



THE UNIVERSITY OF
NEW SOUTH WALES



CENTRE FOR CLINICAL GOVERNANCE RESEARCH IN HEALTH

Knowledge Management: Selected abstracts and citations



The Centre for Clinical Governance Research in Health undertakes strategic research, evaluations and research-based projects of national and international standing with a core interest to investigate health sector issues of policy, culture, systems, governance and leadership.

Knowledge Management

Selected abstracts and citations

Duration of project

August-October 2004

Search period

1892 to 25th August 2004

Key words searched

Knowledge Management

Databases searched

- Medline from 1966
- Embase: Excerpta Medica from 1988
- CINAHL from 1982
- Emerald Fulltext from commencement of the database
- Science Direct from 1967
- PsycINFO from 1892

Criteria applied

We searched the term 'Knowledge Management'. All articles that met the criteria were included in the project. A bibliography including citations and abstracts of these articles is presented on the next pages.

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Overview of the literature

Background

In what follows we provide abstracts and citations, arranged alphabetically by category and author, for the articles we uncovered using the search strategy outlined above. Literature from 1892 to the present was searched using mainly health databases and the key word *knowledge management*. This document will have utility for everyone who either wants to get an overview of the broad field of knowledge management or to explore a more specific topic in the area of knowledge management. Full text articles are available on request from the Centre for Clinical Governance Research.

Method

Two researchers (Nadine Mallock and Jo Travaglia) jointly analysed these abstracts and citations and categorised them using a grounded process. We sought to determine the kinds of categories by which the broad knowledge management literature represented in this document could be appropriately described.

Findings

We identified a diverse knowledge management literature. This literature covers a range of industries and approaches employed to describe and study the complex field of knowledge management. All abstracts and citations were assigned to one or more of the following categories: Evaluation Studies, Health, Human Factors/Culture, Learning/Education, Review and Systems/Approaches. Some abstracts and citations were classified to more than one category, where applicable.

The Categories

Evaluation Studies: This section deals with studies measuring the impact of different approaches to managing knowledge. Knowledge management practices are identified and investigated. How do individuals and organisations use and access knowledge management systems? Organisations from different industries are compared in terms of knowledge management practices and their perceptions of the systems in place. A wide range of methods is employed covering qualitative methods such as interviews and case and field studies as well as quantitative empirical studies using questionnaires.

Health: This section draws together all references found relating to the use of knowledge management approaches within the health care field. These studies highlight the notion of health care professionals

as knowledge based communities, but also underscore the problematic and developmental nature of both the technology and the relationships (both individual and organisation) required to enable the creation, capture, codification and re-use of current and future knowledge.

Human Factors/Culture: These abstracts and citations focus on the cultural dimensions of individuals and organisations and how culture and human factors affect the management of knowledge. This section acknowledges that the willingness and capacity to share knowledge is directly affected by the culture and people of an organisation. In other words, the knowledge management process is influenced by peoples' behaviour and practices. Interactions between knowledge management technologies and techniques and people are investigated. These abstracts and citations take into account cross-cultural management of knowledge and information sharing.

Information Technology: Developments in information technology are one of the drivers and enablers of managing knowledge. The abstracts and citations covered in this section provide an overview of current technology, and its uses and limitations when applied the harnessing and transfer of information, data and knowledge.

Learning/Education: Several aspects of learning and education are directly relevant to knowledge management. These include educating people about knowledge management processes and infrastructures, using knowledge management as a learning/educational conduit, through the dissemination of information, the sharing and transfer of knowledge, and the use of e-learning and other forms of learning systems in educational institutions.

Review: This section provides a collection of review abstracts and citations about KM concepts, models, processes, structures and techniques. Authors in this section provide both historical and current overviews of common issues in, barriers to, and potential benefits of, knowledge management in a wide variety of organisational and international settings.

Systems/Approaches: These abstracts and citations provide insights into the vast variety of knowledge management systems currently available and in operation. The systems utilised vary in their location (computer based, human based), focus (data collection, data mining, knowledge production) and organising structures (networks, databases).

EVALUATION STUDIES

This section deals with studies measuring the impact of different approaches to managing knowledge. Knowledge management practices are identified and investigated. How do individuals and organisations use and access knowledge management systems? Organisations from different industries are compared in terms of knowledge management practices and their perceptions of the systems in place. A wide range of methods is employed covering qualitative methods such as interviews and case and field studies as well as quantitative empirical studies using questionnaires.

Beckett, A. J., C. E. R. Wainwright, et al. (2000). "Implementing an industrial continuous improvement system: a knowledge management case study." *Industrial Management and Data Systems* 100(7): 330-338.

Bennett, R. and H. Gabriel (1999). "Organisational factors and knowledge management within large marketing departments: An empirical study." *Journal of Knowledge Management* 3(3): 212-225.

Abstract 179 heads of sales or direct marketing departments in large UK companies across 5 industry sectors completed mail questionnaires concerning the knowledge management (KM) practices employed by their firms. The extents of the KM systems operating within sample enterprises were analyzed with respect to each company's use of teamwork, level of bureaucracy and centralization of decision making, innovativeness, and ability to cope with change. Respondents' views on the contributions of KM to marketing management were also examined.

Berdrow, I. and H. W. Lane (2003). "International joint ventures: creating value through successful knowledge management." *Journal of World Business* 38(1): 15-30.

Abstract Knowledge management is the conscious and active management of creating, disseminating, evolving and applying knowledge to strategic ends. In this paper, we examine knowledge management in the context of international joint ventures (IJVs), activities that cut across organizational and national boundaries, to show how to manage the behavioral and contextual considerations to create value for the parent companies. A case based methodology was used to conduct 20 in-depth interviews and collect archival data from eight IJVs within the NAFTA partnership of Canada, U.S.A. and Mexico. The findings, achieved with the aid of NUD.IST, a qualitative data analysis package, are summarized into six descriptors that differentiate successful and unsuccessful cases. These descriptors are: mindset, controls,

strategic integration, training and development, resource contributions and integration, and relationship development.

Bornemann, M. and M. Sammer (2003). "Assessment methodology to prioritize knowledge management related activities to support organizational excellence." *Measuring Business Excellence* 7(2): 21-28.

Bose, R. (2003). "Knowledge management-enabled health care management systems: capabilities, infrastructure, and decision-support." *Expert Systems with Applications* 24(1): 59-71.

Abstract The health care industry is increasingly becoming a knowledge-based community that is connected to hospitals, clinics, pharmacies, and customers for sharing knowledge, reducing administrative costs and improving the quality of care. Thus, the success of health care depends critically on the collection, analysis and seamless exchange of clinical, billing, and utilization information or knowledge within and across the above organizational boundaries. This research envisions a knowledge management-enabled health care management system that would help integrate clinical, administrative, and financial processes in health care through a common technical architecture; and provides a decision support infrastructure for clinical and administrative decision-making. Hence, the objective of this research is to present and describe the knowledge management capabilities, the technical infrastructure, and the decision support architecture for such a health care management system. The research findings would immensely help the health care information technology (IT) managers and knowledge based system developers to identify their IT needs and to plan for and develop the technical infrastructure of the health care management system for their organizations.

Chang Lee, K., S. Lee, et al. "KMPI: measuring knowledge management performance." *Information & Management In Press, Corrected Proof.*

Abstract This paper provides a new metric, knowledge management performance index (KMPI), for assessing the performance of a firm in its knowledge management (KM) at a point in time. Firms are assumed to have always been oriented toward accumulating and applying knowledge to create economic value and competitive advantage. We therefore suggest the need for a KMPI which we have defined as a logistic function having five components that can be used to determine the knowledge circulation process (KCP): knowledge creation, knowledge accumulation, knowledge sharing, knowledge utilization, and knowledge internalization. When KCP efficiency increases, KMPI will also expand, enabling firms to become knowledge-intensive. To prove KMPI's contribution, a questionnaire survey was conducted on 101 firms listed in the KOSDAQ market in Korea. We associated KMPI with three financial measures: stock price, price earnings ratio (PER), and R&D expenditure. Statistical results

show that the proposed KMPI can represent KCP efficiency, while the three financial performance measures are also useful.

Chourides, P., D. Longbottom, et al. (2003). "Excellence in knowledge management: an empirical study to identify critical factors and performance measures." *Measuring Business Excellence* 7(2): 29-45.

Chuang, S.-H. (2004). "A resource-based perspective on knowledge management capability and competitive advantage: an empirical investigation." *Expert Systems with Applications* 27(3): 459-465.

Abstract The concept of knowledge management (KM) as a powerful competitive weapon has been strongly emphasized in the strategic management literature, yet the sustainability of the competitive advantage provided by KM capability is not well-explained. To fill this gap, this paper develops the concept of KM as an organizational capability and empirically examines the association between KM capabilities and competitive advantage. In order to provide a better presentation of significant relationships, through resource-based view of the firm explicitly recognizes important of KM resources and capabilities. Firm specific KM resources are classified as social KM resources, and technical KM resources. Surveys collected from 177 firms were analyzed and tested. The results confirmed the impact of social KM resource on competitive advantage. Technical KM resource is negatively related with competitive advantage, and KM capability is significantly related with competitive advantage.

Damodaran, L. and W. Olphert (2000). "Barriers and facilitators to the use of knowledge management systems." *Behaviour & Information Technology* 19(6): 405-413.

Abstract Investigated the use and perceptions of an electronic information management system (EIM) within a multi-national company. 33 managers, information systems support personnel, and specialists completed interviews concerning perceived aims and benefits, current usage, perceived barriers to usage, factors promoting usage, user requirements, and critical success factors of their existing EIM system. Results show that, in spite of the commitment of management and belief in the strategic importance of the EIM to the company's aims and success, uptake of the EIM system was slow. The shortfall between the promise of EIM technology and actual delivery was considerable. The 4 main causes of underutilization of the EIM system were: (1) inadequacies of the technology; (2) lack of user-friendliness of the system; (3) high current workload and absence of spare capacity for new tasks; and (4) failure to institutionalize the EIM.

Darroch, J. and R. McNaughton (2003). "Beyond market orientation: Knowledge management and the innovativeness of New Zealand firms." *European Journal of Marketing* 37(3-4): 572-593.

Abstract Knowledge is seen as a critical resource, with both tangible and intangible attributes. Effective knowledge management is emerging as an important concept that enables all the resources of firms, including knowledge, to be used effectively. A knowledge-management orientation is positioned in this paper as a distinctive capability that supports the creation of sustainable competitive advantages such as innovation. Using an instrument to measure a knowledge-management orientation, which is grounded in the A. K. Kohli et al (1993) work on a market orientation, this paper identifies 4 clusters of firms based on knowledge-management practices that exist within the New Zealand business environment. The clusters are then described according to their innovation and financial performance profiles. The study finds that firms with a knowledge-management orientation outperformed those classified as market-oriented. Results also show a market orientation to be a subset of a knowledge-management orientation.

de Pablos, P. O. (2002). "Knowledge management and organizational learning: Typologies of knowledge strategies in the Spanish manufacturing industry from 1995 to 1999." *Journal of Knowledge Management* 6(1): 52-62.

Abstract Investigates organizational knowledge strategies in Spanish industry, using a survey questionnaire covering: (1) organizational knowledge management, and (2) organizational learning and performance. Applies P. Bierly and A. Chakrabarty's typology of generic knowledge strategies to perform cluster analysis and classify firms. Implications for strategy emerge: each firm owns a specific bundle of resources forming organizational capabilities; uniqueness nature is an outcome of different organizational decisions. Knowledge strategies determine stocks and flows of organizational knowledge and competitive advantage of firms. Decisions involving trade-offs between knowledge exploitation or exploration, internal or external knowledge, breadth of knowledge base, etc. should be made to configure the best strategy. Results show organizational performance varies across clusters. Knowledge strategy should be integrated among strategic decisions to get good organizational fit.

del-Rey-Chamorro, F. M., R. Roy, et al. (2003). "A framework to create key performance indicators for knowledge management solutions." *Journal of Knowledge Management* 7(2): 46-62.

Abstract Knowledge management (KM) is popular within the engineering industry. With increasing investment in KM projects, companies are looking for ways to justify their effort. This research develops a framework to assess the contribution of KM solutions within a business against its corporate objectives. The framework uses a set of key performance indicators (KPIs) as lead indicators. The lead indicators are developed in line with the lag indicators at the strategic level. A number of templates is developed to implement the framework within a company. A real life case study is presented where the templates are

used to identify KPIs for a manufacturing solution. The paper also gives guidelines on using the templates effectively.

Desouza, K. and R. Evaristo (2003). "Global Knowledge Management Strategies." *European Management Journal* 21(1): 62-67.

Abstract In this paper we address the issue of managing knowledge within firms that span multiple countries. Through a series of semi-structured interviews with 29 senior managers, spanning three continents and 11 firms, we present insights on knowledge management approaches and strategies being undertaken. In the organizations we interviewed we found presence of three strategies for knowledge management: Headquarter Commissioned and Executed, Headquarter Commissioned and Regionally Executed, and Regionally Commissioned and Locally Executed. We also discuss challenges faced in executing global knowledge management initiatives.

Desouza, K. C. (2003). "Strategic contributions of game rooms to knowledge management: some preliminary insights." *Information & Management* 41(1): 63-74.

Abstract Academics and practitioners have stressed the significance of managing knowledge in today's competitive environment. This has resulted in many efforts to increase knowledge exchange between organizational members. Much work so far has focused on the use of information technology as either a solution or enabler of knowledge management. While information technology enables easy exchange of explicit knowledge, its contributions to sharing tacit knowledge is restricted to connecting individuals via tools, such as e-mail and groupware. This research adds to the literature by reporting on a people-centered perspective for facilitating tacit knowledge exchange. The article describes an in-depth case study carried out to determine the role played by game rooms in the exchange of tacit knowledge.

Dilnutt, R. (2002). "Knowledge management in practice: Three contemporary case studies." *International Journal of Accounting Information Systems* 3(2): 75-81.

Abstract Knowledge management has become a popular business management discussion topic over the past 5 years. Some of this discussion is no more than hype-generated by software product vendors and consulting houses. However, there is a compelling value proposition holding that the intellectual capital of most organisations can be better managed to create internal efficiencies and external business opportunities. This paper discusses three knowledge management initiatives recently undertaken in the Asia Pacific region that have delivered real business improvements with quantifiable benefits and demonstrable outcomes. Two of these case studies involve major Australian-

based financial institutions, while the third relates to a government treasury organisation.

Gabbay, J., A. le May, et al. (2003). "A case study of knowledge management in multiagency consumer-informed 'communities of practice': Implications for evidence-based policy development in health and social services." *Health: An Interdisciplinary Journal for the Social Study of Health, Illness & Medicine* 7(3): 283-310.

Abstract We report a study that facilitated and evaluated two multi-agency Communities of Practice (CoPs) working on improving specific aspects of health and social services for older people, and analysed how they processed and applied knowledge in formulating their views. Data collection included observing and tape-recording the CoPs, interviewing participants and reviewing documents they generated and used. All these sources were analysed to identify knowledge-related behaviours. Four themes emerged from these data: (1) the way that certain kinds of knowledge became privileged and accepted; (2) the ways in which the CoP members transformed and internalized new knowledge; (3) how the haphazard processing of the available knowledge was contingent upon the organizational features of the groups; and (4) the ways in which the changing agendas, roles and power-relations had differential effects on collective sense making. We conclude by recommending ways in which the process of evidence-based policy development in such groups may be enhanced.

Gebert, H., M. Geib, et al. (2003). "Knowledge-enabled customer relationship management: Integrating customer relationship management and knowledge management concepts[1]." *Journal of Knowledge Management* 7(5): 107-123.

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.

Gottschalk, P. (1999). "Knowledge management in the professions: Lessons learned from Norwegian law firms." *Journal of Knowledge Management* 3(3): 203-211.

Abstract Knowledge management is an increasingly important source of competitive advantage for organizations. Knowledge embedded in the organization's business processes and employees' skills provide the firm with unique capabilities to deliver customers with a product or service. Law firms represent an industry which seems well suited for knowledge management investigation. They are knowledge intensive, and use of advanced information technology may transform these organizations in the future. To examine knowledge management in Norwegian law firms, a study that involves two phases of data collection and analysis was designed. The first phase was an initial field study of the leading law firm in Norway. The second phase is a survey of Norwegian law firms. The semi-structured interview in the initial field study document a strong belief in the potential benefits from knowledge management. Future research will investigate law firms' competitive advantage, value of intangible assets, profitability and capabilities from knowledge management.

Gray, P. H. (2001). "A problem-solving perspective on knowledge management practices." *Decision Support Systems* 31(1): 87-102.

Abstract A wide variety of organizational practices have been proposed to support the creation, storage and transfer of knowledge, yet it is often unclear how these practices relate to one another in their contribution to organizational performance. This study develops a categorization system for knowledge management practices based on two dimensions: the practices' role in the problem-solving process, and the type of problem they address. Analysis of survey data supports the proposed framework and uncovers two higher order factors that correspond to the concepts of exploration and exploitation. By focusing attention on the importance of problem solving in transforming knowledge into business value, this research suggests a new way to understand the connection between knowledge management practices and organizational goals.

Hendriks, P. H. J. and D. J. Vriens (1999). "Knowledge-based systems and knowledge management: Friends or foes?" *Information & Management* 35(2): 113-125.

Abstract Knowledge-based systems (KBS) provide a way of formalizing and automating knowledge. Their worth for managing the knowledge assets has not gone unnoticed: they have been promoted as safeguards to retain expert knowledge, to avoid knowledge erosion, etc. KBS are the outcome of a

knowledge engineering process that may be seen as providing some of the building blocks of knowledge management. Although 'knowledge' is the first word in knowledge-based systems, they are hardly ever considered from a knowledge perspective. As a result, a biased view of the organizational value of KBS exists in the literature, putting an undue emphasis on technology. The key issue addressed in this article is: how does knowledge engineering relate to a broader perspective of knowledge management? A way to identify the issues to be addressed when valuing KBS as potential measures for knowledge management is presented. To illustrate its value, the outcomes of a recent empirical investigation of how KBS function within organizations are presented.

Henriksen, L. B. (2001). "Knowledge management and engineering practices: the case of knowledge management, problem solving and engineering practices." *Technovation* 21(9): 595-603.

Abstract Recent debates on knowledge management, competence strategy and the like have made knowledge a pivotal concept in studies of management of technology. It is rather trivial to argue that engineers need to know in order to function as engineers. But how does knowledge work in engineering practices? The Knowledge Project was an attempt to get closer to the everyday life of engineers and to find ways of making engineer's search for knowledge more efficient. The major results from The Knowledge Project are described in this article.

Heinrichs, J. H. and J.-S. Lim (2003). "Integrating web-based data mining tools with business models for knowledge management." *Decision Support Systems* 35(1): 103-112.

Abstract As firms begin to implement web-based presentation and data mining tools to enhance decision support capability, the firm's knowledge workers must determine how to most effectively use these new web-based tools to deliver competitive advantage. The focus of this study is on evaluating how knowledge workers integrate these tools into their information and knowledge management requirements. The relationship between the independent variables (web-based data mining software tools and business models) and the dependent variable (strategic performance capabilities) is empirically tested in this study. The results from this study demonstrate the positive interaction effect between the tools and models application on strategic performance capability.

Hu, J., K.-T. Huang, et al. (1997). "Customer Information Quality and Knowledge Management: A Case Study Using Knowledge Cockpit." *Journal of Knowledge Management* 1(3): 225-236.

Inkpen, A. C. and A. Dinur (1998). "Knowledge management processes and international joint ventures." *Organization Science* 9(4): 454-468.

Abstract The management and processing of organizational knowledge are critical to organizational success. By exploring how firms access and use alliance-based knowledge, the authors provide evidence that the firm is a dynamic system of processes involving different types of knowledge. 58 managers in automotive industry companies are interviewed and the data from this longitudinal study of joint ventures (JVs) between North American and Japanese firms is used to address 3 research questions: (1) what processes do JV partners use to gain access to alliance knowledge; (2) what types of knowledge are associated with the different processes and how should that knowledge be classified; and (3) what is the relationship between organizational levels, knowledge types, and the transfer of knowledge? The authors identify the processes used by alliance partners to transfer knowledge from an alliance to a partner context: technology sharing, alliance-parent interaction, personnel transfers, and strategic integration. Each process provides an avenue for managers to gain knowledge and ideas outside their own organizational boundaries and creates a connection for managers to communicate their alliance experience.

Kalling, T. (2003). "Knowledge management and the occasional links with performance." *Journal of Knowledge Management* 7(3): 67-81.

Abstract This paper argues that current research into knowledge management fails to recognize and offer a detailed understanding about the role of knowledge in improving firm performance. Instead of focusing, exclusively, on the nature and attributes of knowledge, and the management of learning, research should also direct attention to the factors that enable knowledge to contribute to performance. To aid in this, this paper suggests that the concept of knowledge management is divided into three instances; development, utilization and capitalization, based on the assumption that knowledge is not always utilized, and that utilized knowledge does not always result in improved performance. The paper also identifies challenges and solutions in relation to each of the instances. Empirical findings are based on empirical study of three knowledge ventures within a European manufacturing MNC.

Lehr, J. K. and R. E. Rice (2002). "Organizational measures as a form of knowledge management: a multitheoretic, communication-based exploration." *Journal of the American Society for Information Science and Technology*. 53(12): 1060-73.

Liebowitz, J. (2000). "Knowledge management receptivity at a major pharmaceutical company." *Journal of Knowledge Management* 4(3): 252-258.

Abstract Notes that knowledge management seems to be an emerging trend in organizations, but skepticism still exists among many managers as to the true value of undertaking knowledge management initiatives. This article presents a

survey of knowledge management receptivity attitudes of 85 senior managers in a major pharmaceutical company. Survey responses indicate that the organization under study has a firm and clear understanding of the value of its employees, especially the "experts" in the organization. 98% indicated agreement that managers' awareness of the importance of providing their expert employees with challenging work is a necessary ingredient to retain knowledge in an organization. There was some ambiguity over the terms "knowledge worker" and "knowledge work", and it appeared that most people were not familiar with the term or concept of a "knowledge organization". The author concludes that the company seems to appreciate the potential and value of KM but needs some further education on the principles and specific methodologies, techniques, and tools as to how best to leverage their knowledge in their organization to evolve into a "learning organization". The Knowledge Management Receptivity Survey is appended.

Lim, D. and J. Klobas (2000). "Knowledge management in small enterprises." *Electronic Library*. 18(6): 420-32.

Abstract This paper investigates the extent to which six factors drawn from the theory and practice of knowledge management can be applied in small organisations. The factors are: balance between need and cost of knowledge acquisition; the extent to which knowledge originates in the external environment; internal knowledge processing; internal knowledge storage; use and deployment of knowledge within the organisation; and attention to human resources. Three cases demonstrate that the fundamental concepts and principles of knowledge management are similar for small and large organisations. Differences include the value placed on systematic knowledge management practices such as formalised environmental scanning and computer-based knowledge sharing systems. Consultants, and library and information professionals, are advised to understand the organisation's management and communication culture; emphasise simple and inexpensive systems integrated into everyday practice; and establish and monitor adherence to tools such as records management schedules. Information professionals can contribute much by managing systems which use vocabularies to enhance information retrieval for knowledge sharing.

Martin, L. M. and H. Matlay (2003). "Innovative use of the Internet in established small firms: the impact of knowledge management and organisational learning in accessing new opportunities." *Qualitative Market Research: An International Journal* 6(1): 18-26.

Mason, D. and D. J. Pauleen (2003). "Perceptions of knowledge management: a qualitative analysis." *Journal of Knowledge Management* 7(4): 38-48.

McAdam, R. and R. Reid (2000). "A comparison of public and private sector perceptions and use of knowledge management." *Journal of European Industrial Training* 24(6): 317-329.

McAdam, R. and R. Reid (2001). "SME and large organisation perceptions of knowledge management: Comparisons and contrasts." *Journal of Knowledge Management* 5(3): 231-241.

Abstract Compares the perceptions of both large organisations and small- to medium-sized enterprises (SMEs) at a meta level in regard to knowledge management (KM) to improve overall understanding and synthesis of the philosophy and to develop sector-specific learning in the SME sector. First, the article identifies and describes the key dimensions of KM using a socially constructed KM model. Second, the authors use a survey of large (> 250 employees) and SME (< 250 employees) organisations to investigate the perceptions of the KM dimensions. A series of qualitative social constructionist workshops is then reviewed, involving both large and SME organisations which were run to gain a deeper insight into the sectoral comparisons. The results indicate that KM is understanding and implementation is developing in the large organisation sector and knowledge is recognised as having both scientific and social elements. However, the SME sector was less advanced with a mechanistic approach to knowledge and a lack of investment in KM approaches and systems.

McCampbell, A. S., L. M. Clare, et al. (1999). "Knowledge management: The new challenge for the 21st century." *Journal of Knowledge Management* 3(3): 172-179.

Abstract This paper defines the newly emerging concept of knowledge management. The topics presented include: principles and practices of knowledge management, organization, distribution, dissemination, collaboration and refinement of information, and the effect on productivity and quality in business today. The technical applications and tools currently utilized within this discipline are also discussed. Case studies are included on the following firms: Teltech, Ernst & Young, Microsoft, and Hewlett Packard. These are analyzed to determine the effect knowledge management practices have on quality improvement and increased productivity. The authors have included a recommended strategy for implementation of knowledge management "best practices". Finally, conclusions are drawn regarding the strategic direction of this new discipline and its effect on competition, productivity and quality for the business of tomorrow.

McNulty, T. (2002). "Reengineering as knowledge management: A case of change in UK healthcare." *Management Learning* 33(4): 439-458.

Abstract This study of business process reengineering within a UK hospital engages with the following phenomena of interest to organizational scholars and

practitioners: corporate change programmes; new forms of organizing; and knowledge processes in and around organizations. A hospital change programme is conceptualized here as a form of knowledge management whereby organizational leaders used business process reengineering in an attempt to effect changed organizational arrangements and performance. The article observes shifts in the ambition, organization and practice of the reengineering programme over time. The encounter between reengineering as "off-the shelf" prescription and the hospital setting reveals the interaction between "knowledge" and "knowing" to be a social process more subject to politicized relations and arrangements than presently theorized. Thus the study promotes a more socialized view of knowledge management and greater links between contemporary developments in theorizing about organizational change, learning and knowledge processes. Other observations emanating from the study are that greater attention needs to be given to assumptions of knowledge transfer and use within debate about best-practice concepts and corporate change programmes.

Moffett, S., R. McAdam, et al. (2003). "An empirical analysis of knowledge management applications." *Journal of Knowledge Management* 7(3): 6-26.

Mohamed Eshaq, A. R. and P. Karboulonis (2003). "Design considerations for the design of an advanced VR interface for knowledge management and its relevance to CAD." *Automation in Construction* 12(5): 501-507.

Abstract This paper introduces knowledge management as a key in establishing both valuation and value creation capabilities in the enterprise where dissemination of knowledge and effective sharing of information through collaboration spur creativity and stimulate business practices. The paper draws an original approach for the design and development of a universal information/knowledge visualisation tool, elucidates the mechanics that enable the working prototype and most important it elaborates on the concepts that have led to the adopted architecture. Finally it presents the next step in the system's development cycle outlining its architecture and direction.

Montani, S. and R. Bellazzi (2000). "Exploiting multi-modal reasoning for knowledge management and decision support: an evaluation study." *Proceedings / AMIA ... Annual Symposium*.

Abstract We present the first evaluation results of a knowledge management and decision support system for Type I diabetes patients' care. Such system, meant to help physicians in therapy revision, relies on the integration of Rule Based Reasoning and Case Based Reasoning, and exploits both explicit and implicit knowledge. Reliability was positively judged by a group of expert diabetologists; an increase in its performances is foreseen as new knowledge will be acquired, through the system usage in clinical practice.

Montani, S. and R. Bellazzi (2002). "Supporting decisions in medical applications: the knowledge management perspective." *International Journal of Medical Informatics* 68(1-3): 79-90.

Abstract In the medical domain, different knowledge types are typically available. Operative knowledge, collected during every day practice, and reporting expert's skills, is stored in the hospital information system (HIS). On the other hand, well-assessed, formalised medical knowledge is reported in textbooks and clinical guidelines. We claim that all this heterogeneous information should be secured and distributed, and made available to physicians in the right form, at the right time, in order to support decision making: in our view, therefore, a decision support system cannot be conceived as an independent tool, able to substitute the human expert on demand, but should be integrated with the knowledge management (KM) task. From the methodological viewpoint, case based reasoning (CBR) has proved to be a very well suited reasoning paradigm for managing knowledge of the operative type. On the other hand, rule based reasoning (RBR) is historically one of the most successful approaches to deal with formalised knowledge. To take advantage of all the available knowledge types, we propose a multi modal reasoning (MMR) methodology, that integrates CBR and RBR, for supporting context detection, information retrieval and decision support. Our methodology has been successfully tested on an application in the field of diabetic patients management.

Ndlela, L. T. and A. S. A. du Toit (2001). "Establishing a knowledge management programme for competitive advantage in an enterprise." *International Journal of Information Management* 21(2): 151-165.

Abstract This article is concerned with the establishment of a knowledge management programme that will ensure sustainable competitive advantage within an enterprise. The main problem under investigation is to assess the importance of knowledge management within an enterprise and to ascertain how it can ensure sustained competitive advantage in an enterprise. An empirical survey was conducted in the Eskom Transmission Group, Johannesburg, South Africa to investigate understanding of the knowledge management concept amongst business leaders, determine enablers and barriers to implement a knowledge management programme and to determine whether knowledge is seen as a source for competitive advantage. It is suggested that enterprises should adopt a holistic and integrated approach when establishing such a programme. Broad recommendations for establishing a knowledge management programme that will be a source of sustainable competitive advantage are proposed.

O'Brien, C. and P. Cambouropoulos (2000). "Combating information overload: a six-month pilot evaluation of a knowledge management system in general practice." *British Journal of General Practice* 50(455): 489-90.

Abstract A six-month prospective study was conducted on the usefulness and usability of a representative electronic knowledge management tool, the WAX Active Library, for 19 general practitioners (GPs) evaluated using questionnaires and audit trail data. The number of pages accessed was highest in the final two months, when over half of the access trails were completed within 40 seconds. Most GPs rated the system as easy to learn, fast to use, and preferable to paper for providing information during consultations. Such tools could provide a medium for the activities of knowledge officers, help demand management, and promote sharing of information within primary care groups and across NHSnet or the Internet.

Palmer, C. A. (2004). "Linking learner autonomy and conditions for learning in the workplace: Knowledge management systems as organizing circumstances." *Dissertation Abstracts International Section A: Humanities & Social Sciences* 64(7-A): 2346.

Abstract External pressures on academic and management communities demand appropriate, specific, and quickly accessible knowledge transfer for "best possible" business decisions. Large amounts of money are spent by organizations on knowledge transfer activities that fail upon implementation. One reason may be that organizations have assumed that databases would be used by employees as resources to transfer knowledge. Results of this study clearly show that this is not the case. This study investigated how learning characteristics of employees influence their use (or non-use), of a knowledge management database (KMDB). Data was collected from technical manufacturing employees (n = 96), using G.J. Confessore's Learner Autonomy Profile (2001), and a questionnaire derived from Spear and Mocker's (1984) organizing circumstances. Participants completed the LAP and additional questions through the Internet. Participants indicated that they did not use the database as a resource because their perceptions of the database as a problem-solving mechanism precluded knowledge transfer. Results indicated learners were very much in control of their own learning and had a high need to control their learning resources. The study also provided new data through the creation of learning condition 5, indicating the non-use of a KMDB. These results present intriguing questions regarding the relationship between individuals' learning proclivities and workplace conditions. A company's knowledge base can be powerful when individual tacit knowledge is transferred into globally shared knowledge bases. However, this study has shown that learning tools can easily be blindsided by limitations of perspectives of learning and of the environment within a company. This study also demonstrated that applying the right tools in appropriate circumstances could provide unexpected gains toward profit and progress in both educational and organizational environments. Future research can identify learner characteristics and learning environment influences that enable knowledge transfer from employees' heads to company knowledge bases before employees walk out the door.

Parton, C., S. J. Wang, et al. (2002). "Knowledge management: evaluating the organizational requirements and culture for an emerging technology." Proceedings / AMIA ... Annual Symposium.

Abstract The purpose of this paper is to explore the application of knowledge management concepts to an information systems (IS) knowledge base, as opposed to a clinical one. The field of Medical Informatics is committed to helping others manage medical information and knowledge through the application of information technology. At Partners HealthCare, a wide variety of clinical information management systems have been built and implemented in complex environments, creating an extensive applied informatics knowledge base. How should healthcare IS departments manage this intellectual capital? That's the question that Partners HealthCare is asking its senior and middle IS managers. This paper reports on an internal survey addressing Knowledge Management (KM) requirements, the potential application of this technology in our organization, and discusses where we are today and where to go from here.

Pinelli, T. E. and R. O. Barclay (1998). "Maximizing the results of federally-funded research and development through knowledge management: A strategic imperative for improving U.S. competitiveness." Government Information Quarterly 15(2): 157-172.

Abstract Federally-funded research and development (R&D) represents a significant annual investment (approximately \$79 billion in fiscal year 1996) on the part of U.S. taxpayers. Based on the results of a 10-year study of knowledge diffusion in the U.S. aerospace industry, the authors take the position that U.S. competitiveness will be enhanced if knowledge management strategies, employed within a capability-enhancing U.S. technology policy framework, are applied to diffusing the results of federally-funded R&D. In making their case, the authors stress the importance of knowledge as the source of competitive advantage in today's global economy. Next, they offer a practice-based definition of knowledge management and discuss three current approaches to knowledge management implementation--mechanistic, "the learning organization," and systemic. The authors then examine three weaknesses in existing U.S. public policy and policy implementation--the dominance of knowledge creation, the need for diffusion-oriented technology policy, and the prevalence of a dissemination model--that affect diffusion of the results of federally-funded R&D. To address these shortcomings, they propose the development of a knowledge management framework for diffusing the results of federally-funded R&D. The article closes with a discussion of some issues and challenges associated with implementing a knowledge management framework for diffusing the results of federally-funded R&D.

Politis, J. D. (2003). "The connection between trust and knowledge management: What are its implications for team performance." Journal of Knowledge Management 7(5): 55-66.

Abstract The latest buzzwords in organizational change and development literature are "knowledge management" and "knowledge transfer", which proponents claim are successful ways of improving and enhancing employees' performance. Moreover, trust and the ability of employees to work in an autonomous manner are often cited as being essential for the effectiveness of self-managed teams. Little however, is known on the effect of interpersonal trust on knowledge management (acquisition) of team members, and the consequences for team performance. A survey of 49 self-managing teams was carried out to investigate the relationship between the dimensions of interpersonal trust, knowledge acquisition, and team performance. Overall, findings support that most interpersonal trust dimensions are positively related to the variables of knowledge acquisition. The results also showed that the effects of interpersonal trust on team performance to a large extent are mediated by the intervening variables of knowledge acquisition.

Rubenstein-Montano, B., J. Buchwalter, et al. (2001). "Knowledge management: A U.S. Social Security Administration case study." *Government Information Quarterly* 18(3): 223-253.

Abstract Knowledge management can be a powerful tool for addressing the "graying of government" and other factors contributing to the loss of expertise in government organizations. This paper presents a case study of knowledge management at the U.S. Social Security Administration and provides recommendations for how knowledge management might better protect valuable knowledge resources. A two-phase study was conducted of the Benefit Rate Increase/Premium Amount Collectible (BRI/PAC), a core process at the U. S. Social Security Administration, where critical knowledge is at risk of being lost. The study suggests that knowledge sharing, training, and the overall development of a working environment conducive to knowledge management promise to enhance performance of the BRI/PAC operation, at SSA.

Scarbrough, H. and J. Swan (2001). "Explaining the diffusion of knowledge management: The role of fashion." *British Journal of Management* 12(1): 3-12.

Abstract Provides evidence on the emergence and popularity of knowledge management (KM). This evidence is analyzed with the aim of explaining the widespread diffusion of KM across a large number of different groups and organizations, especially in the UK. In particular, the authors consider how far this pattern of diffusion can be explained in terms of the management fashion model (E. Abrahamson, 1996), and whether an alternative view might provide a more complete account of the emerging impact of KM.

Scholl, W., C. Konig, et al. (2004). "The future of knowledge management: an international delphi study." *Journal of Knowledge Management* 8(2): 19-35.

Shani, A. B., J. A. Sena, et al. (2003). "Knowledge management and new product development: a study of two companies." *European Journal of Innovation Management* 6(3): 137-149.

Sher, P. J. and V. C. Lee "Information technology as a facilitator for enhancing dynamic capabilities through knowledge management." *Information & Management In Press, Corrected Proof.*

Abstract Research on dynamic capabilities is an emerging field: it studies the activities of firms during turbulent administrative environments. Current management interests are also focused on knowledge management as a major determinant of business excellence and competitive advantage. Our motivation for this paper was to answer the research question: Does knowledge management (KM) contribute to the enhancement of dynamic capabilities and thus to the enhancement of business excellence and competitive advantage? Our effort examined the use of KM in enhancing dynamic capabilities. Based on results from a survey of major Taiwanese firms, we tested a set of hypotheses with regression models. Empirical findings suggest that management of both endogenous and exogenous knowledge through IT applications significantly enhances dynamic capabilities.

Shin, M. "A framework for evaluating economics of knowledge management systems." *Information & Management In Press, Corrected Proof.*

Abstract Organizations are implementing knowledge management (KM) systems with the assumption that the result will be an increase in organizational effectiveness, efficiency, and competitiveness. Implementing KM systems, however, may be a problem to organizations: too much or too little effort might lead to unwanted outcomes. This paper shows how the introduction of KM systems, which lead to knowledge-sharing, has a negative as well as a positive effect. Important variables from economic perspectives are identified and presented as an integrated framework to illustrate their interrelationships. This paper also explains the implications of an integrated framework for knowledge flow in organizations.

Smith, A. D. (2004). "Knowledge management strategies: a multi-case study." *Journal of Knowledge Management* 8(3): 6-16.

Southon, F. C. G., R. J. Todd, et al. (2002). "Knowledge management in three organizations: an exploratory study." *Journal of the American Society for Information Science and Technology*. 53(12): 1047-59.

Squier, M. M. and R. Snyman (2004). "Knowledge management in three financial organisations: a case study." *Aslib Proceedings: new information perspectives* 56(4): 234-242.

Stefanou, C. J., C. Sarmaniotis, et al. (2003). "CRM and customer-centric knowledge management: an empirical research." *Business Process Management Journal* 9(5): 617-634.

Syed-Ikhsan, S. O. S. and F. Rowland (2004). "Knowledge management in a public organisation: a study on the relationship between organizational elements and the performance of knowledge transfer." *Journal of Knowledge Management* 8(2): 95-111.

Tyndale, P. (2002). "A taxonomy of knowledge management software tools: origins and applications." *Evaluation and Program Planning* 25(2): 183-190.

Abstract A large number of tools have been deemed to be knowledge management tools. In this paper we examine, evaluate and organize a wide variety of such tools, as we look at their origins and their opportunities in the knowledge management arena, by examining the literature related to the selection and evaluation of the knowledge management tools available on the software market.

uit Beijerse, R. P. (1999). "Questions in knowledge management: Defining and conceptualising a phenomenon." *Journal of Knowledge Management* 3(2): 94-110.

Abstract This article examines and defines the main concepts in knowledge management. Since the economy has evolved over the last couple of years into a knowledge-based economy, knowledge has become one of the main assets of companies. Knowledge can be defined as: information; the capability to interpret data and information through a process of giving meaning to these data and information; and an attitude aimed at wanting to do so. In making these factors productive knowledge management can be defined as achieving organisational goals through the strategy-driven motivation and facilitation of (knowledge) workers to develop, enhance and use their capability to interpret data and information (by using available sources of information, experience, skills, culture, character, etc.) through a process of giving meaning to these data and information. Consultants and managers should ask themselves strategic, organisational and instrumental questions regarding knowledge management to stay competitive in a highly dynamic and changing world.

uit Beijerse, R. P. (2000). "Knowledge management in small and medium-sized companies: Knowledge management for entrepreneurs." *Journal of Knowledge Management* 4(2): 162-179.

Abstract Develops and presents a conceptual model that discusses knowledge management in small and medium-sized companies. This model is used to analyze 12 innovative companies from the industrial and business

service sector. It is stated that knowledge management appears in small and medium-sized companies to get its form especially at an operational level. A total of 79 instruments were found with which knowledge is organized in practice: 18 instruments for determining the knowledge gap and for evaluating knowledge; 41 instruments for acquiring and developing knowledge; 20 instruments for knowledge sharing. On a strategic and tactical level there are provisions for knowledge management but they have not been developed as such.

van Zolingen, S. J., J. N. Streumer, et al. (2001). "Problems in knowledge management: A case study of a knowledge-intensive company." *International Journal of Training & Development* 5(3): 168-184.

Abstract Knowledge management has become an important tool in staying ahead in the competition between companies. In this article five different phases of the knowledge management process are distinguished: acquiring knowledge, codifying knowledge, disseminating knowledge, developing knowledge and applying knowledge. The occurrence of knowledge management problems is demonstrated in a case study in a knowledge-intensive company. Most of the problems in this case occur in the first three phases of the knowledge management process. It is recommended that the company monitors on a regular basis, starting from its core competencies and its strategy, what essential knowledge their employees are lacking and encourages them to acquire it. Furthermore, the company should ensure that employees have time to codify their knowledge regularly and that adequate information systems are in place and kept up-to-date. The dissemination of knowledge can be improved by working in different teams, coupling junior with senior employees, and by the exchange of new knowledge between employees on a regular basis by encouraging the development of communities of practice and by the systematic creation of learning histories.

Wickramasinghe, N. and G. L. Mills (2002). "Integrating e-commerce and knowledge management--what does the Kaiser experience really tell us." *International Journal of Accounting Information Systems* 3(2): 83-98.

Abstract The growth of e-commerce (electronic commerce) is vast, complex and rapidly expanding. E-commerce is clearly an integral part of business, spreading across the areas of Business to Consumer, Business to Business, e-government and e-health. In fact, we could be forgiven for thinking we are in the e-millennium. E-medical record is an example of one such e-initiative to touch the health care sector. However, the true advantages of these e-medical records are not clear. We present the case example of medical automated record system (MARS), the automated medical record system at Kaiser Permanente-Ohio. In so doing, we show that the true advantage of this system is that it functions as a knowledge management system (KMS) simultaneously enabling and facilitating convergence and compliance of health care treatment, as well as enhancing and supporting the creation and renewal of knowledge pertaining to health care

delivery. This demonstrates the importance of integrating a knowledge management focus in many e-commerce initiatives and we conclude by outlining the implications of such a focus for all organisations trying to increase their customer moment of value.

Yahya, S. and W.-K. Goh (2002). "Managing human resources toward achieving knowledge management." *Journal of Knowledge Management* 6(5): 457-468.

Abstract Examined the linkages between human resource management and knowledge management. Specifically, the association between 4 areas of human resource management (training, decision-making, performance appraisal, and compensation and reward) with the 5 areas of knowledge management (knowledge acquisition, knowledge documentation, knowledge transfer, knowledge creation, knowledge application) was explored. Subjects were 300 managerial-level employees of Malaysian companies. The statistical results suggest that a knowledge organization requires a different management approach than the non-knowledge organization. Hence, the role of human resource management is also unique. In terms of employee development, the focus should be placed on achieving quality, creativity, leadership, and problem solving skill. The design of a compensation and reward system should be on promoting group performance, knowledge sharing, and innovative thinking. The performance appraisal must be the base of evaluation of employee's knowledge management practices, and an input for directing knowledge management efforts.

Yang, J.-T. and C.-S. C.-S. Wan (2004). "Advancing organizational effectiveness and knowledge management implementation." *Tourism Management* 25(5): 593-601.

Abstract In the recent past, most practitioners and researchers in hospitality have focused on the development of programs and practices for preventing employees leaving a job. The purpose of this paper is to examine an alternative focus, which is the possibility of sharing and retaining the knowledge which resides in employees' minds. The operational practices of this focus would not only add value for internal and external customers, but also benefit overall organizational effectiveness in today's knowledge-oriented era. Semi-structured interviews were administered in four International five-star hotels in Taiwan. This study aims to examine the extent to which the hotels implement knowledge management (KM) practices, the manner in which they are implemented and the impediments they face. The data clearly shows that KM practices, such as programs and cultures that support knowledge acquiring, sharing and storing, can benefit such hotels.

Zarraga, C. and J. M. Garcoa-Falcon (2003). "Factors favoring knowledge management in work teams." *Journal of Knowledge Management* 7(2): 81-96.

Abstract Knowledge management is an activity that has generated great interest in the business world recently. We conceive this activity as the process through which organizational knowledge is created from the individual knowledge of the members of the firm. A variety of contributions on the topic have indicated that organization in work teams is a suitable structure for putting that process into practice. However, we know that this alone is not sufficient. Therefore, in this study, we deal with the analysis of the conditions or characteristics that the work teams should have in order to be true centers of knowledge management. Based on a review of the literature and on the evidence provided by a quantitative empirical study, we obtain a list of factors favoring the process, in order of relative importance. Moreover, we distinguish between those that more deeply favor the creation of individual knowledge and those most suitable for inducing the transfer and integration of that knowledge.

HEALTH

Since the early 1990s knowledge management approaches have increasingly been integrated into health care services across the world, most notably in the UK's National Health Service. Health care has long been considered a knowledge based community, but as many of the references note, knowledge in health care is often kept in silos, at best underutilised, and, at the worst, current approaches result in vital information being missed along and between patients' continuums of care.

As well as models and systems for patient management, knowledge if managed well is able to contribute to decision support for both clinical interventions and referrals. Knowledge can provide access to and management of the latest medical, nursing and allied health practices, general scientific research, paving the way for evidence based practice. It can form the basis for continuing professional education, skilling of workers and provide support for communities of practice. These, and a myriad of other potential benefits, can be managed through a combination of organisational processes and infrastructure, including information technology.

Anonymous (2002). "Product directory -- general information management: knowledge management systems." *British Journal of Healthcare Computing & Information Management*. 19(5): 34.

Anonymous (2002). "Knowledge management a critical component of ongoing excellence." *Healthcare Benchmarks and Quality Improvement*. 9(11): 49-52.

Abidi, S. S. (2001). "Knowledge management in healthcare: towards 'knowledge-driven' decision-support services." *International Journal of Medical Informatics* 63(1-2): 5-18.

Abstract In this paper, we highlight the involvement of Knowledge Management in a healthcare enterprise. We argue that the 'knowledge quotient' of a healthcare enterprise can be enhanced by procuring diverse facets of knowledge from the seemingly placid healthcare data repositories, and subsequently operationalising the procured knowledge to derive a suite of Strategic Healthcare Decision-Support Services that can impact strategic decision-making, planning and management of the healthcare enterprise. In this paper, we firstly present a reference Knowledge Management environment-a Healthcare Enterprise Memory-with the functionality to acquire, share and operationalise the various modalities of healthcare knowledge. Next, we present the functional and architectural specification of a Strategic Healthcare Decision-

Support Services Info-structure, which effectuates a synergy between knowledge procurement (vis-a-vis Data Mining) and knowledge operationalisation (vis-a-vis Knowledge Management) techniques to generate a suite of strategic knowledge-driven decision-support services. In conclusion, we argue that the proposed Healthcare Enterprise Memory is an attempt to rethink the possible sources of leverage to improve healthcare delivery, hereby providing a valuable strategic planning and management resource to healthcare policy makers.

Akinsanya, C. Y. (1985). "The use of knowledge in the management of pain: the nurse's role." *Nurse Education Today*. 5(1): 41-6

Allee, V. and E. Reuthe (1999). "Knowledge management: moving the care model from a "snapshot" to a "story"." *Health Forum Journal*. 42(3): 4p.

Alverzo, J. (2004). "The use of aesthetic knowledge in the management of brain injury patients." *Rehabilitation Nursing*. 29(3): 85-9.

Abstract A patient's recovery from a brain injury (BI) is unpredictable and requires flexible nursing strategies for each stage of recovery. Empirical knowledge provides a framework for delivering nursing care based on scientific principles. Aesthetic knowledge, including intuition, provides a further opportunity to know and understand BI patients and their responses as they progress along the trajectory of recovery. Incorporating both empirical and aesthetic knowledge into the nursing plan of care for this population affords an opportunity for nurses to help patients and their families negotiate the course of recovery with greater success.

Atkinson, N. L. and R. S. Gold (2001). "Online research to guide knowledge management planning." *Health Education Research* 16(6): 747-63.

Abstract The current paper describes the process and results of an effort to find a way to effectively manage and diffuse prevention knowledge. This study shows the role that today's communication technologies can play in ensuring collaboration and participation in both the design and use of a knowledge management system (KMS) for prevention research, practice and policy. In the context of this study, 'prevention research' includes primary through tertiary prevention efforts consistent with general applied public health research in the US. An online Delphi study was used to engage a set of prevention research constituencies in the design of a mechanism to enhance the potential for effective technology transfer. A three-round Delphi was conducted with 58 stakeholders and key informants involved in prevention: government-level policy makers, researchers and front-line practitioners. The study resulted in consensus on 34 functions and 32 output/content elements of a proposed web-based KMS called PreventionEffects.net. The paper also describes the implications of both the processes of development and the benefits of the proposed system for those interested in prevention.

Bailey, C. (2003). "Using knowledge management to make health systems work." *Bulletin of the World Health Organization* 81(11).

Balas, E. A., S. Krishna, et al. (2004). "Computerized knowledge management in diabetes care." *Medical Care* 42(6): 610-21.

Abstract INTRODUCTION: Many scientific achievements become part of usual diabetes care only after long delays. The purpose of this article is to identify the impact of automated information interventions on diabetes care and patient outcomes and to enable this knowledge to be incorporated into diabetes care practice. METHODS: We conducted systematic electronic and manual searches and identified reports of randomized clinical trials of computer-assisted interventions in diabetes care. Studies were grouped into 3 categories: computerized prompting of diabetes care, utilization of home glucose records in computer-assisted insulin dose adjustment, and computer-assisted diabetes patient education. RESULTS: Among 40 eligible studies, glycated hemoglobin and blood glucose levels were significantly improved in 7 and 6 trials, respectively. Significantly improved guideline compliance was reported in 6 of 8 computerized prompting studies. Three of 4 pocket-sized insulin dosage computers reduced hypoglycemic events and insulin doses. Metaanalysis of studies using home glucose records in insulin dose adjustment documented a mean decrease in glycated hemoglobin of .14 mmol/L (95% confidence interval [CI], 0.11-0.16) and a decrease in blood glucose of .33 mmol/L (95% CI, 0.28-0.39). Several computerized educational programs improved diet and metabolic indicators. DISCUSSION: Computerized knowledge management is becoming a vital component of quality diabetes care. Prompting follow-up procedures, computerized insulin therapy adjustment using home glucose records, remote feedback, and counseling have documented benefits in improving diabetes-related outcomes.

Barbosa, R. M. and E. Paiva de Andrade (2003). "Model for a distance learning management course based on new information and learning technologies for educator's formation: a improvement proposal for teaching in the way of knowledge management by the total quality." *Online Brazilian Journal of Nursing*. 2(1): 6.

Abstract The impact brought by the contemporary transformations characterizes as being one of it's central elements the administration processes of knowledge, in other words, the capacity to produce, to store, to prosecute, to recover, and to disseminate information and knowledges. In this context, education is one of the most important protagonists, where we have the main genesis of knowledge construction, consumption, and transfer process. It is unquestionable importance as a critical strategic factor for the development, creation, interference, and contribution by an effective form for man's progress. Following this conductor thread, the teaching institutions should integrate a new culture, allowing that the learning occurs in different places and by different

means. The technology should be used, not only for existent computerization processes of teaching, but for the creation of new ways of thinking and learning. In this sense, search for the Total Quality in Education is the search for excellence in pedagogical, technical, and administrative processes of the school, where should converged the actions of properly qualified and pledged educators with permanent improvement in quality in education. By means of the exposed, this project aims to introduce the factors and structural components for the construction and administration of a model course in syntony with the arguments praised by the theories of Management Knowledge by Total Quality that enables, mostly, to supply the gap of the teachers formation's programs concerning it's technological training, encouraging the integration of modern technologies to the educational practice and suggesting new behaviors and new forms to produce, store, and transmit the knowledge, giving source of the new forms to think, do, and learn.

Beardall, R. W. and N. Wadle (1997). "Knowledge management and business transformation: a new value proposition for the enterprise CPR." *Healthcare Information Management* 11(4): 59-71.

Benson, T. (2000). "WaX: a personal healthcare knowledge management system for professionals." *Studies in Health Technology & Informatics* 77: 470-4.

Bose, R. (2003). "Knowledge management-enabled health care management systems: capabilities, infrastructure, and decision-support." *Expert Systems with Applications* 24(1): 59-71.

Abstract The health care industry is increasingly becoming a knowledge-based community that is connected to hospitals, clinics, pharmacies, and customers for sharing knowledge, reducing administrative costs and improving the quality of care. Thus, the success of health care depends critically on the collection, analysis and seamless exchange of clinical, billing, and utilization information or knowledge within and across the above organizational boundaries. This research envisions a knowledge management-enabled health care management system that would help integrate clinical, administrative, and financial processes in health care through a common technical architecture; and provides a decision support infrastructure for clinical and administrative decision-making. Hence, the objective of this research is to present and describe the knowledge management capabilities, the technical infrastructure, and the decision support architecture for such a health care management system. The research findings would immensely help the health care information technology (IT) managers and knowledge based system developers to identify their IT needs and to plan for and develop the technical infrastructure of the health care management system for their organizations.

Brakensiek, J. C. (2002). "Knowledge management for EHS professionals: is your organization's critical Environment Health and Safety knowledge walking out the door? You can stop it... Environmental Health and Safety." Occupational Health & Safety. 71(1): 72-4.

Burns, S. (2001). "Beyond best practices: knowledge management." Healthcare Benchmarks 8(11): 129-31.

Burns, T., C. Lonsdale, et al. (2004). "The knowledge audit as a launch pad for knowledge management in hospitals: a case report from Sunnybrook and Women's Health Sciences Centre." Healthcare Quarterly 7(3): 82-8.

Cheah, Y. N. and S. S. Abidi (1999). "Healthcare knowledge management through building and operationalising healthcare enterprise memory." Studies in Health Technology & Informatics 68: 726-30.

Abstract In this paper we suggest that the healthcare enterprise needs to be more conscious of its vast knowledge resources vis-a-vis the exploitation of knowledge management techniques to efficiently manage its knowledge. The development of healthcare enterprise memory is suggested as a solution, together with a novel approach advocating the operationalisation of healthcare enterprise memories leading to the modelling of healthcare processes for strategic planning. As an example, we present a simulation of Service Delivery Time in a hospital's OPD.

Chute, C. G., B. Cesnik, et al. (1994). "Medical data and knowledge management by integrated medical workstations: summary and recommendations." International Journal of Bio Medical Computing 34(1-4): 175-83.

Abstract The health care professional workstation will function as an interface between the user and the patient data as well as an interface pertinent medical knowledge. Appropriate knowledge focus will require the workstation to recognize the concepts and structure of patient data, and understand the scope and access methods of knowledge sources. Issues are organized around five major themes: (i) structure, (ii) reliability and validation, (iii) views, (iv) location, and (v) ethical and legal. Conventional database representations can effectively address data structure and format variations that will inevitably persist in local data stores. The reliability of data and the validation of knowledge are critical issues that may determine the ultimate utility of clinical workstations. Alternative views of patient information and knowledge sources represent the true power of an intelligent data portal, represented by a well-designed clinical workstation. Both data and knowledge are optimally represented in decentralized information networks, although the confidentiality and ownership of this information must be respected. Evolutionary progress toward consistent representations of knowledge and patient data will be facilitated by the establishment of self-

documentation standards for the developers of data encoding systems and knowledge sources, perhaps extended from the preliminary model afforded by the Unified Medical Language System (UMLS).

Davenport, T. H. and J. Glaser (2002). "Just-in-time delivery comes to knowledge management." *Harvard Business Review* 80(7): 107-11.

Abstract Like all primary care physicians, Dr. Bob Goldszer must stay on top of approximately 10,000 different diseases and syndromes, 3,000 medications, 1,100 laboratory tests, and many of the 400,000 articles added each year to the biomedical literature. That's no easy task. And it is, quite literally, a matter of life and death. The Institute of Medicine's 1999 report, *To Err Is Human*, suggests that more than a million injuries, and 90,000 deaths are attributable to medical errors annually. Something like 5% of hospital patients have adverse reactions to drugs, another study reports, and of those, 43% are serious, life threatening, or fatal. Many knowledge workers have problems similar to Dr. Goldszer's (though they're usually less life threatening). No matter what the field, many people simply can't keep up with all they need to know. In the early years of knowledge management, companies established knowledge networks and communities of practice, built knowledge repositories, and attempted to motivate people to share knowledge. But each of these activities involved a great deal of additional labor for knowledge workers. A better approach, say the authors, is to bake specialized knowledge into the jobs of highly skilled workers. Partners HealthCare has started to embed knowledge into the technology that doctors use in their jobs so that consulting it is no longer a separate activity. Now when Dr. Goldszer orders medicine or a lab test, the order-entry system automatically checks his decision against a massive clinical database as well as the patient's own medical record. Knowledge workers in other fields could likewise benefit from a just-in-time knowledge-management system tailored to deliver the right supporting information for the job at hand.

Dawes, M. and U. Sampson (2003). "Knowledge management in clinical practice: a systematic review of information seeking behavior in physicians. [Review] [20 refs]." *International Journal of Medical Informatics* 71(1): 9-15.

Abstract OBJECTIVES: To determine information seeking behavior of physicians. DATA SOURCES: Systematic review of 19 studies that described information seeking behavior in a number of different settings using differing methodologies. Analysis was limited to quantitative studies describing sources of information sought by physicians. RESULTS: Investigators have used questionnaires, interviews and observation to identify the information seeking behavior of clinicians. The results were mainly obtained from trials in the United States and showed a wide variation in primary information sources used by physicians. The most frequent source for information used are text sources, second is asking colleagues and only one study found electronic databases to be

the primary resource. Physician's desk reference is the commonest cited printed resource. Convenience of access, habit, reliability, high quality, speed of use, and applicability makes information seeking likely to be successful and to occur. The lack of time to search, the huge amount of material, forgetfulness, the belief that there is likely to be no answer, and the lack of urgency all hinder the process of answering questions. **CONCLUSIONS:** The wide variation in information seeking behavior implies a need for further categorization of information need and information sources. Careful planning of information delivery to physicians is required to enable them to keep up to date and to improve knowledge transfer.

de Lusignan, S., A. Brown, et al. (2002). "The Primary Care National Electronic Library for Health (NeLH-PC): a pilot of information-centred knowledge management for primary care -- www.nelh-pc.nhs.uk." *Informatics in Primary Care*. 10(2): 99-105.

Abstract Introduction: The NeLH-PC (Primary Care National electronic Library for Health) was created as part of the NHS information strategy. It is designed to deliver knowledge to primary care. The rationale for developing this library as a knowledge management tool and where it sits within the science of knowledge management are described., Method: Focus groups were used to define the questions that arise in primary care that the NeLHPC should be seeking to answer. The Primary Care Library is subject to a cyclical programme of continuous improvement., Results: A site has been developed to meet users' needs and levels of expertise. NeLH-PC attracts from 500 000 to in excess of 800 000 hits per month., Conclusions: NeLH-PC provides an exemplar of how a limited range of knowledge management tools is utilised. More investment is needed if a broader range of tools is to be provided. Greater integration is required with educationalists and other information and knowledge services if the library's full potential is to be realised.

de Lusignan, S., K. Pritchard, et al. (2002). "A knowledge-management model for clinical practice." *Journal of Postgraduate Medicine* 48(4): 297-303.

Detmer, W. M. (2001). "Medical knowledge management solutions: revolutionizing the delivery of medical information to the point of need." *Medicine on the Net*. 7(8): 7-8.

Einbinder, J. S., D. A. Klein, et al. (1997). "Making effective referrals: a knowledge-management approach." *Proceedings/AMIA Annual Fall Symposium*.

Abstract Patients and physicians often choose specially consultants with only limited knowledge of the available options. Access to information about specialists that was directly relevant to patient and clinician preferences could improve the effectiveness of the referral process. We have developed a

prescriptive representation of the process of selecting consultants. This "referral map," based on decision theory, uses patient and provider preferences elicited through a literature review and interviews with physicians and provides a formal framework for representing referral knowledge and for evaluating referral options. Our method suggests that the goals and processes of selecting consultants can be managed more systematically using explicit repositories. Such systematic management promises to have a beneficial impact on the delivery of health care, as well as on patient satisfaction.

Evans, M. (2001). "Creating knowledge management skills in primary care residents: A description of a new pathway to evidence-based practice in the community." *Evidence Based Medicine* 6(5): 133-134.

Fennessy, G. (2001). "Knowledge management in evidence-based healthcare: issues raised when specialist information services search for the evidence." *Health Informatics Journal*. 7(1): 4-7.

Abstract Knowledge management is in many ways a new paradigm in healthcare. This paper discusses how knowledge-management problems arising in evidence-based practice can be explored using 'soft systems methodology' and action research. An information centre working exclusively in evidence-based practice is used as a case study to explore how work teams and systems can be better utilized to provide clinical effectiveness information for busy healthcare practitioners.

Frize, M., L. Wang, et al. (1998). "New advances and validation of knowledge management tools for critical care using classifier techniques." *Proceedings / AMIA ... Annual Symposium*.

Abstract An earlier version (2.0) of the case-based reasoning (CBR) tool, called IDEAS for ICU's, allowed users to compare the ten closest matching cases to the newest patient admission, using a large database of intensive care patient records, and physician-selected matching-weights [1,2]. The new version incorporates matching-weights, which have been determined quantitatively. A faster CBR matching engine has also been incorporated into the new CBR. In a second approach, a back-propagation, feed-forward artificial neural network estimated two classes of the outcome "duration of artificial ventilation" for a subset of the database used for the CBR work. Weight-elimination was successfully applied to reduce the number of input variables and speed-up the estimation of outcomes. New experiments examined the impact of using a different number of input variables on the performance of the ANN, measured by correct classification rates (CCR) and the Average Squared Error (ASE).

Gabbay, J., A. le May, et al. (2003). "A case study of knowledge management in multiagency consumer-informed 'communities of practice': Implications for evidence-based policy development in health and social

services." *Health: An Interdisciplinary Journal for the Social Study of Health, Illness & Medicine* 7(3): 283-310.

Abstract We report a study that facilitated and evaluated two multi-agency Communities of Practice (CoPs) working on improving specific aspects of health and social services for older people, and analysed how they processed and applied knowledge in formulating their views. Data collection included observing and tape-recording the CoPs, interviewing participants and reviewing documents they generated and used. All these sources were analysed to identify knowledge-related behaviours. Four themes emerged from these data: (1) the way that certain kinds of knowledge became privileged and accepted; (2) the ways in which the CoP members transformed and internalized new knowledge; (3) how the haphazard processing of the available knowledge was contingent upon the organizational features of the groups; and (4) the ways in which the changing agendas, roles and power-relations had differential effects on collective sense making. We conclude by recommending ways in which the process of evidence-based policy development in such groups may be enhanced

Greenes, R. A. (2002). "Future of medical knowledge management and decision support." *Studies in Health Technology & Informatics* 80: 29-44.

Abstract Attempts to predict the future are typically off the mark. Beyond the challenges of forecasting the stock market or the weather, dramatic instances of notoriously inaccurate prognostications have been those by the US patent office in the late 1800s about the future of inventions, by Thomas Watson in the 1930s about the market for large computers, and by Bill Gates in the early 1990s about the significance of the Internet. When one seeks to make predictions about health care, one finds that, beyond the usual uncertainties regarding the future, additional impediments to forecasting are the discontinuities introduced by advances in biomedical science and technology, the impact of information technology, and the reorganizations and realignments attending various approaches to health care delivery and finance. Changes in all three contributing areas themselves can be measured in "PSPYs", or paradigm shifts per year. Despite these risks in forecasting, I believe that certain trends are sufficiently clear that I am willing to venture a few predictions. Further, the predictions I wish to make suggest a goal for the future that can be achieved, if we can align the prevailing political, financial, biomedical, and technical forces toward that end. Thus, in a sense this is a call to action, to shape the future rather than just let it happen. This chapter seeks to lay out the direction we are heading in knowledge management and decision support, and to delineate an information technology framework that appears desirable. I believe the framework to be discussed is of importance to the health care-related knowledge management and decision making activities of the consumer and patient, the health care provider, and health care delivery organizations and insurers. The approach is also relevant to the other dimensions of academic health care institution activities, notably the conduct of research and the processes of education and learning.

Greenes, R. A. and S. R. A. Deibel (1991). "The DeSyGNER knowledge management architecture: a building block approach based on an extensible kernel." *Artificial Intelligence in Medicine* 3(2): 95-111.

Abstract The Decision Systems Group has been developing a 'building block' approach for creating Knowledge Management (KM) applications for medical education and decision support. Potential functions and knowledge access modes to be supported include query, browsing, testing, simulation, didactic instruction, problem solving, and personal file management. Knowledge is considered to be available in multiple forms, non-adaptive and adaptive. We believe that organization and combination of disparate components, in order to build varied and complex applications as required for KM, is best achieved through a software engineering approach based on a kernel set of functions that provide a consistent set of services for all applications, facilitating extensibility and inter-application compatibility. For this purpose, we are exploring a prototype kernel architecture called DeSyGNER (the Decision Systems Group Nucleus of Extensible Resources). Features addressed by DeSyGNER include methods for decomposition of applications into modular units and identification of their functional dependencies; methods of structuring applications to separate their storage, processing, and presentation components; database requirements for indexing and composing complex structures from disparate, disjoint data elements; and methods to support multi-user cooperative development.

Greenes, R. A., D. B. Tarabar, et al. (1989). "Knowledge management as a decision support method: a diagnostic workup strategy application." *Computers & Biomedical Research* 22(2): 113-35.

Abstract We have explored the potential of a computer-based approach called "knowledge management" to aid in clinical problem solving and education. The major features of the approach are its ability to support flexible and immediate access by a user to relevant knowledge and annotation and organization of the knowledge for personal use and subsequent retrieval. We illustrate this approach with its application to diagnostic workup strategy problems. In this application, knowledge may be in the form of static narrative text, diagrams, pictures, graphs, tables, flow charts, or bibliographic citations. Other more dynamic forms of knowledge may be the result of simulations, "what if" analyses or modeling, quantitative mathematical or statistical calculation, or heuristic inference. User assessment has demonstrated the system's ease of use and user perception of its desirability, but underscores the need for a "critical mass" of knowledge before such an approach will be widely utilized.

Heathfield, H. and G. Louw (1999). "New challenges for clinical informatics: knowledge management tools." *Health Informatics Journal*. 5(2): 67-73.

Abstract It is widely recognized that medicine has reached a crisis point. Doctors can no longer memorize or effectively apply the vast amounts of

scientific knowledge that are relevant to their clinical practice. Estimates suggest that human knowledge doubles every 33 years, while the expansion of medical knowledge is currently estimated at doubling about every 19 years. In contrast, our intellectual capacity has remained practically static over the last thousand or so years. Many have looked to Information Technology (IT) to solve the problem of information overload in medicine. Simply converting existing information resources into an electronic form, however, and distributing or making them accessible to users, is far from adequate and can often exacerbate the problem of information overload. Efficient organization and distribution of knowledge is one of medicine's biggest challenges, and there is much talk about the new paradigm of 'knowledge management tools' which will transform the way medicine is practised.

Henry, J. B. (1990). "Computers in medical education: information and knowledge management, understanding, and learning. *Human Pathology* 21(10): 998-1002.

Abstract Desktop computers have evolved to permit physicians in practice and/or training to access and manage information to enhance knowledge, understanding, and learning. There are compelling reasons why the personal computer is key to learning and important in medical education. Above all, the computer enhances and amplifies the learning process. Using the desktop computer effectively is relatively easy. We teach our students to research information in books and journals and hope that, as practicing physicians, they do it even more to be current and maintain their competency. Why not a desktop computer to access and manage information, analyze it, and present findings? Computer technology is available to do virtually all of these tasks. Some tools are critical for medical students. For some time, all medical students have needed a black bag and microscope. Now every medical student needs a computer. Ample courseware is available and expanding rapidly for basic sciences and clinical disciplines. The explosion in biomedical information will continue. Finding information is key to understanding and learning rather than depending solely on memory, recall, or library trips for information. The desktop computer will benefit students, faculty, and future physicians and other health professionals as life-long learners.

Horak, B. J. (2001). "Dealing with human factors and managing change in knowledge management: a phased approach." *Topics in Health Information Management* 21(3): 8-17.

Abstract Ten human factors affect the implementation of knowledge management initiatives, including fear, cultural change, capturing of tacit knowledge, ease of use, stakeholder involvement, and benefits realization. To deal with these factors, a phased change management approach is offered, consisting of an assessment, strategic planning, organization development,

systems design, orientation and training, team building, and continuous evaluation and improvement

Hughey, D. (2002). "Implementing a clinical knowledge management system." Health IT Advisory Report. 3(9): 10-1.

Jackson, J. R. (2000). "The urgent call for knowledge management in medicine." Physician Executive 26(1): 28-31.

Jadad, A. R., R. B. Haynes, et al. (2000). "The internet and evidence-based decision-making: A needed synergy for efficient knowledge management in health care." CMAJ: Canadian Medical Association Journal 162(3): 362-365.

Jeans, M. E. (1999). "Developing a nursing knowledge management system." Bibliotheca Medica Canadiana. 20(3): 114-5.

Johnson, D. E. (1998). "Knowledge management is new competitive edge." Health Care Strategic Management 16(7): 2-3.

Abstract Managing knowledge is emerging as the latest business strategy to get ahead of the competition. In the process of developing knowledge management systems, executives are increasing their awareness and understanding of organizational dynamics, collaboration, corporate learning and knowledge management technology. But Donald E.L. Johnson writes that health care executives must buy into and understand collaboration and corporate learning before they tackle knowledge management.

Johnson, J. E. "Knowledge management and the shortage of health care workers: linkage, losses, and new perspectives." Patient Care Management. 16(7): 2.

Jovell, A. J. (2002). "Josep Laporte Library Foundation: a model of knowledge management in the life and health sciences." Health Information & Libraries Journal 19(3): 176-80.

Kalogeropoulos, D. A., E. R. Carson, et al. (2003). "Towards knowledge-based systems in clinical practice: development of an integrated clinical information and knowledge management support system." Computer Methods & Programs in Biomedicine 72(1): 65-80.

Abstract Given that clinicians presented with identical clinical information will act in different ways, there is a need to introduce into routine clinical practice methods and tools to support the scientific homogeneity and accountability of healthcare decisions and actions. The benefits expected from such action include an overall reduction in cost, improved quality of care, patient and public opinion satisfaction. Computer-based medical data processing has yielded methods and

tools for managing the task away from the hospital management level and closer to the desired disease and patient management level. To this end, advanced applications of information and disease process modelling technologies have already demonstrated an ability to significantly augment clinical decision making as a by-product. The wide-spread acceptance of evidence-based medicine as the basis of cost-conscious and concurrently quality-wise accountable clinical practice suffices as evidence supporting this claim. Electronic libraries are one-step towards an online status of this key health-care delivery quality control environment. Nonetheless, to date, the underlying information and knowledge management technologies have failed to be integrated into any form of pragmatic or marketable online and real-time clinical decision making tool. One of the main obstacles that needs to be overcome is the development of systems that treat both information and knowledge as clinical objects with same modelling requirements. This paper describes the development of such a system in the form of an intelligent clinical information management system: a system which at the most fundamental level of clinical decision support facilitates both the organised acquisition of clinical information and knowledge and provides a test-bed for the development and evaluation of knowledge-based decision support functions.

Kanouï, H. and M. Joubert (1995). "Acts and knowledge management in an open hospital information system." *Medinfo* 1: 382-6.

Abstract This communication presents the management of a customizable patient medical dossier as implemented in the NUCLEUS project. After a brief reminder of the NUCLEUS hospital information system features, we discuss the two main innovative concepts underlying the intelligent management of the integrated patient dossier: acts management and knowledge management. The functionalities related to patient dossier are then introduced.

Kanouï, H., M. Joubert, et al. (1995). "Acts and knowledge management in the NUCLEUS hospital information system." *Proceedings the Annual Symposium on Computer Applications in Medical Care*.

Abstract NUCLEUS is a project completed in June 1995 in the frame of the European Community programme AIM (Advanced Informatics in Medicine). The main result of NUCLEUS is a prototype of an integrated patient dossier. Together with this patient dossier, facilities have been developed for its customisation by the various categories of end-users. A semantic model has been designed to guide and control the exploitation of data, and ensures the overall integrity of the information system.

Keeling, C. and S. Lambert (2000). "Knowledge management in the NHS: positioning the healthcare librarian at the knowledge intersection." *Health Libraries Review* 17(3): 136-43.

Abstract This paper defines what is meant by Knowledge Management, investigates how it interlinks with new ways of delivering health care and gives a synopsis of a study that investigated issues around implementation of Knowledge Management across a sample of healthcare librarians. Areas of investigation that are related to Knowledge Management include: HSG(97)47, evidence-based medicine, clinical governance, information and communication technologies, and the changing role of the healthcare librarian. A diagram is included in this paper which illustrates how the healthcare librarian interacts with resources, staff and practices, so contributing to the knowledge base of health care. The paper concludes that Government policy, new technologies and the push towards the practice of information age medicine are forcing changes throughout the NHS. Recognition of Knowledge Management is still in its infancy in the NHS--it calls for major change in organizational thinking and acceptance by the librarian that their service must also be subject to continuous improvement.

Kenner, C. and J. H. Fernandes (2001). "Knowledge management and advanced nursing education." *Newborn and Infant Nursing Reviews*. 1(3): 192-8.

Abstract Knowledge management is not a new term in the business literature, but for most graduate nursing programs and practice sites, this concept/educational approach is foreign. As schools of nursing move closer to a business model, it is necessary to embrace some of the strategies our industrial partners are using. What is knowledge management? Is it an innovative educational approach that nurse educators should consider, or is it just another fad in business that nurses can ignore? This article will address these questions and offer the hypothesis that knowledge management is the wave of the future in nursing education to facilitate transition into the 21st century. Knowledge management is an approach that prepares the advanced practice nurse for the ever-changing health care environment in which care is rendered. It is a tool that will help a nurse to work more smartly, efficiently, and cost-effectively. Competency-based curriculum will be linked with knowledge management, as the emphasis today is on outcomes of our educational programs.

Kingston, J. and A. Macintosh (2000). "Knowledge management through multi-perspective modelling: representing and distributing organizational memory." *Knowledge-Based Systems* 13(2-3): 121-131.

Abstract Full and accurate representation of an organization's knowledge assets, which together constitute "organizational memory", requires multi-perspective modelling at a number of levels of detail. We propose that the perspectives which need to be represented can be characterized as who, what, how, when, where and why knowledge; these perspectives, and necessary levels of abstraction, are captured by the Zachman framework for Information Systems Architecture. We suggest modelling techniques that might be appropriate for different perspectives and levels of abstraction, and illustrate using examples

from a medical domain. We also describe how an individual perspective can become the user interface of a knowledge distribution system, and illustrate this by describing the protocol assistant, a Web-based knowledge-based system capable of representing and reasoning with best practice guidelines ("protocols") in the medical domain.

Koretz, S. and G. Lee (1998). "Knowledge management and drug development." *Journal of Knowledge Management* 2(2): 53-58.

Lindsey-King, C. (1998). "Knowledge management: your link to the future." *Bibliotheca Medica Canadiana*. 20(2): 74-5.

Louw, J. A., C. J. Seebregts, et al. (2001). "An informatics system to support knowledge management in the health sector--the South African National Health Knowledge Network." *Medinfo* 10(Pt 1): 361-5.

Abstract This paper discusses the planning and development of a South African national health knowledge network. The methodology is in essence based on the principles of knowledge management and the drivers of a system of innovation. The knowledge network, SA HealthInfo, aims to provide a one-stop interactive forum/resource, for quality-controlled and evidence-based health research information, to a wide spectrum of users, at various levels of aggregation, with the necessary security arrangements and facilities for interaction among users to promote explicit (codified) and tacit knowledge flow. It will therefore stimulate the process of innovation within the South African health system.

Lucier, R. E., N. W. Matheson, et al. (1988). "The knowledge workstation: an electronic environment for knowledge management." *Bulletin of the Medical Library Association* 76(3): 248-55.

Abstract This paper focuses on the creation of the IAIMS workstation in the context of the outcomes of a year-long IAIMS strategic planning process at the Johns Hopkins Medical Institutions (JHMI). These outcomes include a long-term institutional vision for a functional knowledge management environment, a JHMI IAIMS model, a strategic plan, and two model prototypes. The functional requirements and specific implementation strategies for the IAIMS workstation, the prototype for managing the knowledge base of the published biomedical literature, are discussed in detail.

Kupperschmidt, B. (2000). "The paradigm shift to knowledge management framework: challenges for nursing." *Oklahoma Nurse*. 45(1): 13-5.

Macdonald, M. (2003). "Knowledge management in healthcare: what does it involve? How is it measured?" *Healthcare Management Forum* 16(3): 7-11.

Abstract While knowledge exists in all healthcare organizations, it often remains in silos or on the sidelines, neither used to its maximum potential nor purposefully focused on strategic results. In order to facilitate the development of strategically valuable knowledge, this article outlines seven knowledge-building dimensions that create a solid knowledge-management lever within the organization. Additionally, the article helps readers to come to grips with accountability by suggesting strategic outcomes for knowledge management. A particular focus is on lead or forward-looking indicators that track the progress and success of knowledge management.

Malone, S. M. (2001). "Knowledge management: white knight or white elephant?" *Topics in Health Information Management* 21(3): 33-43.

Abstract Knowledge management (KM) is a new management theory embraced by hundreds of writers in multiple countries and industries. Although a single fixed methodology does not exist, several methodological elements are common to most KM writings. KM has a number of similarities to and differences from quality improvement and reengineering. It can be applied to at least two universes in health care organizations. Applying KM to a case study in health information management (HIM) departments yielded much useful information but also proved unable ultimately to resolve the problem being studied. HIM professionals can embrace elements about KM that are good and useful, while ignoring elements that do not work.

Matheson, N. W. (1995). "Things to come: postmodern digital knowledge management and medical informatics." *Journal of the American Medical Informatics Association* 2(2): 73-8.

Abstract The overarching informatics grand challenge facing society is the creation of knowledge management systems that can acquire, conserve, organize, retrieve, display, and distribute what is known today in a manner that informs and educates, facilitates the discovery and creation of new knowledge, and contributes to the health and welfare of the planet. At one time the private, national, and university libraries of the world collectively constituted the memory of society's intellectual history. In the future, these new digital knowledge management systems will constitute human memory in its entirety. The current model of multiple local collections of duplicated resources will give way to specialized sole-source servers. In this new environment all scholarly scientific knowledge should be public domain knowledge: managed by scientists, organized for the advancement of knowledge, and readily available to all. Over the next decade, the challenge for the field of medical informatics and for the libraries that serve as the continuous memory for the biomedical sciences will be to come together to form a new organization that will lead to the development of postmodern digital knowledge management systems for medicine. These systems will form a portion of the evolving world brain of the 21st century.

McNulty, T. (2002). "Reengineering as knowledge management: A case of change in UK healthcare." *Management Learning* 33(4): 439-458.

Abstract This study of business process reengineering within a UK hospital engages with the following phenomena of interest to organizational scholars and practitioners: corporate change programmes; new forms of organizing; and knowledge processes in and around organizations. A hospital change programme is conceptualized here as a form of knowledge management whereby organizational leaders used business process reengineering in an attempt to effect changed organizational arrangements and performance. The article observes shifts in the ambition, organization and practice of the reengineering programme over time. The encounter between reengineering as 'off-the shelf' prescription and the hospital setting reveals the interaction between 'knowledge' and 'knowing' to be a social process more subject to politicized relations and arrangements than presently theorized. Thus the study promotes a more socialized view of knowledge management and greater links between contemporary developments in theorizing about organizational change, learning and knowledge processes. Other observations emanating from the study are that greater attention needs to be given to assumptions of knowledge transfer and use within debate about best-practice concepts and corporate change programmes.

Montani, S. and R. Bellazzi (2000). "Exploiting multi-modal reasoning for knowledge management and decision support: an evaluation study." *Proceedings / AMIA ... Annual Symposium*.

Abstract We present the first evaluation results of a knowledge management and decision support system for Type I diabetes patients' care. Such system, meant to help physicians in therapy revision, relies on the integration of Rule Based Reasoning and Case Based Reasoning, and exploits both explicit and implicit knowledge. Reliability was positively judged by a group of expert diabetologists; an increase in its performances is foreseen as new knowledge will be acquired, through the system usage in clinical practice.

Montani, S. and R. Bellazzi (2002). "Supporting decisions in medical applications: the knowledge management perspective." *International Journal of Medical Informatics* 68(1-3): 79-90.

Abstract In the medical domain, different knowledge types are typically available. Operative knowledge, collected during every day practice, and reporting expert's skills, is stored in the hospital information system (HIS). On the other hand, well-assessed, formalised medical knowledge is reported in textbooks and clinical guidelines. We claim that all this heterogeneous information should be secured and distributed, and made available to physicians in the right form, at the right time, in order to support decision making: in our view, therefore, a decision support system cannot be conceived as an

independent tool, able to substitute the human expert on demand, but should be integrated with the knowledge management (KM) task. From the methodological viewpoint, case based reasoning (CBR) has proved to be a very well suited reasoning paradigm for managing knowledge of the operative type. On the other hand, rule based reasoning (RBR) is historically one of the most successful approaches to deal with formalised knowledge. To take advantage of all the available knowledge types, we propose a multi modal reasoning (MMR) methodology, that integrates CBR and RBR, for supporting context detection, information retrieval and decision support. Our methodology has been successfully tested on an application in the field of diabetic patients management.

Morrissey, J. (1998). "ACHE preview. Principles of knowledge management." *Modern Healthcare* 28(7): 16.

Nutkis, D. S. (1997). "Webcasting: knowledge management coming to health care providers." *Surgical Services Management*. 3(11): 18-21.

O'Brien, C. and P. Cambouropoulos (2000). "Combating information overload: a six-month pilot evaluation of a knowledge management system in general practice." *British Journal of General Practice* 50(455): 489-90.

Abstract A six-month prospective study was conducted on the usefulness and usability of a representative electronic knowledge management tool, the WAX Active Library, for 19 general practitioners (GPs) evaluated using questionnaires and audit trail data. The number of pages accessed was highest in the final two months, when over half of the access trails were completed within 40 seconds. Most GPs rated the system as easy to learn, fast to use, and preferable to paper for providing information during consultations. Such tools could provide a medium for the activities of knowledge officers, help demand management, and promote sharing of information within primary care groups and across NHSnet or the Internet.

Packer, J. and D. Parry-Smith (2002). "Drug target databases: Knowledge management exemplified through a gene family approach." *Current Drug Discovery*. Issue MAR.

Abstract In this post-genomic era, intelligent access to relevant information on potential drug targets is a key research facility, enabling prioritization of new targets for biomedical characterization, selectivity testing and high-throughput screening. Bioinformatics is set to play a critical role in organizing and delivering information that can empower scientists and senior decision-makers, rather than simply furnishing tools for a somewhat tedious data mining exercise.

Parachoor, S. B., E. Rosow, et al. (2003). "Knowledge management system for benchmarking performance indicators using statistical process control

Plaice, C. and P. Kitch (2003). "Embedding knowledge management in the NHS south-west: pragmatic first steps for a practical concept." *Health Information & Libraries Journal* 20(2): 75-85.

Abstract Knowledge management, like clinical governance, is a practical science. Clinical governance, with its emphasis on creating an environment where clinical quality is monitored and acted upon, is one of the foundation stones of the new National Health Service (NHS). Both knowledge management and clinical governance need to share the same criteria in order to operate. Using these two pragmatic concepts and the premise of a practical approach, this article seeks to identify the drivers for knowledge management in the NHS, highlight national initiatives and focus on the steps libraries in the south-west of England have taken to make knowledge management a reality. In so doing, the central role of the library and information service has been reinforced and embedded and librarians have been recognized for their real worth to their organizations.

Pedersen, M. K. and M. H. Larsen (2001). "Distributed knowledge management based on product state models -- the case of decision support in health care administration." *Decision Support Systems* 31(1): 139-158.

Abstract Knowledge management has inspired a shift from a transaction to a distributed knowledge management (DKM) perspective on inter-organizational information processing. The DKM concept structures the knowledge creation, knowledge sharing, and knowledge exploitation in organizations according to a product state model (PSM) required for management of technological diversity. Each player in the network acquires specific knowledge from other players for decision support. This article shows the relevance of the DKM model in a case study of a distributed decision support system (DDSS) in health care administration in the US.

Peruzzi, W. (2001). "Translating outcomes research into fiscal responsibility and knowledge management in health care." *Critical Care Medicine* 29(3): 679-680.

Peryer, A. and C. Ritchie (2003). "Knowledge management. Knowledge maps: a common language for the healthcare sector." *British Journal of Healthcare Computing & Information Management*. 20(5): 38-9.

Plaice, C. and P. Kitch (2003). "Embedding knowledge management in the NHS south-west: pragmatic first steps for a practical concept." *Health Information & Libraries Journal* 20(2): 75-85.

Abstract Knowledge management, like clinical governance, is a practical science. Clinical governance, with its emphasis on creating an environment

where clinical quality is monitored and acted upon, is one of the foundation stones of the new National Health Service (NHS). Both knowledge management and clinical governance need to share the same criteria in order to operate. Using these two pragmatic concepts and the premise of a practical approach, this article seeks to identify the drivers for knowledge management in the NHS, highlight national initiatives and focus on the steps libraries in the south-west of England have taken to make knowledge management a reality. In so doing, the central role of the library and information service has been reinforced and embedded and librarians have been recognized for their real worth to their organizations.

Reuthe, E. and V. Allee (1999). "Knowledge management: moving the care model from a "snapshot" to a "story"." Health Forum Journal 42(3): 26-8.

Russo, R. (2001). "The application of knowledge management principles to compliant coding activities." Topics in Health Information Management 21(3): 18-23.

Abstract This article applies the concepts of knowledge management to diagnostic and procedural coding performed by health care providers. The process of diagnostic and procedural coding is both an art and a science. In particular, the information stored away in the minds of individuals performing the coding function is ripe for the basis of an effective knowledge Health Information Management (HIM) coding management system. In this article, we explore the issues and processes that HIM professionals can take advantage of in standardizing the coding function.

Sandars, J. (2004). "Knowledge management: something old, something new!" Work Based Learning in Primary Care. 2(1): 9-17.

Abstract Knowledge management is a structured process that enables knowledge to be created, stored, distributed and applied to decision making. Experience from non-healthcare industries has identified the potential of knowledge management to increase the effectiveness of an organisation, and also the necessary factors that are required to ensure success of a knowledge management approach. Important lessons are now available from the available literature to enable the NHS to successfully implement knowledge management and to realise its full potential. There are important implications for work based learning in primary care.

Shams, K. and M. Farishta (2001). "Data warehousing: toward knowledge management." Topics in Health Information Management 21(3): 24-32.

Abstract With rapid changes taking place in the practice and delivery of health care, decision support systems have assumed an increasingly important role. More and more health care institutions are deploying data warehouse

applications as decision support tools for strategic decision making. By making the right information available at the right time to the right decision makers in the right manner, data warehouses empower employees to become knowledge workers with the ability to make the right decisions and solve problems, creating strategic leverage for the organization. Health care management must plan and implement data warehousing strategy using a best practice approach. Through the power of data warehousing, health care management can negotiate better managed care contracts based on the ability to provide accurate data on case mix and resource utilization. Management can also save millions of dollars through the implementation of clinical pathways in better resource utilization and changing physician behavior to best practices based on evidence-based medicine.

Stefanelli, M. (2002). "Knowledge management to support performance-based medicine." *Methods of Information in Medicine* 41(1): 36-43.

Abstract OBJECTIVES: To discuss research issues for medical informatics in order to support the further development of health information systems, exploiting knowledge management and information and communication technology to increase the performance of Health Care Organizations (HCOs). METHODS: Analyze the potential of exploiting knowledge management technology in medicine. RESULTS AND CONCLUSIONS: The increasing pressure on HCOs to ensure efficiency and cost-effectiveness, balance the quality of care, and contain costs will drive them towards more effective management of medical knowledge derived from biomedical research. Knowledge management technology may provide effective methods and tools in speeding up the diffusion of innovative medical procedures. Reviews of the effectiveness of various methods of best practice dissemination show that the greatest impact is achieved when such knowledge is made accessible through the health information system at the moment it is required by care providers at their work sites. There is a need to take a more clinical process view of health care delivery and to identify the appropriate organizational and information infrastructures to support medical work. Thus, the great challenge for medical informatics is represented by the effective exploitation of the astonishing capabilities of new technologies to assure the conditions of knowledge management and organizational learning within HCOs.

Strawser, C. L. (2000). "Building effective knowledge management solutions." *Journal of Healthcare Information Management* 14(1): 73-80.

Van Beveren, J. (2003). "Does health care for knowledge management?" *Journal of Knowledge Management* 7(1): 90-95.

Winkelman, W. J. and C. W. Choo (2003). "Provider-sponsored virtual communities for chronic patients: improving health outcomes through

organizational patient-centred knowledge management." Health Expectations 6(4): 352-8.

Abstract Patients with long-term chronic disease experience numerous illness patterns and disease trends over time, resulting in different sets of knowledge needs than patients who intermittently seek medical care for acute or short-term problems. Health-care organizations can promote knowledge creation and utilization by chronic patients through the introduction of a virtual, private, disease-specific patient community. This virtual socialization alters the role of chronic disease patients from external consumers of health-care services to a 'community of practice' of internal customers so that, with the tacit support of their health-care organization, they have a forum supporting the integration of knowledge gained from the experiences of living with chronic disease in their self-management. Patient-centred health-care organizations can employ the virtual community to direct and support the empowerment of chronic patients in their care.

Wood, H. (2002). "Knowledgebases. Resources on the Web... 'workflow', 'knowledge management' and 'business process re-engineering'." British Journal of Healthcare Computing & Information Management. 19(9): 34.

Zazzara, P. (2001). "Operationalizing knowledge management in health care." Topics in Health Information Management 21(3): 1-7.

Abstract Being able to leverage the collective clinical knowledge that a health system acquires on a daily basis and then apply that knowledge to elevate productivity and maintain clinical quality would be nirvana for health system executives. Although it is difficult to bring knowledge management to health care, it is not impossible. Architects of knowledge management solutions in health care will need to balance what an organization hopes to achieve in its market (business strategy); how they hope to achieve it (operating strategy); and where information technology is needed to enable what they hope to achieve and how they hope to achieve it (information strategy).

Zinder, D. J. (2001). "The tumble of medical advancement: a call for knowledge management. Archives of Otolaryngology Head & Neck Surgery 127(2).

HUMAN FACTORS/CULTURE

These abstracts and citations focus on the cultural dimension of individuals and organisations and how culture and human factors affect the management of knowledge. This section acknowledges that the willingness to share knowledge is directly affected by the culture and people of an organisation. In other words, knowledge management processes are influenced by peoples' behaviour. Interactions between knowledge management technologies and techniques and people are investigated. These abstracts and citations take into account cross-cultural management of knowledge and information sharing.

Anonymous (2001). "Knowledge management practices within a knowledge-intensive firm: the significance of the people management dimension." *Measuring Business Excellence* 5(3): 10-10.

Bhagat, R. S., D. L. J. R. Ford, et al. (2002). *Knowledge Management in Global Organizations: Implications for International Human Resource Management. Research in personnel and human resources management. G. R. E. M. Ferris, Joseph J (Ed): 243-274.*

Abstract The concept of organizational knowledge, as a major determinant for global competitiveness, has received significant attention in recent years. In this paper, we discuss the importance of managing human resource knowledge to enhance the effectiveness of global corporations. A theoretical framework is proposed for understanding the effectiveness of knowledge management processes as a function of strategic considerations, administrative heritage, and technical systems, as embedded in the cultural context of the society. Later, we propose that individualistic vs. collectivistic cultures process the various types of knowledge differently, and prefer different modes of knowledge conversion based on their cultural values. Implications for international human resource management are discussed.

Bhatt, G. D. (2001). "Knowledge management in organizations: Examining the interaction between technologies, techniques, and people." *Journal of Knowledge Management* 5(1): 68-75.

Abstract Argues that the knowledge management process can be categorized into knowledge creation, knowledge validation, knowledge presentation, knowledge distribution, and knowledge application activities. To capitalize on knowledge, an organization must be swift in balancing its knowledge management activities. In general, such a balancing act requires changes in organizational culture, technologies, and techniques. A number of organizations believe that by focusing exclusively on people, technologies, or

techniques, they can manage knowledge. However, that exclusive focus on people, technologies, or techniques does not enable a firm to sustain its competitive advantages. It is, rather, the interaction between technology, techniques, and people that allow an organization to manage its knowledge effectively. By creating a nurturing and "learning-by-doing" kind of environment, an organization can sustain its competitive advantages.

Bailey, C. and M. Clarke (2000). "How do managers use knowledge about knowledge management?" *Journal of Knowledge Management* 4(3): 235-243.

Abstract Argues that hard-pressed managers seem to find it difficult to appreciate the special significance that knowledge management (KM) has for redefining their managerial work. This problem is investigated and ideas developed to help turn existing information about KM into "usable ideas". The authors explain the importance of helping managers to relate knowledge management to what is organizationally important (currency), to what furthers an individual's goals and interests (personal relevance), and to what is practical within an individual's current capacity (actionable). Currency is explored using a managerial knowledge portfolio that identifies the knowledge to be managed in the critical areas of managerial focus, strategy, operational processes and change management. Actionability is explored using an organizational knowledge management activity matrix that describes KM activities in terms which are meaningful and provides a basis for a KM audit.

Brand, A. (1998). "Knowledge management and innovation at 3M." *Journal of Knowledge Management* 2(1): 17-22.

Abstract 3M's objective is to become the most innovative company in the world. 3M employs a wide range of Knowledge Management systems, but the appropriate environment has to be in place before people will be motivated to input and access such systems. 3M concentrates on the "tacit to tacit" area in the belief that if this is functioning well, other aspects of Knowledge Management will fall more readily into place. The willingness to share knowledge between individuals is directly affected by the culture within a company.

Buessing, A. and B. Herbig (2003). "Implicit knowledge and knowledge management--difficulties and chances in dealing with an important human resource." *Zeitschrift fur Personalpsychologie* 2(2): 51-65.

Abstract Based on the development over the last few years that implicit knowledge is gaining an increasing importance as a human resource, a definition of implicit knowledge from psychological research is given and the main difficulties, the lack of consciousness and the possible inadequacy of this knowledge, for knowledge management and human resource development are presented. It is subsequently outlined how these and other problems affect the

four process categories of knowledge management (knowledge generation, representation, communication, and use). Finally, the dealings up to this point with implicit knowledge in organisations are recapitulated by means of practical examples, and demands on human resource development are discussed.

Carneiro, A. (2000). "How does knowledge management influence innovation and competitiveness?" *Journal of Knowledge Management* 4(2): 87-98.

Abstract Discusses human value management; examines the relationships between organizations' competitiveness, innovation advancements, and knowledge management; and presents a set of considerations regarding how these relationships affect strategic management and the formulation of competitive strategies. By considering how knowledge development is related with personal characteristics and personal development, this article provides insights on the linkages between innovation and competitiveness. These considerations point out the importance of knowledge development and the role of knowledge management in order to assure competitiveness. This work proposes also a conceptual model, with special focus on the relationships between knowledge management, competitiveness, and innovation. The major factors are presented and directions for future research are suggested according to the proposed model.

Carneiro, A. (2001). "The role of intelligent resources in knowledge management." *Journal of Knowledge Management* 5(4): 358-367.

Abstract Discusses the process through which knowledge acquisition, technical tools, and organization actors can contribute to organizational development in developing knowledge as a systemic competitive weapon. The relationships between technology and human value are examined, and it is argued that both components are vital instruments of the knowledge management (KM) process. By considering that KM is related to intelligent agents, information technology (IT), and strategic decision-support systems (SDSS), the author attempts to provide insights on KM efficiency. A conceptual model of KM efficiency in organizations is presented that is supported by the combination of intelligent agents' role and intelligent systems resources. The model is divided in 2 areas: the area of technical tools for specification of intelligent systems resources; and the area of intelligent agents destined to focus their roles on organizations' performance. The major factors are discussed and directions for future research are suggested.

Choi, B. and H. Lee (2002). "Knowledge management strategy and its link to knowledge creation process." *Expert Systems with Applications* 23(3): 173-187.

Abstract Knowledge has become to be considered as valuable strategic assets that can provide proprietary competitive advantages. It is more important for companies to distinguish themselves through knowledge management strategies. Without a constant creation of knowledge, a business is condemned to poor performance. However, it is still unclear how these strategies affect knowledge creation. Knowledge management strategies can be categorized as being either human or system oriented. This paper proposes a model to illustrate the link between the strategies and its creating process. The model is derived on the basis of samples from 58 Korean firms. The model depicts how companies should align the strategies with four knowledge creation modes such as socialization, externalization, combination, and internalization. It is found that human strategy is more likely to be effective for socialization while system strategy is more likely to be effective for combination. Furthermore, the survey result suggests that managers should adjust knowledge management strategies in view of the characteristics of their departments.

Currie, G. and M. Kerrin (2003). "Human resource management and knowledge management: Enhancing knowledge sharing in a pharmaceutical company." *International Journal of Human Resource Management* 14(6): 1027-1045.

Abstract There is a gap in understanding the implications for human resource management practices of the rising interest in managing knowledge (Scarborough and Carter, 2000). As a response, this paper takes an organizational learning perspective to reflect more critically upon the problems of managing knowledge. In particular, it highlights employees' unwillingness to share knowledge with others as crucial in determining the contribution human resource practices can make to managing knowledge (Alvesson and Karreman, 2001; Easterby-Smith et al., 2000; Hayes and Walsham, 2000; Mueller and Dyerson, 1999; Pritchard et al, 2000; Willmott, 2000). Specifically, the paper considers the contribution that human resource management practices can make in mediating a functionally based organizational structure and culture in a global pharmaceutical company.

Currie, G. and M. Kerrin (2004). "The Limits of a Technological Fix to Knowledge Management: Epistemological, Political and Cultural Issues in the Case of Intranet Implementation." *Management Learning* 35(1): 9-29.

Abstract Our paper examines issues of epistemology, power and culture with respect to their impact upon the use of information and communication technology (ICT) to manage knowledge within an organization. Utilizing an empirical case study of a global pharmaceutical company, in which the implementation of an intranet failed to meet aspirations of the Chief Executive that employees freely share knowledge, we encourage academics and practitioners to reflect more critically upon the limits to technology in pursuit of knowledge management. Our study illustrates that 'technical fixes' to knowledge

management issues merely harden existing practices and routines, rather than open up new directions. In particular, broader organizational issues of power and culture may mean that employees are unwilling or unable to share knowledge and, beyond the epistemological problem, this is likely to further inhibit the contribution of ICT to the management of knowledge.

Darroch, J. (2003). "Developing a measure of knowledge management behaviors and practices." *Journal of Knowledge Management* 7(5): 41-54.

Abstract Knowledge management has recently emerged as a new discipline and is generating considerable interest among academics and managers. Given its newness, there is still little guidance in the extant literature on how to measure knowledge management. This paper presents the first scale developed to measure knowledge management behaviors and practices and in so doing provides construct boundaries that should enable the development of a theory of knowledge management.

de Gooijer, J. (2000). "Designing a knowledge management performance framework." *Journal of Knowledge Management* 4(4): 303-310.

Abstract Measuring the business benefits of knowledge management is difficult. Even more so for public sector agencies whose outcomes are social benefits, rather than simple profit. This paper describes an approach for measuring the performance of knowledge management strategies for a public sector agency in Victoria, Australia. Knowledge management is defined as those actions which support collaboration and integration. Two models are presented for measuring knowledge management performance and knowledge management behaviours: a performance framework based on the balanced scorecard approach, and a behaviour framework that identifies levels of practice demonstrated by individuals. The Knowledge Management Performance Scorecard maps the objectives for knowledge management across the balanced scorecard's key result areas. The Knowledge Management Behaviour Framework identifies seven levels of knowledge management skills for demonstrating collaborative behaviour. The framework also outlines what might be typical behaviours of managers and the roles they would assume in relation to individuals at each level.

Desouza, K. C. (2003). "Strategic contributions of game rooms to knowledge management: some preliminary insights." *Information & Management* 41(1): 63-74.

Abstract Academics and practitioners have stressed the significance of managing knowledge in today's competitive environment. This has resulted in many efforts to increase knowledge exchange between organizational members. Much work so far has focused on the use of information technology as either a solution or enabler of knowledge management. While information technology

enables easy exchange of explicit knowledge, its contributions to sharing tacit knowledge is restricted to connecting individuals via tools, such as e-mail and groupware. This research adds to the literature by reporting on a people-centered perspective for facilitating tacit knowledge exchange. The article describes an in-depth case study carried out to determine the role played by game rooms in the exchange of tacit knowledge.

Filius, R., J. A. de Jong, et al. (2000). "Knowledge management in the HRD office: A comparison of three cases." *Journal of Workplace Learning* 12(7): 286-295.

Abstract Human resource development (HRD) professionals can be considered to be knowledgeable about knowledge management practices in their own offices. Effectiveness of knowledge management practices of 3 HRD offices were studied, using a combination of structured questionnaires plus interviews with 4 HRD professionals per office. Three categories of knowledge management activities were considered, by the members of these organisations, to be effective: activities that expand the individual or collective experiential horizon; activities that are meant to consolidate knowledge; informal and formal communication about work issues. Conditions that facilitate or inhibit these activities are identified. Organisations wishing to improve their knowledge productivity are confronted with some fundamental choices: innovation versus routine, office versus officer, and knowledge sharing versus knowledge shielding.

Gertler, M. S. and D. A. Wolfe (2004). "Local social knowledge management: Community actors, institutions and multilevel governance in regional foresight exercises." *Futures* 36(1): 45-65.

Abstract A key question for policymakers at the regional and local level is how to provide the right conditions for generating the growth of more knowledge-intensive forms of economic activity within the context of dynamic innovation systems or learning regions. Regional foresight exercises may provide a useful instrument in helping chart their economic strategies. Successful regions must be able to engage in regional foresight exercises that identify and cultivate their assets, undertake collaborative processes to plan and implement change, and encourage a regional mindset that fosters growth. Communities and regions, like companies, need to innovate and adapt to remain competitive. As a result, successful regions must be able to engage in regional foresight exercises that identify and cultivate their assets, undertake collaborative processes to plan and implement change, and encourage a regional mindset that fosters growth. This paper provides an overview of these issues by reviewing the most important ideas in the recent literature on innovation systems, technological dynamism and local economic development. We regard regional foresight processes to be, at their most fundamental level, socially organized learning processes involving learning by individuals, by firms, and by institutions. One of our central concerns

is to show how the actions of individuals to shape collective local visioning exercises interact with larger institutional structures to produce local outcomes.

Hislop, D. (2003). "Linking human resource management and knowledge management via commitment: A review and research agenda." *Employee Relations* 25(2): 182-202.

Abstract This paper contributes to the development of the knowledge management and human resource management (HRM) literatures through developing the linkages between them. Increasingly it is being acknowledged that the success of knowledge management initiatives is fundamentally predicated on having workers who are prepared to share their knowledge. It is suggested that HRM concepts and frameworks could be utilized to improve our understanding of what shapes the willingness (or reluctance) of workers to share their knowledge. Specifically the paper considers how the motivation of workers to share their knowledge may be shaped by their level of organizational commitment. Guest and Conway's model of the psychological contract is modified to link commitment with knowledge-sharing attitudes and behaviours. Finally, it is suggested that, if commitment is linked to knowledge-sharing attitudes, then the apparently low commitment levels reported by a number of surveys may mean this represents a key problem for knowledge management initiatives.

Hiscock, J. (2004). "Developing knowledge management awareness in public relations students." *Public Relations Review* 30(1): 107-115.

Abstract Students completing the postgraduate qualification, Graduate Diploma in Communication (Public Relations) at the University of South Australia, undertake a field research project, the Graduate Communication Management project, as the final course in their program. Students design their own research (mainly interpretive and qualitative in nature) to investigate communication and organizational culture within their chosen organization. This paper suggests that knowledge management concepts provide another useful framework in which the students can research organizational culture and communication.

Holden, N. J. (2004). "Cross-cultural Management: A Knowledge Management Perspective." *European Business Review* 16(2): 205-206.

Horak, B. J. (2001). "Dealing with human factors and managing change in knowledge management: a phased approach." *Topics in Health Information Management* 21(3): 8-17.

Abstract Ten human factors affect the implementation of knowledge management initiatives, including fear, cultural change, capturing of tacit knowledge, ease of use, stakeholder involvement, and benefits realization. To deal with these factors, a phased change management approach is offered,

consisting of an assessment, strategic planning, organization development, systems design, orientation and training, team building, and continuous evaluation and improvement.

Jang, S., K. Hong, et al. (2002). "Knowledge management and process innovation: The knowledge transformation path in Samsung SDI." *Journal of Knowledge Management* 6(5): 479-485.

Abstract Explores the connection between knowledge management (KM) and process innovation (PI). Although these are popular themes in the literature on management innovation, there is not much discussion of these issues. On the one hand, KM has been treated as a managerial fad that is mainly focused on knowledge generation, dissemination, and utilization. Moreover, the advocates of KM seem to be concerned with building knowledge management systems (KMS). On the other hand, PI is regarded as an efficiency-oriented process redesign and re-engineering (or BPR), which seems to be nothing to do with KM. However, the case study of Samsung SDI shows that in the real world KM is deeply linked with PI. For illustrating the KM strategy of Samsung SDI, uses the term "PI-based KM". The paper sheds light on 2 points: the features of process knowledge can be studied in the sense that knowledge associated with process is dubbed "process knowledge"; and socio-cultural features of KM should be illustrated in terms of knowledge transformation path in the information space.

Lang, J. C. (2001). "Managerial concerns in knowledge management." *Journal of Knowledge Management* 5(1): 43-59.

Abstract Knowledge differs markedly from information and data. At rock bottom, knowledge is socially constructed in discourse communities. Because knowledge is not synonymous with information, information technology (IT) cannot deliver knowledge management. Since there will always be uncoded or uncoded knowledge content and contexts--given the social nature of knowledge--several barriers to the creation and utilization of knowledge exist. The task of knowledge management is to identify such barriers and overcome them. In this paper, the author reviews the social nature of knowledge and knowledge work; outlines why IT cannot deliver knowledge management; describes knowledge management problem of representational limitations, interactional contexts and knowledge outcomes in organizations; and identifies barriers to the creation and utilization of knowledge in organizations and suggests solutions.

McKenzie, J., A. Truc, et al. (2001). "Winning commitment for knowledge management initiatives." *Journal of Change Management* 2(2): 115-127.

Abstract Building commitment to the principles and practices of knowledge management is the goal of many organizations today. This is proving not to be a straightforward process and even when commitment is evident, it is fragile and

easily shattered by inconsistencies in management actions and behavior. The authors have identified key aspects of winning commitment that need to be recognized and managed at an organizational level, and the level of groups and individuals. Commitment is both an intellectual and an emotional process, and it is achieved through both internal motivation and external incentives. It is maintained through providing positive feedback on the outcomes of knowledge management activities and learning from mistakes. The authors have created a comprehensive checklist based on research carried out within an industry forum of more than forty companies to help practitioners monitor their progress in winning lasting commitment.

McManus, D. and B. Loughridge (2002). "Corporate information, institutional culture and knowledge management: a UK university library perspective." *New Library World* 103(9): 320-327.

Merali, Y. (2000). "Individual and collective congruence in the knowledge management process." *The Journal of Strategic Information Systems* 9(2-3): 213-234.

Abstract This paper is concerned with the cognitive infrastructure underpinning the socially situated process of knowledge management in dynamic contexts. It describes the cognitive congruence framework (Fourth International Conference on Competence Based Management (1998); Knowledge Management and Organizational Competence, Oxford University Press (2001)) and shows how it can be used as a sensemaking device to reconcile some of contentious issues in knowledge management literature. Three case study vignettes are employed to illustrate the importance of individual and collective cognitive congruence and the utility of the framework as a diagnostic tool for highlighting flaws in the cognitive infrastructure. The implications of the framework for theory and practice are discussed.

Meso, P. and R. Smith (2000). "A resource-based view of organizational knowledge management systems." *Journal of Knowledge Management* 4(3): 224-234.

Abstract Notes the proliferation of organizational knowledge management systems (OKMS) for managing intellectual capital. The authors address the question: "Are OKMS strategic assets within the context of the resource-based view?" Two views of OKMS emerge--the technical and the socio-technical view. An analysis of OKMS from each perspective is presented and their resultant implications on the competitive position of the firm explained. The findings indicate that, for a firm to reap long-term strategic benefit from OKMS, it should adapt the broader socio-technical view when developing, implementing and managing its OKMS. It is suggested that firms need to consider not only the technology but also the organizational infrastructure, the organizational culture

and the people who form the OKMS, and the knowledge that is to be processed by these OKMS.

Mohamed, M., M. Stankosky, et al. (2004). "Applying knowledge management principles to enhance cross-functional team performance." *Journal of Knowledge Management* 8(3): 127-142.

Neidorf, R. (2002). "Knowledge management: changing cultures, changing attitudes." *Online*. 26(5): 60-2.

Park, H., V. Ribiere, et al. (2004). "Critical attributes of organizational culture that promote knowledge management technology implementation success." *Journal of Knowledge Management* 8(3): 106-117.

Perez, J. R. and P. O. de Pablos (2003). "Knowledge management and organizational competitiveness: A framework for human capital analysis." *Journal of Knowledge Management* 7(3): 82-91.

Abstract Knowledge management literature highlights the fact that, in the new economy, the achievement of a sustained competitive advantage depends on firm's capacity to develop and deploy its knowledge-based resources. However, not all resources are equally important for the achievement of this competitive edge. In this sense, this paper proposes an integrative framework for the analysis of human capital combining the advances from three different areas of research: knowledge management, intellectual capital, and strategic human resource management. Juxtaposing two dimensions - value and uniqueness - it analyzes the different forms of firm's human capital. These are the following: idiosyncratic, ancillary, core and compulsory. Furthermore different human resources practices that should be used to manage such specific forms of human capital are described.

Perez-Bustamante, G. (1999). "Knowledge management in agile innovative organisations." *Journal of Knowledge Management* 3(1): 6-17.

Abstract Technology and innovation processes are formed by knowledge bases and continuous flows of information. Their intangibility and the actual trend to support the competitiveness of the firm in the synergistic relations of its intangible assets have led to a new form of analysis of the technological innovation processes. Technology management also requires assuming new activities to manage effectively the flow of information and the knowledge reservoirs which are necessary to provide a quick answer to the uncertainty and dynamism of technological evolution. The firm should also create knowledge milieus, common shared environments or bas and a clear knowledge culture. In this paper, the authors review the importance of the knowledge consideration of technology and its incidence on the innovation process, and then analyze which are the main characteristics of knowledge management and how it should be put

into practice in the innovating firm, where knowledge managers are an essential component.

Politis, J. D. (2001). "The relationship of various leadership styles to knowledge management." *Leadership and Organization Development Journal* 22(8): 354-364.

Politis, J. D. (2003). "The connection between trust and knowledge management: What are its implications for team performance." *Journal of Knowledge Management* 7(5): 55-66.

Abstract The latest buzzwords in organizational change and development literature are "knowledge management" and "knowledge transfer", which proponents claim are successful ways of improving and enhancing employees' performance. Moreover, trust and the ability of employees to work in an autonomous manner are often cited as being essential for the effectiveness of self-managed teams. Little however, is known on the effect of interpersonal trust on knowledge management (acquisition) of team members, and the consequences for team performance. A survey of 49 self-managing teams was carried out to investigate the relationship between the dimensions of interpersonal trust, knowledge acquisition, and team performance. Overall, findings support that most interpersonal trust dimensions are positively related to the variables of knowledge acquisition. The results also showed that the effects of interpersonal trust on team performance to a large extent are mediated by the intervening variables of knowledge acquisition.

Robertson, M. and G. O. M. Hammersley (2000). "Knowledge management practices within a knowledge-intensive firm: the significance of the people management dimension." *Journal of European Industrial Training* 24(2): 241-253.

Sarnoff, A. and T. Wimmer (2003). "Knowledge management and Intranets: putting people first." *Intranet Professional*. 6(6): 6-8.

Schultze, U. and R. J. Boland Jr. (2000). "Knowledge management technology and the reproduction of knowledge work practices." *The Journal of Strategic Information Systems* 9(2-3): 193-212.

Abstract Organizations seeking ways to manage their knowledge assets are increasingly turning to information technology for solutions. As knowledge management systems are being developed and implemented, it behooves both practitioners and researchers to learn from the successes and failures of more established types of information systems including MIS and DSS. According to the Standish Group, the implementation success rate for these systems runs at around 30%. Many argue that these low success rates are, in part, attributable to technologists' lack of understanding of the situated work practices of the systems'

user communities. This has led to increasing calls for research on work practice in the field of Information Systems. Unfortunately, it is not always clear what is meant by work practice. Furthermore, the consideration of work practice outside of its circuit of reproduction can be misleading. By circuits of reproduction we mean the reciprocal relationships through which practice creates and recreates the objectified social structures and conditions in which it occurs. In this paper, we adopt Bourdieu's Theory of Practice to illuminate work practices and their circuits of reproduction. Relying on data that were collected during an eight-month ethnography of knowledge work practices in a US-based, Fortune 500 manufacturing firm, we focus on the situated "gatekeeping" practices of a group of competitive intelligence analysts and explore how their situated practices were at odds with the generalized "gatekeeping" practices embedded in a knowledge management technology whose implementation they themselves were advocating. We argue that their inability to see this incongruence until very late in the pilot implementation is associated with an understanding of their work practices in isolation, i.e. outside of their circuits of reproduction.

Shariq, S. Z. (1998). "Sense making and artifacts: An exploration into the role of tools in knowledge management." *Journal of Knowledge Management* 2(2): NP.

Abstract The advancement of human knowledge (HKN) is the result of evolution of human capabilities for absorbing, developing and processing human intelligence, and perhaps just as equally, on the human capability to develop symbols and artifacts (ARs) for assisting in the creation, diffusion and sharing of knowledge. These artifacts not only have evolved in their sophistication and ability to help HKN enterprise, but also they have become embedded in the knowledge networks and the global knowledge enterprises. The universal knowledge architecture today can be best represented as a set of interconnected networks linking the neural networks of our brain with our organizational, institutional, professional and societal networks, and the networks of knowledge ARs. Within this context the knowledge enterprise is viewed as a sustaining quest for sense making through the human to human process for scaffolding of knowledge where the knowledge ARs play quintessential and inseparable roles. The effectiveness of our efforts in developing and implementing the knowledge ARs or management tools depends to a large extent on our ability to refocus the design context of these tools as ARs, from an information centric paradigm to one of knowledge within the context of a sense-making paradigm.

Smoliar, S. W. (2003). "Interaction management: The next (and necessary) step beyond knowledge management." *Business Process Management Journal* 9(3): 337-353.

Van Beveren, J. (2002). "A model of knowledge acquisition that refocuses knowledge management." *Journal of Knowledge Management* 6(1): 18-22.

Abstract This paper presents a model of knowledge acquisition from definitions of data, information and knowledge. The model asserts that knowledge cannot exist outside of the human brain, and that any expression of the knowledge requires it to be transformed into information to be communicated outside of the brain. The model asserts that information is acquired through the sensors to the brain where it is processed with prior knowledge and that new knowledge can be created from the processing of information within the brain only. From a discussion of this model in the context of alternative viewpoints, it is concluded that the future focus for knowledge management should be toward human resource strategies that leverage human-intellectual capital within firms and for the dissemination and sharing of important information that promotes creativity and innovation within and between employees.

Walsham, G. (2001). "Knowledge Management: The Benefits and Limitations of Computer Systems." *European Management Journal* 19(6): 599-608.

Abstract Much organisational effort has been put into knowledge management initiatives in recent years, and information and communication technologies (ICTs) have been central to many of these initiatives. However, organisations have found that leveraging knowledge through ICTs is often hard to achieve. This paper addresses the question of why this is the case, and what we can learn of value to the future practice of knowledge management. The analysis in the paper is based on a human-centred view of knowledge, emphasising the deep tacit knowledge which underpins human thought and action, and the complex sense-reading and sense-giving processes which human beings carry out in communicating with each other and 'sharing' knowledge. The paper concludes that computer-based systems can be of benefit in knowledge-based activities, but only if we are careful in using such systems to support the development and communication of human meaning.

Wang, S. and G. Ariguzo (2004). "Knowledge management through the development of information schema." *Information & Management* 41(4): 445-456.

Abstract Knowledge management (KM) has been receiving considerable attention in the human-systems research community in the past few years. This paper discusses the key concepts of user-computer interaction for knowledge development and proposes a model of an information schema. Such an information repository for KM must be organized into a domain schema. Users of an information repository play an active role in searching through information to coordinate their actions. An example of information schema for KM can be found in a student advising system. This will be used to illustrate the concept of the development of an information schema.

Yahya, S. and W.-K. Goh (2002). "Managing human resources toward achieving knowledge management." *Journal of Knowledge Management* 6(5): 457-468.

Abstract Examined the linkages between human resource management and knowledge management. Specifically, the association between 4 areas of human resource management (training, decision-making, performance appraisal, and compensation and reward) with the 5 areas of knowledge management (knowledge acquisition, knowledge documentation, knowledge transfer, knowledge creation, knowledge application) was explored. Subjects were 300 managerial-level employees of Malaysian companies. The statistical results suggest that a knowledge organization requires a different management approach than the non-knowledge organization. Hence, the role of human resource management is also unique. In terms of employee development, the focus should be placed on achieving quality, creativity, leadership, and problem solving skill. The design of a compensation and reward system should be on promoting group performance, knowledge sharing, and innovative thinking. The performance appraisal must be the base of evaluation of employee's knowledge management practices, and an input for directing knowledge management efforts.

LEARNING/EDUCATION

The purpose of knowledge management is to create the conditions within which knowledge is created, captured, learnt, shared and used for the benefit of themselves, their organisation and their customers. Learning, both individual and group can be facilitated through KM processes, in order to enhance creativity, innovation, reflexivity, collaboration, communication, and critical thinking and inquiry.

The references in this section reflect several common learning themes in KM: how to learn about KM, how educational institutions can utilise KM methods for the purpose of distance, higher and e-learning, the role of KM in the learning organisation, the development of learning communities and/or communities of practice, and the use of KM as a learning strategy in itself.

Anonymous (2004). "Follow the rainbow at Motorola : Knowledge management and learning in new product introduction." *Development and Learning in Organizations: An International Journal* 18(1): 27-29.

Barbosa, R. M. and E. Paiva de Andrade (2003). "Model for a distance learning management course based on new information and learning technologies for educator's formation: a improvement proposal for teaching in the way of knowledge management by the total quality." *Online Brazilian Journal of Nursing*. 2(1): 6p.

Abstract The impact brought by the contemporary transformations characterizes as being one of it's central elements the administration processes of knowledge, in other words, the capacity to produce, to store, to prosecute, to recover, and to disseminate information and knowledges. In this context, education is one of the most important protagonists, where we have the main genesis of knowledge construction, consumption, and transfer process. It is unquestionable importance as a critical strategic factor for the development, creation, interference, and contribution by an effective form for man's progress. Following this conductor thread, the teaching institutions should integrate a new culture, allowing that the learning occurs in different places and by different means. The technology should be used, not only for existent computerization processes of teaching, but for the creation of new ways of thinking and learning. In this sense, search for the Total Quality in Education is the search for excellence in pedagogical, technical, and administrative processes of the school, where should converged the actions of properly qualified and pledged educators with permanent improvement in quality in education. By means of the exposed, this project aims to introduce the factors and structural components for the construction and administration of a model course in syntony with the arguments

praised by the theories of Management Knowledge by Total Quality that enables, mostly, to supply the gap of the teachers formation's programs concerning it's technological training, encouraging the integration of modern technologies to the educational practice and suggesting new behaviors and new forms to produce, store, and transmit the knowledge, giving source of the new forms to think, do, and learn.

Chaudhry, A. S. and S. Higgins (2003). "On the need for a multidisciplinary approach to education for knowledge management." *Library Review* 52(2): 65-69.

Cook, P. (1999). "I heard it through the grapevine: making knowledge management work by learning to share knowledge, skills and experience." *Industrial and Commercial Training* 31(3): 101-105.

Crocetti, C. (2001). "Corporate learning: A knowledge management perspective." *The Internet and Higher Education* 4(3-4): 271-285.

Abstract This paper provides a point of view on the relationship between learning and knowledge management in corporate training. This relationship forms the framework for the development of an effective learning management system (LMS). It comprises four sections: (1) a theoretical analysis of the relationship between training and knowledge management. In today's corporate environment, characterized by rapid change and restructuring, organizations need to become "learning organizations"; (2) some examples are provided of how training issues are intertwined with other processes, such as sales, communication, research and development (R&D), external network management; (3) corporate universities are the means for achieving those goals. They are efficient as long as they become strategy-supportive organizations. Such a structure is in need of the appropriate technology tool, an LMS; (4) it is possible to underline which functionalities are needed in order to have an efficient LMS. These are the kinds of considerations that led ID Technology in developing LiveLearning. Thus, an LMS for corporate training should take into account the relationship between knowledge management and training. An LMS should allow the integration of training with company processes and should assist in meeting corporate university goals. The same considerations also guide decision makers when choosing an LMS.

Davenport, E. (2002). "Mundane knowledge management and microlevel organizational learning: an ethological approach." *Journal of the American Society for Information Science and Technology*. 53(12): 1038-46.

Evans, M. (2001). "Creating knowledge management skills in primary care residents: A description of a new pathway to evidence-based practice in the community." *Evidence Based Medicine* 6(5): 133-134.

Henry, J. B. (1990). "Computers in medical education: information and knowledge management, understanding, and learning. *Human Pathology* 21(10): 998-1002.

Abstract Desktop computers have evolved to permit physicians in practice and/or training to access and manage information to enhance knowledge, understanding, and learning. There are compelling reasons why the personal computer is key to learning and important in medical education. Above all, the computer enhances and amplifies the learning process. Using the desktop computer effectively is relatively easy. We teach our students to research information in books and journals and hope that, as practicing physicians, they do it even more to be current and maintain their competency. Why not a desktop computer to access and manage information, analyze it, and present findings? Computer technology is available to do virtually all of these tasks. Some tools are critical for medical students. For some time, all medical students have needed a black bag and microscope. Now every medical student needs a computer. Ample courseware is available and expanding rapidly for basic sciences and clinical disciplines. The explosion in biomedical information will continue. Finding information is key to understanding and learning rather than depending solely on memory, recall, or library trips for information. The desktop computer will benefit students, faculty, and future physicians and other health professionals as life-long learners.

Hiscock, J. (2004). "Developing knowledge management awareness in public relations students." *Public Relations Review* 30(1): 107-115.

Abstract Students completing the postgraduate qualification, Graduate Diploma in Communication (Public Relations) at the University of South Australia, undertake a field research project, the Graduate Communication Management project, as the final course in their program. Students design their own research (mainly interpretive and qualitative in nature) to investigate communication and organizational culture within their chosen organization. This paper suggests that knowledge management concepts provide another useful framework in which the students can research organizational culture and communication

Jarrar, Y. F. (2002). "Knowledge management: learning for organisational experience." *Managerial Auditing Journal* 17(6): 322-328.

Johannessen, J.-A. and B. Olsen (2003). "Knowledge management and sustainable competitive advantages: The impact of dynamic contextual training." *International Journal of Information Management* 23(4): 277-289.

Abstract The problem to be analyzed in this article is the following one: How can training be instrumental in developing competence into sustainable competitive advantages? The fundamental belief behind the question is that there is an untapped capability in every business of today, which is knowledge,

and it represents a vast potential for gaining sustainable competitive advantage. The article is organized in the following manner: First, we will discuss the role of knowledge and competence in creating sustainable competitive advantages. Secondly, discuss the need for a strategic approach to competence development, by asking the question: "What competencies do we need?". We present a methodology for isolating the competencies that provide sustainable competitive advantages. Third, we discuss the role of training in meeting the strategic competence priorities of companies, by asking: "How should we train to acquire the competence we need". In the conclusion we will present a model for delivering training at the workplace.

Joia, L. A. (2002). "Assessing unqualified in-service teacher training in Brazil using knowledge management theory: A case study." *Journal of Knowledge Management* 6(1): 74-86.

Abstract Presents the Proformacao program, analyzing it as a case study and using the knowledge management theory to assess it. The Proformacao program aims to train in-service unqualified teachers in the Brazilian K-12 public schools, so as to give them skills and expertise to develop their mission better. Most of these teachers are located in the poorest Brazilian regions, mainly in the rural areas, so the project is based both on distance training and mentoring approach. Along with a more consolidated and traditional model used for a descriptive case study, this study addresses an innovative way of assessing knowledge creation and transmission, based on the "knowledge spiral" and the socialization-externalization-combination-internalization methodology. Finally, the main purpose of this case study is to subsidize policy-makers so as to understand better how to deploy huge training endeavors successfully, avoiding the pitfalls and drawbacks inherent in these kind of initiatives and understanding how to better manage the knowledge creation and flow among the involved players.

Kenner, C. and J. H. Fernandes (2001). "Knowledge management and advanced nursing education." *Newborn and Infant Nursing Reviews*. 1(3): 192-8.

Abstract Knowledge management is not a new term in the business literature, but for most graduate nursing programs and practice sites, this concept/educational approach is foreign. As schools of nursing move closer to a business model, it is necessary to embrace some of the strategies our industrial partners are using. What is knowledge management? Is it an innovative educational approach that nurse educators should consider, or is it just another fad in business that nurses can ignore? This article will address these questions and offer the hypothesis that knowledge management is the wave of the future in nursing education to facilitate transition into the 21st century. Knowledge management is an approach that prepares the advanced practice nurse for the ever-changing health care environment in which care is rendered. It is a tool that

will help a nurse to work more smartly, efficiently, and cost-effectively. Competency-based curriculum will be linked with knowledge management, as the emphasis today is on outcomes of our educational programs.

Koenig, M. E. D. (2003). "Knowledge management, user education and librarianship." *Library Review* 52(1): 10-17.

Laszlo, K. C. and A. Laszlo (2002). "Evolving knowledge for development: The role of knowledge management in a changing world." *Journal of Knowledge Management* 6(4): 400-412.

Abstract In today's changing world, knowledge, and the processes to generate it and manage it, have become key factors in creating competitive business advantage. However, the challenges facing contemporary global societies, from human conflicts to environmental degradation, call for an expanded research agenda in the field of knowledge management. Issues such as improvement of the role of corporate citizenship to promote socially and ecologically responsible operations and development of human and social capital should become part of a purposeful strategy for creating a better future. "Knowledge is power"--and it is up to those with access to knowledge to decide if that power will continue to be used over others to increase the gap between rich and poor or if it will be a power to empower visions and realities based on an inclusive planetary ethic. From an evolutionary systems perspective, this paper explores some of the implications and key contributions that knowledge management can make for the transition toward sustainable forms of social organization. The heuristic of evolutionary learning community is presented as a participatory strategy for promoting learning and knowledge creation for evolutionary development.

Loermans, J. (2002). "Synergizing the learning organisation and knowledge management." *Journal of Knowledge Management* 6(3): 285-294.

Lytras, M. D. and A. Pouloudi (2003). "Project management as a knowledge management primer: the learning infrastructure in knowledge-intensive organizations: projects as knowledge transformations and beyond." *The Learning Organization: An International Journal* 10(4): 237-250.

Lytras, M. D., A. Pouloudi, et al. (2002). "Knowledge management convergence-- expanding learning frontiers." *Journal of Knowledge Management* 6(1): 40-51.

Abstract Knowledge management (KM) seems to be another buzzword. More and more we hear about the new imperatum of knowledge. Like researchers in a new field, our daily life is a continuous knowledge management process. Moreover, the origins of our focus diversify biased to the KM perspectives that we have conceptualized. This paper intends to reveal the

continuous process of KM to re-usable learning objects. The case of organizational memory is treated as a cumulative system of value adding components. The deployment of information and communication technologies in this approach justifies the intelligence of this analysis. Web semantics, metadata specification and extensive XML specifications provide only the enclosure of an extensive analysis of concepts. Two concepts are presented: multidimensional dynamic e-learning and the value adding knowledge management framework.

Malone, D. (2002). "Knowledge management: A model for organizational learning." *International Journal of Accounting Information Systems* 3(2): 111-123.

Abstract This paper presents a model developed with the help of the Knowledge Management Special Interest Group (KM-SIG) of the Consortium for Advanced Manufacturing-International (CAM-I) with organizational implications for managing knowledge. The KM-SIG model rests on knowledge domains that exist in an organization's environment. Firms engage in knowledge management practices for the purpose of filtering knowledge into its core, stable processes where that knowledge can be used to produce value for the firm. The model presented in this paper identifies the route knowledge takes in this filtering process. The filtration mechanisms that accomplish this process are project teams, knowledge communities, communities of practice and knowledge networks.

Martin, L. M. and H. Matlay (2003). "Innovative use of the Internet in established small firms: the impact of knowledge management and organisational learning in accessing new opportunities." *Qualitative Market Research: An International Journal* 6(1): 18-26.

Mitri, M. (2003). "Applying tacit knowledge management techniques for performance assessment." *Computers & Education* 41(2): 173-189.

Abstract Performance assessment is an important task in all levels of education, both as input for identifying remedial needs of individual students and for improving general quality of education. Although explicit assessment measures can be obtained through objective standardized testing, it is much more difficult to capture fuzzier, or tacit, performance assessment measures. The problem of tacit knowledge capture is a central theme in the field of knowledge management, and assessment management can be thought of as a form of knowledge management. Therefore, tacit assessment management can be facilitated through technologies commonly used in knowledge management systems such as databases, Internet architectures, artificial intelligence, and decision support techniques. This paper describes tacit performance assessment in the context of knowledge management and presents a prototype decision support system for managing tacit assessment knowledge using knowledge management techniques.

Pablos, P. O. d. (2002). "Knowledge management and organizational learning: typologies of knowledge strategies in the Spanish manufacturing industry from 1995 to 1999." *Journal of Knowledge Management* 6(1): 52-62.

Palmer, C. A. (2004). "Linking learner autonomy and conditions for learning in the workplace: Knowledge management systems as organizing circumstances." *Dissertation Abstracts International Section A: Humanities & Social Sciences* 64(7-A): 2346.

Abstract External pressures on academic and management communities demand appropriate, specific, and quickly accessible knowledge transfer for "best possible" business decisions. Large amounts of money are spent by organizations on knowledge transfer activities that fail upon implementation. One reason may be that organizations have assumed that databases would be used by employees as resources to transfer knowledge. Results of this study clearly show that this is not the case. This study investigated how learning characteristics of employees influence their use (or non-use), of a knowledge management database (KMDB). Data was collected from technical manufacturing employees (n = 96), using G.J. Confessore's Learner Autonomy Profile (2001), and a questionnaire derived from Spear and Mocker's (1984) organizing circumstances. Participants completed the LAP and additional questions through the Internet. Participants indicated that they did not use the database as a resource because their perceptions of the database as a problem-solving mechanism precluded knowledge transfer. Results indicated learners were very much in control of their own learning and had a high need to control their learning resources. The study also provided new data through the creation of learning condition 5, indicating the non-use of a KMDB. These results present intriguing questions regarding the relationship between individuals' learning proclivities and workplace conditions. A company's knowledge base can be powerful when individual tacit knowledge is transferred into globally shared knowledge bases. However, this study has shown that learning tools can easily be blindsided by limitations of perspectives of learning and of the environment within a company. This study also demonstrated that applying the right tools in appropriate circumstances could provide unexpected gains toward profit and progress in both educational and organizational environments. Future research can identify learner characteristics and learning environment influences that enable knowledge transfer from employees' heads to company knowledge bases before employees walk out the door.

Petrides, L. A. and S. Z. Guiney (2002). "Knowledge Management for School Leaders: An Ecological Framework for Thinking Schools." *Teachers College Record* 104(8): 1702-1717.

Abstract Although there has been a great deal of recognition in the business world that information and knowledge management can be vital tools in

organizations, it is only recently that educational administrators and teachers have begun to look at how they might use information systems to assist in creating effective learning environments. In the business research environment, the evolution from data to information and from information to knowledge plays a leading role in shaping how organizations develop strategies and plans for the future. Using examples from schools, this paper illustrates how knowledge management can enable schools to examine the plethora of data they collect and how an ecological framework can be used to transform these data into meaningful information

Petrovic, O., N. Kailer, et al. (1998). "Learning aspects of knowledge management and new technologies." *Journal of European Industrial Training* 22(7): 277-288.

Rowley, J. (2000). "Is higher education ready for knowledge management?" *International Journal of Educational Management* 14(7): 325-333.

Selen, W. (2000). "Knowledge management in resource-based competitive environments: A roadmap for building learning organizations." *Journal of Knowledge Management* 4(4): 346-353.

Abstract Today's competitive focus manifests itself with the strategic management of unique operational resources that impact the rules of competition, rather than a market-based view where the firm follows the rules dictated by markets. Knowledge management becomes hereby a vital prerequisite. This paper suggests a roadmap for building a learning organization in a resource-competitive environment, based on previous research, and highlights the knowledge management issues involved along the way. A number of learning issues from this process are addressed as well. Combined, they form the basis for constructing agile learning environments, linked to tangible performance criteria and strategic objectives.

Seng, C. V., E. Zannes, et al. (2002). "The contributions of knowledge management to workplace learning." *Journal of Workplace Learning* 14(4): 138-147.

Abstract This paper argues that increases in workplace learning may occur concomitantly with ways in which knowledge is managed in an organization, and knowledge management effectiveness may be a function of how successfully an organization is able to put a technological infrastructure into place. It describes the phases in a strategy for implementing knowledge management procedures and processes and argues that an appropriate mix of technological equipment is pivotal to both knowledge management and enhanced workplace learning. The paper suggests that the cultivation of a climate and culture that support and encourage knowledge sharing and learning to occur may be more important than any of the technological advancements to assure enhanced workplace learning.

Stevenson, J. M. (2000). "A new epistemological context for education: Knowledge management in public schools." *Journal of Instructional Psychology* 27(3): 198-201.

Abstract Knowledge management is an increasingly common application in the corporate sector for leveraging intellectual capital and fostering organizational learning. The author advocates this approach for public schools to improve student achievement.

Thomas, J. B., S. W. Sussman, et al. (2001). "Understanding "strategic learning": Linking organizational learning, knowledge management, and sensemaking." *Organization Science* 12(3): 331-345.

Abstract Strategic learning aims to generate learning in support of future strategic initiatives that will, in turn, foster knowledge asymmetries that can lead to differences in organizational performance. From a case study of a unique organization whose purpose is to facilitate strategic knowledge distillation, it was found that this process is characterized by targeted information gathering that relies on diverse experts for interpretation as well as validation. It also embodies the organizational capability to leverage information technologies in the distillation effort, integrating them with processes for generating, storing, and transporting rich, de-embedded knowledge across multiple levels of the organization. As a result of the case study, a model of the strategic learning is developed and a series of propositions regarding its context and processes are presented based on this model. The model highlights key dimensions of strategic learning that suggest design parameters for organizations building strategic learning systems.

Tippins, M. J. (2003). "Implementing knowledge management in academia: teaching the teachers." *The International Journal of Educational Management* 17(7): 339-345.

van Heijst, G., R. van der Spek, et al. (1997). "Corporate memories as a tool for knowledge management." *Expert Systems with Applications* 13(1): 41-54.

Abstract This article addresses the relation between corporate memories and learning in organizations. We argue that a corporate memory should support three types of learning in organizations: Individual learning, learning through direct communication, and learning using a knowledge repository. Then we formulate functional requirements for a corporate memory that would support these types of learning, and we present an architecture that satisfies these requirements. The article ends with pointers to related work and future research issues.

Wild, R. H., K. A. Griggs, et al. "A framework for e-learning as a tool for knowledge management." Industrial Management.

Yagodzinski, E. (2003). "eSocrates Knowledge Management System and e-Learning Company:." The Internet and Higher Education 6(1): 105-107.

INFORMATION TECHNOLOGY

Information technology is one of the enablers of knowledge management, not least in the field of health services. Essentially, IT allows for the organisation and storage of, and access to explicit information data and knowledge, via databases, for example, as well as facilitating the sharing of tacit knowledge between people through, for example, video-conferencing or intra-organisational chat rooms.

In general, IT or "knowledge architecture" can be grouped into roughly three categories:

- *systems for the storage (such as data or knowledge warehousing, knowledge repositories, databases or intranet servers) and communication (such as e-mail programs, groupware internet based conferencing or knowledge portals) of knowledge;*
- *systems for the capture, creation (data cleaning, data mining, codification), sharing (transfer, social networks and analysis, project support and collaborative tools) and reuse (content management, decision support, and concept mapping tools) of knowledge; and*
- *systems for the presentation, including personalisation (such as user configuration and filtering) and visualisation (graphic interfaces and models) of knowledge.*

Apostolou, D. and G. Mentzas (2003). "Experiences from knowledge management implementations in companies of the software sector." *Business Process Management Journal* 9(3): 354-381.

Arnold, S. E. (2001). "The "Ultra-Intra-Content-Knowledge Management Portal solution": online's new buzzword." *Online*. 25(3): 32-5.

Barthes, J.-P. A. and C. A. Tacla (2002). "Agent-supported portals and knowledge management in complex R&D projects." *Computers in Industry* 48(1): 3-16.

Abstract This paper is concerned with organizing knowledge management in complex R&D projects where time is the prime factor. We argue that specific portals developed using groupware technology and products should be augmented by agents in order to increase the overall system reactivity and achieve the global objective, namely to save time. We describe a portal we have developed using a groupware approach, we give the structure of a system of cognitive agents, and discuss our current attempt to bring the two technologies together.

Becerra-Fernandez, I. (2000). "The role of artificial intelligence technologies in the implementation of People-Finder knowledge management systems." Knowledge-Based Systems 13(5): 315-320.

Abstract The development of knowledge management systems (KMS) demands that knowledge be obtained, shared and regulated by individuals and knowledge-sharing organizational systems, such as knowledge repositories. People-Finder systems, a type of knowledge repository, attempt to manage knowledge by pointing to experts possessing specific knowledge within an organization. Details about such systems implemented at several organizations such as Hewlett-Packard, National Security Agency and Microsoft are presented. Insights, challenges and future development plans gained through the development of a People-Finder are discussed. Finally, concluding remarks about the role of artificial intelligence in the development of People-Finder KMS and automating the process of profile maintenance are discussed.

Bloodgood, J. M. and W. Salisbury (2001). "Understanding the influence of organizational change strategies on information technology and knowledge management strategies." Decision Support Systems 31(1): 55-69.

Abstract While discussion about knowledge management often centers around how knowledge may best be codified into an explicit format for use in decision support or expert systems, some knowledge best serves the organization when it is kept in tacit form. The authors draw upon the resource-based view to identify how information technology can best be used during different types of strategic change. Specifically, they suggest that different change strategies focus on different combinations of tacit and explicit knowledge that make certain types of information technology more appropriate in some situations than in others.

Burns, G. A. P. C., K. Stephan, et al. (2001). "Towards a federated neuroscientific knowledge management system using brain atlases." Neurocomputing 38-40: 1633-1641.

Abstract The topic of federated databases has received much attention within the domain of neuroinformatics and is widely perceived as the eventual solution to the problems inherent in building truly interoperable informatics systems. We describe a feasibility study of a methodology strategy for building federated informatics systems with a specific example from informatics approaches involving the neuroscientific literature. We examine the logistical issues concerning linking two database systems (CoCoMac and NeuroScholar) via a method based on the use of transformations between neuroanatomical parcellations (Stephan et al., Phil. Trans. R. Soc. London B 335 (2000) 37-54).

Chen, H., J. Schroeder, et al. (2003). "COPLINK Connect: information and knowledge management for law enforcement." *Decision Support Systems* 34(3): 271-285.

Abstract Information and knowledge management in a knowledge-intensive and time-critical environment presents a challenge to information technology professionals. In law enforcement, multiple data sources are used, each having different user interfaces. COPLINK Connect addresses these problems by providing one easy-to-use interface that integrates different data sources such as incident records, mug shots and gang information, and allows diverse police departments to share data easily. User evaluations of the application allowed us to study the impact of COPLINK on law-enforcement personnel as well as to identify requirements for improving the system. COPLINK Connect is currently being deployed at Tucson Police Department (TPD).

Chua, A. (2004). "Knowledge management system architecture: a bridge between KM consultants and technologists." *International Journal of Information Management* 24(1): 87-98.

Abstract Many scholars and practitioners recognise the power of technology in supporting knowledge management (KM) activities. However, in most KM literatures, the discussion on related technology is either given cursory treatment or confined largely to product-specific features. This reflects a division between KM consultants and KM technologists. For this reason, the objective of this paper is to develop a knowledge management systems architecture that seeks to bridge the gap between consultants and technologists. The architecture is intended to provide a common framework for both to review how technologies are used to support KM processes.

Chute, C. G., B. Cesnik, et al. (1994). "Medical data and knowledge management by integrated medical workstations: summary and recommendations." *International Journal of Bio Medical Computing* 34(1-4): 175-83.

Abstract The health care professional workstation will function as an interface between the user and the patient data as well as an interface pertinent medical knowledge. Appropriate knowledge focus will require the workstation to recognize the concepts and structure of patient data, and understand the scope and access methods of knowledge sources. Issues are organized around five major themes: (i) structure, (ii) reliability and validation, (iii) views, (iv) location, and (v) ethical and legal. Conventional database representations can effectively address data structure and format variations that will inevitably persist in local data stores. The reliability of data and the validation of knowledge are critical issues that may determine the ultimate utility of clinical workstations. Alternative views of patient information and knowledge sources represent the true power of an intelligent data portal, represented by a well-designed clinical workstation.

Both data and knowledge are optimally represented in decentralized information networks, although the confidentiality and ownership of this information must be respected. Evolutionary progress toward consistent representations of knowledge and patient data will be facilitated by the establishment of self-documentation standards for the developers of data encoding systems and knowledge sources, perhaps extended from the preliminary model afforded by the Unified Medical Language System (UMLS).

Cloete, M. and R. Snyman (2003). "The enterprise portal - is it knowledge management?" *Aslib Proceedings: new information perspectives* 55(4): 234-242.

Dong, Y. and M. Li (2004). "HyO-XTM: a set of hyper-graph operations on XML Topic Map toward knowledge management." *Future Generation Computer Systems* 20(1): 81-100.

Abstract Knowledge management is a critical issue for the next-generation web application, because the next-generation web is becoming a semantic web, a knowledge-intensive network. XML Topic Map (XTM), a new standard, is appearing in this field as one of the structures for the semantic web. It organizes information in a way that can be optimized for navigation. In this paper, a new set of hyper-graph operations on XTM (HyO-XTM) is proposed to manage the distributed knowledge resources. HyO-XTM is based on the XTM hyper-graph model. It is well applied upon XTM to simplify the workload of knowledge management. The application of the XTM hyper-graph operations is demonstrated by the knowledge management system of a consulting firm. HyO-XTM shows the potential to lead the knowledge management to the next-generation web.

Emerson, T. (1999). "What comes after knowledge management? Wearable computers, smart rooms, and virtual humans." *Information Outlook*. 3(4): 13-4.

Fowler, A. (2000). "The role of AI-based technology in support of the knowledge management value activity cycle." *The Journal of Strategic Information Systems* 9(2-3): 107-128.

Abstract The paper evaluates the phenomenon of knowledge management (KM) and its relationship to the artificial intelligence (AI) technologies of knowledge-based systems, case-based reasoning and neural networks. A knowledge value-chain (KVC) concept is established and developed into a closed loop knowledge activity cycle. This is then linked to Nonaka's knowledge spiral and related concepts. Using this framework, applied within the context of the core business processes underpinning a contemporary 'knowledge company' that is operating at the forefront of computer networking technology, the potential application of AI is investigated. The study thereby illustrates both the potential

and the limitations of AI technologies in terms of their capability to support the KM process.

Greenes, R. A. and S. R. A. Deibel (1991). "The DeSyGNER knowledge management architecture: a building block approach based on an extensible kernel." *Artificial Intelligence in Medicine* 3(2): 95-111.

Abstract The Decision Systems Group has been developing a 'building block' approach for creating Knowledge Management (KM) applications for medical education and decision support. Potential functions and knowledge access modes to be supported include query, browsing, testing, simulation, didactic instruction, problem solving, and personal file management. Knowledge is considered to be available in multiple forms, non-adaptive and adaptive. We believe that organization and combination of disparate components, in order to build varied and complex applications as required for KM, is best achieved through a software engineering approach based on a kernel set of functions that provide a consistent set of services for all applications, facilitating extensibility and inter-application compatibility. For this purpose, we are exploring a prototype kernel architecture called DeSyGNER (the Decision Systems Group Nucleus of Extensible Resources). Features addressed by DeSyGNER include methods for decomposition of applications into modular units and identification of their functional dependencies; methods of structuring applications to separate their storage, processing, and presentation components; database requirements for indexing and composing complex structures from disparate, disjoint data elements; and methods to support multi-user cooperative development.

Guenther, K. and E. Braun "Knowledge management benefits of intranets." *Online*. 25(3): 16-8.

Heathfield, H. and G. Louw (1999). "New challenges for clinical informatics: knowledge management tools." *Health Informatics Journal*. 5(2): 67-73.

Abstract It is widely recognized that medicine has reached a crisis point. Doctors can no longer memorize or effectively apply the vast amounts of scientific knowledge that are relevant to their clinical practice. Estimates suggest that human knowledge doubles every 33 years, while the expansion of medical knowledge is currently estimated at doubling about every 19 years. In contrast, our intellectual capacity has remained practically static over the last thousand or so years. Many have looked to Information Technology (IT) to solve the problem of information overload in medicine. Simply converting existing information resources into an electronic form, however, and distributing or making them accessible to users, is far from adequate and can often exacerbate the problem of information overload. Efficient organization and distribution of knowledge is one of medicine's biggest challenges, and there is much talk about the new paradigm of 'knowledge management tools' which will transform the way

medicine is practised.

Jadad, A. R., R. B. Haynes, et al. (2000). "The internet and evidence-based decision-making: A needed synergy for efficient knowledge management in health care." CMAJ: Canadian Medical Association Journal 162(3): 362-365.

Kalogeropoulos, D. A., E. R. Carson, et al. (2003). "Towards knowledge-based systems in clinical practice: development of an integrated clinical information and knowledge management support system." Computer Methods & Programs in Biomedicine 72(1): 65-80.

Abstract Given that clinicians presented with identical clinical information will act in different ways, there is a need to introduce into routine clinical practice methods and tools to support the scientific homogeneity and accountability of healthcare decisions and actions. The benefits expected from such action include an overall reduction in cost, improved quality of care, patient and public opinion satisfaction. Computer-based medical data processing has yielded methods and tools for managing the task away from the hospital management level and closer to the desired disease and patient management level. To this end, advanced applications of information and disease process modelling technologies have already demonstrated an ability to significantly augment clinical decision making as a by-product. The wide-spread acceptance of evidence-based medicine as the basis of cost-conscious and concurrently quality-wise accountable clinical practice suffices as evidence supporting this claim. Electronic libraries are one-step towards an online status of this key health-care delivery quality control environment. Nonetheless, to date, the underlying information and knowledge management technologies have failed to be integrated into any form of pragmatic or marketable online and real-time clinical decision making tool. One of the main obstacles that needs to be overcome is the development of systems that treat both information and knowledge as clinical objects with same modelling requirements. This paper describes the development of such a system in the form of an intelligent clinical information management system: a system which at the most fundamental level of clinical decision support facilitates both the organised acquisition of clinical information and knowledge and provides a test-bed for the development and evaluation of knowledge-based decision support functions.

Kanoui, H. and M. Joubert (1995). "Acts and knowledge management in an open hospital information system." Medinfo 1: 382-6.

Abstract This communication presents the management of a customizable patient medical dossier as implemented in the NUCLEUS project. After a brief reminder of the NUCLEUS hospital information system features, we discuss the two main innovative concepts underlying the intelligent management of the integrated patient dossier: acts management and knowledge management. The functionalities related to patient dossier are then introduced.

Kaufman, D. (2002). "Turning search into knowledge management." *Electronic Library*. 20(1): 49-54.

Abstract Creating a high quality search algorithm is more of an art than a science. It is a balancing act, and as any tightrope walker will tell you, it takes years to master. But when the art of ranking a query against a set of documents is virtually mastered, one has the foundation upon which to build a system that can do more than just search; it can turn information into knowledge. By effectively finding, categorizing, summarizing, and proactively routing information, it is possible to take total control of the ever-growing mountain of unstructured data in the digital world.

Latham, J. (1998). "IRC notes. Intranets are not instant knowledge management systems." *Information Outlook*. 2(9): 42.

Liebowitz, J. (1998). "Expert systems: An integral part of knowledge management." *Kybernetes* 27(2): 170-175.

Liebowitz, J. (2001). "Knowledge management and its link to artificial intelligence." *Expert Systems with Applications* 20(1): 1-6.

Abstract Knowledge management is an emerging area which is gaining interest by both industry and government. As we move toward building knowledge organizations, knowledge management will play a fundamental role towards the success of transforming individual knowledge into organizational knowledge. One of the key building blocks for developing and advancing this field of knowledge management is artificial intelligence, which many knowledge management practitioners and theorists are overlooking. This paper will discuss the emergence and future of knowledge management, and its link to artificial intelligence.

Lindvall, M., I. Rus, et al. (2003). "Software systems support for knowledge management." *Journal of Knowledge Management* 7(5): 137-150.

Lucier, R. E., N. W. Matheson, et al. (1988). "The knowledge workstation: an electronic environment for knowledge management." *Bulletin of the Medical Library Association* 76(3): 248-55.

Abstract This paper focuses on the creation of the IAIMS workstation in the context of the outcomes of a year-long IAIMS strategic planning process at the Johns Hopkins Medical Institutions (JHMI). These outcomes include a long-term institutional vision for a functional knowledge management environment, a JHMI IAIMS model, a strategic plan, and two model prototypes. The functional requirements and specific implementation strategies for the IAIMS workstation, the prototype for managing the knowledge base of the published biomedical literature, are discussed in detail.

Macintosh, A., I. Filby, et al. (1999). "Knowledge management techniques: Teaching and dissemination concepts": Errata." *International Journal of Human-Computer Studies* 51(6): 1189.

Abstract Describes knowledge management teaching and dissemination concepts to support training of professionals in an organization to manage their knowledge assets. These concepts are based on Artificial Intelligence Applications Institutes experience of working with large organizations to establish a technical knowledge management framework and to support their personnel in implementing the framework. The concepts support organizations who embark on a knowledge management program. They promote the importance of knowledge management and the awareness of how knowledge management can be accomplished within, and across, operational divisions: create an awareness of a framework to achieve knowledge management; and establish a group of personnel who have skills in knowledge management techniques to enable them to facilitate the development, maintenance, use and sharing of the organization's knowledge assets.

Malhotra, Y. (2001). "Expert systems for knowledge management: crossing the chasm between information processing and sense making." *Expert Systems with Applications* 20(1): 7-16.

Abstract Based on insights from research in information systems, information science, business strategy and organization science, this paper develops the bases for advancing the paradigm of AI and expert systems technologies to account for two related issues: (a) dynamic radical discontinuous change impacting organizational performance; and (b) human sense-making processes that can complement the machine learning capabilities for designing and implementing more effective knowledge management systems.

Martens, B., Z. Turk, et al. (2003). "Re-engineering the scientific knowledge management process: the SciX project." *Automation in Construction* 12(6): 677-687.

Abstract In the past, paper-based publications were both the medium for the information exchange among the scientists as well as the measure of their scientific quality. Recently electronic publication is increasingly important for the dissemination of scientific work, while evaluation of scientists and institutions remains largely based on the printed publications. In the "material world", associations, such as eCAADe have been providing a stage for getting the right people together and through annual conferences and seminars made sure that research results were heard and read. The Internet and the Web are allowing the scientists to pursue those activities on their own or through flexibly organized "virtual" associations. Electronic publications also provide a basis for efficient management of scientific knowledge--discovering related work, reduction of the duplicate efforts, establishment of virtual research teams etc. In this paper, we

present the goals and initial results of an EU-project called SciX: "Open, Self Organising Repository for Scientific Information Exchange". The goal of SciX is to analyze the business processes of scientific publishing, to invent new publication models and through a series of pilots to demonstrate how this will work. In the envisioned scenarios, professional associations such as eCAADe play an important role. Their members are the potential users of SciX's platforms, authors and readers of the papers. Associations could also become the publishers and archivists of the knowledge created within their respective community. The objectives of this contribution focus on involving the eCAADe-community in the developments in SciX, on fine-shaping the goals, as well as on defining the requirements and monitoring the usability of the pilots.

Metaxiotis, K., K. Ergazakis, et al. "Decision support through knowledge management: the role of the artificial intelligence." *Information Management*.

Mineau, G. W., R. Missaoui, et al. (2000). "Conceptual modeling for data and knowledge management." *Data & Knowledge Engineering* 33(2): 137-168.

Abstract In order to exploit knowledge embedded in databases and to migrate from data to knowledge management environments, conceptual modeling languages must offer more expressiveness than traditional modeling languages. This paper proposes the conceptual graph formalism as such a modeling language. It shows through an example and a comparison with Telos, a semantically rich knowledge modeling language, that it is suited for that purpose. The conceptual graph formalism offers simplicity of use through its graphical components and small set of constructs and operators. It allows easy migration from database to knowledge base environments. Thus, this paper advocates its use.

Milton, N., N. Shabolt, et al. (1999). "Towards a knowledge technology for knowledge management." *International Journal of Human-Computer Studies* 51(3): 615-641.

Abstract Knowledge Management (KM) is crucial to organizational survival, yet is a difficult task requiring large expenditure of resources. Information Technology solutions, such as email, document management and intranets, are proving very useful in certain areas. However, many important problems still exist, providing opportunities for new techniques and tools more oriented towards knowledge. We refer to this as Knowledge Technology. A framework has been developed which has allowed opportunities for Knowledge Technology to be identified in support of five key KM activities: personalization, creation/innovation, codification, discovery and capture/monitor. In developing Knowledge Technology for these areas, methods from knowledge engineering are being explored. Our main work in this area has involved the application and evaluation of existing knowledge for a large intranet system. This, and other case studies, have provided important lessons and insights which have led to ongoing

research in ontologies, generic models and process modelling methods. We believe that the evidence presented here shows that knowledge engineering has much to offer KM and can be the basis on which to move towards a Knowledge Technology.

Nemati, H. R., D. M. Steiger, et al. (2002). "Knowledge warehouse: an architectural integration of knowledge management, decision support, artificial intelligence and data warehousing." *Decision Support Systems* 33(2): 143-161.

Abstract Decision support systems (DSS) are becoming increasingly more critical to the daily operation of organizations. Data warehousing, an integral part of this, provides an infrastructure that enables businesses to extract, cleanse, and store vast amounts of data. The basic purpose of a data warehouse is to empower the knowledge workers with information that allows them to make decisions based on a solid foundation of fact. However, only a fraction of the needed information exists on computers; the vast majority of a firm's intellectual assets exist as knowledge in the minds of its employees. What is needed is a new generation of knowledge-enabled systems that provides the infrastructure needed to capture, cleanse, store, organize, leverage, and disseminate not only data and information but also the knowledge of the firm. The purpose of this paper is to propose, as an extension to the data warehouse model, a knowledge warehouse (KW) architecture that will not only facilitate the capturing and coding of knowledge but also enhance the retrieval and sharing of knowledge across the organization. The knowledge warehouse proposed here suggests a different direction for DSS in the next decade. This new direction is based on an expanded purpose of DSS. That is, the purpose of DSS in knowledge improvement. This expanded purpose of DSS also suggests that the effectiveness of a DSS will, in the future, be measured based on how well it promotes and enhances knowledge, how well it improves the mental model(s) and understanding of the decision maker(s) and thereby how well it improves his/her decision making.

Nissen, M. E. (1999). "Knowledge-based knowledge management in the reengineering domain." *Decision Support Systems* 27(1-2): 47-65.

Abstract A fundamental problem with knowledge management is the information technology (IT) employed to enable knowledge work appears to target data and information, as opposed to knowledge itself. In contrast, knowledge-based systems (KBS) maintain an explicit and direct focus on knowledge. The research described in this article is focused on innovating knowledge management through KBS technology. We refer to this KBS-enabled transformation of knowledge work as knowledge-based knowledge management. Drawing from the recent literature, we identify a number of key activities associated with knowledge management to establish a set of requirements for knowledge management support. We match these requirements with textbook

capabilities of intelligent systems and use this analysis to evaluate KOPeR, a KBS employed to automate and support knowledge management in the reengineering domain. We find KOPeR possesses the capabilities required for knowledge management support. And its field application, as part of a major reengineering engagement, reveals four important knowledge effects enabled by this KBS. From this study, we also find KOPeR to be effective in its automation and support of key knowledge management activities. And through its successful use and knowledge effects in this study, we conclude that KBS can be developed and employed for effective knowledge management support.

Nutkis, D. S. (1997). "Webcasting: knowledge management coming to health care providers." *Surgical Services Management*. 3(11): 18-21.

Odden, J. R. (1998). "Developing Web-based knowledge management systems for healthcare call centers." *Healthcare Information Management* 12(2): 87-95.

Otto, J. R., J. H. Cook, et al. (2001). "Extensible markup language and knowledge management." *Journal of Knowledge Management* 5(3): 278-284.

Abstract Explores the use of extensible markup language (XML) to both store and enforce organizational data definitions, thus providing a synergetic framework for leveraging the potential of knowledge management (KM) tools. XML provides a flexible markup standard for representing data models. KM provides information technology (IT) processes for capturing, maintaining, and using information. While the processes that comprise KM and the mechanisms that form XML differ greatly in concept, they both deal in a fundamental way with information. XML maintains the context of data (i.e., data model) which enables data to represent information. KM provides the framework for managing this information. Explores the vital role that XML can play to support an efficient corporate KM strategy.

Sarnoff, A. and T. Wimmer (2003). "Knowledge management and Intranets: putting people first." *Intranet Professional*. 6(6): 6-8.

Schmoldt, D. L. and H. M. Rauscher (1994). "A knowledge management imperative and six supporting technologies." *Computers and Electronics in Agriculture* 10(1): 11-30.

Abstract Knowledge differs from data and information in that it is organized and evaluated. These added dimensions give knowledge meaning, something beyond the syntactic representations used for data and information, and therefore make it more difficult to manage. Management of our current knowledge and focused creation of new knowledge are essential for productive interaction with our world, as scientists and citizens. However, both science and

society are simultaneously experiencing information excess and knowledge scarcity. Our abilities to produce data, information, and knowledge have exceeded our knowledge management skills. Many of the tools necessary for a Knowledge Revolution, however, now exist or are under development. Good knowledge management tools can reduce today's information glut, support creative scientific synthesis, and aid effective knowledge application. Within this context, software tools for knowledge management examined in this paper are: knowledge-based systems, scientific visualization, virtual reality, spatial data management, computer-supported cooperative work, and hypertext.

Shams, K. and M. Farishta (2001). "Data warehousing: toward knowledge management." *Topics in Health Information Management* 21(3): 24-32.

Abstract With rapid changes taking place in the practice and delivery of health care, decision support systems have assumed an increasingly important role. More and more health care institutions are deploying data warehouse applications as decision support tools for strategic decision making. By making the right information available at the right time to the right decision makers in the right manner, data warehouses empower employees to become knowledge workers with the ability to make the right decisions and solve problems, creating strategic leverage for the organization. Health care management must plan and implement data warehousing strategy using a best practice approach. Through the power of data warehousing, health care management can negotiate better managed care contracts based on the ability to provide accurate data on case mix and resource utilization. Management can also save millions of dollars through the implementation of clinical pathways in better resource utilization and changing physician behavior to best practices based on evidence-based medicine.

Shaw, M. J., C. Subramaniam, et al. (2001). "Knowledge management and data mining for marketing." *Decision Support Systems* 31(1): 127-137.

Abstract Due to the proliferation of information systems and technology, businesses increasingly have the capability to accumulate huge amounts of customer data in large databases. However, much of the useful marketing insights into customer characteristics and their purchase patterns are largely hidden and untapped. Current emphasis on customer relationship management makes the marketing function an ideal application area to greatly benefit from the use of data mining tools for decision support. A systematic methodology that uses data mining and knowledge management techniques is proposed to manage the marketing knowledge and support marketing decisions. This methodology can be the basis for enhancing customer relationship management.

Sheu, P. C.-Y. and W. Sull (1990). "Knowledge management in deductive object bases." *Data & Knowledge Engineering* 5(1): 39-58.

Abstract A deductive object base is a deductive database that is constructed based of an object data model. Using mathematical logic as formal representation, it can be constructed to support classification, aggregation, generalization, and association. It further extends existing databases with procedural semantics. In this paper we extended the framework of deductive object base with the constructs for meta-knowledge. To enhance the quality of knowledge, we also present a knowledge assimilation scheme based on the resolutorial scheme.

Silverman, B. G. (1998). "The role of Web agents in medical knowledge management." MD Computing 15(4): 221-31.

Abstract The intelligent agent approach offers the promise of remaking a traditional enterprise into a learning organization, one that uses progressive information technology and information strategies to study its outcomes prospectively, to avoid repetition of past errors, and to improve its effectiveness continuously. This paper explores whether agent technology can fulfill this promise in health care, both in a general sense and in terms of knowledge management and performance support. A case study is presented to illustrate some lessons learned and the pitfalls that need to be avoided as the development of agents proceeds.

Stefanelli, M. (2002). "Knowledge management to support performance-based medicine." Methods of Information in Medicine 41(1): 36-43.

Abstract **OBJECTIVES:** To discuss research issues for medical informatics in order to support the further development of health information systems, exploiting knowledge management and information and communication technology to increase the performance of Health Care Organizations (HCOs). **METHODS:** Analyze the potential of exploiting knowledge management technology in medicine. **RESULTS AND CONCLUSIONS:** The increasing pressure on HCOs to ensure efficiency and cost-effectiveness, balance the quality of care, and contain costs will drive them towards more effective management of medical knowledge derived from biomedical research. Knowledge management technology may provide effective methods and tools in speeding up the diffusion of innovative medical procedures. Reviews of the effectiveness of various methods of best practice dissemination show that the greatest impact is achieved when such knowledge is made accessible through the health information system at the moment it is required by care providers at their work sites. There is a need to take a more clinical process view of health care delivery and to identify the appropriate organizational and information infrastructures to support medical work. Thus, the great challenge for medical informatics is represented by the effective exploitation of the astonishing capabilities of new technologies to assure the conditions of knowledge management and organizational learning within HCOs.

Swan, J., S. Newell, et al. (1999). "Knowledge management and innovation: Networks and networking." *Journal of Knowledge Management* 3(4): 262-275.

Abstract Begins with a critical review of the literature on knowledge management, arguing that its focus on information technology (IT) to create a network structure may limit its potential for encouraging knowledge sharing across social communities. Two cases of interactive innovation are contrasted. One focused almost entirely on using IT (intranet) for knowledge sharing, resulting in a plethora of independent intranets which reinforced existing organizational and social boundaries with electronic "fences." In the other, while IT was used to provide a network to encourage sharing, there was also recognition of the importance of face-to-face interaction for sharing tacit knowledge. The emphasis was on encouraging active networking among dispersed communities, rather than relying on IT networks. Argues for a community-based model of knowledge management for interactive innovation and contrasts this with the cognitive-based view that underpins many IT-led knowledge management initiatives.

Tsui, E., B. J. Garner, et al. (2000). "The role of artificial intelligence in knowledge management." *Knowledge-Based Systems* 13(5): 235-239.

Wachter, R. M. (1999). "Technology support for knowledge management." *Mid-American Journal of Business* 14(2): 13-20.

Abstract Finding the optimum way to leverage the resources of a firm remains a prominent issue for organizational management. Increasingly, firms are realizing that the ultimate organizational resource is the knowledge that resides in the minds of employees and is embedded in the processes, products, and services of the firm. Knowledge has been identified as the new basis of competition in a post capitalist society and has been considered the only unlimited resource. The focus of knowledge management is to capture information which resides in the individual and group experience. This paper discusses the types of knowledge found in organizations, the reasons for which knowledge is sought, and the role of technology in the facilitation of the codification, conversion, and management of knowledge. Specific examples from companies such as Shell, Coopers & Lybrand, Chase Manhattan, and others illustrate the concepts presented.

West, J., Lawrence A. and T. J. Hess (2002). "Metadata as a knowledge management tool: supporting intelligent agent and end user access to spatial data." *Decision Support Systems* 32(3): 247-264.

Abstract Many factors have led to explosive growth in the use of geographic information system (GIS) technology to support managerial decision making. Despite their power, utility, and popularity, however, GIS require a significant

amount of specialized knowledge for effective use. This paper describes a GIS-based decision support system (DSS) design approach that embeds much of this knowledge in well-structured metadata and presents it to the decision maker through an appropriate interface or software agents, thereby decreasing system learning costs and improving effectiveness. The metadata design from a spatial decision support system (SDSS) is presented along with illustrations showing how the design addresses specific knowledge management (KM) problems. The paper then discusses how the knowledge management design approach can be generalized to other SDSS, to DSS in general, and to data warehouses.

Williams, S. (1997). "The Internet explorer: knowledge management resources on the Internet." *Online Currents*. 12(8): 7-8.

Yoo, S. B. and Y. Kim (2002). "Web-based knowledge management for sharing product data in virtual enterprises." *International Journal of Production Economics* 75(1-2): 173-183.

Abstract As the networks (i.e., Internet and Intranet) proliferate all over the world, it is inevitable to move some (or all) enterprise activities into the virtual spaces. Although the core in this new enterprise environment is at ready and effective exchange of information, it is not an easy task due to the heterogeneity of information resources. In this paper, a Web-based knowledge management system is presented for facilitating seamless sharing of product data among application systems in virtual enterprises. Three types of knowledge, that is, metadata, ontology, and mapping relationships, and applications of these to sharing product data are explained. That knowledge provides users with a map of product data that helps them to locate proper information, enables a content-based search that can improve search effectiveness, and supports automatic translation and reuse of product data among different application systems throughout the product life cycle. The key technologies enabling the proposed approach include CORBA, Java, and data exchange standards such as STEP, EDIFACT, and XML. A prototype system is implemented to demonstrate the feasibility of the proposed approach.

Yoshida, R., T. Murao, et al. (2000). "3D web environment for knowledge management." *Future Generation Computer Systems* 17(1): 73-78.

Abstract Our module for establishing the shared-state of 3D objects, which supports the LivingWorlds specification, is integrated with a VRML browser plugged into a web browser and a web server, as a 3D web environment system for knowledge management in an industrial manufacturing process. Users will be able to record the minutes of their online meetings using 3D models, which may include annotations or object behaviors, and will be able to store them in a database with related documents in preparation for another meeting. In this report, we discuss the direction of our work and the concept underlying the 3D web environment system design.

REVIEW

The following references provide reviews of the history and development of knowledge management, and the factors which differentiate it from, or link it to other organisational improvement models such as Total Quality Management (TQM), learning organisations and systems theories. Also included are articles about KM's current use in various business sectors, including health, as well as critical reviews about the barriers, issues, challenges and "hype" surrounding KM.

Anonymous (2001). "Knowledge management: practices and challenges." *Measuring Business Excellence* 5(3): 12-12.

Anonymous (2001). "The knowledge management spectrum: understanding the KM landscape." *Measuring Business Excellence* 5(3): 7-7.

Anonymous (2003). "When knowledge adds up to nothing: Why knowledge management fails and what you can do about it." *Development and Learning in Organizations: An International Journal* 17(1): 32-35.

Adams, G. L. and B. T. Lamont (2003). "Knowledge management systems and developing sustainable competitive advantage." *Journal of Knowledge Management* 7(2): 142-154.

Abstract Recent literature in the strategic management field suggests that firms must learn to re-bundle internal competencies and resources in order to maintain competitive advantages over time. Utilizing the resource-based view of the firm and dynamic capabilities perspectives, this paper examines the roles that absorptive and transformative capacity play in organizational innovation, with specific emphasis placed on the role and effectiveness of knowledge management systems as a determinant of innovation practices.

Ahmed, P. K., K. K. Lim, et al. (1999). "Measurement practice for knowledge management." *Journal of Workplace Learning* 11(8): 304-311.

Abstract Notes that knowledge management (KM) has become part of common vocabulary in academic circles as well as in the business world. Whilst an increasing number of companies have embarked upon knowledge management initiatives, a large proportion of these initiatives remain technically focused. The authors maintain that the problem with this type of focus is that it excludes and neglects the true potential benefits that can be derived from knowledge management. In this paper, a holistic model of KM is presented which dynamically incorporates both tactical as well as strategic elements. Secondly in

this paper the authors address how to measure KM by developing a framework which systematically allows for screening and evaluation. The measurement framework proposed enables leveraging knowledge assets effectively and efficiently. It is concluded that without a holistic perspective which captures all the key elements and dimensions, KM initiatives will create marginal gains at best and failure at worst. (PsycINFO Database Record (c) 2003 APA, all rights reserved).

Beijerse, R. P. u. (1999). "Questions in knowledge management: defining and conceptualising a phenomenon." *Journal of Knowledge Management* 3(2): 94-110.

Binney, D. (2001). "The knowledge management spectrum--Understanding the KM landscape." *Journal of Knowledge Management* 5(1): 33-42.

Abstract Knowledge management (KM) is the subject of much literature, discussion, planning and some action. Effectively implementing a sound KM strategy and becoming a knowledge-based company is seen as a mandatory condition of success for organizations as they enter the era of the knowledge economy. Yet KM remains a broadly ill-defined term, with many, often disparate management theories, applications and technologies claiming a place under the KM banner. Read individually, the literature often presents a single view of what is a multifaceted topic. The KM spectrum has been developed to assist organizations in understanding the range of KM options, applications and technologies available to them. It provides a view of the totality and complexity of the various KM theories, tools and techniques presented in the literature. It provides a framework within which management can balance its KM focus and establish and communicate its strategic KM direction. This article introduces the KM spectrum as a synthesis of current KM theories, applications, tools and technologies described in the literature. (PsycINFO Database Record (c) 2003 APA, all rights reserved).

Chauvel, D. and C. Despres (2002). "A review of survey research in knowledge management: 1997-2001." *Journal of Knowledge Management* 6(3): 207-223.

Civi, E. (2000). "Knowledge management as a competitive asset: A review." *Marketing Intelligence & Planning* 18(4): 166-174.

Abstract Knowledge is the fundamental basis of competition. Although the study of knowledge is as old as human history, it has only been recognized in the last decade as a crucial element of the industrial development of firms. Organizations view knowledge as their most valuable and strategic resource. They believe in managing their intellectual resources and capabilities in order to become and remain competitive. To this end, knowledge management (KM) has become a fundamental concept for those interested in the ever-changing events

of the business world. Organizations invest heavily in building KM systems. They must strategically assess their knowledge resources and capabilities, and need to establish their knowledge strategy to sustain competitive advantages.

Clarke, T. and C. Rollo (2001). "Corporate initiatives in knowledge management." *Education & Training* 43(4-5): 206-214.

Abstract Knowledge is a social construct and cannot be managed as physical assets. The distinction between data, information and knowledge is made. The transformation of raw data and information into useful knowledge requires a sense of trust and reciprocity on the part of people. Knowledge flows involve the translation of tacit knowledge into explicit knowledge in a process of codification. Knowledge produced by individuals reaches its full potential to create economic value when it becomes embedded in organizational routines. It is important to focus upon flows of knowledge, and not simply measure stocks of knowledge. Examples are given of successful corporate initiatives in knowledge management.

Coakes, E. (2004). "Knowledge Management: Current Issues and Challenges." *The Electronic Library* 22(2): 193-193.

Cooper, L. P. (2003). "A research agenda to reduce risk in new product development through knowledge management: a practitioner perspective." *Journal of Engineering and Technology Management* 20(1-2): 117-140.

Coulson-Thomas, C. J. (1997). "The Future of the organisation: Selected Knowledge Management Issues." *Journal of Knowledge Management* 1(1): 15-26.

Courtney, J. F. (2001). "Decision making and knowledge management in inquiring organizations: toward a new decision-making paradigm for DSS." *Decision Support Systems* 31(1): 17-38.

Abstract Organizational decisions of the future may include social, environmental, and economic concerns, and be much more "wicked" [Policy Sciences, 4 (1973) 155], complex and interconnected than those of the past. Organizations and their decision support systems must embrace procedures that can deal with this complexity and go beyond the technical orientation of previous DSS. Singerian inquiring organizations are designed to deal with wicked decision situations. This paper discusses DSS and knowledge management in Singerian organizations and calls for a new decision-making paradigm for DSS.

Davenport, T. H. and J. Glaser (2002). "Just-in-time delivery comes to knowledge management." *Harvard Business Review* 80(7): 107-11.

Abstract Like all primary care physicians, Dr. Bob Goldszer must stay on top of approximately 10,000 different diseases and syndromes, 3,000 medications, 1,100 laboratory tests, and many of the 400,000 articles added each year to the biomedical literature. That's no easy task. And it is, quite literally, a matter of life and death. The Institute of Medicine's 1999 report, *To Err Is Human*, suggests that more than a million injuries, and 90,000 deaths are attributable to medical errors annually. Something like 5% of hospital patients have adverse reactions to drugs, another study reports, and of those, 43% are serious, life threatening, or fatal. Many knowledge workers have problems similar to Dr. Goldszer's (though they're usually less life threatening). No matter what the field, many people simply can't keep up with all they need to know. In the early years of knowledge management, companies established knowledge networks and communities of practice, built knowledge repositories, and attempted to motivate people to share knowledge. But each of these activities involved a great deal of additional labor for knowledge workers. A better approach, say the authors, is to bake specialized knowledge into the jobs of highly skilled workers. Partners HealthCare has started to embed knowledge into the technology that doctors use in their jobs so that consulting it is no longer a separate activity. Now when Dr. Goldszer orders medicine or a lab test, the order-entry system automatically checks his decision against a massive clinical database as well as the patient's own medical record. Knowledge workers in other fields could likewise benefit from a just-in-time knowledge-management system tailored to deliver the right supporting information for the job at hand.

Dawes, M. and U. Sampson (2003). "Knowledge management in clinical practice: a systematic review of information seeking behavior in physicians". *International Journal of Medical Informatics* 71(1): 9-15.

Abstract **OBJECTIVES:** To determine information seeking behavior of physicians. **DATA SOURCES:** Systematic review of 19 studies that described information seeking behavior in a number of different settings using differing methodologies. Analysis was limited to quantitative studies describing sources of information sought by physicians. **RESULTS:** Investigators have used questionnaires, interviews and observation to identify the information seeking behavior of clinicians. The results were mainly obtained from trials in the United States and showed a wide variation in primary information sources used by physicians. The most frequent source for information used are text sources, second is asking colleagues and only one study found electronic databases to be the primary resource. Physician's desk reference is the commonest cited printed resource. Convenience of access, habit, reliability, high quality, speed of use, and applicability makes information seeking likely to be successful and to occur. The lack of time to search, the huge amount of material, forgetfulness, the belief that there is likely to be no answer, and the lack of urgency all hinder the process of answering questions. **CONCLUSIONS:** The wide variation in information seeking behavior implies a need for further categorization of information need

and information sources. Careful planning of information delivery to physicians is required to enable them to keep up to date and to improve knowledge transfer.

de Hoog, R. and R. van der Spek (1997). "Knowledge management: Hope or hype?" *Expert Systems with Applications* 13(1): v-vi.

De Long, D. and P. Seemann (2000). "Confronting conceptual confusion and conflict in knowledge management." *Organizational Dynamics* 29(1): 33-44.

Decker, S. and F. Maurer (1999). "Editorial: Organizational memory and knowledge management." *International Journal of Human-Computer Studies* 51(3): 511-516.

Demarest, M. (1997). "Understanding knowledge management." *Long Range Planning* 30(3): 321-322.

Desouza, K. C. (2003). "Knowledge management barriers: why the technology imperative seldom works." *Business Horizons* 46(1): 25-29.

Despres, C. and D. Chauvel (1999). "Knowledge management(s)." *Journal of Knowledge Management* 3(2): 110-123.

Abstract This article reviews developments in the field of applied knowledge management dating from 1990 and argues that a fragmented mosaic of programs and problematics currently exists, at various levels of incompatibility. Using a software product, the information space around applied knowledge management is mapped as an illustration of this basic fact. A research program that extends this logic is then described and a model on four dimensions is developed that appears to order the various programs, practices and processes in this divergent field. Implications for managers of knowledge management initiatives are discussed, and avenues for future research suggested.

Detmer, W. M. (2001). "Medical knowledge management solutions: revolutionizing the delivery of medical information to the point of need." *Medicine on the Net*. 7(8): 7-8.

Dieng, R., O. Corby, et al. (1999). "Methods and tools for corporate knowledge management." *International Journal of Human-Computer Studies* 51(3): 567-598.

Abstract This article, +is a survey of some methods, techniques and tools aimed at managing corporate knowledge from a corporate memory designer's perspective. In particular, it analyses problems and solutions related to the following steps: detection of needs of corporate memory, construction of the

corporate memory, its diffusion (specially using the Internet technologies), use, evaluation and evolution

Dove, R. (1999). "Knowledge management, response ability, and the agile enterprise." *Journal of Knowledge Management* 3(1): 18-35.

Abstract Defines the agile enterprise as one which is able to both manage and apply knowledge effectively, and suggests that value from either capability is impeded if they are not in balance. The article looks at the application of knowledge as requiring a change, and overviews a body of analytical work on change proficiency in business systems and processes. It looks at knowledge management as a strategic portfolio management responsibility based on learning functionality, and shares knowledge and experience in organizational collaborative learning mechanisms. The author introduces the concept of plug-compatible knowledge packaging as a means for increasing the velocity of knowledge diffusion and the likelihood of knowledge understood at the depth of insight. Finally, the article reviews a knowledge portfolio management and collaborative knowledge development architecture used successfully in a sizable cross-industry informal-consortia activity, and suggests that it is a good model for a corporate university architecture.

Drew, S. (1999). "Building Knowledge Management into Strategy: Making Sense of a New Perspective." *Long Range Planning* 32(1): 130-136.

Abstract Strategy at the Leading Edge features short reports on conferences, new research and experiments by academics, organizations and consultancies for all those involved in strategy and strategic management. Contributions (two hard copies and a disk) should be sent to Martin Whitehill, City University Business School, Frobisher Crescent, Barbican Centre, London EC2Y8HB E-mail: m.whitehill@city.ac.uk. Knowledge management is rapidly becoming one of the next big trends. All the signs are apparent in the number of recent conferences, articles and books devoted to the topic. Even the comic strip Dilbert has taken notice and poked fun at it. Our experience of earlier management trends, including BPR, organizational learning and TQM, might cause sceptics to question: so what's new here? The experiences of knowledge management pioneers in North America and Europe show that real and significant results are possible. However, as with older methodologies, good planning and implementation are essential and success is not guaranteed. This paper explores how managers might build knowledge management into the strategy process in their firms. Much has already been written about the philosophy and concepts of knowledge and intellectual capital. Less attention has been focused on how to combine a knowledge perspective with established strategy tools, or how to develop unique knowledge-based sources of sustainable competitive advantage. Gary Hamel and C.K. Prahalad have observed that managers typically spend too little time thinking seriously about

strategy and the future. We need to ensure that in this limited time, the important dimension of knowledge doesn't get overlooked.

Dunford, R. (2000). "Key challenges in the search for the effective management of knowledge in management consulting firms." *Journal of Knowledge Management* 4(4): 295-302.

Abstract Consulting firms cite knowledge management as a core capability for achieving competitive advantage. Consistent with this claim has been their increasing investment in systems that seek to formalize knowledge management and allow firms to leverage the knowledge held within the firm. However, despite some successes, knowledge management remains a major challenge. This paper investigates this situation, using a framework that distinguishes between input and output challenges. Input challenges relate to the production of a knowledge base that is able to be shared within the firm. Output challenges relate to the capacity for effective utilization of any such knowledge base. Concludes with a discussion of the way in which changes in the pattern of consulting services has implications for the sort of knowledge that various consulting firms wish to codify, the dangers associated with codification and the means by which these can be managed.

Fennessy, G. (2001). "Knowledge management in evidence-based healthcare: issues raised when specialist information services search for the evidence." *Health Informatics Journal*. 7(1): 4-7.

Abstract Knowledge management is in many ways a new paradigm in healthcare. This paper discusses how knowledge-management problems arising in evidence-based practice can be explored using 'soft systems methodology' and action research. An information centre working exclusively in evidence-based practice is used as a case study to explore how work teams and systems can be better utilized to provide clinical effectiveness information for busy healthcare practitioners.

Firestone, J. M. and M. W. McElroy (2004). "Organizational learning and knowledge management: the relationship." *The Learning Organization: An International Journal* 11(2): 177-184.

Frey, R. S. (2001). "Knowledge management, proposal development, and small business." *Journal of Management Development* 20(1): 38-54.

Abstract Reviews knowledge management (KM) and its development from concept to core competence. Shows how knowledge management is the tool that really enables organizations to "work smarter." Works through the steps of the KM project lifecycle. Details the KM proposal development process and the elements and method for a truly successful KM project application. Emphasises

the importance of knowledge validation. Reviews some organizations that are using KM successfully.

Gibbert, M., M. Leibold, et al. (2002). "Five Styles of Customer Knowledge Management, and How Smart Companies Use Them To Create Value." *European Management Journal* 20(5): 459-469.

Abstract Corporations are beginning to realize that the proverbial 'if we only knew what we know' also includes 'if we only knew what our customers know.' The authors discuss the concept of Customer Knowledge Management (CKM), which refers to the management of knowledge from customers, i.e. knowledge resident in customers. CKM is contrasted with knowledge about customers, e.g. customer characteristics and preferences prevalent in previous work on knowledge management and customer relationship management. Five styles of CKM are proposed and practically illustrated by way of corporate examples. Implications are discussed for knowledge management, the resource based view, and strategy process research.

Gladstone, B. (2001). "From Know-How to Knowledge: The Essential Guide to Understanding and Implementing Knowledge Management." *Journal of Organizational Change Management* 14(1): 101-104.

Gloet, M. (2002). "Knowledge management audit: the role of managers in articulating and integrating quality practices." *Managerial Auditing Journal* 17(6): 310-316.

Gloet, M. and M. Berrell (2003). "The dual paradigm nature of knowledge management: implications for achieving quality outcomes in human resource management." *Journal of Knowledge Management* 7(1): 78-89.

Gloet, M. and M. Terziovski (2004). "Exploring the relationship between knowledge management practices and innovation performance." *Journal of Manufacturing Technology Management* 15(5): 402-409.

Goddard, M., D. Mowat, et al. (2004). "The impacts of knowledge management and information technology advances on public health decision-making in 2010." *Health Informatics Journal* 10(2): 111-120.

Abstract Population and public health programs in Canada in local/regional, provincial/territorial and federal governments have been working together to adopt and to adapt modern information and communication technologies (ICTs) to improve program effectiveness. Effective public health is information intensive and the impact of emerging knowledge management and ICT solutions will be significant. To capture some of the current thinking on how knowledge management and ICT will benefit public health, a panel of Canadian public health professionals was convened to discuss opportunities for progress by 2010. Three

broad areas were addressed: (1) information and knowledge management; (2) information technology; and (3) working together to improve public health with knowledge management and ICT opportunities.

Gorman, A. N. (2004). "Sharing Expertise: Beyond Knowledge Management." *Personnel Psychology* 57(1): 237-240.

Abstract Provides a review of the book "Sharing Expertise: Beyond Knowledge Management" edited by M. Ackerman, V. Pipek, and V. Wulf (2003). The reviewer concludes that, although this text was written neither by nor for personnel psychologists, the eclectic nature of the chapters provides something for everyone with an interest in knowledge management. Readers with a background in programming and human-computer interaction will appreciate the depth of discussion of software, structure, and hardware provided for many of the applications. Readers who are considering an investment in knowledge management for their own organizations will undoubtedly find the many "on holds" and "work-in-progress" stories to be useful cautionary tales. That said, the reviewer does not think this text will convince many that the field of expertise sharing has ready replacements yet for individually "bootstrapped" methods involving some combination of e-mail, teleconferencing, virtual shared drives, and Microsoft's Netmeeting.

Gourlay, S. (2004). "On Organizational Learning and Knowledge Management." *British Journal of Management* 15(Suppl1): S96-S99.

Abstract Reviews the book, "The Blackwell Handbook of Organizational Learning and Knowledge Management," edited by M. Easterby-Smith and M. Lyles. This handbook comprises over 600 pages and is organized into four parts: Disciplinary Perspectives, Organizational Learning and the Learning Organization, Organizational Knowledge and Knowledge Management, and Problematizing Organizational Knowledge and learning. The editors provide a useful introduction analysing aspects of the contents, and a concluding chapter on future research agendas as identified by the authors and a panel of experts from range of management journals. The core of the book comprises 30 chapters, all except one of which have not previously been published. All the chapters are literature based and conceptual; several use illustrative case materials, but only one chapter presents empirical data in any detail. A number of authors also present explicit propositions, or new frameworks or models.

Gray, P. H. and D. B. Meister "Introduction: fragmentation and integration in knowledge management research." *Information Technology*.

Greenes, R. A. (2002). "Future of medical knowledge management and decision support." *Studies in Health Technology & Informatics* 80: 29-44.

Abstract Attempts to predict the future are typically off the mark. Beyond the challenges of forecasting the stock market or the weather, dramatic instances of notoriously inaccurate prognostications have been those by the US patent office in the late 1800s about the future of inventions, by Thomas Watson in the 1930s about the market for large computers, and by Bill Gates in the early 1990s about the significance of the Internet. When one seeks to make predictions about health care, one finds that, beyond the usual uncertainties regarding the future, additional impediments to forecasting are the discontinuities introduced by advances in biomedical science and technology, the impact of information technology, and the reorganizations and realignments attending various approaches to health care delivery and finance. Changes in all three contributing areas themselves can be measured in "PSPYs", or paradigm shifts per year. Despite these risks in forecasting, I believe that certain trends are sufficiently clear that I am willing to venture a few predictions. Further, the predictions I wish to make suggest a goal for the future that can be achieved, if we can align the prevailing political, financial, biomedical, and technical forces toward that end. Thus, in a sense this is a call to action, to shape the future rather than just let it happen. This chapter seeks to lay out the direction we are heading in knowledge management and decision support, and to delineate an information technology framework that appears desirable. I believe the framework to be discussed is of importance to the health care-related knowledge management and decision making activities of the consumer and patient, the health care provider, and health care delivery organizations and insurers. The approach is also relevant to the other dimensions of academic health care institution activities, notably the conduct of research and the processes of education and learning.

Gupta, B., L. S. Iyer, et al. (2000). "Knowledge management: practices and challenges." *Industrial Management and Data Systems* 100(1): 17-21.

Hatchuel, A., P. Le Masson, et al. (2002). "From knowledge management to design-oriented organisations." *International Social Science Journal* 54(1): 25-37.

Abstract The topicality of knowledge management is borne out by the sheer number of publications devoted to the subject in both management and economics literature. However, the notion of knowledge management applies not to a tried and tested body of practices, but to a whole set of concerns and experiments; it is, of course, also a widely used term that has arrived in the wake of a "learning organisation", a buzzword whose success is symptomatic of the many tensions today's companies face in maintaining effective collective learning. The subject of this article will be issues relating to these tensions and what they teach us about company management.

Helfer, J. (1998). "Order out of chaos: a practitioner's guide to knowledge management." *Searcher: The Magazine for Database Professionals*. 6(7): 44-51.

Hendriks, P. H. J. and D. J. Vriens (1999). "Knowledge-based systems and knowledge management: Friends or foes?" *Information & Management* 35(2): 113-125.

Abstract Knowledge-based systems (KBS) provide a way of formalizing and automating knowledge. Their worth for managing the knowledge assets has not gone unnoticed: they have been promoted as safeguards to retain expert knowledge, to avoid knowledge erosion, etc. KBS are the outcome of a knowledge engineering process that may be seen as providing some of the building blocks of knowledge management. Although 'knowledge' is the first word in knowledge-based systems, they are hardly ever considered from a knowledge perspective. As a result, a biased view of the organizational value of KBS exists in the literature, putting an undue emphasis on technology. The key issue addressed in this article is: how does knowledge engineering relate to a broader perspective of knowledge management? A way to identify the issues to be addressed when valuing KBS as potential measures for knowledge management is presented. To illustrate its value, the outcomes of a recent empirical investigation of how KBS function within organizations are presented

Hitt, M. A., R. D. Ireland, et al. (2000). "Technological learning, knowledge management, firm growth and performance: an introductory essay." *Journal of Engineering and Technology Management* 17(3-4): 231-246.

Abstract The uncertainty, dynamism and volatility of the new competitive landscape are altering the fundamental nature of competition as the 21st century begins. In this exciting competitive era, technological learning plays a vital role in the firm's competitive success. This role is significant because increasingly, technological learning is linked to the firm's ability to develop, maintain and exploit dynamic core competencies. Dynamic core competencies are the foundation for competitive advantages. Although difficult to accomplish, firms try to establish competitive advantages that can be sustained for some period of time. Being able to develop, maintain and exploit competitive advantages is critical to the creation of firm value. This introductory article for the Special Issue explores the importance of technological learning and the management of knowledge for firm growth and performance. Additionally, we present a context that frames the issues examined and the contributions made by the papers included in the special issue.

Hoyt, B. (2002). "Facilitating agreement for effective knowledge management systems: The Abilene Paradox is thriving in the new millennium." *International Journal on E-Learning* 1(3): 15-20.

Abstract Notes that several key applications today of advances in Knowledge Management (KM) include Customer Relationship Management, E-commerce, Supply Chain Management, and E-learning. All 4 KM interventions require significant investments of time, money, expertise, and strong commitment

but also have had a wide range of business success across many industries. Some applications have been complete failures, others have seen success, and most are in-between. There are obviously varied reasons for the variation in performance but each KM application must perform in 3 category areas; the approach; the deployment, and the results. The approach includes the alignment of the KM system with market conditions, strategic objectives, and action planning. The deployment category is the execution of the plans including; development and design; installation; test and trial; project management; and the usage or integration of the KM system into the business decision process. The results include the actual performance and measuring of performance to plan. This article focuses on execution issues. (PsycINFO Database Record (c) 2003 APA, all rights reserved).

Ives, W., B. Torrey, et al. (1997). "Knowledge Management: An Emerging Discipline with a Long History." *Journal of Knowledge Management* 1(4): 269-274.

Jackson, J. R. (2000). "The urgent call for knowledge management in medicine." *Physician Executive* 26(1): 28-31.

Jarke, M. (2002). "Experience-based knowledge management: a cooperative information systems perspective." *Control Engineering Practice* 10(5): 561-569.

Abstract Experience-based knowledge management is the art of capitalizing on failures and missed opportunities. Building on a number of interdisciplinary research projects, we study three possible approaches within a cooperative information systems framework, focussing on the facets of pragmatic technology usage, model-based management control, and social work practice and learning, respectively.

Johanessen, J.-A., J. Olaisen, et al. (1999). "Systemic thinking as the philosophical foundation for knowledge management and organizational learning." *Kybernetes* 28(1): 24-46.

Johannsen, C. G. (2000). "Total quality management in a knowledge management perspective." *Journal of Documentation* 56(1): 42-54.

Johnson, D. E. (1998). "Knowledge management is new competitive edge." *Health Care Strategic Management* 16(7): 2-3.

Abstract Managing knowledge is emerging as the latest business strategy to get ahead of the competition. In the process of developing knowledge management systems, executives are increasing their awareness and understanding of organizational dynamics, collaboration, corporate learning and knowledge management technology. But Donald E.L. Johnson writes that health

care executives must buy into and understand collaboration and corporate learning before they tackle knowledge management.

Johnson, J. E. "Knowledge management and the shortage of health care workers: linkage, losses, and new perspectives." *Patient Care Management*. 16(7): 2.

Johnson, J. E. "Linking strategic planning and knowledge management." *Patient Care Management*. 16(9): 2.

Jovell, A. J. (2002). "Josep Laporte Library Foundation: a model of knowledge management in the life and health sciences." *Health Information & Libraries Journal* 19(3): 176-80.

Jurisica, I. (2000). "Systematic knowledge management and knowledge discovery." *Bulletin of the American Society for Information Science*. 27(1): 9-12.

Kakabadse, N. K., A. Kakabadse, et al. (2003). "Reviewing the knowledge management literature: towards a taxonomy." *Journal of Knowledge Management* 7(4): 75-91.

Kermally, S. (2003). "Effective Knowledge Management: A Best practise Blueprint." *Journal of Documentation* 59(1): 118-119.

Kreiner, K. (2002). "Tacit knowledge management: The role of artifacts." *Journal of Knowledge Management* 6(2): 112-123.

Abstract This article discusses both the management of tacit knowledge and the tacit approach to knowledge management. Tacit knowledge must be made manageable by being explicated and separated from the knowledge workers, so that the knowledge resources do not go home at night. However, the less knowledge leaving in the evening, the less knowledge will return the following morning. Making the organization as independent as possible of the tacit knowledge of its knowledge workers is an ironic program for knowledge management, since it advocates a reduction of the total resource pool for the sake of managerial control. The article searches for alternatives to knowledge management exercised from a position of control and ownership. A case study of product development is analyzed. This specialized context focuses attention on knowledge mobilization rather than knowledge control and sharing. The artifact provides sufficient pressure for order and coordination to emerge spontaneously. Knowledge management can in such circumstances become tacit without losing its value.

Lamont, J. (2004). "Knowledge management at your service: new solutions and sources for librarians." *Searcher: The Magazine for Database Professionals*. 12(1): 57-61.

Lang, J. C. (2001). "Managerial concerns in knowledge management." *Journal of Knowledge Management* 5(1): 43-59.

Abstract Knowledge differs markedly from information and data. At rock bottom, knowledge is socially constructed in discourse communities. Because knowledge is not synonymous with information, information technology (IT) cannot deliver knowledge management. Since there will always be uncodified or uncodifiable knowledge content and contexts--given the social nature of knowledge--several barriers to the creation and utilization of knowledge exist. The task of knowledge management is to identify such barriers and overcome them. In this paper, the author reviews the social nature of knowledge and knowledge work; outlines why IT cannot deliver knowledge management; describes knowledge management problem of representational limitations, interactional contexts and knowledge outcomes in organizations; and identifies barriers to the creation and utilization of knowledge in organizations and suggests solutions.

Laszlo, K. C. and A. Laszlo (2002). "Evolving knowledge for development: The role of knowledge management in a changing world." *Journal of Knowledge Management* 6(4): 400-412.

Abstract In today's changing world, knowledge, and the processes to generate it and manage it, have become key factors in creating competitive business advantage. However, the challenges facing contemporary global societies, from human conflicts to environmental degradation, call for an expanded research agenda in the field of knowledge management. Issues such as improvement of the role of corporate citizenship to promote socially and ecologically responsible operations and development of human and social capital should become part of a purposeful strategy for creating a better future. "Knowledge is power"--and it is up to those with access to knowledge to decide if that power will continue to be used over others to increase the gap between rich and poor or if it will be a power to empower visions and realities based on an inclusive planetary ethic. From an evolutionary systems perspective, this paper explores some of the implications and key contributions that knowledge management can make for the transition toward sustainable forms of social organization. The heuristic of evolutionary learning community is presented as a participatory strategy for promoting learning and knowledge creation for evolutionary development.

Leech, S. A. and S. G. Sutton (2002). "Knowledge management issues in practice: Opportunities for research." *International Journal of Accounting Information Systems* 3(2): 69-73.

Leseure, M. J. and N. J. Brookes (2004). "Knowledge management benchmarks for project management." *Journal of Knowledge Management* 8(1): 103-116.

Liao, S.-h. (2003). "Knowledge management technologies and applications-literature review from 1995 to 2002." *Expert Systems with Applications* 25(2): 155-164.

Abstract This paper surveys knowledge management (KM) development using a literature review and classification of articles from 1995 to 2002 with keyword index in order to explore how KM technologies and applications have developed in this period. Based on the scope of 234 articles of knowledge management applications, this paper surveys and classifies KM technologies using the seven categories as: KM framework, knowledge-based systems, data mining, information and communication technology, artificial intelligence/expert systems, database technology, and modeling, together with their applications for different research and problem domains. Some discussion is presented, indicating future development for knowledge management technologies and applications as the followings: (1) KM technologies tend to develop towards expert orientation, and KM applications development is a problem-oriented domain. (2) Different social studies methodologies, such as statistical method, are suggested to implement in KM as another kind of technology. (3) Integration of qualitative and quantitative methods, and integration of KM technologies studies may broaden our horizon on this subject. (4) The ability to continually change and obtain new understanding is the power of KM technologies and will be the application of future works.

Lindsey-King, C. (1998). "Knowledge management: your link to the future." *Bibliotheca Medica Canadiana*. 20(2): 74-5.

Lloyd, B. (1996). "Knowledge management: the key to long-term organizational success." *Long Range Planning* 29(4): 576-580.

Lubit, R. (2001). "Tacit knowledge and knowledge management: The keys to sustainable competitive advantage." *Organizational Dynamics* 29(3): 164-178.

Abstract Discusses how both tacit knowledge and knowledge management capabilities can be the basis for sustained competitive advantage in today's economic environment. This article explores how companies can best grow their knowledge resources to create not simply competitive advantage, but sustainable competitive advantage.

Malone, S. M. (2001). "Knowledge management: white knight or white elephant?" *Topics in Health Information Management* 21(3): 33-43.

Abstract Knowledge management (KM) is a new management theory embraced by hundreds of writers in multiple countries and industries. Although a single fixed methodology does not exist, several methodological elements are common to most KM writings. KM has a number of similarities to and differences from quality improvement and reengineering. It can be applied to at least two universes in health care organizations. Applying KM to a case study in health information management (HIM) departments yielded much useful information but also proved unable ultimately to resolve the problem being studied. HIM professionals can embrace elements about KM that are good and useful, while ignoring elements that do not work.

Martensson, M. (2000). "A critical review of knowledge management as a management tool." *Journal of Knowledge Management* 4(3): 204-216.

Abstract The management of knowledge is promoted as an important and necessary factor for organizational survival and maintenance of competitive strength. It is argued that to remain at the forefront, organizations need a good capacity to retain, develop, organize, and utilize their employees' capabilities. The author explores knowledge management with respect to its content, its definition and domain in theory and practice, its use and implications, and to point out some problems inherent in the concept. A literature survey on knowledge management is provided.

Martiny, M. (1998). "Knowledge management at HP consulting." *Organizational Dynamics* 27(2): 71-77.

Matheson, N. W. (1995). "Things to come: postmodern digital knowledge management and medical informatics." *Journal of the American Medical Informatics Association* 2(2): 73-8.

Abstract The overarching informatics grand challenge facing society is the creation of knowledge management systems that can acquire, conserve, organize, retrieve, display, and distribute what is known today in a manner that informs and educates, facilitates the discovery and creation of new knowledge, and contributes to the health and welfare of the planet. At one time the private, national, and university libraries of the world collectively constituted the memory of society's intellectual history. In the future, these new digital knowledge management systems will constitute human memory in its entirety. The current model of multiple local collections of duplicated resources will give way to specialized sole-source servers. In this new environment all scholarly scientific knowledge should be public domain knowledge: managed by scientists, organized for the advancement of knowledge, and readily available to all. Over the next decade, the challenge for the field of medical informatics and for the libraries that serve as the continuous memory for the biomedical sciences will be to come together to form a new organization that will lead to the development of

postmodern digital knowledge management systems for medicine. These systems will form a portion of the evolving world brain of the 21st century.

Matthews, P. (1997). "What Lies Beyond Knowledge Management: Wisdom Creation and Versatility." *Journal of Knowledge Management* 1(3): 207-214.

McAdam, R. and S. McCreedy (1999). "A critical review of knowledge management models." *The Learning Organization* 6(3): 91-101.

McBriar, I., C. Smith, et al. (2003). "Risk, gap and strength: key concepts in knowledge management." *Knowledge-Based Systems* 16(1): 29-36.

Abstract This paper argues that there are certain concepts within the general domain of Knowledge Management that have not been fully explored. The discipline will benefit from a more detailed look at some of these concepts. The concepts of risk, gap and strength are the particular concepts that are explored in some more detail within this paper. A reason for describing these elements as concepts rather than terms is discussed. More precise definitions for the concepts described can provide management support about the knowledge resource in decision-making. Several function definitions for risk, gap and strength are offered. Finally, the paper considers how these concepts can influence organisational knowledge management schemes.

McCampbell, A. S., L. M. Clare, et al. (1999). "Knowledge management: The new challenge for the 21st century." *Journal of Knowledge Management* 3(3): 172-179.

Abstract This paper defines the newly emerging concept of knowledge management. The topics presented include: principles and practices of knowledge management, organization, distribution, dissemination, collaboration and refinement of information, and the effect on productivity and quality in business today. The technical applications and tools currently utilized within this discipline are also discussed. Case studies are included on the following firms: Teltech, Ernst & Young, Microsoft, and Hewlett Packard. These are analyzed to determine the effect knowledge management practices have on quality improvement and increased productivity. The authors have included a recommended strategy for implementation of knowledge management "best practices". Finally, conclusions are drawn regarding the strategic direction of this new discipline and its effect on competition, productivity and quality for the business of tomorrow.

McElroy, M. W. (2000). "Integrating complexity theory, knowledge management and organizational learning." *Journal of Knowledge Management* 4(3): 195-203.

Abstract Aims to chronicle the unfolding convergence of thinking and practice behind knowledge management, organizational learning and complexity theory. It is argued that on the one hand, knowledge management is anxious to rid itself of its overly technology-centric reputation in favor of promoting the role it can play in furthering organizational learning. On the other, complexity theory, a confident solution in search of unorthodox problems, has discovered its own true place in the world, an explanation for the means by which living systems engage in adaptive learning--the seminal source of social cognition in living systems.

Meso, P., M. D. Troutt, et al. (2002). "A review of naturalistic decision making research with some implications for knowledge management." *Journal of Knowledge Management* 6(1): 63-73.

Abstract In the last decade naturalistic decision making has been pursued by cognitive psychologists. The focus is on how human experts make decisions under conditions of time pressure and complexity; how they organize and use their knowledge is expected to provide principles for the emerging science of knowledge management. This paper surveys this research and discusses results, which indicate more attention needs to be given to: problem formulation; asking the right questions; use of teams; organization of knowledge; expanding scope of expert systems and case-based reasoning. Also the method, cognitive task analysis, which is generally used in naturalistic decision making is readily adaptable to business knowledge management.

Morey, D. (2001). "High-speed knowledge management: Integrating operations theory and knowledge management for rapid results." *Journal of Knowledge Management* 5(4): 322-328.

Abstract Argues that knowledge management programs that ignore the principles of operations theory achieve slow bottom-line results, if any, and that organizations which spread their knowledge management investments too thin on organization-wide initiatives suffer from similar problems in producing near-term business results. This paper proposes a knowledge management approach with a 4 step focusing process. This continuous process first discovers where knowledge management-enabled learning will address a constraint to business results, and then implements an appropriate intervention in the organizational learning process to accelerate the transfer and application of knowledge at the constraint. The author concludes that knowledge management programs should focus their resources on accelerating the learning process for key constraints.

Moule, L. (1998). "Making sense of knowledge management." *Information Highways*. 5(6): 16-9.

Mudambi, R. (2002). "Knowledge management in multinational firms." *Journal of International Management* 8(1): 1-9.

Abstract Multinationals by their very nature are network firms. They are therefore able to leverage their networks to effectively manage dispersed knowledge assets. They do this by tapping into a number of local clusters to assimilate and integrate knowledge. However, knowledge traffic is almost always two-way, so that clusters have much to gain from both intentional and unintentional knowledge outflows from MNEs. Thus, MNEs can serve as conduits between clusters, so that their network knowledge contributes to the health of all the clusters in which it operates.

Nieto, M. (2003). "From R&D management to knowledge management: An overview of studies of innovation management." *Technological Forecasting and Social Change* 70(2): 135-161.

Abstract This article is intended to establish links and seek connections between the contributions made to the study of innovatory phenomena. Specifically, it analyzes the evolution undergone by studies on the topic of the technological innovation (TI) process carried out by different disciplines from the point of view of the objectives they pursue and the suppositions on which they are based. Hence, it attempts to provide evidence for the relationships existing between research done at macro level (sociology, history, economics, and industrial economics) and that undertaken at micro level (management).

Pedersen, M. K. and M. H. Larsen (2001). "Distributed knowledge management based on product state models -- the case of decision support in health care administration." *Decision Support Systems* 31(1): 139-158.

Abstract Knowledge management has inspired a shift from a transaction to a distributed knowledge management (DKM) perspective on inter-organizational information processing. The DKM concept structures the knowledge creation, knowledge sharing, and knowledge exploitation in organizations according to a product state model (PSM) required for management of technological diversity. Each player in the network acquires specific knowledge from other players for decision support. This article shows the relevance of the DKM model in a case study of a distributed decision support system (DDSS) in health care administration in the US.

Perez-Bustamante, G. (1999). "Knowledge management in agile innovative organisations." *Journal of Knowledge Management* 3(1): 6-17.

Abstract Technology and innovation processes are formed by knowledge bases and continuous flows of information. Their intangibility and the actual trend to support the competitiveness of the firm in the synergistic relations of its intangible assets have led to a new form of analysis of the technological innovation processes. Technology management also requires assuming new activities to manage effectively the flow of information and the knowledge

reservoirs which are necessary to provide a quick answer to the uncertainty and dynamism of technological evolution. The firm should also create knowledge milieus, common shared environments or bas and a clear knowledge culture. In this paper, the authors review the importance of the knowledge consideration of technology and its incidence on the innovation process, and then analyze which are the main characteristics of knowledge management and how it should be put into practice in the innovating firm, where knowledge managers are an essential component.

Plessis, M. d. and J. A. Boon (2004). "Knowledge management in eBusiness and customer relationship management: South African case study findings." *International Journal of Information Management* 24(1): 73-86.

Abstract Knowledge management is a prerequisite for eBusiness and its increasing customer centric focus. To operate in an eBusiness environment, an organisation has to have a good command of knowledge on its markets, customers, products and services, methods and processes, competitors, employee skills and its regulatory environment. This is due to the fact that organisations can, with the advent of eBusiness, do business electronically, seamlessly across the globe, via the Internet and via intranets, which has caused an explosion of the richness and reach of information and knowledge. Knowledge management systems are now essential to ensure that value is extracted from knowledge internal and external to the organisation. eBusiness also broadens an organisation's customer base due to the possibility of operating globally through electronic means. Customer relationship management in the global and digital economy has, therefore, forced organisations to rethink the ways in which they build relationships with a broadened customer base. The researcher is of the opinion that customer relationships cannot take place without knowledge management. To enable organisations to become more efficient and effective in delivering products and/or services to customers, thus creating customer delight, knowledge on customers will have to be managed to ensure that the services organisations provide are those that will address customer needs. Knowledge management is, therefore, an integral part of customer relationship management and eBusiness.

Quintas, P., P. Lefrere, et al. (1997). "Knowledge management: A strategic agenda." *Long Range Planning* 30(3): 385-391.

Abstract This article explores what knowledge management is and what relevance it has to organizations and the people who work in or with them. Taking a broad definition of knowledge, it raises a number of questions concerning knowledge management as a source of competitive advantage and questions our conceptualization of 'knowledge'. We provide a brief review of the field and raise a number of challenges for managers. From this emerges an agenda for the development of action-orientated goals for managers, organizations and networks of organizations. These include the formulation and

implementation of strategies for developing, acquiring and applying knowledge, and the monitoring and evaluation of knowledge assets and processes for their effective management.

Revilla, E., J. Sarkis, et al. "Towards a knowledge management and learning taxonomy for research joint ventures." *Technovation In Press*, Corrected Proof.

Abstract Research joint ventures (RJVs) are project environments that typically focus on the development of innovations and ideas. The development and management of knowledge is the primary objective for these RJVs. To help understand the practices and characteristics of RJV knowledge management and learning processes we introduce a taxonomy for these types of project environments. Using existing literature and supporting case study examples, a four-cell grid is developed to categorize RJVs. The grid is based on two dimensions, namely, the locus of the RJV research, which is concerned with the 'newness' of the knowledge, and the knowledge management approach, which is concerned with the learning and knowledge integration processes.

Rowley, J. (1999). "What is knowledge management?" *Library Management* 20(8): 416-420.

Russo, R. (2001). "The application of knowledge management principles to compliant coding activities." *Topics in Health Information Management* 21(3): 18-23.

Abstract This article applies the concepts of knowledge management to diagnostic and procedural coding performed by health care providers. The process of diagnostic and procedural coding is both an art and a science. In particular, the information stored away in the minds of individuals performing the coding function is ripe for the basis of an effective knowledge Health Information Management (HIM) coding management system. In this article, we explore the issues and processes that HIM professionals can take advantage of in standardizing the coding function.

Sandars, J. (2004). "Knowledge management: something old, something new!" *Work Based Learning in Primary Care*. 2(1): 9-17.

Abstract Knowledge management is a structured process that enables knowledge to be created, stored, distributed and applied to decision making. Experience from non-healthcare industries has identified the potential of knowledge management to increase the effectiveness of an organisation, and also the necessary factors that are required to ensure success of a knowledge management approach. Important lessons are now available from the available literature to enable the NHS to successfully implement knowledge management

and to realise its full potential. There are important implications for work based learning in primary care.

Sawy, O. A. E. and A. Majchrzak (2004). "Critical issues in research on real-time knowledge management in enterprises." *Journal of Knowledge Management* 8(4): 21-37.

Srikantaiah, T. K. and M. E. D. Koenig (2002). "Knowledge Management for the Information Professional." *Journal of Documentation* 58(2): 240-242.

Stanford, X. (2000). "Knowledge management. Who's in charge?" *Information Highways*. 7(5): 24-5.

Storey, J. and E. Barnett (2000). "Knowledge management initiatives: learning from failure." *Journal of Knowledge Management* 4(2): 145-156.

Susman, G. I. and A. Majchrzak (2003). "Research issues in knowledge management and virtual collaboration in new product development: an introductory essay." *Journal of Engineering and Technology Management* 20(1-2): 1-5.

Tah, J. H. M. and V. Carr (2001). "Towards a framework for project risk knowledge management in the construction supply chain." *Advances in Engineering Software* 32(10-11): 835-846.

Abstract The shortcomings of current project risk management processes, tools and techniques, are identified and the case for the application of knowledge management philosophies and techniques to project risk management is made. A common language for describing risks based on a hierarchical-risk breakdown structure has been developed and it provides the basis for developing a sharable knowledge-driven approach to risk management. This defines generic risk and remedial action descriptive terms, which can then be stored in catalogues. These have been implemented in a database management system to act as a knowledge repository. A prototype system being developed to support the risk management framework is briefly discussed.

Teng, S. and S. Hawamdeh (2002). "Knowledge management in public libraries." *Aslib Proceedings: new information perspectives* 54(3): 188-197.

Thompson, D. (1998). "Managing technology. Knowledge management -- who knows what to manage?" *Information Highways*. 5(4): 9.

Tiwana, A. and B. Ramesh (2001). "A design knowledge management system to support collaborative information product evolution." *Decision Support Systems* 31(2): 241-262.

Abstract The Internet has led to the widespread trade of digital information products. These products exhibit unusual properties such as high fixed costs and near-zero marginal costs. They need to be developed on compressed time frames by spatially and temporally distributed teams, have short lifecycles, and high perishability. This paper addresses the challenges that information product development (IPD) teams face. Drawing on the knowledge intensive nature of IPD tasks, we identify potential solutions to these problems that can be provided by a knowledge management system. We discuss a prototype Knowledge Management System (KMS) that supports linking of artifacts to processes, flexible interaction and hypermedia services, distribution annotation and authoring as well as providing visibility to artifacts as they change over time. Using a case from the publishing industry, we illustrate how contextualized decision paths/traces provide a rich base of formal and informal knowledge that supports IPD teams.

Wickramasinghe, N. (2003). "Do we practise what we preach?: Are knowledge management systems in practise truly reflective of knowledge management systems in theory?" *Business Process Management Journal* 9(3): 295-316.

Wielinga, B., J. Sandberg, et al. (1997). "Methods and techniques for knowledge management: What has knowledge engineering to offer?" *Expert Systems with Applications* 13(1): 73-84.

Abstract Knowledge engineering has been around for more than a decade, and has achieved some results that will be useful for knowledge management. This paper tries to link both areas and show how the latter can benefit from the achievements of the former. First an overview is given of the major 'assets' realized by knowledge engineering. Next it is investigated how requirements from knowledge management could be met by reusing modeling results and ontologies. Two case studies are presented to show how both disciplines could work together to improve the knowledge households of museums. The paper concludes with some observations on the future relation between knowledge engineering and knowledge management.

Wiig, K. M. (1997). "Knowledge management: Where did it come from and where will it go?" *Expert Systems with Applications* 13(1): 1-14.

Abstract Knowledge management came for some as the proverbial bolt from the blue. This paper traces the history of knowledge management from its modest beginnings in the early/mid eighties to its current status. It shows that knowledge management is, to a certain extent, the logical next step in a sequence of societal developments that has already been going on for a very long time. The likely future of knowledge management is explored along four perspectives: The management practices perspective, the information technology perspective, the organizational efforts perspective and the development, supply

and adoption rate perspective. The conclusion is that knowledge management methods and technologies will, until the turn of the century, be provided in a 'technology push' manner. After that time a more 'demand pull' way is foreseen. For the average company the full operation period will probably be in the first quarter of the next century. And, as will happen with every new approach, it will become outdated somewhere in the second quarter of the next century.

Wiig, K. M. (1997). "Knowledge Management: An Introduction and Perspective." *Journal of Knowledge Management* 1(1): 6-14.

Wiig, K. M. (1999). "What future knowledge management users may expect." *Journal of Knowledge Management* 3(2): 155-166.

Wijetunge, P. (2002). "Adoption of Knowledge Management by the Sri Lankan University librarians in the light of the National Policy on University Education." *International Journal of Educational Development* 22(1): 85-94.

Abstract This paper discusses the concept of knowledge and provides a definition of Knowledge Management. It also gives an insight into the Sri Lankan University context and the background which required the national policy reforms on universities. It also describes the four key areas of the national policy on university education and the knowledge requirements of the policy implementers. In the fourth section, the paper discusses Knowledge Management by the university librarians. The position of the Sri Lankan University librarian within the university, management of knowledge within the university and the skills required by the librarians for Knowledge Management are discussed.

Zazzara, P. (2001). "Operationalizing knowledge management in health care." *Topics in Health Information Management* 21(3): 1-7.

Abstract Being able to leverage the collective clinical knowledge that a health system acquires on a daily basis and then apply that knowledge to elevate productivity and maintain clinical quality would be nirvana for health system executives. Although it is difficult to bring knowledge management to health care, it is not impossible. Architects of knowledge management solutions in health care will need to balance what an organization hopes to achieve in its market (business strategy); how they hope to achieve it (operating strategy); and where information technology is needed to enable what they hope to achieve and how they hope to achieve it (information strategy).

SYSTEMS/APPROACHES

The management of knowledge requires, in addition to IT, effective systems and processes with which the organization can facilitate and promote the creation and transfer of knowledge. The relative "newness" of knowledge management and its diverse roots in technical, organizational, computational, cognitive, communicative, philosophical and systems theories and methods have resulted in a complex range of concepts, models, tools and techniques from which organizations may choose. The references which follow provide a snapshot of a range of KM concepts, approaches and mechanisms.

Anonymous (2003). "Knowledge management tools." Work Study 52(1): 4-4.

Abou-Zeid, E.-S. (2002). "A knowledge management reference model." Journal of Knowledge Management 6(5): 486-499.

Abstract A three-layer, cognitive domains, functional and resources, reference model for knowledge management systems is developed. This model aims at providing the basis for identifying the processes to be supported by any knowledge management support system (KMSS), for modeling the dynamics of these processes, for developing a framework of a business-aware approach to KMSS development methodology, and for developing blueprints for information/communication technology (ICT)-based KMSS. The first layer deals with the organizational knowledge and its characterization in terms of knowledge things. The concept of "K-manipulating situation" is introduced and used as a conceptual construct for structuring the functional aspects of KMSS. While this construct combines knowledge and its manipulating processes, it also captures the social aspects of them by including the involved actors and their roles. Examples from Matsushita's "Home Bakery" case study are used to illustrate the application of the reference model.

Ahmed, P. K., K. K. Lim, et al. (1999). "Measurement practice for knowledge management." Journal of Workplace Learning 11(8): 304-311.

Abstract Notes that knowledge management (KM) has become part of common vocabulary in academic circles as well as in the business world. Whilst an increasing number of companies have embarked upon knowledge management initiatives, a large proportion of these initiatives remain technically focused. The authors maintain that the problem with this type of focus is that it excludes and neglects the true potential benefits that can be derived from knowledge management. In this paper, a holistic model of KM is presented which dynamically incorporates both tactical as well as strategic elements. Secondly in this paper the authors address how to measure KM by developing a framework

which systematically allows for screening and evaluation. The measurement framework proposed enables leveraging knowledge assets effectively and efficiently. It is concluded that without a holistic perspective which captures all the key elements and dimensions, KM initiatives will create marginal gains at best and failure at worst.

Armistead, C. and M. Meakins (2002). "A Framework for Practising Knowledge Management." *Long Range Planning* 35(1): 49-71.

Abstract The management of an intangible asset such as knowledge is beset with complex and theoretical concepts. This paper sets out a matrix that describes four approaches to Knowledge Management based on whether it is in an organisational or an individual context, and whether knowledge management is imposed or empowered by managerial approaches. It explores the validity of the framework through an analysis of ongoing management projects at seven organisations.

Basu, A. (1998). "Perspectives on operations research in data and knowledge management." *European Journal of Operational Research* 111(1): 1-14.

Abstract A number of problems in the design and management of database systems and knowledge base systems (KBSs) can be addressed using techniques from operations research (OR). This article provides a perspective on these problems and the types of models that have been applied to them, and identifies some areas that pose interesting modeling and analysis questions for researchers working in areas such as mathematical programming, stochastic modeling, dynamic programming and simulation.

Benson, T. (2000). "WaX: a personal healthcare knowledge management system for professionals." *Studies in Health Technology & Informatics* 77: 470-4.

Bolloju, N., M. Khalifa, et al. (2002). "Integrating knowledge management into enterprise environments for the next generation decision support." *Decision Support Systems* 33(2): 163-176.

Abstract Decision support and knowledge management processes are interdependent activities in many organizations. In this paper, we propose an approach for integrating decision support and knowledge management processes using knowledge discovery techniques. Based on the proposed approach, an integrative framework is presented for building enterprise decision support environments using model marts and model warehouses as repositories for knowledge obtained through various conversions. This framework is expected to guide further research on the development of the next generation decision support environments.

Becerra-Fernandez, I. (2000). "The role of artificial intelligence technologies in the implementation of People-Finder knowledge management systems." Knowledge-Based Systems 13(5): 315-320.

Abstract The development of knowledge management systems (KMS) demands that knowledge be obtained, shared and regulated by individuals and knowledge-sharing organizational systems, such as knowledge repositories. People-Finder systems, a type of knowledge repository, attempt to manage knowledge by pointing to experts possessing specific knowledge within an organization. Details about such systems implemented at several organizations such as Hewlett-Packard, National Security Agency and Microsoft are presented. Insights, challenges and future development plans gained through the development of a People-Finder are discussed. Finally, concluding remarks about the role of artificial intelligence in the development of People-Finder KMS and automating the process of profile maintenance are discussed.

Buckley, P. J. and M. J. Carter (2000). "Knowledge Management in Global Technology Markets: Applying theory to practice." Long Range Planning 33(1): 55-71.

Abstract Knowledge management has become one of the most widely promoted management ideas of all time. It is perhaps more than a passing fad, suggesting a real convergence of theoretical and practical ideas about the firm. Ideas developed to explain strategic success are being used to design strategies which improve the firm's ability to capture more of the potential value from the knowledge which they and their members have or can acquire. This article provides an outline of the theory of knowledge in business and describes and analyses two matched but contrasting examples of knowledge management activities that illustrate the impact of theory on practice.

Buckley, P. J. and M. J. Carter (2002). "Process and structure in knowledge management practices of British and US multinational enterprises." Journal of International Management 8(1): 29-48.

Abstract This paper suggests that the conventional opposition of 'global' versus 'local' strategies in knowledge management processes is not only unhelpful but misleading. It investigates the process of knowledge management, its impact on organisational structure and, in particular, its spatial aspects. Using three detailed case studies of multinational firms, it finds that knowledge configurations, which are both dynamic and 'glocal', are utilised to extract value from sticky local sources of knowledge and to evolve better solutions. The paper moves away from the unidirectional flow of knowledge to a picture showing conflicts between the preexisting organisational structure and the desire to manage spatially separated knowledge sources. The analysis encompasses the strategic active subsidiary as a special, possibly intermediate case, of the problems of managing spatially separate knowledge sources.

Burns, G. A. (2001). "Knowledge management of the neuroscientific literature: the data model and underlying strategy of the NeuroScholar system. Philosophical Transactions of the Royal Society of London Series B: Biological Sciences 356(1412): 1187-208.

Abstract This paper describes the underlying strategy and system's design of a knowledge management system for the neuroscientific literature called 'NeuroScholar'. The problem that the system is designed to address is to delineate fully the neural circuitry involved in a specific behaviour. The use of this system provides experimental neuroscientists with a new method of building computational models ('knowledge models') of the contents of the published literature. These models may provide input for analysis (conceptual or computational), or be used as constraint sets for conventional neural modelling work. The underlying problems inherent in this approach, the general framework for the proposed solution, the practical issues concerning usage of the system and a detailed, technical account of the system are described. The author uses a widely used software specification language (the Universal Modelling Language) to describe the design of the system and present examples from published work concerned with classical eyeblink conditioning in the rabbit.

Burstein, F. and H. Linger "Supporting post-Fordist work practices: A knowledge management framework for supporting knowledge work." Information Technology.

Campos, E. B. and M. S. Sanchez (2003). "Knowledge management in the emerging strategic business process: Information, complexity and imagination." Journal of Knowledge Management 7(2): 5-17.

Abstract This article features a descriptive proposal that examines the different conceptual dimensions of knowledge (basically the epistemological, ontological, systemic and strategic dimensions) that are involved in the emerging strategic process of organizations. Included in this process are aspects of information, complexity and imagination that make up the spirals of knowledge. In this study we aim to shed light on knowledge management in strategy-making so that the different categories of knowledge may emerge and develop their potential within an organization and interact among each other. The goal is to create sustainable competitive advantages or essential competencies that help a business to succeed. Considering a constructionist approach to knowledge - specifically, the theory of knowledge creation developed by Nonaka and Takeuchi - we conclude that the formation of the strategy is a double-loop knowledge creating process. Finally, we outline some of the main practical implications of our position.

Carayannis, E. G. (1999). "Fostering synergies between information technology and managerial and organizational cognition: the role of knowledge management." Technovation 19(4): 219-231.

Abstract In this paper, we try to understand the role of knowledge management in fostering a synergistic symbiosis between information technology and managerial and organizational cognition. Both information technology and knowledge management can be perceived as strategic enablers of managerial and organizational cognition. We synthesize classical cognition concepts and recent empirical experience with knowledge management applications to develop an organizational knowledge management model (the Organizational Cognition Spiral or OCS) and tool (the organizational knowledge network or OK net) for understanding and supporting managerial and organizational cognition.

Carneiro, A. (2001). "The role of intelligent resources in knowledge management." *Journal of Knowledge Management* 5(4): 358-367.

Abstract Discusses the process through which knowledge acquisition, technical tools, and organization actors can contribute to organizational development in developing knowledge as a systemic competitive weapon. The relationships between technology and human value are examined, and it is argued that both components are vital instruments of the knowledge management (KM) process. By considering that KM is related to intelligent agents, information technology (IT), and strategic decision-support systems (SDSS), the author attempts to provide insights on KM efficiency. A conceptual model of KM efficiency in organizations is presented that is supported by the combination of intelligent agents' role and intelligent systems resources. The model is divided in 2 areas: the area of technical tools for specification of intelligent systems resources; and the area of intelligent agents destined to focus their roles on organizations' performance. The major factors are discussed and directions for future research are suggested.

Carpenter, S. and S. Rudge (2003). "A self-help approach to knowledge management benchmarking." *Journal of Knowledge Management* 7(5): 82-95.

Carroll, J. M., C. W. Choo, et al. (2003). "Knowledge management support for teachers." *Educational Technology Research & Development* 51(4): 42-64.

Abstract Business organizations worldwide are implementing techniques and technologies to better manage their knowledge. Their objective is to improve the quality of the contributions people make to their organizations by helping them to make sense of the context within which the organization exists; to take responsibility, cooperate, and share what they know and learn; and to effectively challenge, negotiate, and learn from others. We consider how the concepts, tools, and techniques of organizational knowledge management can be applied to the professional practices and development of teachers. We describe a framework for knowledge management support for teachers where the sharing of concrete knowledge scaffolds the attainment of more abstract levels of

knowledge sharing. We describe the development of a knowledge management support system emphasizing long-term participatory design relationships between technologists and teachers, regional cooperation among teachers in adjacent school divisions, the integration of communication and practice, synchronous and asynchronous interactions, and multiple metaphors for organizing knowledge resources and activities.

Cavaleri, S. A. (2004). "Principles for designing pragmatic knowledge management systems." *The Learning Organization: An International Journal* 11(4): 312-321.

Chaston, I. and T. Mangles (2000). "Business networks: assisting knowledge management and competence acquisition within UK manufacturing firms." *Journal of Small Business and Enterprise Development* 7(2): 160-170.

Christensen, K. S. and H. K. Bang (2003). "Knowledge management in a project-oriented organization: Three perspectives." *Journal of Knowledge Management* 7(3): 116-128.

Abstract Knowledge management is seen as a metaphorical perspective on management where the managerial focus depends on the epistemological standpoint taken. An identification of three epistemological perspectives accommodates the main body of literature on knowledge management: an artifact oriented epistemology that focuses on explicit knowledge, a process oriented epistemology focusing, on both tacit and explicit knowledge and the interaction of these types of knowledge and an, autopoietic epistemology where knowledge basically always has a tacit dimension. Based on a study of knowledge management in the Danish company Crisplant, the paper shows how the three epistemologies bring different aspects of managerial practice forward. By comparing the characteristics of knowledge, the nature of knowledge management activities, how knowledge is created and shared it is concluded that awareness of the implications of epistemological perspectives could enhance managerial analysis and conduct with respect to the management of knowledge as well as enrich research in the area.

CUENA, J. and M. MOLINA (2000). "The role of knowledge modelling techniques in software development: a general approach based on a knowledge management tool." *International Journal of Human-Computer Studies* 52(3): 385-421.

Abstract The aim of the paper is to discuss the use of knowledge models to formulate general applications. First, the paper presents the recent evolution of the software field where increasing attention is paid to conceptual modelling. Then, the current state of knowledge modelling techniques is described where increased reliability is available through the modern knowledge-acquisition

techniques and supporting tools. The knowledge structure manager (KSM) tool is described next. First, the concept of knowledge area is introduced as a building block where methods to perform a collection of tasks are included together with the bodies of knowledge providing the basic methods to perform the basic tasks. Then, the CONCEL language to define vocabularies of domains and the LINK language for methods formulation are introduced. Finally, the object-oriented implementation of a knowledge area is described and a general methodology for application design and maintenance supported by KSM is proposed. To illustrate the concepts and methods, an example of system for intelligent traffic management in a road network is described. This example is followed by a proposal of generalization for reuse of the resulting architecture. Finally, some concluding comments are made regarding the feasibility of using the knowledge modelling tools and methods for general application design.

Darroch, J. and R. McNaughton (2003). "Beyond market orientation: Knowledge management and the innovativeness of New Zealand firms." *European Journal of Marketing* 37(3-4): 572-593.

Abstract Knowledge is seen as a critical resource, with both tangible and intangible attributes. Effective knowledge management is emerging as an important concept that enables all the resources of firms, including knowledge, to be used effectively. A knowledge-management orientation is positioned in this paper as a distinctive capability that supports the creation of sustainable competitive advantages such as innovation. Using an instrument to measure a knowledge-management orientation, which is grounded in the A. K. Kohli et al (1993) work on a market orientation, this paper identifies 4 clusters of firms based on knowledge-management practices that exist within the New Zealand business environment. The clusters are then described according to their innovation and financial performance profiles. The study finds that firms with a knowledge-management orientation outperformed those classified as market-oriented. Results also show a market orientation to be a subset of a knowledge-management orientation.

de Lusignan, S., K. Pritchard, et al. (2002). "A knowledge-management model for clinical practice." *Journal of Postgraduate Medicine* 48(4): 297-303.

Despres, C. and D. Chauvel (1999). "Knowledge management(s)." *Journal of Knowledge Management* 3(2): 110-123.

Abstract This article reviews developments in the field of applied knowledge management dating from 1990 and argues that a fragmented mosaic of programs and problematics currently exists, at various levels of incompatibility. Using a software product, the information space around applied knowledge management is mapped as an illustration of this basic fact. A research program that extends this logic is then described and a model on four dimensions is

developed that appears to order the various programs, practices and processes in this divergent field. Implications for managers of knowledge management initiatives are discussed, and avenues for future research suggested.

Diakoulakis, I. E., N. B. Georgopoulos, et al. (2004). "Towards a holistic knowledge management model." *Journal of Knowledge Management* 8(1): 32-46.

Dieng, R., O. Corby, et al. (1999). "Methods and tools for corporate knowledge management." *International Journal of Human-Computer Studies* 51(3): 567-598.

Abstract This article, +is a survey of some methods, techniques and tools aimed at managing corporate knowledge from a corporate memory designer's perspective. In particular, it analyses problems and solutions related to the following steps: detection of needs of corporate memory, construction of the corporate memory, its diffusion (specially using the Internet technologies), use, evaluation and evolution

Drew, S. (1999). "Building Knowledge Management into Strategy: Making Sense of a New Perspective." *Long Range Planning* 32(1): 130-136.

Abstract Strategy at the Leading Edge features short reports on conferences, new research and experiments by academics, organizations and consultancies for all those involved in strategy and strategic management. Contributions (two hard copies and a disk) should be sent to Martin Whitehill, City University Business School, Frobisher Crescent, Barbican Centre, London EC2Y8HB E-mail: m.whitehill@city.ac.uk. Knowledge management is rapidly becoming one of the next big trends. All the signs are apparent in the number of recent conferences, articles and books devoted to the topic. Even the comic strip Dilbert has taken notice and poked fun at it. Our experience of earlier management trends, including BPR, organizational learning and TQM, might cause sceptics to question: so whats new here? The experiences of knowledge management pioneers in North America and Europe show that real and significant results are possible. However, as with older methodologies, good planning and implementation are essential and success is not guaranteed. This paper explores how managers might build knowledge management into the strategy process in their firms. Much has already been written about the philosophy and concepts of knowledge and intellectual capital. Less attention has been focused on how to combine a knowledge perspective with established strategy tools, or how to develop unique knowledge-based sources of sustainable competitive advantage. Gary Hamel and C.K. Prahalad have observed that managers typically spend too little time thinking seriously about strategy and the future. We need to ensure that in this limited time, the important dimension of knowledge doesnt get overlooked.

Dillon, M. (2002). "Information technology perspectives. Knowledge management: chimera or solution?" portal: Libraries and the Academy. 2(2): 321-36.

Abstract This essay reviews the origins of the term Knowledge Management, contrasting it with both data processing and information processing. The notion that knowledge is exclusively mental is refuted by reference to recorded knowledge, the stuff of books, reports, plans, et al. Examples of working knowledge are provided that shed light on the importance of knowledge processes to organizations that depend on knowledge for their success. These ideas are then extrapolated to libraries where I argue that knowledge management, always crucial to success in the paper world, is even more central as the knowledge world goes digital.

Dilnutt, R. (2002). "Knowledge management in practice: Three contemporary case studies." International Journal of Accounting Information Systems 3(2): 75-81.

Abstract Knowledge management has become a popular business management discussion topic over the past 5 years. Some of this discussion is no more than hype-generated by software product vendors and consulting houses. However, there is a compelling value proposition holding that the intellectual capital of most organisations can be better managed to create internal efficiencies and external business opportunities. This paper discusses three knowledge management initiatives recently undertaken in the Asia Pacific region that have delivered real business improvements with quantifiable benefits and demonstrable outcomes. Two of these case studies involve major Australian-based financial institutions, while the third relates to a government treasury organisation.

Filius, R., J. A. de Jong, et al. (2000). "Knowledge management in the HRD office: A comparison of three cases." Journal of Workplace Learning 12(7): 286-295.

Abstract Human resource development (HRD) professionals can be considered to be knowledgeable about knowledge management practices in their own offices. Effectiveness of knowledge management practices of 3 HRD offices were studied, using a combination of structured questionnaires plus interviews with 4 HRD professionals per office. Three categories of knowledge management activities were considered, by the members of these organisations, to be effective: activities that expand the individual or collective experiential horizon; activities that are meant to consolidate knowledge; informal and formal communication about work issues. Conditions that facilitate or inhibit these activities are identified. Organisations wishing to improve their knowledge productivity are confronted with some fundamental choices: innovation versus routine, office versus officer, and knowledge sharing versus knowledge shielding.

Galliers, B. (1999). "Towards the integration of e-business, knowledge management and policy considerations within an information systems strategy framework." *The Journal of Strategic Information Systems* 8(3): 229-234.

Gao, F., M. Li, et al. (2002). "Systems thinking on knowledge and its management: Systems methodology for knowledge management." *Journal of Knowledge Management* 6(1): 7-17.

Abstract Knowledge management is increasingly imperative as it is regarded as the key determinant of a firm, industry or country for survival and growth in the knowledge era. Varieties of disciplines have made contributions to knowledge and knowledge management. Research focuses on one or more specific fields, but an understanding of which levels of knowledge processes knowledge management should concentrate on should be more fundamental than advocacy of knowledge management. Knowledge-related matters were examined from the viewpoint of systems science. Using critical systems thinking, soft systems thinking etc., a new systematic perspective on knowledge was proposed, aiming to provide a new way of thinking and a useful toolbox on different levels and phases of knowledge management for practical knowledge users.

Giannetto, K. and A. Wheeler (2001). "Knowledge Management Toolkit." *Industrial and Commercial Training* 33(5): 178-186.

Giannetto, K. and A. Wheeler (2001). "Knowledge Management Toolkit: A Resource for Creating Policy and Strategy, with Practical Guidance for Managing Knowledge at All Levels within the organisation." *Online Information Review* 25(3): 214-222.

Gooijer, J. d. (2000). "Designing a knowledge management performance framework." *Journal of Knowledge Management* 4(4): 303-310.

Greenes, R. A., D. B. Tarabar, et al. (1989). "Knowledge management as a decision support method: a diagnostic workup strategy application." *Computers & Biomedical Research* 22(2): 113-35.

Abstract We have explored the potential of a computer-based approach called "knowledge management" to aid in clinical problem solving and education. The major features of the approach are its ability to support flexible and immediate access by a user to relevant knowledge and annotation and organization of the knowledge for personal use and subsequent retrieval. We illustrate this approach with its application to diagnostic workup strategy problems. In this application, knowledge may be in the form of static narrative text, diagrams, pictures, graphs, tables, flow charts, or bibliographic citations. Other more dynamic forms of knowledge may be the result of simulations, "what if" analyses or modeling, quantitative mathematical or statistical calculation, or

heuristic inference. User assessment has demonstrated the system's ease of use and user perception of its desirability, but underscores the need for a "critical mass" of knowledge before such an approach will be widely utilized

Ho, C.-T., Y.-M. Chen, et al. (2004). "Developing a distributed knowledge model for knowledge management in collaborative development and implementation of an enterprise system." *Robotics and Computer-Integrated Manufacturing* 20(5): 439-456.

Abstract Recently, enterprise systems have been extensively adopted to boost enterprise competitiveness. The development and implementation of enterprise systems is a knowledge intensive procedure, being related to enterprise processes and involving information, system and software engineering technologies. Consequently, knowledge management is required to enhance the effectiveness of enterprise system development and implementation, thus helping to increase industrial competitiveness. This study aims to develop a distributed knowledge model for knowledge management, capable of supporting the collaborative development and implementation of enterprise systems. This objective can be obtained by performing the following tasks: (1) modeling and characterization of the collaborative development and implementation process, (2) identification, analysis and modeling of involved knowledge, and (3) development of a distributed knowledge model for knowledge management related to the collaborative development and implementation of enterprise systems.

Holsapple, C. W. (1987). "Adapting demons to knowledge management environments." *Decision Support Systems* 3(4): 289-298.

Abstract Decision support systems depend on a variety of knowledge management techniques. These range from data base management, programming, and spreadsheet analysis to rule set management and automated inference. One valuable knowledge management technique that has yet to find its way into the repertoire of decision support system developers is general-purpose demon management. This article identifies and explores the major issues pertaining to the integration of demon representation and processing into a knowledge management environment. These serve as a basis for design and implementation of more flexible and powerful environments for decision support

Hsieh, C.-t., H. Yang, et al. "Roles of knowledge management in online procurement systems." *Industrial Management*.

Jantz, R. (2001). "Knowledge management in academic libraries: special tools and processes to support information professionals." *Reference Services Review* 29(1): 33-39.

Jeans, M. E. (1999). "Developing a nursing knowledge management system." *Bibliotheca Medica Canadiana*. 20(3): 114-5.

Kamara, J. M., C. J. Anumba, et al. (2002). "A CLEVER approach to selecting a knowledge management strategy." *International Journal of Project Management* 20(3): 205-211.

Abstract The effective management of knowledge is being recognised as a vehicle through which organisations can address their need for innovation and improved business performance. This paper describes a framework for selecting a knowledge management strategy that is appropriate to the organisational and cultural context of an organisation. The framework is the main output of the CLEVER (cross-sectoral learning in the virtual enterprise) research project at Loughborough University. It was developed following a detailed study of current knowledge management processes in the construction and manufacturing sectors. The approach represented in the framework underscores the fact that knowledge management is not an end in itself but a means towards the solution of business problems that militate against the efficiency and innovative capacity of a company.

Kalogeropoulos, D. A., E. R. Carson, et al. (2003). "Towards knowledge-based systems in clinical practice: development of an integrated clinical information and knowledge management support system." *Computer Methods & Programs in Biomedicine* 72(1): 65-80.

Abstract Given that clinicians presented with identical clinical information will act in different ways, there is a need to introduce into routine clinical practice methods and tools to support the scientific homogeneity and accountability of healthcare decisions and actions. The benefits expected from such action include an overall reduction in cost, improved quality of care, patient and public opinion satisfaction. Computer-based medical data processing has yielded methods and tools for managing the task away from the hospital management level and closer to the desired disease and patient management level. To this end, advanced applications of information and disease process modelling technologies have already demonstrated an ability to significantly augment clinical decision making as a by-product. The wide-spread acceptance of evidence-based medicine as the basis of cost-conscious and concurrently quality-wise accountable clinical practice suffices as evidence supporting this claim. Electronic libraries are one-step towards an online status of this key health-care delivery quality control environment. Nonetheless, to date, the underlying information and knowledge management technologies have failed to be integrated into any form of pragmatic or marketable online and real-time clinical decision making tool. One of the main obstacles that needs to be overcome is the development of systems that treat both information and knowledge as clinical objects with same modelling requirements. This paper describes the development of such a system in the form of an intelligent clinical information management system: a system which at

the most fundamental level of clinical decision support facilitates both the organised acquisition of clinical information and knowledge and provides a test-bed for the development and evaluation of knowledge-based decision support functions.

Katsirikou, A. (2003). "Consortia and knowledge management: the functional context and an organisational model." *Library Management* 24(6): 337-347.

Kingston, J. and A. Macintosh (2000). "Knowledge management through multi-perspective modelling: representing and distributing organizational memory." *Knowledge-Based Systems* 13(2-3): 121-131.

Abstract Full and accurate representation of an organization's knowledge assets, which together constitute "organizational memory", requires multi-perspective modelling at a number of levels of detail. We propose that the perspectives which need to be represented can be characterized as who, what, how, when, where and why knowledge; these perspectives, and necessary levels of abstraction, are captured by the Zachman framework for Information Systems Architecture. We suggest modelling techniques that might be appropriate for different perspectives and levels of abstraction, and illustrate using examples from a medical domain. We also describe how an individual perspective can become the user interface of a knowledge distribution system, and illustrate this by describing the protocol assistant, a Web-based knowledge-based system capable of representing and reasoning with best practice guidelines ("protocols") in the medical domain.

Lee, C. Y. (2004). "A knowledge management scheme for meta-data: an information structure graph." *Decision Support Systems* 36(4): 341-354.

Abstract For an effective management of data, we need various kinds of meta-data. This article proposes a scheme--an information structure graph (ISG)--to represent meta-data that are not managed as a database schema. An ISG is a directed graph, where nodes represent data objects. It is built on a database schema and extends it to include data creation structures. For each data object in a database schema, an ISG shows its input data objects and a data creation type. An ISG is an abstraction of a data creation structure and may be applied to enhance our understanding of data.

Lee, J.-H. and Y.-G. Kim (2001). "A stage model of organizational knowledge management: a latent content analysis." *Expert Systems with Applications* 20(4): 299-311.

Abstract This study develops an integrated management framework for building organizational capabilities of knowledge management. The framework consists of four major components of management: organizational knowledge,

knowledge workers, knowledge management processes, and information technology. Based on the framework, this study proposes a stage model of organizational knowledge management encompassing the initiation, propagation, integration, and networking stages. Each of the four stages is differentiated in terms of its management goals, activities, and characteristics of the management components. To validate the proposed stage model, we conducted a latent content analysis of 21 knowledge management case reports. While the results do not validate the time sequence of each stage, they do reveal meaningful clustering of distinct case organizations in different knowledge management implementation stages.

Lehr, J. K. and R. E. Rice (2002). "Organizational measures as a form of knowledge management: a multitheoretic, communication-based exploration." *Journal of the American Society for Information Science and Technology*. 53(12): 1060-73.

Levett, G. P. and M. D. Guenov (2000). "A methodology for knowledge management implementation." *Journal of Knowledge Management* 4(3): 258-270.

Abstract Describes research work which was directed towards providing the automotive industry with a practical methodology that translates the conceptual ideas of knowledge management (KM) into a working programme with defined objectives, using industry terminology. The research also developed a supporting analysis methodology that is said to enable an effective analysis of the influences on employee activities when creating and sharing valuable corporate knowledge, that spans technical and cultural boundaries. This happens through identifying the factors that impact on defined KM metrics. The authors maintain that the analysis identifies the key influencing factors within a working environment. The research benefits are felt when the ground-level drivers of KM behavior are improved through links to an appropriate KM strategy. KM strategy may emphasize organizational cultural changes or IT changes or both in an endeavor to improve innovation, reduce business costs and reduce time to market of new products. An industrial case study was undertaken to validate the research.

Liao, S.-h. (2003). "Knowledge management technologies and applications-literature review from 1995 to 2002." *Expert Systems with Applications* 25(2): 155-164.

Abstract This paper surveys knowledge management (KM) development using a literature review and classification of articles from 1995 to 2002 with keyword index in order to explore how KM technologies and applications have developed in this period. Based on the scope of 234 articles of knowledge management applications, this paper surveys and classifies KM technologies using the seven categories as: KM framework, knowledge-based systems, data mining, information and communication technology, artificial intelligence/expert

systems, database technology, and modeling, together with their applications for different research and problem domains. Some discussion is presented, indicating future development for knowledge management technologies and applications as the followings: (1) KM technologies tend to develop towards expert orientation, and KM applications development is a problem-oriented domain. (2) Different social studies methodologies, such as statistical method, are suggested to implement in KM as another kind of technology. (3) Integration of qualitative and quantitative methods, and integration of KM technologies studies may broaden our horizon on this subject. (4) The ability to continually change and obtain new understanding is the power of KM technologies and will be the application of future works.

Liebowitz, J. and I. Megbolugbe (2003). "A set of frameworks to aid the project manager in conceptualizing and implementing knowledge management initiatives." *International Journal of Project Management* 21(3): 189-198.

Abstract Over the years, researchers and practitioners have been concerned about the "collection" of information and knowledge. Now with Web-based and Intranet technologies, we have the "connectivity" to allow information and knowledge sharing to take place. In recent years, the term "knowledge management" has been proposed, and numerous individuals and organizations are trying to put more "science" behind the "art" of knowledge management. To help in this direction, this paper addresses some useful frameworks to help project managers and others in conceptualizing and implementing knowledge management initiatives. A generic knowledge management implementation framework is proposed. This paper should provide the building blocks necessary to further understand and develop knowledge management initiatives.

Lim, D. and J. Klobas (2000). "Knowledge management in small enterprises." *Electronic Library*. 18(6): 420-32.

Abstract This paper investigates the extent to which six factors drawn from the theory and practice of knowledge management can be applied in small organisations. The factors are: balance between need and cost of knowledge acquisition; the extent to which knowledge originates in the external environment; internal knowledge processing; internal knowledge storage; use and deployment of knowledge within the organisation; and attention to human resources. Three cases demonstrate that the fundamental concepts and principles of knowledge management are similar for small and large organisations. Differences include the value placed on systematic knowledge management practices such as formalised environmental scanning and computer-based knowledge sharing systems. Consultants, and library and information professionals, are advised to understand the organisation's management and communication culture; emphasise simple and inexpensive systems integrated into everyday practice; and establish and monitor adherence to tools such as records management

schedules. Information professionals can contribute much by managing systems which use vocabularies to enhance information retrieval for knowledge sharing.

Louw, J. A., C. J. Seebregts, et al. (2001). "An informatics system to support knowledge management in the health sector--the South African National Health Knowledge Network." *Medinfo 10(Pt 1)*: 361-5.

Abstract This paper discusses the planning and development of a South African national health knowledge network. The methodology is in essence based on the principles of knowledge management and the drivers of a system of innovation. The knowledge network, SA HealthInfo, aims to provide a one-stop interactive forum/resource, for quality-controlled and evidence-based health research information, to a wide spectrum of users, at various levels of aggregation, with the necessary security arrangements and facilities for interaction among users to promote explicit (codified) and tacit knowledge flow. It will therefore stimulate the process of innovation within the South African health system.

Mabudafhasi, R. (2002). "The role of knowledge management and information sharing in capacity building for sustainable development--an example from South Africa." *Ocean & Coastal Management 45(9-10)*: 695-707.

Abstract The coastal areas of the Northern Cape, South Africa, and the transfrontier region with Namibia are in a state of rapid transformation from a mining-based economy to one supporting diverse and sustainable livelihoods. Land-based diamond mining activities are in the early stages of decommissioning while a number of planning and development initiatives are underway. Key obstacles to integrated planning and development in the region are insufficient and inaccessible information. Knowledge management (KM) and information sharing mechanisms can facilitate meaningful participation and promote decision-making at the local level. The distance learning and information sharing tool is an internet based KM tool that promotes transparency and collaboration and provides open access to information resources for sustainable development.

Macdonald, M. (2003). "Knowledge management in healthcare: what does it involve? How is it measured?" *Healthcare Management Forum 16(3)*: 7-11.

Abstract While knowledge exists in all healthcare organizations, it often remains in silos or on the sidelines, neither used to its maximum potential nor purposefully focused on strategic results. In order to facilitate the development of strategically valuable knowledge, this article outlines seven knowledge-building dimensions that create a solid knowledge-management lever within the organization. Additionally, the article helps readers to come to grips with accountability by suggesting strategic outcomes for knowledge management. A

particular focus is on lead or forward-looking indicators that track the progress and success of knowledge management.

Macintosh, A., I. Filby, et al. (1999). "Knowledge management techniques: Teaching and dissemination concepts": Errata." *International Journal of Human-Computer Studies* 51(6): 1189.

Abstract Describes knowledge management teaching and dissemination concepts to support training of professionals in an organization to manage their knowledge assets. These concepts are based on Artificial Intelligence Applications Institutes experience of working with large organizations to establish a technical knowledge management framework and to support their personnel in implementing the framework. The concepts support organizations who embark on a knowledge management program. They promote the importance of knowledge management and the awareness of how knowledge management can be accomplished within, and across, operational divisions: create an awareness of a framework to achieve knowledge management; and establish a group of personnel who have skills in knowledge management techniques to enable them to facilitate the development, maintenance, use and sharing of the organization's knowledge assets.

Malhotra, Y. (2001). "Expert systems for knowledge management: crossing the chasm between information processing and sense making." *Expert Systems with Applications* 20(1): 7-16.

Abstract Based on insights from research in information systems, information science, business strategy and organization science, this paper develops the bases for advancing the paradigm of AI and expert systems technologies to account for two related issues: (a) dynamic radical discontinuous change impacting organizational performance; and (b) human sense-making processes that can complement the machine learning capabilities for designing and implementing more effective knowledge management systems.

McAdam, R. and S. McCreedy (1999). "A critical review of knowledge management models." *The Learning Organization* 6(3): 91-101.

McKenzie, J., A. Truc, et al. (2001). "Winning commitment for knowledge management initiatives." *Journal of Change Management* 2(2): 115-127.

Abstract Building commitment to the principles and practices of knowledge management is the goal of many organizations today. This is proving not to be a straightforward process and even when commitment is evident, it is fragile and easily shattered by inconsistencies in management actions and behavior. The authors have identified key aspects of winning commitment that need to be recognized and managed at an organizational level, and the level of groups and individuals. Commitment is both an intellectual and an emotional process, and it

is achieved through both internal motivation and external incentives. It is maintained through providing positive feedback on the outcomes of knowledge management activities and learning from mistakes. The authors have created a comprehensive checklist based on research carried out within an industry forum of more than forty companies to help practitioners monitor their progress in winning lasting commitment.

Merali, Y. (2000). "Individual and collective congruence in the knowledge management process." *The Journal of Strategic Information Systems* 9(2-3): 213-234.

Abstract This paper is concerned with the cognitive infrastructure underpinning the socially situated process of knowledge management in dynamic contexts. It describes the cognitive congruence framework (Fourth International Conference on Competence Based Management (1998); Knowledge Management and Organizational Competence, Oxford University Press (2001)) and shows how it can be used as a sensemaking device to reconcile some of contentious issues in knowledge management literature. Three case study vignettes are employed to illustrate the importance of individual and collective cognitive congruence and the utility of the framework as a diagnostic tool for highlighting flaws in the cognitive infrastructure. The implications of the framework for theory and practice are discussed.

Mitri, M. (2003). "Applying tacit knowledge management techniques for performance assessment." *Computers & Education* 41(2): 173-189.

Abstract Performance assessment is an important task in all levels of education, both as input for identifying remedial needs of individual students and for improving general quality of education. Although explicit assessment measures can be obtained through objective standardized testing, it is much more difficult to capture fuzzier, or tacit, performance assessment measures. The problem of tacit knowledge capture is a central theme in the field of knowledge management, and assessment management can be thought of as a form of knowledge management. Therefore, tacit assessment management can be facilitated through technologies commonly used in knowledge management systems such as databases, Internet architectures, artificial intelligence, and decision support techniques. This paper describes tacit performance assessment in the context of knowledge management and presents a prototype decision support system for managing tacit assessment knowledge using knowledge management techniques.

Newman, V. (1997). "Redefining Knowledge Management to Deliver Competitive Advantage." *Journal of Knowledge Management* 1(2): 123-128.

Nomura, T. (2002). "Design of 'Ba' for successful Knowledge Management--how enterprises should design the places of interaction to gain competitive advantage." *Journal of Network and Computer Applications* 25(4): 263-278.

Abstract This paper represents the framework, based on the study results of practical benchmarking and assessment of Knowledge Management, for designing 'Ba' where creative interaction generates. In organization, we can find various Ba, such as cyber space for Community of Practice to gather and open physical space for collaboration beyond divisions. Ba develops circulation of knowledge and which is the key to the improvement of competitive advantage of organization. When benchmarking was conducted to KM leading companies, we have found that the method of utilizing Ba was very logically adapted to the business strategy, which supported corporate culture for knowledge sharing. On the other hand, after assessing the workstyle of knowledge workers in detail, we have uncovered that although the style of knowledge work is different, the design of Ba for each department in a company is standardized and does not apply to the current situation. This is because, a guide for strategic design of Ba does not exist, even though the importance of Ba for interactions that go beyond organization is increasing, which is necessary for business that creates value added. In this paper, we propose a new framework for the design of Ba that applies to both knowledge strategy and the workstyle of each knowledge worker.

Rubenstein-Montano, B., J. Liebowitz, et al. (2001). "A systems thinking framework for knowledge management." *Decision Support Systems* 31(1): 5-16.

Abstract Myriad frameworks have been developed for knowledge management. However, the field has been slow in formulating a generally accepted, comprehensive framework for knowledge management. This paper reviews the existing knowledge management frameworks and provides suggestions for what a general framework should include. The distinguishing feature of this research is that it emphasizes placing knowledge management in a larger context of systems thinking so that the influencing factors on its success or failure can better be recognized and understood

Salisbury, M. W. (2003). "Putting theory into practice to build knowledge management systems." *Journal of Knowledge Management* 7(2): 128-141.

Abstract This article describes our process for putting theory into practice to build knowledge management systems. We begin by discussing our definition of knowledge management and describe our theoretical foundation for developing systemic solutions for organizations to manage their knowledge. Next, we describe our process for creating a knowledge management strategy and how we design the technological aspects of a knowledge management system that will enable organizations to achieve their knowledge management strategy. We also describe how we provide training on the completed system and the

organizational development interventions necessary to ensure that management and the members of the organization support the strategy. We conclude by providing an example scenario to illustrate how the resulting knowledge management system would operate in an organization's work environment.

Schulz, M. and L. A. Jobe (2001). "Codification and tacitness as knowledge management strategies: an empirical exploration." *The Journal of High Technology Management Research* 12(1): 139-165.

Abstract This paper develops four categories of knowledge management strategies used by multinational corporations (MNCs). Codification strategies involve the transformation of tacit knowledge into explicit knowledge in order to facilitate flows of organizational knowledge. Tacitness strategies keep organizational knowledge tacit in order to prevent flows of knowledge to competitors. Focused knowledge management strategies regulate knowledge flows by controlling the degree to which knowledge is encoded in forms that match the information intensity and ambiguity of their knowledge. Unfocused knowledge management strategies attempt to regulate knowledge flows by controlling the overall level of codification of knowledge without special consideration of the capabilities of specific forms of codification. Empirical analyses of the effects of these strategies on subunit performance in a sample of US and Danish subsidiaries suggest that the focused strategies are superior to the other strategies. Our results also indicate that different kinds of organizational knowledge require matching forms of codification in order to increase performance. The results give rise to a nested contingency model of knowledge management.

Shankar, R., M. D. Singh, et al. (2003). "Strategic planning for knowledge management implementation in engineering firms." *Work Study: A Journal of Productivity Science* 52(4-5): 190-200.

Abstract Knowledge management (KM) is the process of leveraging organizational knowledge to deliver long-term advantage to a business and is based on a business strategy that involves engineering various knowledge-centric business processes and developing organization structures to support these. These, in turn, require technology to capture, codify, store, disseminate and reuse the knowledge. Successful deployment of KM is not a simple process. This paper suggests that a major reason for the failure of many KM projects is the absence of a well-defined strategic plan to guide implementation. This paper discusses the strategic planning needs of the KM deployment process, and develops a framework that could be used specifically by engineering firms to guide the KM implementation process.

Shen, S. (1987). "Knowledge management in decision support systems." *Decision Support Systems* 3(1): 1-11.

Abstract This paper discusses a framework for knowledge management in a DSS. We assume decision making is based mainly on numerical data processing. Thus, we abstract data and knowledge as relations, and decision models as relators. Based on these two constructs, our framework allows a user to compose and experiment decision models interactively; it also provides decision information nonprocedurally through a knowledge processor.

Siemieniuch, C. E. and M. A. Sinclair "A framework for organisational readiness for knowledge management." *International Journal of Operations*

Smirnov, A. V., M. Pashkin, et al. (2003). "Agent-based support of mass customization for corporate knowledge management." *Engineering Applications of Artificial Intelligence* 16(4): 349-364.

Abstract The paper describes an agent-based architecture developed as a part of the KNet-approach to the knowledge logistics. This approach is targeted to timely provide an appropriate personalized knowledge for an intelligent support of decision-makers. In the KNet-approach the problem of knowledge logistics is considered as a configuration of a network of end-users/customers, loosely coupled knowledge sources/resources, and set of tools and methods for information processing. Such network located in the information environment has been referred to as knowledge source network or "KNet". The paper presents this approach from the perspective of application of the mass customization idea to corporate knowledge management as a major information kernel technology of intelligent enterprises. As an example of intelligent enterprise the paper considers virtual supply network. Main ideas of the KNet-approach are presented and the structure of the developed agents' society is described in more detail. Main results are illustrated via a configuration case study and discussed in conclusions.

Solomon, M. (1997). "Retooling the information professional. Knowledge management tools for knowledge managers: filling the gap between finding information and applying it." *Searcher: The Magazine for Database Professionals*. 5(3): 10-4.

Stern, D. (2003). "New knowledge management systems: the implications for data discovery, collection development, and the changing role of the librarian." *Journal of the American Society for Information Science and Technology*. 54(12): 1138-40.

uit Beijerse, R. P. (1999). "Questions in knowledge management: Defining and conceptualising a phenomenon." *Journal of Knowledge Management* 3(2): 94-110.

Abstract This article examines and defines the main concepts in knowledge management. Since the economy has evolved over the last couple of years into

a knowledge-based economy, knowledge has become one of the main assets of companies. Knowledge can be defined as: information; the capability to interpret data and information through a process of giving meaning to these data and information; and an attitude aimed at wanting to do so. In making these factors productive knowledge management can be defined as achieving organisational goals through the strategy-driven motivation and facilitation of (knowledge) workers to develop, enhance and use their capability to interpret data and information (by using available sources of information, experience, skills, culture, character, etc.) through a process of giving meaning to these data and information. Consultants and managers should ask themselves strategic, organisational and instrumental questions regarding knowledge management to stay competitive in a highly dynamic and changing world.

uit Beijerse, R. P. (2000). "Knowledge management in small and medium-sized companies: Knowledge management for entrepreneurs." *Journal of Knowledge Management* 4(2): 162-179.

Abstract Develops and presents a conceptual model that discusses knowledge management in small and medium-sized companies. This model is used to analyze 12 innovative companies from the industrial and business service sector. It is stated that knowledge management appears in small and medium-sized companies to get its form especially at an operational level. A total of 79 instruments were found with which knowledge is organized in practice: 18 instruments for determining the knowledge gap and for evaluating knowledge; 41 instruments for acquiring and developing knowledge; 20 instruments for knowledge sharing. On a strategic and tactical level there are provisions for knowledge management but they have not been developed as such.

Van Beveren, J. (2002). "A model of knowledge acquisition that refocuses knowledge management." *Journal of Knowledge Management* 6(1): 18-22.

Abstract This paper presents a model of knowledge acquisition from definitions of data, information and knowledge. The model asserts that knowledge cannot exist outside of the human brain, and that any expression of the knowledge requires it to be transformed into information to be communicated outside of the brain. The model asserts that information is acquired through the sensors to the brain where it is processed with prior knowledge and that new knowledge can be created from the processing of information within the brain only. From a discussion of this model in the context of alternative viewpoints, it is concluded that the future focus for knowledge management should be toward human resource strategies that leverage human-intellectual capital within firms and for the dissemination and sharing of important information that promotes creativity and innovation within and between employees.

van den Hooff, B., J. Vijvers, et al. (2003). "Foundations and Applications of a Knowledge Management Scan." *European Management Journal* 21(2): 237-246.

Abstract In today's knowledge-intensive society, organisations need to be able to effectively manage the increasingly important production factor 'knowledge' in order to thrive. In this article, an instrument is presented which enables organisations to diagnose their 'state of the art' regarding knowledge management, and to identify opportunities and threats for a further growth towards professional knowledge management. The theoretical foundations of the instrument are presented, as well as the goals that it helps realise. Finally, the results are discussed of a continuous methodological evaluation of a central part of the instrument, the questionnaire

Wachter, R. M. (1999). "Technology support for knowledge management." *Mid-American Journal of Business* 14(2): 13-20.

Abstract Finding the optimum way to leverage the resources of a firm remains a prominent issue for organizational management. Increasingly, firms are realizing that the ultimate organizational resource is the knowledge that resides in the minds of employees and is embedded in the processes, products, and services of the firm. Knowledge has been identified as the new basis of competition in a post capitalist society and has been considered the only unlimited resource. The focus of knowledge management is to capture information which resides in the individual and group experience. This paper discusses the types of knowledge found in organizations, the reasons for which knowledge is sought, and the role of technology in the facilitation of the codification, conversion, and management of knowledge. Specific examples from companies such as Shell, Coopers & Lybrand, Chase Manhattan, and others illustrate the concepts presented.

Webb, S. P. (2000). "Knowledge Management: Linchpin of Change. Some Practical Guidelines." *New Library World* 101(3): 141-143.

West, J., Lawrence A. and T. J. Hess (2002). "Metadata as a knowledge management tool: supporting intelligent agent and end user access to spatial data." *Decision Support Systems* 32(3): 247-264.

Abstract Many factors have led to explosive growth in the use of geographic information system (GIS) technology to support managerial decision making. Despite their power, utility, and popularity, however, GIS require a significant amount of specialized knowledge for effective use. This paper describes a GIS-based decision support system (DSS) design approach that embeds much of this knowledge in well-structured metadata and presents it to the decision maker through an appropriate interface or software agents, thereby decreasing system learning costs and improving effectiveness. The metadata design from a spatial

decision support system (SDSS) is presented along with illustrations showing how the design addresses specific knowledge management (KM) problems. The paper then discusses how the knowledge management design approach can be generalized to other SDSS, to DSS in general, and to data warehouses.

Wiig, K. M., R. de Hoog, et al. (1997). "Supporting knowledge management: A selection of methods and techniques." *Expert Systems with Applications* 13(1): 15-27.

Abstract Carrying out knowledge management effectively requires support from a repertoire of methods, techniques and tools. This paper provides a selection of those methods. They are described according to a conceptual framework that sees knowledge management as consisting of four activities that are performed sequentially. These activities are Review, Conceptualize, Reflect and Act. For each activity some methods are discussed while additional ones are referred to in the existing literature. At several points in the paper links with other contributions in this special issue are stipulated, as is also done the other way round. It is concluded that there is already a comprehensive set of support methods available, but for some peculiar aspects of knowledge assets there are still gaps. This holds in particular for the tangibility and measurability of knowledge assets.

Zetie, S. (2002). "The quality circle approach to knowledge management." *Managerial Auditing Journal* 17(6): 317-321.