

Towards Customer Knowledge Management: Integrating Customer Relationship Management and Knowledge Management Concepts

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Abstract

The concepts of customer relationship management (CRM) and knowledge management (KM) have been recently gaining wide attention in business and academia. Both approaches focus on allocating resources to supportive business activities in order to gain competitive advantages.

CRM focus on managing the relationship between a company and its current and prospective customer base as a key to success. A good relationship with the customer leads to higher customer satisfaction. Content customers are loyal and therefore more valuable customers. This directly affects the revenue stream.

KM sees the knowledge available to a company as a major success factor. Through superior knowledge companies can accomplish their results faster, cheaper and with higher quality than their competition. Knowledge about customers, markets and other relevant factors of influence allows faster utilization of opportunities and more flexible reaction to threats.

From the perspective of a process owner both CRM and KM approaches promise positive impact on the cost structure and revenue streams for a company in return for allocating resources from the core business into supportive functions. This investment is not without risk as many failed projects in the areas of CRM and KM demonstrate.

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. Managing relationships requires managing knowledge for the customer, knowledge about the customer and knowledge from the customer. KM takes the role of a service provider for CRM, managing the four knowledge aspects content, competence, collaboration and composition to satisfy customer requests within stated budget restrictions. The findings are based on literature analysis and six years of action research, supplemented by case studies and surveys.

1. Introduction

The concepts of customer relationship management (CRM) and knowledge management (KM) have been recently gaining wide attention in business and academia. Both approaches focus on allocating resources to supportive business activities in order to gain competitive advantages. Although both concepts are currently mostly

treated as separate research areas, we see high synergy potential in an integrated approach.

1.1 Objectives

The challenge of achieving a good relationship can be seen as serving each customer in his preferred way, therefore requiring to manage "customer knowledge" [4]. Many knowledge management approaches, as presented by KM models, see managing knowledge as independent from the supported business processes. Knowledge and its management is seen as inherently valuable, a view not generally shared by the process owners, who bear the costs for supportive activities but are measured by their ability to generate revenue and control costs, which in many cases is not measured in knowledge, but in services or products [7, p. 1].

In this paper we will show that integration of CRM and KM concepts on process level are beneficial for both management approaches. A CRM-oriented knowledge management focuses on the knowledge most valuable to the company: Customer knowledge. A KM-oriented customer relationship management receives a framework to manage the knowledge required for high quality relationships in a cost effective way. Both approaches directly interface in the area of information management, as both decide which content should be explicated and disseminated. The resulting customer knowledge management (CKM) model describes basic elements for a successful customer knowledge management. It wants to serve as a frame of reference for integrated CKM activities both on enterprise and project level.

In order to integrate KM and CRM on process level, both resource oriented concepts must be aligned towards the business oriented process view. This modification is based on a literature analysis and is the reason for the emphasis on the theoretical foundations. Furthermore, the implications of the integration approach described in chapter 3.3 as well as the case study in chapter 4 provide tangible recommendations for practitioners.

1.2 Research scope, methodology and structure

The CKM model bases 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 [28, p. 13]. Business engineering differentiates between the levels of strategy, processes and

systems. The research described in this paper concentrates on the process level of CRM, KM and subsequently CKM, while on different points interdependences with the system level are discussed.

The primary research approach employs "action research" as defined by GUMMESSON: "On the basis of their paradigms and preunderstanding and given access to empirical, real-world data through their role as change agent, [...] action scientists [...] generate a specific (local) theory which is then tested and modified through action. The interaction between the role of academic researcher and the role of management consultant, within a single project as well as between projects, can also help the scientist to generate a more general theory, which in turn becomes an instrument for increased theoretical sensitivity [...]" [17, p. 208]. This foundation is enriched by complementing in-depth case study that help validating research questions, aligning existing models with reality, and finally prompting new research challenges. The CKM model is based on nearly 6 years of research¹. The research partners AGI, Asean Brown Boveri, Bank Austria, BASF, Credit Suisse, Deutsche Telekom, DKV, Helsana Insurance, Landesbank Baden-Württemberg, St. Galler Kantonalbank, Swisscom IT Services, Union Investment and Winterthur Life & Pension.

This paper is structured into three main chapters. The theoretical foundation in chapter 2 analyzes some current approaches in the fields of CRM and KM and identifies relevant elements concerning integration into a CKM model. The necessary modification to the current approaches and the main elements of the integrated model are discussed in chapter 3. Chapter 4 offers a sample application of the model in a business environment, based on an action research report conducted with a research partner. The paper concludes with a summary, a critical reflection and an outlook on further research possibilities.

2. Theoretical Background

2.1 Customer Relationship Management

Increasing competition and decreasing customer loyalty have led to the emergence of concepts that focus on the nurturing of relationships to customers. Customer Relationship Management (CRM) emerged as an amalgamation of different management and information systems approaches, in particular Relationship Marketing and technology-oriented approaches such as Computer Aided Selling (CAS) and Sales Force Automation (SFA). Following SHAW, we define CRM as an interactive process achieving the optimum balance between corporate investments and the satisfaction of customer needs to generate the maximum profit. It involves: [40]

- 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 about

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 the activities of marketing, sales and service to achieve a common goal.
- the implementation of appropriate systems to support customer knowledge acquisition, sharing and the measurement of CRM effectiveness.
- constantly flexing the balance between marketing, sales and service inputs against changing customer needs to maximize profit.

2.1.1 Knowledge in CRM processes

To integrate marketing, sales, and service activities, CRM requires strong integration of business processes which involve customers. These front-office or CRM processes are mostly unstructured and non-transactional. Their performance is predominantly influenced by the underlying supply with knowledge about products, markets, and customers [6][13][36].

CRM processes can therefore be considered as knowledge-oriented processes with the following characteristics which have a strong correlation: [12]

- *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:

- *Knowledge for customers* is required in CRM processes to satisfy knowledge needs of customers. Examples include knowledge about products, markets and suppliers [13].
- *Knowledge about customers* is accumulated to understand motivations of customers and to address them in a personalized way. This includes customer histories, connections, requirements, expectations, and purchasing activity [4][6].
- *Knowledge from customers* is knowledge of customers about products, suppliers and markets. Within interactions with customers this knowledge can be gathered to feed continuous improvement, e.g. service improvements or new product developments [13].

Managing these different knowledge flows is one of the biggest challenges of CRM. The most important issue is how to collect, store, and distribute only the knowledge that is needed and not waste time and effort on collecting and storing useless knowledge [4].

To identify relevant knowledge that is needed in business processes, methods of Business Process Engineering can be used [3][18][19]. To integrate different CRM processes, often process reengineering projects are

¹ Further information under: <http://ccckm.iwi.unisg.ch>

carried out. These projects provide process models that can form the basis for an analysis of knowledge flows in CRM processes.

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

2.1.2 Current CRM approaches and process orientation

The origins of CRM can be traced back to the management concept of *Relationship Marketing* (RM). LEVITT was one of the first to propose a systematic approach for the development of buyer-seller relationships [22]. Relationship Marketing is 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 [39, p. 34].

RM is of largely strategically character. As such, although business processes are regarded as important [30], a holistic view on business processes connected to RM is missing.

On the other hand, CRM was influenced by several information systems concepts, focusing on distinct application areas. For example systems for Computer Aided Selling (CAS) and Sales Force Automation (SFA) were responsible for the control and automation of sales processes, whereas other systems for service or marketing automation focused on service resp. marketing processes. In the course of process integration these systems continually merge towards integrated CRM systems.

A widely accepted classification of systems connected to CRM is the following [37, p. 8]:

- *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, email, 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 for operational CRM.

Apart from the strategy-oriented concept of RM and systems-oriented concepts, there are several CRM approaches with special focus on business processes [36]. Most of these approaches define marketing sales, and service as core CRM processes, neglecting that these are functional areas which have to be integrated by defining cross-functional business processes. Others focus on specific activities, but don't propose a process framework for

CRM.

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

2.1.3 Status and challenges of CRM in real-world applications

Case studies and action research with our business partners support the assumption that the management of knowledge in CRM processes is a critical success factor.

Especially important for our business partners is the identification of prospective customers as well as the discovery of cross- and up-selling opportunities within the existing customer base. We thus observe an extensive use of applications for analytical CRM. 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 development of knowledge about the customer (in marketing, sales, and service) to the point of utilization, where the knowledge has to be presented in adequate form and complexity is far from being solved.

Another subject of considerable relevance is the management of customer service. All of the participating companies have call-centers that handle service inquiries. One of the major challenges remains the provision of the right knowledge for call-center staff to handle inquiries in an adequate timeframe. To address this challenge, some companies have projects for the implementation of supporting knowledge management tools. 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 consistency towards the customer.

Closely connected to service management is the handling of customer complaints. Although all our partner companies have a process for complaint management, many reveal shortcomings in the analysis and utilization of complaints for continuous improvement.

2.1.4 Summary

Literature research and work with our business partners suggest that the management of knowledge in CRM processes is a critical success factor. For an analysis and improvement of knowledge flows, a CRM process model can be used as starting point. Existing conceptualizations of CRM in the literature either lack process-orientation or don't provide a process framework for CRM that is detailed enough to suit this purpose.

2.2 A review on Knowledge Management Models

The steady interest for 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 methods and techniques of managing it in a business environment.

While many knowledge management models offer valuable insights into the nature of knowledge, their difficulties of justifying the management of knowledge within the business environment is a point of constant criticism [5], [8]. 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 when analyzing knowledge. The models either view knowledge as an entity with distinctive attributes, that can be decomposed and its details analyzed, or they view it as an integrated whole and focus on its relations to 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 into this differentiation.

2.2.1 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 decomposed into discrete, relevant attributes, based on the epistemological foundation held by the modeler. There are many different epistemological views in philosophy, but mainly the cognitivist and the autopoietic approaches have been of significance in the area of knowledge management [44]. The cognitivist approach describes knowledge as stored in distinct knowledge structures, that are created through rule based manipulation and can exist independently from an individual, while the autopoietic approach states that knowledge is context sensitive and basically embodied in the individual [44, p. 55f.]. The following description will focus on the autopoietic approach on knowledge management.

According to the autopoietic epistemology an individual observes its environment and acquires knowledge by interpreting data through an informational process [42]. Individuals can actively transfer knowledge between themselves through articulation and different types of interaction [45].

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" [32, pp. 3-25] which was superseded by the term "implicit knowledge". With their SECI knowledge management model Nonaka and Takeuchi have formulated an encompassing epistemological autopoietic oriented knowledge management model [27, p. 45]. Other examples of epistemological oriented knowledge manage-

ment models with an autopoietic approach include the models of Boisot [1] and McLoughlin & Thorpe [25].

2.2.2 Ontology oriented KM models

Also based on philosophical research, an ontology represents 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" [16, p. 1].

Ontology knowledge management models therefore view knowledge as "black box". The characteristics of knowledge are defined through its relationships with a constructed universe of discourse, encompassing all dimensions that are relevant to the modeler.

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 the intellectual capital research, and will, due to the specific aims of the models, not be discussed further 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 processes of knowledge development, dissemination, modification and use. Examples for process oriented KM models include Probst [34] and Wiig [47]. Agent oriented KM models focus on the characteristics of knowledge during the flow between individuals. They analyze the variables that expedite or hinder the flow of knowledge in social networks. Examples for agent oriented KM models include Wenger [46] and Enkel [11].

2.2.3 Hybridization of KM models

The perspectives of epistemology and ontology 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. Nonaka has integrated an agent ontology dimension in 1994 [20] and he tries to fully bond both views in his concept of "ba" [27]. The process oriented KM model of Demarest focuses by definition on the processing of explicated knowledge [7]. Still a fully balanced model is yet to be created [24].

2.2.4 The inherent value of knowledge

Peter Drucker and others speak of knowledge as "the most important resource of the 21st century" [9, p. 1]. To determine what kind and how much knowledge a business process requires to achieve top performance must be the first step of a supportive knowledge management system [7, p. 1].

Epistemology oriented KM models share an inherent

disability to assess this question. They focus on the inner characteristics of the entity knowledge and neglect the relationships to the environment per definition. To assess whether a certain knowledge entity is explicit or implicit does not allow to draw any conclusions about its value in a business process. Epistemological KM models are therefore not able to support business processes when trying to identify and manage valuable knowledge.

Ontology oriented KM models display relationships between knowledge entities and their environment. They should therefore be able to help the process owners to identify and manage valuable knowledge by offering a suitable knowledge management process dimension. However when analyzing ontological KM models, it becomes apparent that many processes described are completely self oriented. They focus on the knowledge life-cycle, such as knowledge development, knowledge dissemination and knowledge modification [23]. Based on this view, knowledge management processes are independent business processes, taking a similar position in an enterprise as marketing or sales; knowledge itself and its management possesses inherent value.

We criticize this endorsement of inherent value to knowledge and knowledge management. While knowledge becomes more important to all business processes, it is still a resource that abides the laws of economics: It has a diminishing marginal utility and its management does normally not directly generate business value. A change in alignment of the KM models is required to tap the supportive performance for managing knowledge in a CRM environment.

2.2.5 Action research results

The stated gap between the self-conception of knowledge management models and the requirements of business process owners could be verified through research within our partner companies.

A survey based on 241 questionnaires with a reply of 60 and 19 detailed telephone interviews comprised the following results: The managers demand an evaluation framework that supports them in operating the content flow within and between their processes and maintaining a concise and performance oriented content base. Information requirements driven by new CRM systems strain the service capabilities of employees with customer interaction in subsidiaries and call centers. A manager's issue is not about how to commonly create and disseminate knowledge in an effective way. While the research partners spent substantial resources on knowledge management they still try to get their exponentially growing content base of semi-structured documents under control. They want to know which content to keep in which state to run their processes more efficiently and effectively.

Therefore another area of intense interest is the identification of employees according to their competences. While process managers see distinct improvement potential using expertise directories or yellow pages, the restrictive European data protection acts and the ambiguous

position of these systems concerning human resources activities, stalls such approaches in many companies. While several research partners have isolated solutions in single departments, especially IT and internal consulting, only one partner 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. 9 stakeholders with customer oriented assignments ranging from operatives to the middle management were interviewed in 45 to 60 minutes sessions. All interviewees confirmed a high demand for expertise location services within their business processes and were willing to support the project financially. The stated requirements included a better transparency of their own workforce concerning skills, qualifications, abilities and required trainings as well as the potential of fast identification of required resources within other parts of the company. The main difficulties were seen in constructing a competences base relevant to the own business process while minimizing the effort for the employees updating their personal profiles.

Storage of knowledge across business processes is another area of interest for research partners. While a third of the companies have large scale community structures in place, most of them concentrate in one core process, such as research & development and other areas of high expertise. In organizations that structure along customer oriented processes communities of practice that span organizational team structures are currently not explicitly managed. The lack of possibilities 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 is seen as vital. One research partner has started a multi-million euro project with a major focus on enhancing his capabilities of using forms of virtual work independent from temporal, geographical constraints and embedded into the existing organizational structure.

2.2.6 Summary

While the integration of epistemological and ontological approaches into an encompassing knowledge management model is progressing, the direct process support by knowledge management required by the research partners and survey participants can still not be served. This limitation is based on the self-conception of KM models stated in chapter 2.2.4. To address this challenge, we propose a customer oriented knowledge management (cKM) model described in chapter 3.2.

3. Proposing a CKM framework

3.1 CRM process model

Based on previous research by SCHMID, literature research and work with our business partners, we propose the following process model for CRM which describes business processes relevant for CRM [35]. Based on this model, we can identify relevant activity fields for knowl-

edge management, in order to improve these processes.

3.1.1 CRM business processes

Marketing, sales, and service are primary business functions [33] with the characteristics of a high degree of direct customer interaction and knowledge intensity, which makes them primary targets for CRM. We therefore derive our process model by detailing these functions into relevant business processes which may be cross-functional. A CRM business process involves the processing of customer knowledge to pursue the goals of relationship marketing. Usually it also involves direct customer contact and the exchange of information or services between enterprise and customer. Such processes are either triggered by the customer (with the aim of receiving information or services), which involves a transfer of information from customer to enterprise, or are triggered by the enterprise with the aim of delivering information or services to customers. Each process handles a specific business object which distinguishes it from other processes. We identified 6 relevant CRM business processes: *campaign management*, *lead management*, *offer management*, *contract management*, *complaint management*, and *service management*.

In contrast to transaction marketing, relationship marketing is based on interactive, individualized contacts [15, p. 11]. *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 towards known recipients, who are either existing or prospective customers. Marketing campaigns are individualized (one-to-one marketing [31]) 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 the 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 focuses on one-way communication from enterprise to customer is the concept of direct marketing [26].

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 corporation-wide consistent creation and delivery of individualized, binding offers which fulfill all requirements for 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 insurances.

Within the scope of *complaint management*, articulated dissatisfaction of customers is received, processed, and communicated into the enterprise [41]. 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 intangible output of an enterprise generated with direct involvement of customers or some of their assets. 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.

3.1.2 CRM activities

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), to achieve the optimal channel mix [38]. The objective is to increase the quality and value of interactions while at the same time 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 configuration and synchronization of different communication channels [14]. Key objectives are to define organizational responsibilities for each channel, to avoid conflicts between channels, and to ensure consistent knowledge flows over different channels.

3.1.3 Enabling factors

Opportunity management has an outstanding role in the context of CRM. In contrast to the rigid structure of processes like e.g. *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 [2]. This can be achieved by the expansion of competences of employees with direct customer contact and the provision of techniques and simple rules for identification and selection of promising opportunities [10].

3.2 A customer oriented KM (cKM) model for CRM

In the conclusion of chapter 2.2 we stated that the endorsement of knowledge with an inherent value is the main reason that many KM models have difficulties to prove the value of managing knowledge within a business

environment. The following chapter offers a way to realign a KM model directly to a business process, in this case the CRM process framework of chapter 3.1.

3.2.1 Knowledge requirements of CRM

To achieve their goal of serving the customer the individuals performing in CRM must understand and address the customer's processes [29]. They therefore require three different types of customer oriented knowledge:

- They need to understand the requirements of customers in order to address them. This is referred to as "knowledge about customers".
- Customer needs must be matched with the services and products available. All knowledge required here for can be summarized under the term "knowledge for customers".
- Finally customers gain many experiences and insights when utilizing a product or service. This knowledge is valuable as it can be used for service and product enhancements. This "knowledge from customers" must be channeled back into an enterprise.

All three types of customer oriented knowledge will be henceforth summarized under the term "customer knowledge". A cKM model addressing CRM requirements focus on managing customer knowledge. All other knowledge is therefore neglected in the model.

3.2.2 Building a customer oriented cKM model

Knowledge is created, located and captured, disseminated, modified and used constantly within all CRM business processes. However CRM does not require self-oriented knowledge 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 to focus on when managing critical knowledge entities. The cKM goal perspective encompasses four goals (see figure 1):

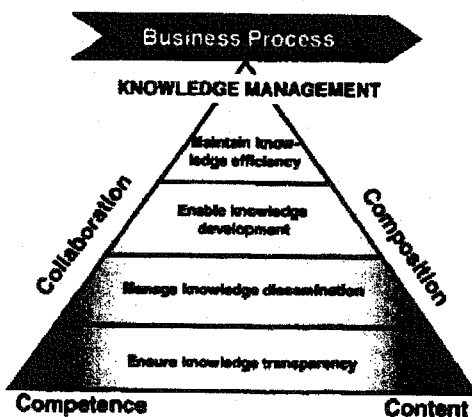


Figure 1: Knowledge Management Pyramid

- The goal of 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.
- The goal of knowledge dissemination supports the business process owners in defining the degree of customer knowledge distribution required between all individuals that take part in process activities. The management of dissemination requires the management of knowledge transparency.
- The goal of knowledge development supports the business process in defining the requirements concerning the adaptation and creation of knowledge. Even so knowledge can be created by an individual based solely on his or her own context, valuable customer knowledge development from a CRM process perspective requires the ability to disseminate knowledge between individuals. The management of knowledge development therefore requires the management of knowledge dissemination.
- The goal of 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 essential for enhancing the CRM processes. To voluntarily destroy or disregard customer knowledge, based on the understanding that this knowledge will actually hinder the knowledge flows within a business process, is one of the most difficult managerial decisions, because it requires a decisive decision within an uncertain environment.

The four management goals constitute a cascading framework for analyzing the customer knowledge requirements of a CRM business process. The first three can be compared to the process perspectives of existing KM models such as [43]. Most importantly the KM goals are stripped of their self orientation; they do not add value by themselves but serve as a subsystem for business processes.

3.2.3 Managing four aspects of knowledge

While allowing process owners the direct articulation of their knowledge needs, the four KM goals do not provide guidelines for managing customer knowledge based on its relevant characteristics and additional relations. The cKM model therefore is enhanced through the integration four aspects *content*, *competence*, *collaboration* and *composition* as shown in this chapter.

Relevant *aspects* of knowledge can be extracted by

analyzing existing KM models that focus on explaining characteristics and relations of knowledge entities. As shown in chapter 2.2 most KM models fall into this category. The relevance of a knowledge aspect for a CRM process is subject to the following preconditions:

- A knowledge aspect must be of business significance; changes in its parameter values must impact either the cost or the revenues of the CRM process.
- A knowledge aspect must be measurable and manageable within a business process.
- An additional knowledge aspect must form a consistent framework with already chosen aspects; there should be no overlapping in characteristics or dimensions.

Though the number of aspects integrated in a KM model must be based on all relevant aspects, the cKM model described in this paper is based on the action research results of the CC CKM. As a complete derivation is beyond this paper, we show the basic elements based on an analysis of the SECI model of Nonaka / Takeuchi [27]. This choice is based on the following criteria:

- The model is widely accepted both in the scientific community and the business environment.
- It possesses a "simple" structure, offering one epistemological and one ontological knowledge aspect. Both are well defined.
- The parameter values of its epistemology and its ontology have high a high degree of overlap with the empirical findings.

As described in chapter 2.2, SECI is basically an autopoietic epistemological KM model, focusing on the knowledge aspects of implicit and explicit knowledge. The scientific foundation for this characteristic was published by Polanyi in 1968 [32]. According to Polanyi each individual possesses an amount of implicit knowledge which influences the ability to articulate and therefore explicate and also create knowledge. In the SECI model the difficulty of articulation differentiates implicit from explicit knowledge. Both knowledge entities only exist within an individual. While media, such as text or images, can be used to store and carry their essence in a way, the carried knowledge can only be reconstructed via informational processing through another individual.

The individuals accountable of a business process use both implicit and explicit knowledge to perform their tasks. In addition a business process includes explicated knowledge, mostly in terms of documents, which exists independent of individuals. A process manager is therefore not so much interested in the difference between explicit and implicit knowledge in an individual, a factor that is beyond his control, but in the ratio between explicated and explicit/implicit knowledge, that offers high business performance and adaptability in case of personnel changes while fulfilling external requirements such as financial audits. The process owner can therefore manage the amount of explicated knowledge, henceforth termed the knowledge aspect of "content" as compared to the amount

of explicit and implicit knowledge available in individuals, henceforth termed the knowledge aspect of "competence".

The epistemological view of the SECI models was enhanced through the integration of an ontological agent dimension by Nonaka and Hedlund [20]. The agent dimension describes the possibilities of knowledge dissemination by the four parameter values: individual, group, organization and inter-organization. These parameter values are based on the view of a commercial organization. From a CRM process perspective, only two of these parameter values are of interest. Process interaction with customer focus always includes at least two partners, a service provider and a customer; personal knowledge management is therefore only interesting in terms of sharing knowledge in the process context. From a process perspective there is also no differentiation between an intra-organizational and an inter-organizational process. This leaves the parameter values group and organization. The parameter group represents the dissemination of knowledge between few individuals, henceforth represented by the knowledge aspect of "collaboration". The parameter value of organization represents the knowledge dissemination between a large number of individuals, henceforth termed as knowledge aspect "composition". The latter term describes the level of structuring required to relay knowledge, such as this paper, to a large group of individuals. Both knowledge aspects are important for a CRM process, as the cost of dissemination through composition is much more expensive than through collaboration. Also collaboration offers the possibility of relaying implicit knowledge which is not possible through composition.

3.2.4 Summary

The cKM model described in this chapter 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 the characteristics and dimensions with direct impact to the process performance.

3.3 Towards Customer Knowledge Management

We observe in practice that customer relationship management and knowledge management have an considerable synergy potential (see figure 2). While KM acts as a service provider for CRM, the interdependences and mutual benefits between the two approaches result in a merger of equals. The subjoining of knowledge management elements allows CRM to broaden from its mechanistic, technology driven and data oriented approach, enabling it to encompass both the elements of technology and people orientation. Knowledge management is thereby able to prove its value directly within the process chain.

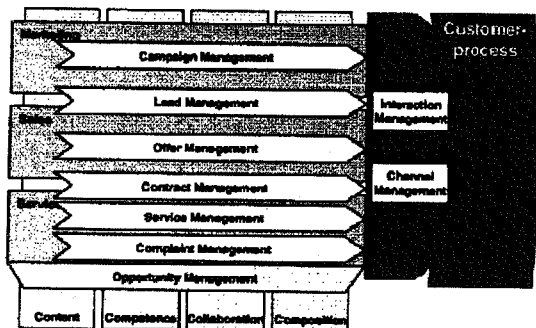


Figure 2: Customer Knowledge Management model

As integration area we have chosen the process dimension. Because most CRM and KM research does not directly focus on the process dimension, we stated the modification required to allow a direct integration into a process framework. The following chapter gives a brief overview of a joint model, balancing the approaches of knowledge management and customer relationship management.

3.3.1 CRM, customer knowledge and knowledge goals

As described in chapter 3.2.1, CRM manages knowledge for, from and about the customer, a customer lock-in through superior services and products.

Knowledge *for* customers is mainly generated in processes within the enterprise, such as research and development and production. Campaign management is responsible for collecting this knowledge and refining it according to 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 for customers. Maintaining the balance between comprehensibility and precision is the main challenge when managing this kind of knowledge.

Knowledge *about* customers is captured mainly by offer management, service management, complaint management and, if available, contract management. Main user processes of knowledge about the customer are campaign management and service management, because both processes personalize their services based on user criteria. Knowledge about the customer must be transparent within the company, however its dissemination beyond the border of an organization must be controlled, as knowledge about the customer can often be directly transformed into competitive advantages. The development of such knowledge is also expensive, because knowledge explication is taking time and attention away from the main task, i.e. serving the customer. Interaction management offers possibilities of gaining knowledge about customers automatically via electronic media. The question of how much data about the customer an enterprise can transform into knowledge is the critical challenge when managing knowledge about the customer.

Knowledge *from* customers can be captured in similar 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 can be seen as equal partners, when discussing changes or improvements. This aim is not commonly understood in the business world and its impacts poorly researched in academia [13]. To utilize this knowledge from "outside experts" as change agent it must be channeled into the back end processes of an enterprise, such as the research and development process. Even so valuable knowledge from customers is mostly gained at the service points, an enterprise must check its CRM processes for their capability of serving customers. To bend CRM away from their service goal in order to capture higher amounts of knowledge from customers is a short sighted goal.

3.3.2 Knowledge aspects and the enabling factor

The knowledge aspects support CRM in maintaining its primary goal of service for customers, by managing knowledge for, about and from customers. The management of content allows CRM process owners focus on the messages they want to deliver to customers. Competence management streamlines processes, as it bridges the gap between an individual receiving a customer request and the individual solving it. Collaboration support allows teamwork with less time and space constraints. Composition enables scaling the former three beyond the team context, as structures and indexes allow faster access to knowledge by navigation and search.

3.3.3 Summary

As shown, the integration of CRM and KM approaches benefits the utilization in both areas. While the CKM model displays the major integration elements, the performance benefits of the integrated approach however can only be shown in specific process implementations.

4. Enhancing knowledge dissemination in a customer service center

The following excerpt of an action research case of a large fund managing bank (LFMB) shows the business impact of the CKM view in a typical CRM environment. The case focuses on a major element within modern CRM concepts, the call or communication centers (CCC), that in many companies consolidate the communication channels phone, fax and email serving a geographically dispersed client base.

4.1 Large Fund Managing Bank (LFMB)

Founded by 14 private banks in 1956, our research partner LFMB offers specialized funds for private and institutional investors. In December 1999, the company moved up to the top three players of the German fund market managing assets of EUR54bn.

Because our research partner primarily works as specialized service provider for the founding banks, the CCC serves bank employees and retail customers alike. This requires a profound knowledge of the banking and funds

environment. The CCC employees possess a high expertise in their chosen profession, many of them having specialized degrees and multiple years of working experience within the banking environment.

The CCC consists of 120 employees, two thirds offering the more general first level support while one third specializes in second level support on complicated and dynamic knowledge areas such as funds in specific international area.

4.2 KM challenges of customer service

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 named information management (IM). This content is still mostly disseminated via email. While this is possible without investments into the 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 as the usual informational email includes frequently 10 up to megabytes of attachments and 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 for one email.

IM therefore started implementing a new information channel using basic web technology. The resulting intranet presence, termed "surfMe", is intended to be a centralized platform offering information about products and services that can be used by CCC employees when serving customers on the phone.

After one year in service, the role of "surfMe" entered a critical stage. While the amount of content included in the system started to put a strain on maintenance for IM, it still failed to accomplish full acceptance by the CCC employees: Important information was not available instantly and the missing search functions prolonged the critical time to retrieve content when searching for information while serving a customer on the phone.

While thinking about changing the technical infrastructure IM brought up the case within the context of the CC CKM in order to achieve a comprehensive analysis of the challenges hindering the success of the new communication channel.

4.3 Relevant knowledge goals and aspects

Based on two one-day workshops, the CKM model was used to analyze the success factors for redesigning the existing communication channels based on LFMB's customer knowledge processes.

The focus of the project was to provide the CCC employee with knowledge for the customer. Because many members of IM were former CCC employees, IM has a very good overview of the knowledge available and required by the CCC; knowledge transparency therefore was not an issue. The main knowledge goal of the project was enhancement of knowledge dissemination. A follow-up

with knowledge development was also seen as important, as most knowledge used within CCC is created in other departments such as product management and marketing. Because knowledge delivering to the CCC-employees, working to solve this challenge was delayed until the basic solution for dissemination was operative.

After determining the knowledge goals, relevant knowledge aspects and its manifestations were identified. The demands of the CCC employees showed a major shortcoming in the current design of knowledge composition. The navigational structure was unwieldy, searching for content was not possible.

IM itself required improvement on the knowledge aspects of content and composition. The major content challenge, requiring up to 50% percent of the time spent for "surfMe", was identified in the transformation of documentation from MS office format delivered by other departments into content displayable in a web browser. The composition challenge matches with the requirements of CCC. The constant growth of the "surfMe"-structure required increasing maintenance and tied employees to their job roles as web managers, as assigning new colleagues became increasingly expensive. Even though it was not in the original focus, the possibilities of adding the knowledge aspect of competence via an expertise directory was discussed during a workshop. Foundations of this knowledge aspect already existed within the electronic phone books offered by "surfMe" that serves as a rudimentary yellow pages system.

4.4 Results

Through the use of the CKM model as analyzing tool, relevant weaknesses of the current knowledge management configuration could be identified and communicated in a structured and coherent way. This led to a customer and maintenance friendly architecture for the new application, which was tested in a rapid prototype. The resulting reengineering project for "surfMe" concentrated on the removal of the identified weaknesses, which had a profound impact on the requirements specification for the new technical solution, namely stating flexible transformation of office documents into HTML (rendering), in place editing of documents on the server, an automatic maintaining search indexer and a navigational bar that can be managed by editors as mandatory features. Similar results were obtained in projects with other research partners.

5. Summary and outlook

We observed in multiple cases [21], that management of knowledge is a critical success factor for CRM. Knowledge management methods with the aim of supporting CRM have to be process-oriented.

Based on literature and action research, we tried to show, that CRM and KM have high synergy potential and should be used in conjunction. To achieve a good integration we proposed a business process model for CRM comprising six relevant business processes: campaign management, lead management, offer management, con-

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

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

To address the mentioned shortcomings, we will advance and detail the CRM process model so that it describes knowledge flows among the processes. Further work on a method for Customer Knowledge Management which aims at using the four knowledge aspects to improve the CRM processes is underway.

The main focus will be the measurement and proof of tangible performance improvements achieved.

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