated to understand customers' motivations and to address them in a personalized way. This includes customer histories, connections, requirements, expectations, and their purchasing activity (Day, 2000; Davenport *et al.*, 2001).
- (3) **Knowledge from customers** is customers' knowledge of products, suppliers and markets. Through interactions with customers this knowledge can be gathered to sustain continuous improvement, e.g. service improvements or new product developments (Garcia-Murillo and Annabi, 2002).

Knowledge for customers and knowledge from customers are part of the relational intellectual capital of a firm (Ordóñez de Pablos, 2002). Managing these different knowledge flows is one of the most important challenges of CRM. In this regard, the most important issue is how to collect, store, and distribute only that knowledge which is needed and not to waste time and effort on collecting and storing useless knowledge (Davenport *et al.*, 2001).

To identify relevant knowledge that is needed in business processes, business process engineering methods can be used (Harrington, 1991; Davenport, 1993; Hammer and Champy, 1993). In practice, process reengineering projects are often carried out to integrate different CRM processes, with these projects providing process models that can form the basis of an analysis of knowledge flows.

To determine which CRM processes need to be integrated and analyzed with regard to their knowledge needs, we analyzed the existing conceptualizations of CRM.

### Current CRM approaches and process orientation

The origins of CRM can be traced back to the management concept relationship marketing (RM), with Levitt (1983) being one of the first to propose a systematic approach for the development of buyer-seller relationships. Relationship marketing can be defined as an integrated effort to identify, maintain, and build up a network with individual customers and to continuously strengthen the network for the mutual benefit of both sides through interactive, individualized and value-added contacts over a long period of time (Shani and Chalasani, 1992).

However, RM is largely strategic and as such, lacks a holistic view of the business processes connected to it, although business processes are regarded as important (Parvatiyar and Sheth, 2000).

CRM, on the other hand, was influenced by several information systems concepts, focusing on distinct application areas. For example, computer aided selling (CAS) and sales force automation (SFA) systems are responsible for the control and automation of sales processes, whereas other systems for service or marketing automation focus on service as well as marketing processes. In the course of process integration, these systems continually merge towards integrated CRM suites.

A widely accepted classification of systems connected to CRM is the following (Schwede, 2000):

- **Operational** CRM systems improve the efficiency of CRM business processes and comprise solutions for sales force automation, marketing automation, and call center/customer interaction center management.
- **Analytical** CRM systems manage and evaluate knowledge about customers for a better understanding of each customer and his or her behavior. Data warehousing and data mining solutions are typical systems in this area.
- **Collaborative** CRM systems manage and synchronize customer interaction points and communication channels (e.g. telephone, e-mail, and Web).

Whereas operational CRM systems focus on the support of distinct front-office business processes, analytical and collaborative CRM systems only have a supporting role in operational CRM.

Apart from the strategy-oriented concept of CRM and systems-oriented concepts, there are several CRM approaches with a specific focus on business processes (Schulze *et al.*, 2000). Most of these approaches define marketing, sales, and service as core CRM processes, overlooking the fact that these are functional areas that have to be integrated by defining cross-functional business processes. Others focus on specific activities, but do not propose a process framework for CRM.

Our goal was to overcome these shortcomings by proposing a process model consisting of business processes that are relevant in the CRM context. This framework could then be used as a starting point for the analysis of knowledge flows in CRM processes.

#### Status and challenges of CRM in real-world applications

The identification of valuable prospective customers as well as the discovery of cross- and up-selling opportunities within the existing customer base has been especially important for our corporate research partners. We could therefore observe an extensive use of information systems for analytical CRM within these companies. Although several companies are far advanced in the implementation of a continuous process for analytical CRM, the majority still has difficulties in managing the relevant knowledge. In particular, the challenge to ensure a consistent knowledge flow from the point of creation of knowledge about the customer (in marketing, sales, and service) to the point of action, where the knowledge has to be presented in an adequate form and complexity, is far from being solved.

Another subject of considerable relevance is the management of customer service. All the participating companies have call-centers that handle service inquiries. The provision of the right knowledge to assist call-center staff to handle inquiries within an adequate timeframe remains one of the major challenges. To address this challenge, some companies have undertaken projects for the implementation of knowledge management systems. Another future challenge is the use of multiple communication channels to address customer service needs. All companies show further potential to exploit self-service technologies with the aim of increasing service quality and decreasing service costs. Using these technologies will raise the question of how to synchronize different communication channels to ensure a consistent appearance towards customers.

Closely connected to service management is the handling of customer complaints. Although all our corporate research partners have a process for complaint management, many of these

reveal shortcomings regarding the analysis and proactive utilization of complaints for continuous improvement.

The literature research and work with our corporate research partners suggested that the management of knowledge in CRM processes is a critical success factor. A CRM process model could therefore be used as starting point for an analysis and improvement of knowledge flows. However, the existing conceptualizations of CRM in the literature either lacked process-orientation or could not provide a process framework for CRM that was detailed enough to suit this purpose.

#### A review of knowledge management models

Drucker (1999) and others speak of knowledge as “the most important resource of the twenty-first century”. To determine what kind and how much knowledge a business process requires for a top performance should be the first step in a supportive knowledge management approach (Demarest, 1997). The steady interest in knowledge management in academia and business circles alike has spawned many KM models that try to capture the inherent qualities as well as the dissemination and development characteristics of knowledge in order to assess the methods and techniques of managing this resource in a business environment.

While many knowledge management models offer valuable insights into the nature of knowledge, their difficulties with justifying the management of knowledge within the business environment, e.g. attaching a value to specific knowledge resources and providing guidelines concerning its use, is a point of constant criticism (Davenport and Marchand, 2001; Donahue, 2001). To understand the reason for this it is important to analyze the foundations of the modeling approaches used. Almost all knowledge management models can be traced back to a basic approach to analyze knowledge. The models either view knowledge as an entity with distinctive attributes that can be deconstructed and its details analyzed, or they view it as an integrated whole and focus on its relations with the surroundings. Within this paper the former view will be called an epistemological perspective, the latter an ontological perspective. The following analysis provides an introduction to this differentiation.

#### *Epistemology-oriented KM models*

As a philosophical research area, epistemology investigates the nature of knowledge itself. Epistemological knowledge management models therefore view knowledge as an entity that can be deconstructed into discrete, relevant attributes, based on the epistemological foundation held by the modeler.

Based on the autopoietic theory, the main differentiating characteristic of knowledge is the difficulty of its articulation. Knowledge that can be easily articulated is labeled “explicit knowledge”. Knowledge, that is difficult to articulate, and therefore difficult to transfer, is labeled “tacit knowledge” (Polanyi, 1966), which has been recently superseded by the term “implicit knowledge”. With their SECI model, Nonaka and Takeuchi have formulated an encompassing epistemological, autopoietic knowledge management approach (Nonaka and Konno, 1998). Other examples of epistemological-oriented knowledge management models with an autopoietic approach include the models of Boisot (1987) and McLoughlin and Thorpe (1993).

Based on their definition of knowledge, all epistemological-oriented knowledge management models share a common weakness when used in an environment that requires evaluating knowledge as a business resource. These models can only calculate the value of knowledge as based on its internal qualities, thus independent of the context in which it is used. Since the evaluation of a resource based solely on internal qualities is not sufficient for management decisions, the value of epistemological models in a business environment is limited.

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### Ontology-oriented KM models

Also based on philosophical research, ontology represents a systematic account of existence. It is an "explicit specification of a conceptualization: the objects, concepts, and other entities that are presumed to exist in some area of interest and the relationships that hold them" (Gruber, 1993).

Ontological knowledge management models therefore define knowledge solely through their relationships with a constructed universe of discourse, encompassing all dimensions that are relevant to the modeler. They view knowledge as a "black box" with undefined inherent characteristics.

Modeling dimensions frequently used by ontological knowledge management models include a process dimension, an agent dimension (individual vs. group) and a financial dimension. The latter is based on intellectual capital research, and, due to the specific aims of the resulting models, will not be further examined within this paper.

Process-oriented KM models focus on the characteristics of knowledge during its life cycle. They analyze the relationships and environmental variables that influence the development, dissemination, modification and use of knowledge processes. Examples of process-oriented KM models include Probst *et al.* (1999) and Wiig (1995). Agent-oriented KM models focus on the characteristics of knowledge during its flow between individuals. They analyze the variables that expedite or hinder the flow of knowledge in social networks. Examples of agent-oriented KM models include Wenger (1997) and Enkel *et al.* (2000).

Ontology-oriented models analyze links between knowledge and its environment. They can therefore evaluate knowledge based on a specific business context. However, the analysis ability of ontology-oriented knowledge management models is limited by their disregard of the inherent characteristics of knowledge. While generic processes for knowledge management can be defined with a black box approach, the structure of knowledge management processes on the realization level depends on the characteristics of the knowledge being managed. For example, expenditures on knowledge management, on identifying and disseminating knowledge, depend on whether its manifestation is mainly implicit or explicit. Similar process influences can be examined in other knowledge characteristics, such as context complexity, knowledge volatility and culture. Therefore, due to their generic approach, ontology-oriented knowledge management models cannot assess the value of knowledge on an operational level.

### Hybridization of KM models

Based on the strengths and weaknesses of both model types, epistemology and ontology perspectives seem to have high synergy potentials. Though it is possible to analyze the structure of an entity and its relations separately; in trying to assess the business benefits of knowledge management, both the inherent characteristics and relevant relationship variables of knowledge must be taken into account.

Most KM models developed within the last decade therefore exhibit characteristics of both views with most models revealing their origins as based on an internal imbalance between the details of epistemological and ontological viewpoints. Nonaka integrated an agent ontological dimension in 1994 (Hedlund and Nonaka, 1993) and tried to bond both views in his concept of "ba" (Nonaka and Konno, 1998). By definition Demarest's process-oriented KM model focuses on the processing of explicated knowledge (Demarest, 1997). But a fully balanced model is yet to be created (McAdam and McCreedy, 1999).

### The inherent value of knowledge

As most enterprises do not survive by only managing knowledge, knowledge management is basically a support process. However, due to the pervasive nature of knowledge, any business process can be transformed into a "knowledge management process", if defined by activities such as knowledge creation, knowledge dissemination and knowledge use. Many ontological and hybrid knowledge management models allude to this view by making no clear value distinction between business processes and knowledge processes. Instead of merely supporting value generation, knowledge management processes also have inherent value



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creation capabilities. By stipulating the co-existence or substitution of existing business processes, knowledge management becomes unattractive for managers who view it as a threat to their position and resources.

We oppose the argument that knowledge and knowledge management have an inherent value. While knowledge has become more important to all business processes, it is still a resource that abides by the laws of economics: it has a diminishing marginal utility and normally its management does not directly generate business value. A change in the alignment of the KM models is required to actually tap the supportive performance of managing knowledge in a CRM environment.

### Knowledge management in practice

The established gap between the self-orientation of knowledge management models and the requirements of business process owners was verified by research undertaken within our corporate research partners.

A survey (Büren *et al.*, 2001) based on 60 questionnaires and 19 detailed telephone interviews delivered the following results: the managers require an evaluation framework that will support them in operating the content flow within and between processes and will maintain a concise and performance-oriented content base. In subsidiaries and call centers, information requirements that are driven by new CRM systems inhibit employees' service capabilities in their interaction with customers. Managers are therefore not concerned with ways in which to effectively and mutually create and disseminate knowledge. While the corporate research partners spend substantial resources on knowledge management, their managers are trying to control the exponentially growing content base of semi-structured documents. They thus need to know which content to keep in which state in order to run their processes more efficiently and effectively.

Consequently, another area of intense interest is the identification of employees according to their competencies. While process managers see distinct improvement potential in using expertise directories or yellow pages, the restrictive European data protection acts and the ambiguous position of these systems in terms of human resources activities, stall such approaches in many companies. While several of our corporate research partners have isolated solutions in single departments, especially in IT and internal consulting, only one in the insurance industry has set up a company-wide skills management project.

To analyze the customer requirements in this project, a two-day interview session was conducted. A total of nine stakeholders, ranging from operatives to middle management with customer-oriented assignments, were interviewed in sessions ranging from 45 to 60 minutes. All the interviewees confirmed the high demand for expertise location services within their business processes and were willing to support the project financially. The stated requirements included improved transparency regarding their workforce's skills, qualifications, abilities and required trainings as well as the potential to swiftly identify required resources within other parts of the company. The main difficulties were seen in constructing a competencies base relevant to the own business process, while minimizing the effort for employees updating personal profiles.

The storage of knowledge across business processes is another area of interest for corporate research partners. While a third of the companies have large scale community structures in place, most of them concentrate on one core process, such as research and development and other areas of high expertise. In organizations that are structured along customer-oriented processes, communities of practice that span organizational team structures are not as yet

explicitly managed. The lack of possibilities with which to bridge the temporal and geographical gaps between the different customer teams is seen as a major hindering factor. Nevertheless, the role and management of these complementary organizational structure are seen as vital. One organizational partner has started a multi-million Euro project that largely focuses on enhancing its abilities to use forms of virtual work that are independent of temporal and geographical constraints, and are embedded into the existing organizational structure.

While the integration of epistemological and ontological approaches into an encompassing knowledge management model was continuing, the direct process support through knowledge management that was required by the corporate research partners and survey participants could still not be provided. This limitation was due, as previously mentioned, to the self-orientation of KM models. To address this challenge, we proposed a framework for customer knowledge management which is described in the following sections.

#### A CRM process model

Based on previous research by Schmid (2001), literature research, and work with our corporate research partners, we proposed the following process model which describes business processes relevant for CRM. This model assists us in specifically identifying activity fields that are relevant for knowledge management, thus helping to improve CRM processes.

Marketing, sales, and service are primary business functions (Porter, 1998) characterized by a high degree of direct customer interaction and knowledge intensity, which makes them primary targets for CRM. We therefore derived a process model by deconstructing these functions into relevant business processes which could be cross-functional. A CRM business process involves the processing of customer knowledge to pursue the goals of CRM. Usually it also involves direct customer contact and the exchange of information or services between the enterprise and a customer. Such processes are either triggered by a customer (with the aim of receiving information or services), which involves a transfer of information from the customer to the enterprise, or are triggered by the enterprise with the aim of delivering information or services to customers. Each process is aimed at a specific business object that distinguishes it from other processes. We identified six relevant CRM business processes: campaign management, lead management, offer management, contract management, complaint management, and service management.

In contrast with transaction marketing, relationship marketing is based on interactive, individualized contacts (Grönroos, 1994). Campaign management is the core marketing process which implements the ideas of relationship marketing. We define it as the planning, realization, control and monitoring of marketing activities aimed at known recipients, who are either existing or prospective customers. Marketing campaigns are individualized (one-to-one marketing) (Peppers and Rogers, 1993) or segment-specific, usually use different communication channels, and offer at least one communication channel for feedback from the recipients to allow interaction. Campaigns may be triggered by the enterprise or by a customer. The objective of campaign management is to generate valuable opportunities or "leads", which can be further qualified by lead management. An earlier approach, which focused on a one-way communication from the enterprise to the customer, was the concept of direct marketing (Nash, 1986).

Lead management is the consolidation, qualification, and prioritization of contacts with prospective customers. Contacts may be received from campaign management or other sources, e.g. the service management process. The objective is to provide sales staff with a qualified and prioritized list of presumably valuable prospective customers to allow a precise and effective address within the offer management process.

Offer management is the core sales process. Its objective is the enterprise-wide consistent creation and delivery of individualized, binding offers that fulfill all requirements for a direct conclusion. An offer management process may be triggered by a customer inquiry, a qualified lead, or an otherwise discovered opportunity.



Contract management is the creation and maintenance of contracts for the supply of a product or service. As such, it may support offer management or service management processes in the preparation of an offer. Especially important in the service sector, contract management comprises the maintenance and adjustment of long-term contracts, e.g. for outsourcing agreements or insurance.

Within the scope of complaint management, the articulated dissatisfaction of customers is received, processed, and communicated to the enterprise (Stauss and Seidel, 2002). The objectives are to improve customer satisfaction in the short-run by directly addressing problems that led to complaints, and to feed a continuous improvement process to avoid complaints in the long-run.

Service management is the planning, realization and control of measures for the provision of services. A service is an enterprise's intangible output, generated with customers' or some of their assets' direct involvement. Examples include maintenance, repair, and support activities in the after-sales phase as well as the provision of financial or telecommunication services after the conclusion of contracts.

### CRM activities and enabling factors

In addition to CRM business processes, CRM requires activities to design interfaces to customers at customer interaction points.

Interaction management is the analysis and selection of media-based communication channels, e.g. interactive voice response (IVR) or the World Wide Web (WWW), with which to achieve the optimal channel mix (Senger *et al.*, 2002). The objective is to increase the quality and value of interactions, while simultaneously decreasing the cost of interactions by shifting customers to less costly channels, e.g. Web-self-service.

Closely connected to interaction management is channel management, which addresses the challenge of the configuration and synchronization of different communication channels (Gronover and Riempp, 2001). Its key objectives are to define organizational responsibilities for each channel, to avoid conflicts between channels, and to ensure consistent knowledge flows through different channels.

Opportunity management has a primary role as an enabling factor in the CRM context. In contrast to the rigid structure of processes such as lead management, which prioritizes valuable contacts derived mainly from campaign management, the aim of opportunity management is to realize specific opportunities discovered locally by sales and service staff (Colarelli O'Connor and Rice, 2001). This can be achieved by the expansion of employees' competencies with direct customer contact, the provision of techniques and simple rules for the identification and selection of promising opportunities (Eisenhardt and Sull, 2001).

### Process-oriented knowledge management goals

We previously maintained that the self-orientation of KM is the main reason that many KM models have difficulties proving the value of managing knowledge within a business environment. This section offers a way to directly realign a KM model to business processes, in this case the CRM process framework. The resulting CKM model focuses on the management of knowledge about, for and from customers, henceforth summarized by the term "customer knowledge".

Knowledge is created, located and captured, disseminated, modified and constantly used within all CRM business processes. However, CRM does not require self-oriented knowledge

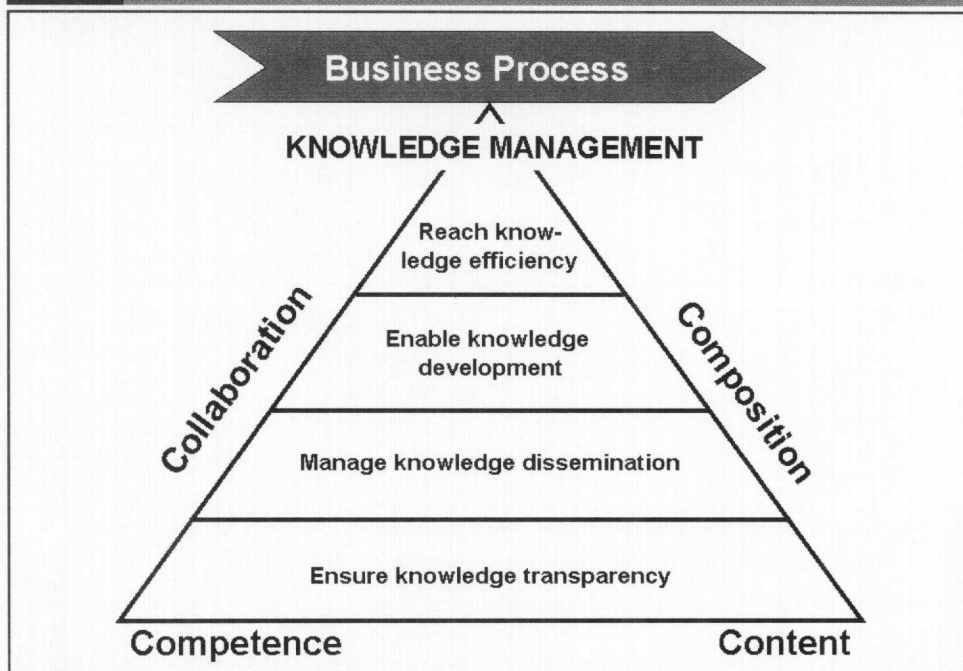
**“ The customer knowledge management model focuses on the management of knowledge about, for and from customers. ”**

management processes. It requires goals for managing the knowledge critical for its business processes.

The CKM model therefore transforms the KM process perspective of ontological KM models into a KM goal perspective. The KM goal perspective offers process owners different options on which to focus when managing critical knowledge entities. The CKM goal perspective encompasses four goals (see Figure 1):

- (1) **Knowledge transparency** supports the execution of business processes in defining their requirements concerning the manageability of customer knowledge. A high degree of manageability requires a high degree of transparency.
- (2) **Knowledge dissemination** supports the business process owners in defining the degree of customer knowledge distribution required among all the individuals who participate in process activities. The management of dissemination requires the management of knowledge transparency.
- (3) **Knowledge development** supports the business process in defining the requirements concerning the adaptation and creation of knowledge. Although knowledge can be created by an individual, based solely on his or her own context, from a CRM process perspective valuable customer knowledge development requires the ability to disseminate knowledge among individuals. The management of knowledge development therefore requires the management of knowledge dissemination.
- (4) **Knowledge efficiency** is based on the diminishing marginal utility of customer knowledge. The goal of knowledge efficiency supports the business process in selecting the knowledge crucial for the CRM process from the large body of knowledge available. Knowledge efficiency requires the manageability of knowledge development, because it necessitates a high level of understanding of current and future customer needs that is essential for enhancing the CRM processes. Since it requires a decision within an uncertain environment, one of the most difficult managerial decisions is to voluntarily destroy or disregard customer knowledge, based on the understanding that this knowledge will actually hinder the knowledge flows within a business process.

Figure 1 Knowledge management (KM) goal pyramid



The four management goals constitute a cascading framework for analyzing the customer knowledge requirements of a CRM business process. They are stripped of their self-orientation; they themselves do not add value, but serve as a subsystem for business processes.

### Managing the four aspects of knowledge

While allowing process owners the direct articulation of their knowledge needs, the four KM goals do not provide operational guidelines for managing customer knowledge based on its relevant characteristics. Operational decisions regarding knowledge management within a business process should, however, take its relevant characteristics into account. Although commonly used knowledge characteristics such as implicit/explicit knowledge (Polanyi, 1966) and programmed/reflective knowledge (Revans, 1982) exist, developing an encompassing list of business-relevant knowledge characteristics is yet to be done. Beside the difficulties of structuring knowledge into discrete categories, the main drawback of this approach lies in the complex result. The SECI model consists of two knowledge characteristics with two and four parameter values for a total of eight possible combinations. This number grows exponentially with each added characteristic, leading to a matrix whose complexity prevents its use within a business environment.

Consequently, the CKM model follows a different approach by defining the relevant knowledge characteristics based on a business perspective. The goal is not a set of discrete knowledge attributes, but "chunks" of several knowledge characteristics that, combined, are relevant to business processes. Each combination of knowledge characteristics, also called a knowledge aspect, is therefore based on a specific business requirement related to the management of knowledge. The CKM model differentiates between the four knowledge aspects of content, competence, collaboration and composition:

The content aspect offers guidelines to answering the question: when should knowledge be separated from individuals and codified into information objects within a business process? Information objects are not knowledge, but massively reduced representations thereof (Riempp, 2003). Given sufficient context, an individual can reconstruct the knowledge within an information object without needing access to the originator. Codification therefore allows cost efficient storage and dissemination of knowledge. Besides documentation requirements, the value of information objects depends on the stability and longevity of the knowledge it contains as well as on the number of individuals who are able to reconstruct it.

The competence aspect concentrates on answering the question: which knowledge is required by the workforce in order to provide competitive accomplishments within the business processes? The knowledge analyzed within this aspect is generally implicit, highly volatile, context sensitive and is constantly reflected. Managing this knowledge requires the transparency of all business relevant competencies and options to enhance specific competence areas by either educating the existing workforce or by hiring new personnel.

The collaboration aspect focuses on the question: how can the knowledge within groups, such as project teams or quality circles, be effectively supported? This knowledge is different from individual knowledge as it only exists in a group context. Collaborative knowledge mainly exists in implicit form. It is volatile, as it is constantly shared between group members. Its existence is tied to the originating group and it can be supported by community management or knowledge networks.

The composition aspect represents the incorporation and cost effective dissemination of knowledge within enterprises. This requires information objects that can point to other information objects or sources of knowledge residing in individuals or groups. Referencing information objects, such as glossaries, taxonomies and metadata repositories, support users while they navigate or search for required knowledge.

The CKM model offers goals and aspects of knowledge that support the management of knowledge within a business environment. The four knowledge aspects of content, competence, collaboration and composition allow the management of knowledge based on those characteristics and dimensions that directly impact the process performance.

## Towards customer knowledge management

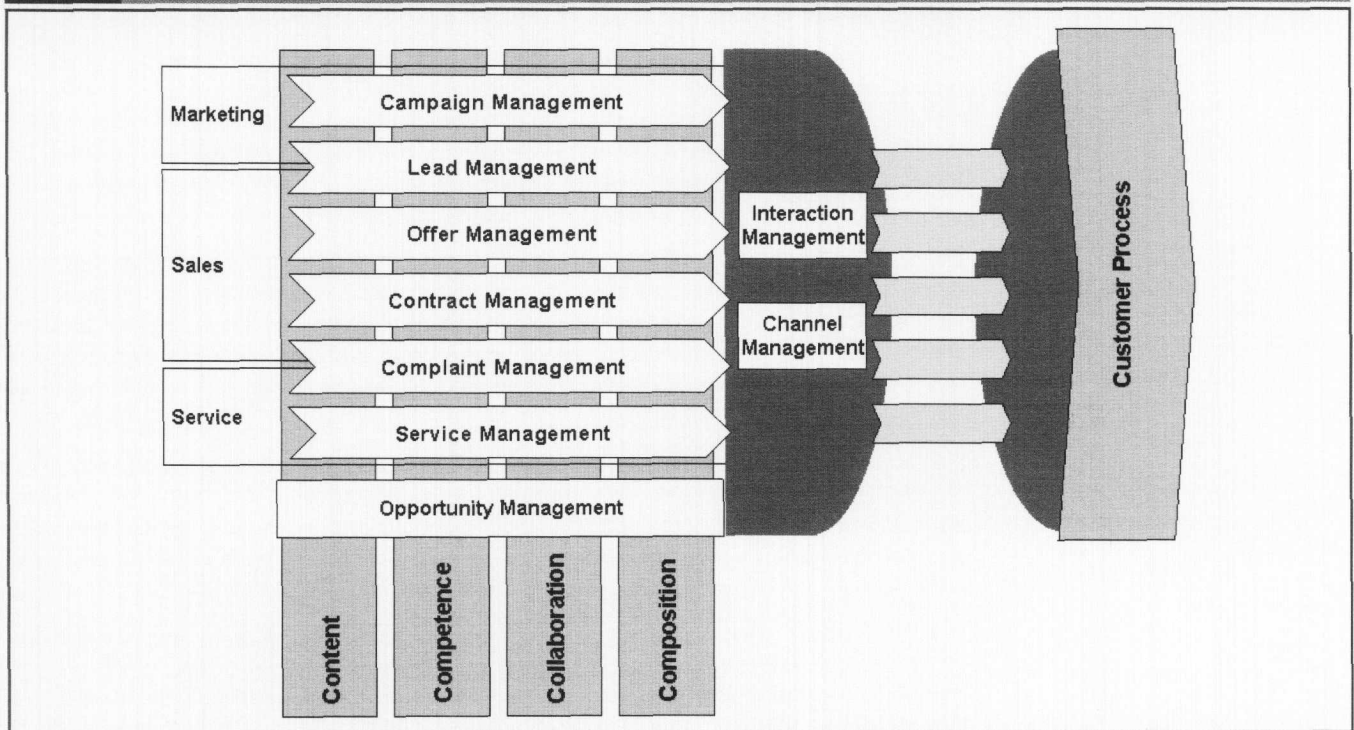
In practice, we observe that customer relationship management and knowledge management have considerable synergy potential (see Figure 2). While KM acts as a service provider for CRM, the interdependencies between and mutual benefits of the two approaches can result in synergies. The subjoining of knowledge management elements allows CRM to expand from its mechanistic, technology-driven and data-oriented approach, enabling it to encompass technological and people-orientation elements. Knowledge management is thereby able to directly prove its value within the process chain.

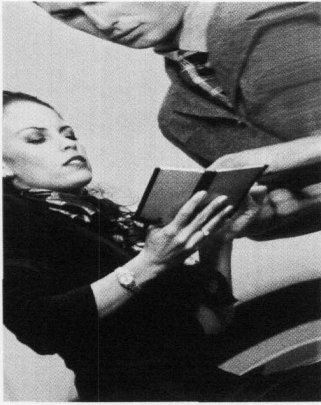
We chose the process dimension as the integration area. Because most CRM and KM research does not directly focus on the process dimension, we developed modifications to allow direct integration into a process framework. This section provides a brief overview of a joint model that balances the approaches of knowledge management and customer relationship management.

As described before, CRM manages knowledge for, from and about customers. Knowledge for customers is mainly generated in processes within the enterprise, such as in research and development and production. Campaign management is responsible for collecting this knowledge and refining it in respect of the customer requirements. It is then distributed to the other CRM processes, mainly offer management, contract management and service management. CRM manages knowledge transparency and dissemination of knowledge to customers. The main challenge when managing this kind of knowledge is maintaining the balance between comprehensibility and precision.

Knowledge about customers is mainly captured by offer management, service management, complaint management and, if available, contract management. Campaign management and service management are the main user processes of knowledge about customers, because both processes personalize their services as based on user criteria. Within the company, knowledge about customers must be transparent, although its dissemination beyond the borders of an organization must be controlled, since this knowledge can often be directly transformed into competitive advantages. The development of such knowledge is also expensive, because knowledge explication takes time and draws attention from the main task,

Figure 2 Customer knowledge management (CKM) model





i.e. serving the customer. Interaction management offers opportunities to automatically gain knowledge about customers via the electronic media. The critical challenge when managing knowledge about the customer is the question of how much data about the customer an enterprise can transform into knowledge.

Knowledge from customers can be captured in the same ways as knowledge about customers. Gaining knowledge from customers is based on the fact that customers gain their own expertise while using a product or service, and that they can be regarded as equal partners when discussing changes or improvements. This aim is not commonly understood in business and its impact is insufficiently researched (Garcia-Murillo and Annabi, 2002). To utilize knowledge from customers as agents of change, it must be channeled into the back-end processes of an enterprise, such as the research and development processes. Although valuable knowledge from customers is mostly gained at service points, an enterprise has to analyze its CRM processes concerning their ability to serve customers. Distracting CRM from its original service goal in order to capture larger amounts of knowledge from customers is, however, a short-sighted goal.

The knowledge aspects support CRM to meet its primary goal of serving customers by managing knowledge for, about and from customers. The management of content thereby allows CRM process owners to focus on the messages they want customers to receive. Competence management streamlines processes, as it bridges the gap between an individual receiving a customer request and the individual solving it. Collaboration support is an aspect that allows teamwork with less time and space constraints. In turn, composition enables scaling the former three aspects beyond the team context, as navigation and search allow faster access to knowledge by using taxonomies and indexes.

The integration of CRM and KM approaches benefits both areas. Whereas the CKM model displays major integration elements, the performance benefits of the integrated approach can only be shown in specific process implementations – the following case study is an example of this.

#### Case study: enhancing knowledge dissemination in a customer service center

This excerpt from an action research case of a large mutual fund company (MFC) illustrates the business impact of the CKM view in a typical CRM environment. The case focuses on a major element within modern CRM concepts: a call or communication center (CCC) that integrates the communication channels (phone, fax and email) serving a geographically dispersed client base in many companies.

Because our research partner works primarily as a specialized service provider for its founding banks, the CCC serves bank employees and retail customers alike. This requires a profound knowledge of the banking and fund managing environments. The CCC employees are highly skilled, many of them having specialized degrees and multiple years of working experience within a banking environment.

The CCC has 120 employees, of whom two thirds offer the more general first level support while one third specializes in second level support of complex and dynamic knowledge areas such as funds in specific international areas.

In order to address their customer needs, CCC employees utilize different information sources. News and important information concerning services and products are provided by an internal unit called "information management" (IM). This content is largely disseminated via email. While this is possible without investments in technical infrastructure, each CCC employee must organize his or her content individually and new employees have no knowledge base to build on. The amount of content disseminated also strains the network environment because the usual informational email frequently includes up to 10 megabytes of attachments. Thus its transfer via "Simple Mail Transfer Protocol" (SMTP) to nearly 150 recipients results in a data transfer volume of up to 1.5 gigabytes per email.

IM therefore started implementing a new information channel by using basic Web technology. The resulting intranet solution, called "surfMe", was intended as a centralized platform offering

information on products and services that can be used by CCC employees when serving customers by phone.

After a year, the role of "surfMe" entered a critical stage. While the amount of content included in the system required increasing maintenance efforts by IM, it was still not fully accepted by the CCC employees: important information was not instantly available and a lack of search functions prolonged the critical time to retrieve content while serving a customer by phone.

While thinking about changing the technical infrastructure, IM raised the issue within the context of our collaborative research in order to obtain a comprehensive analysis of the challenges hindering the success of the new communication channel.

### Application of the CKM model

During two one-day workshops and based on MFC's customer knowledge processes, the CKM model was used to analyze the success factors for a redesign of the existing communication channels.

The focus of the project was to provide CCC employees with knowledge for customers. Because many IM members are former CCC employees, IM has a very good overview of the knowledge available and required by the CCC – knowledge transparency was therefore not an issue. The main knowledge goal of the project was enhancement of knowledge dissemination. Following up the knowledge development was also regarded as important, as most knowledge used within CCC is created in other departments, such as product management and marketing. But because knowledge delivery to the CCC employees was the top priority, solving this secondary challenge was delayed until the basic solution for dissemination was operative.

After determining the knowledge goals, the relevant knowledge aspects and its manifestations were identified. The requirements of the CCC employees showed a major shortcoming in the current design of knowledge composition: the navigational structure was unmanageable, hampering the searching for content.

IM itself required improvement of the knowledge aspects content and composition. The major content challenge, requiring up to 50 percent of the time spent on "surfMe", was identified in the transformation of Microsoft Office documents into content displayable in a Web browser. The constant growth of the "surfMe" structure also required increased maintenance and tied employees to their roles as Web managers, since assigning new colleagues became increasingly expensive. Even though it was not part of the original focus, the possibility of adding the knowledge aspect competence via an expertise directory was discussed during a workshop, since the foundations of this knowledge aspect already existed within the electronic phone book, offered by "surfMe", which served as a rudimentary yellow pages system.

By using the CKM model as an analysis tool, the weaknesses of the current knowledge management configuration could be identified and communicated in a structured and coherent way. This led to the new application having a customer- and maintenance-friendly architecture. The resulting project to reengineer "surfMe" concentrated on the removal of the identified weaknesses, which had a profound impact on the requirements specification for the new technical solution. Mandatory features included flexible transformation (rendering) of office documents into HTML (Hypertext Markup Language, which can be read by Web browsers), in-place editing of documents on the server, an automatic search indexer and a navigation bar that can be managed by editors without technical skills.

### Summary and outlook

In multiple cases (Kolbe *et al.*, 2003), we observed that the management of knowledge is indeed a critical success factor for CRM. It is furthermore important that knowledge management methods that aim to support CRM are process-oriented.

Based on a literature analysis and action research, we demonstrated that CRM and KM have a high synergy potential and should be used in conjunction with each other. To achieve a successful integration we proposed a business process model for CRM, comprising the six relevant business processes: campaign management, lead management, offer management,

contract management, service management, and complaint management. Additional activities for the implementation of the customer interface are interaction management and channel management. We also identified four relevant knowledge aspects to supplement CRM processes: content, competence, collaboration, and composition. These aspects allow a structured approach for the identification of business process improvement opportunities through KM.

The proposed business process model for CRM provides an initial starting point for the process-oriented application of KM. However, it has insufficient granularity to allow a thorough analysis of process optimization using KM. Although the four knowledge aspects provide guidance in the discovery of optimization opportunities, they do not replace a process-oriented KM method, but, subject to further research, form the foundation of such a method.

To address the mentioned shortcomings, we will improve and detail the CRM process model so that it describes knowledge flows among the processes[3]. Work on a method for customer knowledge management, which aims to use the four knowledge aspects to improve CRM processes, is also underway. The main focus of our research will be the measurement and proof of tangible performance improvements that have been achieved by the application of KM instruments in CRM processes.

### Notes

1. A previous version of this paper was presented at the Second International Conference on Electronic Business (Gebert *et al.*, 2002).
2. Further information is available on the Web site of the competence center Customer Knowledge Management (CC CKM, <http://ccckm.iwi.unisg.ch>).
3. Research work is carried out within the competence center Customer > Knowledge > Performance (CC CKP, <http://ccckp.iwi.unisg.ch>).

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