

Medical Knowledge

A Core Asset for Healthcare Industry

Brigitte Stroetmann¹, Anja Hasler² and Alena Leinfelder¹

¹Siemens AG Healthcare Sector, Allee am Röthelheimpark 3 A, Erlangen, Germany

²Siemens AG Healthcare Sector, Henkestraße 127, Erlangen, Germany

Keywords: Business Excellence, Clinical Knowledge, Knowledge Management, Knowledge Services, Learning Organizations, Trust, Education.

Abstract: The main objective of this paper is to show how efficiently Siemens Healthcare connects knowledge holders and knowledge recipients from various disciplines within the company. Siemens offers its customers products and solutions for the entire range of patient care from a single source – from prevention and early detection to diagnosis, treatment, and aftercare. Optimizing clinical workflows always requires a multidisciplinary team and a collaborative structure between e.g. medical advisors, researchers, scientists, and healthcare economists. This new form of collaboration brings together experts with deep technical experience, physicians with specialized medical knowledge, as well as people with comprehensive knowledge about health economics. To create a knowledge network Siemens Healthcare introduced the Clinical Competence Centers for specialized medical knowledge, the Clinical Knowledge Base as online platform for disease specific information and the Healthcare Academy for medical education and web-based trainings. These are impressive examples of the successful knowledge management and education strategy of Siemens- the Knowledge Company.

1 INTRODUCTION

In healthcare, having the right information at the right time can become a very difficult challenge due to the sheer amount of ever-expanding knowledge. Clinicians, administrators, industry managers, and research scientists are facing a growing body of knowledge that they have to routinely access, absorb, and utilize (Wickramasinghe, 2007). The volume of medical knowledge doubles every 17 years. New areas of research, such as bionanotechnology and genetics, are growing at a tremendous pace (Wickramasinghe, 2008). Taking these aspects into account, it is not surprising that knowledge management is attracting so much attention.

The healthcare industry is currently trying to develop into a knowledge-based community that connects hospitals, clinics, pharmacies, physicians, and customers for sharing knowledge, reducing administrative costs, and improving the quality of care (Metaxiotis, 2006).

Thus, successful global firms also see a major task in offering professional education programs that

fulfill the need of the organization. Most employees at Siemens Healthcare have in-depth scientific knowledge, process-, market- or organizational knowledge, but not necessarily in-depth medical expertise.

The aim of this paper is to suggest Siemens Healthcare's systematic knowledge management approach to facilitate access to reliable, relevant medical information with adequate depth and to support lifelong medical education of its employees.

2 THE IMPORTANCE OF MEDICAL EDUCATION

The healthcare industry has grown rapidly and is projected to grow in the future due to advances in medical knowledge and the increased need for medical services required by an aging population, as well as demographic changes. Moreover, the growing complexity of healthcare delivery, including advances in medical technologies, will require skilled workers and scientists with in-depth

medical expertise.

Successful organizations, according to Dorothy Leonard and Walter Swap in their new book, *Deep Smarts: How to Cultivate and Transfer Enduring Business Wisdom*, rely on people who possess knowledge that provides a distinctive competitive advantage (Leonard and Swap, 2005). As Tom Peters described in his book, *The Little BIG Things: 163 Ways to Pursue Excellence*, Lifelong Learning Is a Mission Statement Must (Peters, 2010). “In our rapidly gyrating world, learning-for-life is no longer an option; it’s a professional life (or death) necessity – as more and more are beginning to realize. This is true of you age 16 or 26 or 46 or 66 – and God knows it’s true of my great pal, *The Little BIG Things*’ dedicatee, Warren Bennis, voracious in the depth and breadth of his quest for knowledge at 85!” (Peters, 2010, #35)

According to a survey recently conducted by XCM Solutions Inc. (de Visscher, 2002), a differentiating factor between high and low performing firms also lies in the company’s education program. High performers invest in their people through education and training. They understand that education and training is an important component of knowledge management.

In addition, high performing firms seek out opportunities to learn. Most professionals say that they read newsletters, professional publications, journals, blogs, etc. Top performers also get out there and talk to peers in their networks and associations; participate in technology events like tradeshows, webinars, and user conferences; and keep an open mind (de Visscher, 2002).

3 KNOWLEDGE IS A KEY RESOURCE THAT MUST BE ACTIVELY MANAGED

A tangible KM process is essential in modern and successful organizations which look at knowledge as a major factor in their competitiveness. It can be considered as fast response of threats and challenges in a company’s business. As a key component in its overall strategy, Siemens Healthcare established a pro-active KM approach. It manages all process steps in the knowledge life-cycle model, but most important encourages people to disseminate knowledge and use it.

Schendel and Heuermann (2002) look at the advantages of active knowledge and describe how knowledge management systems package together

existing know-how and simplify procedures. They maintain that active knowledge management includes the collection, evaluation, storage and use of internal and external information. Its objective is to systematically acquire knowledge as a resource and to use it efficiently. Active knowledge management is designed to provide each employee of a company with access to the optimum knowledge base in the organisation when performing his or her duties.

Most of the Knowledge life-cycle models in literature emphasis on the processes of knowledge at the individual, organizational and inter organizational level. The purpose of these processes is to optimize individual and organisational effectiveness by appropriate knowledge management models. Sagsan and Zorlu (2010) evaluated different knowledge management models and provide a comprehensive review on the different knowledge levels or stages. They identified a gap between the practical and theoretical side of KM and suggest one of the most holistic approaches to the knowledge management at the organizational level. This model called “Knowledge Management Life Cycle Model” Sagsan (2007) is aligned with business processes, knowledge types, data-information-knowledge repositories based as well as product / service based processes.

It is based on five basic processes such as knowledge creating, sharing, structuring, using and auditing. Siemens Healthcare identified these basic processes essential for a practically implemented Knowledge Management solution.

A dedicated team of KM “workers”, who are actively managing the operational KM process, coordinates the basic processes of the knowledge management life-cycle. As the expertise of most employees is related to economics, business, or technical issues, the team actively manages the timely dissemination of relevant medical information into the organization.

To implement the knowledge life-cycle model, the team first had to identify the organization’s medical knowledge needs.

If the necessary medical knowledge was not available, the “creation process” was initiated. The company focuses on a person-centered view of knowledge creation to enable the constructive and subjective nature of such a process. In this regard, the utilization of diverse knowledge sources, drawing upon different organizational functions and professional disciplines is an essential success factor. Medical knowledge is provided by dedicated Clinical Competence Centers; they provide the

necessary broadness of medical knowledge combined with extensive clinical expertise.

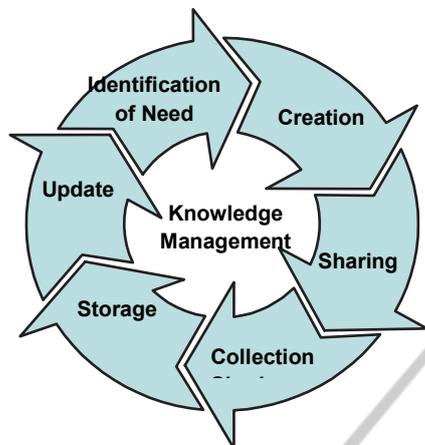


Figure 1: Knowledge life-cycle model.

The “new” information together with the existing information is “collected and stored” in a web-based database called “Clinical Knowledge Base”. Any input to the knowledge base is evaluated and commented on by the medical experts and thus adapted to the need of the organization. This meta-information serves to give an overview of the relevance of a publication, the author, etc. and to allow for an improved keyword search.

Siemens Healthcare’s approach to successful medical knowledge “sharing” is the implementation of push-pull strategies within the organization. KM Services offered are a combination of pull (self-service) and push services (facilitated transfer) specially designed to meet the needs of the organization.

For example: the information is pulled from operational, technical and clinical areas and pushed, in the shortest time possible, to the staff of the organization and decision makers.

The KM program offers three services. First, pull services (self-service) – contribute & retrieve knowledge as and when it is needed. Second, push services (facilitated transfer of knowledge) driven by the need of the organization. And third, individual expert advice where peers and experts join hands to discuss and share knowledge.

Since the “Clinical Knowledge Base” serves as the central platform for medical knowledge, the company places the utmost importance on keeping the stored information updated and current. Basically, the medical knowledge is updated whenever new medical findings are made available. Every single document has a time stamp, which reminds the responsible physician of the respective

Clinical Competence Center to review the document and approve or reject it for the knowledge base.

4 CLINICAL COMPETENCE CENTERS – THE UNIQUE SOURCE OF MEDICAL KNOWLEDGE

The foundation of Clinical Competence Centers (CCC) within Siemens Healthcare three years ago was aimed at providing direct access and assistance e.g. to technical engineers, scientists, sales representatives, and managers that do not necessarily have a medical background. Today’s Clinical Competence Centers focus on cardiology, oncology and neurosciences because cardiovascular disease (CVD), cancer, and stroke are the leading causes of death globally and present a huge economic burden to healthcare systems worldwide.

The members of the Clinical Competence Centers have profound expertise on the diagnosis and treatment of a specific disease or group of diseases. Their activities cover counselling and guidance of more technically-minded colleagues, as well as high-quality education and training sessions. They orchestrate cross-functional teams that jointly develop new products for dedicated medical fields, thus providing a forum for the exchange of information and discussion of new ideas.

With others, these physicians also regularly monitor scientific medical literature to identify new trends and write for selected publications and international medical journals.

Furthermore, the members of the Clinical Competence Centers build and maintain networks of key opinion leaders in their specialties to identify future disease trends at any early stage. They are involved in intensive international scientific cooperation and closely linked to expert centers and patient organizations. This acquired information is used to support the overall portfolio strategy of Siemens Healthcare.

As the healthcare field is in a constantly changing process, the physicians of the CCCs are also practicing in hospitals to keep up with medical progress and advances within their specialties.

5 CLINICAL KNOWLEDGE BASE – THE ONLINE PLATFORM FOR MEDICAL INFORMATION

Best-practice information, white papers, and select literature, as well as experts’ comments and relevant metadata, e.g. ICD10 codes, are stored in the Clinical Knowledge Base. The Clinical Knowledge Base is a specialized database that aims to ensure that Siemens Healthcare will have access to high-quality medical knowledge in a comprehensive, useful, and accurate way.



Figure 2: Clinical knowledge base.

With its primary focus on cardiology, oncology, and neurosciences, it allows online access to scientific medical information, review articles, and graphical presentations of disease workflows provided by the members of the Clinical Competence Centers. The unique feature of the papers presented in the Clinical Knowledge Base? Every single paper is reviewed and commented on with respect to its relevance for the Siemens Healthcare business. While it is relatively easy for clinical experts to identify relevant medical publications, it is rather complex to perform a scientific, as well as a business-related interpretation of each paper.

Transferring medical and clinical workflow knowledge is clearly another important focus of Siemens Clinical Knowledge Management. Disease-specific sales activities are for example supported by medical workflows that have been visualized with VISIO software for main diseases, like stroke, prostate and breast cancer, as well as acute

myocardial infarction. The whole knowledge of workflows, the deep understanding of medical technology and profound IT expertise is combined, so that each single process step is described by the optimal Siemens solution, as well as its medical benefits.

This close connection with ongoing business activities is considered to be the key to successful knowledge management.

The Clinical Knowledge Base is available to everyone and can be accessed freely from any level. There is a special application built on the Microsoft SharePoint® collaboration platform for capturing, organizing, and sharing knowledge throughout the organization. It also uses workflows to guide the user through the collaboration process. The content of the Clinical Knowledge Base is updated, which not only includes adding new information, but also cleaning out outdated information.

5.1 Ask the Expert Function

The Clinical Knowledge Base enables its users to post urgent requests via a simple web-based interface. Unlike emails, which have to be directed to a specific recipient, the Clinical Knowledge Base guides the inquiry to the medical experts best suited to answer it. The selected expert receives an email notification with a direct hyperlink to the question. The expert answers the question in a main text field and can add attachments as desired. Via a simple “send to requester” button, the answer is sent to the questioner. He also has the opportunity to comment, for example, on the quality of the provided answer via the feedback button. The system is very user-friendly, so that even newcomers quickly have medical information at their fingertips.

All requests are stored in a central database in which the members of the Clinical Knowledge Management group and the Clinical Competence Centers can search.

6 SIEMENS HEALTHCARE ACADEMY - MEDICAL EDUCATION & WEB-BASED TRAINING

Medical education plays a vital role in the healthcare industry. Continuous learning and a drive for excellence are necessary in order to achieve best solutions for patient care.

To successfully claim its market position as a solution provider in the healthcare industry, it has

been a strategic decision of Siemens Healthcare to anchor medical knowledge within the entire team of employees. Thereby two major challenges need to be mastered. One challenge is to provide access to medical education to a large international target group. The other one is to do so most effectively and efficiently by delivering the fitting level of medical knowledge to a highly heterogeneous target group.

Therefore the Siemens Healthcare Academy (SHA) had been founded in 2005. It plays a crucial role at Siemens Healthcare and contributes to the company’s educational program in a major way.

Siemens Healthcare Academy provides anytime access to a dynamic, online catalogue of high-quality medical web-based trainings. To targetedly address the needs of different job roles the course portfolio is subdivided into a basic and an advanced category. Basic courses provide a broad understanding of the healthcare world including a minimum level of medical basics, clinical pathways and healthcare systems to employees with no medical background. It has been a strategic decision that the majority of employees need to acquire this level of knowledge within their first months at Siemens Healthcare via a comprehensive on boarding course called ‘Healthcare Essentials’. Between 2009 and 2012 over 17 thousand Siemens Healthcare employees worldwide successfully completed this course that is offered in five languages. More than 82% of participants rated the course excellent or very good – proving that the high-quality didactical design is acknowledged by the learners.



Figure 3: Healthcare Essentials web-based training – discovering basic healthcare knowledge in a virtual city.

‘Healthcare Essentials’ lays the foundation for understanding more in-depth medical knowledge that is crucial for employees in certain job roles, such as product development, sales and marketing. In a joint effort the experts from the Clinical

Competence Center and the SHA team provide a comprehensive portfolio of advanced clinical web-based trainings as well as classroom trainings, for example, on cardiology, electrophysiology, neurosciences, and oncology.

Among others, the courses cover the most important diseases or clinical questions, the clinical key drivers for imaging and therapy, clinical applications, and workflow topics. Constantly accessible web-based trainings allow for a flexible integration of advanced clinical education into daily work. The classroom trainings are organized in clinical settings and allow to dive deeper into subtopics. For example, the participants have the unique opportunity to see live procedures, e.g. from the EP lab or operating rooms. Upon successful completion of a course, the participants will receive their own certificates as a proof of learning.

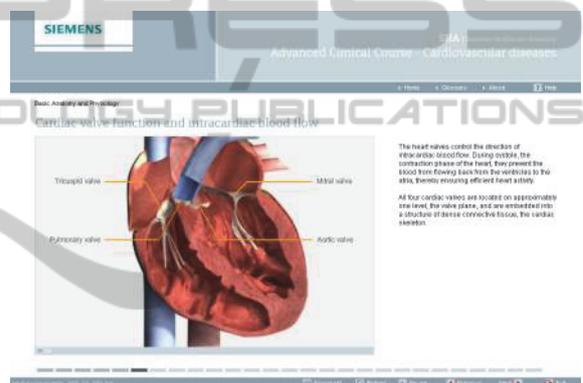


Figure 4: Siemens Healthcare Academy – animations illustrate cardiology basics in a web-based training.

In addition to the course offerings, the Siemens Healthcare Academy provides anytime online-access to glossaries explaining medical, business and healthcare terminology as well as to knowledge base articles illustrating medical basics.

So, the user is able to get information regarding, for example, what hypertension is, its causes and symptoms and how it is treated on less than two pages. This narrowly focused information allows for an efficient distribution of knowledge.

7 SIEMENS HEALTHCARE - THE KNOWLEDGE COMPANY

KM as a whole is a complex process, which requires more than an optimal information and communication infrastructure. “Too often, companies implement state-of-the-art technology

and then discover that culture and behavior are slow to change, which impacts their consistency with the organization's broader business strategy and culture. The success of KM initiatives depends equally on the active involvement of everyone throughout the organization, as well as on their consistency with the organization's broader business strategy and culture." (Ergazakis, 2005, p.23)

Today, KM is absolutely indispensable for the company. For many years, Siemens has followed a KMS with clear objectives and approaches and had strong commitment from top management.

Since 2001, Siemens has been among the best finalists in MAKE, the European Most Admired Knowledge Enterprises ranking, which is conducted annually by the UK-based consulting firm Teleos. In 2010, the organization placed first-place for the third time (2003, 2004, 2010).

The Siemens Healthcare Academy, the Clinical Competence Centers, as well as Clinical Knowledge Base of Siemens Healthcare are a constructive example of the company's successful KM- and education strategy.

The organizational benefit of the Siemens Healthcare Clinical Knowledge Management concept is the improved operational efficiency of finding relevant information when needed and a higher confidence in the quality and relevance of that information. Also, Siemens employees are respected worldwide for their clinical and workflow expertise, as well as their awareness of and responsiveness to customer needs.

The whole point of KM is to make sure that the knowledge available in an organization is applied productively for the benefit of the organization.

REFERENCES

- Ergazakis, K. 2005. Knowledge Management in Enterprises: a research agenda. *Intelligent Systems in Accounting, Finance and Management*, Vol.13, pp. 17-26.
- Leonard, D., and Swap, W., 2005. *Deep Smarts: How to Cultivate and Transfer Enduring Business Wisdom* Harvard Business School Press.
- Metaxiotis, K., 2006. in Schwartz, D. G.: Healthcare Knowledge Management. *Encyclopedia of Knowledge Management*, pp.204-210.
- Peters, T., 2010. *The Little BIG Things: 163 Ways to Pursue Excellence*, Harper Studios, #35.
- Sagsan, M., 2007 Knowledge management from practice to discipline: a field study, *AID TODAIE's Review of Public Administration*, 1(4):123-157.
- Sagsan, M., and Zorlu, K., 2010 An Empirical Test of the

- Knowledge Management Life Cycle Model at a Turkish Petroleum Oil Industry Firm, *7th International Conference on Intellectual Capital, Knowledge Management & Organisational Learning*, Hong Kong, China, pp. 405-413.
- Schendel, J., and Heuermann, R., 2002. *Advantages of Active Knowledge Management*, World Cement July 2002.
- Siemens Medical Solutions USA, 2010. *The Future of Care*. Siemens.
- de Visscher, F., 2002. *Seven Habits of Highly Effective Companies*. University of Massachusetts Family Business Centre, Boston.
- Wickramasinghe, N., 2008 Building a Learning Healthcare Organization by Fostering Organizational Learning through a Process Centric View of Knowledge Management. *International Journal of Innovation and Learning*, Chicago, Vol.5, No 2/2008, pp. 201-216.
- Wickramasinghe, N., Geisler, E., 2007. Epistemetrics: Conceptual Domain and Applications of Knowledge Management (KM) in Health Care. *PICMET '07, Portland International Conference on Management of Engineering & Technology* 2007, pp. 1056-1061.