

THE ROLE OF LEARNIG ORGANIZATION FOR KNOWLEDE CREATION

ULOGA ORGANIZACIJE KOJA UČI U KREACIJI ZNANJA

RADISLAV JOVOVIĆ, Univerzitet Mediteran u Podgorici

Abstract: *Yet, while individual learning is indeed a key building block of organizational effectiveness, it is not sufficient. Over the last fifty years, we have built a deeper understanding of how the dynamics of groups and the structures of organizations can create a context in which learning may flourish, or indeed where it may decline. In this paperr we take a closer look at what we know about these contexts for learning, and at how organizations succeed or fail to use learning and knowledge as key resources for innovation, productivity, and ultimately competitiveness.*

Keywords: *learning organization, knowledge, innovation, competitiveness.*

Abstrakt: *Iako je individualno učenje zaista glavni preduslov efektivnosti organizacije, ono nije dovoljno. U zadnjih pet godina, dostigli smo dublje razumijevanje kako dinamika grupa i struktura u organizaciji mogu kreirati kontekst u kojem učenje "cvjeta", ili u kojem se ono smanjuje. U ovom radu, bavimo se istraživanjem znanja o tom kontekstu učenja i kako organizacija može uspjeti ili neuspjeti u korišćenju učenja i znanja kao glavnih resursa za inovacije, produktivnost i konkurentnost.*

Ključne riječi: *organizacija koja uči, znanje, inovacija, konkurentnost.*

JEL clasification: D 80; I 20;

Preliminary communications; Recived:

1. Intraduction

First, we must critically consider the widely held assumption that alignment between individual and collective development is a key to competitiveness. Experience shows that alignment is hard to achieve in practice: personal agendas and organizational contexts constrain the ability and willingness of individuals to show and share what they know. The methods and techniques designed to capture the knowledge and experience of individuals often fail because they do not resolve the tension between the organizational need for control (and systematization) and the basic unmanageability of learning processes. Firms are often incapable of responding to radical changes in the business environment because the political agendas that underpin learning and knowing are such that the insights and experiences of managers and other employees are not fully engaged and benefited from. An acknowledgement of the political nature of organizational knowledge is crucial if managers are successfully to manage these processes.

Our central premise is that learning is an important bridging concept which links the firm with its external environment; the strategic with operational levels of the organization; and past experience with current practice. Yet to realize the potential of learning,

it is necessary to decide whose knowledge is most important, how individual knowledge can best be translated into organizational knowledge (and vice versa), whether the most useful forms of knowledge can be managed in systematized ways, and what weightings should be given to knowledge derived from the top or bottom of the organization.

We believe that a critical way for managers to make a difference is to maximize the potential of individual and organizational knowledge. To see how this can be done, we examine three concepts that have gained currency since 1990—organizational learning, knowledge management, and the development of dynamic capabilities. In each case, we look briefly at the underlying principles, give examples of how the practice has developed, and summarize the lessons that can be learned from them.

2. Organizational learning

In the early 1960s the idea first surfaced that organizations might learn in ways that were similar to, yet independent of, individual learning. Researchers (Cyret, March, Cangelosi, Dill) noted that organizations adopted routines and operating procedures that evolved over time in response to cumulative experience and crises, and that these could embody both history and complexity which were beyond the awareness, or

intentionality, of any individual. Other academics began a debate about whether the most valuable learning comes from incremental improvements or as radical response to major crises, a debate that is still reflected in the literature on corporate strategy and innovation (Argyris, Schon, and others).

The next major contribution came from the work of Chris Argyris and Donald Schon in the late 1970. They, too, highlighted the difference between incremental and radical forms of learning, arguing that organizations needed to develop greater capacity for the latter. They called this 'double-loop' learning, involving the detection and correction of error resulting in modification of an organization's underlying norms, policies, and objectives (Argyris). They suggested that organizations generally fail to grasp the challenge of 'double-loop' learning because managers are unwilling to acknowledge the nature and consequences of bad news, poor performance, or organizational shortcomings. Instead, they set up 'defensive routines' to protect themselves, resulting in a gap between their espoused views and what they actually do in practice. For example, senior managers may espouse radical and critical thinking, but then punish subordinates whose suggestions are too radical or critical of current practice.

Although well-known, the theories of Argyris and Schon are often criticized for being naive and impractical because they neglect the impact of wider organizational systems. These issues were tackled a decade later in Peter Senge's 1990 book, *The Fifth Discipline*, which popularized the idea of the 'learning organization'. Senge argued that learning had to be organization-wide and not just based around the behavior of enlightened top managers. His model included five elements:

- ❑ personal mastery—all employees need to develop their own skills through training and education;
- ❑ mental models—following Argyris and Schon, managers must examine their own assumptions for potential discrepancies between theory and practice;
- ❑ team learning, stressing greater awareness of how teams and groups work and the behaviors' that can support or undermine collective learning;
- ❑ shared vision—encouraging creative ideas that can inspire the origination and its members;
- ❑ 'the fifth discipline', or systems thinking, which says that all the above; elements need to be present, because the different parts reciprocally reinforce each other.

Senge was not the first person to use the term 'learning organization' but his work had a major impact for several reasons: his ideas were neatly packaged; he explicitly built on the work of Argyris and Schon, and on systems-dynamics arguments of Jay Forrester; his book was packed with practical examples from US companies; and he was supported by a network of consultants and companies. In the next few years, many companies followed the trail of the 'learning organization', although

some seemed to be more interested in using the label for public-relations purposes. Below are three examples from the 1990-s showing what can go right or wrong under the name of the learning organization.

2. Individual learning without organizational learning

We will use case study Rover to treat this issue. Rover has been the subject of many case studies showing how its decline and final downfall was a product of poor strategy, decision-making, industrial relations, and so on. But part of its reputation that has survived is of being one of the UK's pioneer learning organizations. In 1990, Rover established an independent company called the Rover Learning Business, with the aim of spreading learning principles across the group. A highly visible feature of this business was the provision of learning opportunities for all 35,000 employees through personal development plans (affectionately referred to as 'pizza boxes' because of the shape and size of the containers), supported by an allocation of £100 to spend on any aspect of personal development.

By 1994 senior managers were claiming significant benefits. At the time of the group's sale to BMW in 1994, it was estimated that people-development initiatives had improved shareholder value overall by some £650 million. Rover had also won a Global Learning Organization Award for 'being a global leader in the development of learning organizations, and [its] commitment to continuous learning. The subsequent trajectory of Rover is well documented: sold to BMW for £800 million, it failed to prosper and in 2000 was bought by the Phoenix consortium, headed by the previous chief executive, John Towers, for £10. Ultimately, this deal failed too. Rover's reputation as a learning organization survived the company's demise. In an interview, consultant Ian Rose described what Rover did as 'a beacon for all aspiring learning organizations'. But a new study (Simon) shows that much of the reputation was based on rhetoric. The research found no systematic calculations of the financial benefits of the initiative, most of the figures appearing in the press apparently being based on a 'back of the envelope' calculation by a senior manager on his way to a conference where he was giving a presentation. Also, the focus was on employees, and certainly did not reach as high as the board. When Towers was asked what the 'learning organization' meant for senior managers, he admitted that he had 'a group of board directors who were all working in the same old way.

On the positive side, the initiative provided substantial benefits for individuals, and many remained highly enthusiastic throughout. Even employees who left in subsequent downsizings were still very enthusiastic about the learning initiatives to which they were exposed. However, it had very little impact on the company as a whole, for two main reasons. First, it did not get beyond the first of Senge's five principles to address the systemic aspects of the organization. Sec-

only, it was used by senior managers mainly as a PR story, and was not actively supported by their own behavior. In short, learning served as a tool to enhance company reputation without fundamentally transforming anything.

3. Knowledge Creation and Management

The next idea to attract strong attention was that it might be possible to 'manage' knowledge. For some time, economists had been suggesting that knowledge was a crucial determinant of competitiveness. But two of factors came together in the mid- 1990s. The first was developments in IT the Internet. For example, the International Knowledge Management Network (IKMN) started in Europe in 1989, went online in 1994, and was soon joined by the US-based Knowledge Management Forum and related groups and publications. At the same time, international consulting firms such as Arthur Andersen and Booz-Allen & Hamilton began to realize knowledge-management systems might offer a desirable alternative to what were increasingly being seen as failed TQM and business-process re-engineering initiatives. The result was that knowledge, and its management, become big business. The second key influence was the publication of a prominent book by Nonaka and Takeuchi called *The Knowledge-Creating Company*

In essence, Nonaka argues that organizational knowledge is created by the direct experience of individuals and then needs to be spread by various means across the organization. His model includes four main processes:

- ❑ 'Socialization': individuals learning through direct experience, within organizational contexts;
- ❑ 'Externalization': making this personal knowledge public so that others can understand it;
- ❑ 'Combination': linking this knowledge to other formal knowledge to create innovations;
- ❑ 'Internalization': absorbing the knowledge into the normal operating procedures of individuals and teams.

Nonaka also suggests that knowledge can be converted from tacit to explicit and from individual to collective levels, and vice versa. This is illustrated in the book by examples of product innovations such as Matsushita's domestic bread-making machine and Honda's 'Tall Boy' car which captured the imagination of many readers and seemed to substantiate their explanatory model. From there it was a short step to the idea that knowledge could be 'managed' by converting what people know and learn into codified organizational knowledge, and again to the use of technical tools able to cope with large volumes of data.

Consequently, the knowledge-management systems developed by consultants generally rely on IT implementations such as intranets, data warehousing, collaborative software, 'Yellow Pages' of internal expertise, and virtual knowledge-worker networks. Some are highly automated. For example, Ernst & Young's consultancy

arm used IT to standardize solutions for typical small-business problems. Its Center for Business Knowledge employs more than 200 people to collate the experiences of consultants handling typical problems and codifying them into 'knowledge objects'. This process of externalization, in Nonaka's terms, is valuable to a business looking to solve many similar (technical) problems at high speed. Computer manufacturer Dell uses a similar highly centralized and codified system to link the supply chain elements, from order to delivery, in such a way that buyers can customize their orders in more than 40.000 different configurations.

Despite these successes, it is now widely recognized that IT cannot deliver 'knowledge management' on its own. Useful though formalized systems were in some circumstances, they had difficulty handling complex processes. Companies specializing in complex problems or unique processes increasingly turned to more interactive and informal modes of managing knowledge. Consultancies such as Bain and McKinsey, which specialize in strategic problems, use IT as a means of supporting human networks. Informal modes of interaction supported by formal means of knowledge exchange assume that knowledge is created and transferred through discussions and brainstorming sessions between individuals. And client projects often require the lead consultant to assemble a virtual team, which draws on different experience and expertise from within the firm. Similarly, computer maker Hewlett-Packard, which builds its competitive advantage around the development of innovative products, makes much less use of IT support for knowledge management because it regards knowledge as too complex to be codified. It concentrates on knowledge transfer through personal exchanges, travel, face-to-face meetings, and conferences.

The basic issue is whether to rely on IT or people processes to transfer knowledge around organizations. The former concentrates on explicit knowledge, while the latter is better suited to tacit knowledge. The examples above suggest that at the basic level the choice depends on whether the primary task can be standardized, or whether each instance is unique.

That knowledge-management procedures can contribute significantly to the bottom line has been documented at companies such as Dow Chemical and Xerox. But they also throw up a number of problems. At their heart is the politics of organizational knowledge. Knowledge management systems are often charged with naivety for assuming that people will willingly share information in the general interests of the company. But studies have shown that knowledge is more likely to flow between people if reciprocal relationships exist, and if there are incentives to do so. For example, a study of knowledge exchange between scientists showed that they used different criteria for seeking or offering knowledge: they would offer knowledge only to those they trusted, but they would

seek information from people whose scientific expertise they respected.

This point highlights a less discussed aspect of knowledge management: the responsibility that knowing entails. There is a powerful connection between knowledge and what people do with it. To be knowledgeable is not so much to *have* information as it is to know how to *use* it in action and interaction with others. In short, knowledge reflects the way individuals and groups balance the inherent conflicts embedded in what is expected of them, what they expect, and consequently what they do in the context of the communities of which they are members. The social and collective nature of knowledge has become a primary focus for recent research.

Researchers have shown how practical knowledge is often developed and disseminated within 'communities of practice'-naturally occurring groups of people tackling similar issues, whose task-based bond is often supplemented by social ties. This informally based knowledge is often quite different from the formal systems and manuals that provide instructions on, for example, how to repair complex machinery or how to navigate an aircraft carrier.

In the case of field technicians servicing Xerox photocopiers, managers noticed that the technicians usually ignored the detailed official manual. In practice, 'identical' models could have very different operating characteristics, depending on how the machines were being used and by whom. To keep the machines running, the technicians needed to find out about the people who used them, and they would regularly gather for lunch to swap stories and information about clients and operatives. In this way, they built up a stock of local knowledge and shared experience which was quite outside the purview of the technical manuals, but which was essential for solving their practical problems in the field.

A similar story concerns a bakery company where senior managers hired an external market-research company to help it anticipate changing consumer tastes. Ironically, all the necessary knowledge already existed inside the company-among distribution drivers who talked daily to shopkeepers about what was selling or not and shared the information informally among themselves. But the information failed to trickle up stairs, because the drivers were of low status and peripheral to decision-making.

These two stories well illustrate how organizations tend to undervalue the knowledge and expertise of junior and less powerful staff. Senior managers have the power to determine which kinds of knowledge are significant, and this is essentially a political process. But some of the most significant knowledge is local, built up in social interaction between employees who are in daily contact with customers, far from the gaze and direct control of managers.

As the importance of the social and local dimensions of knowledge have become clearer, consultants and practitioners have been quick to seize on the ideas to

remedy the weaknesses of IT-based forms of knowledge management. By the end of the 1990s, a wide range of companies, including BP, Microsoft, Monsanto, and DaimlerChrysler, were trying to leverage local knowledge by fostering communities of practice among groups of professionals and scientists, often distributed across the world, to share insights and problems. Peer Assist has evidently created a highly effective lateral community of scientists and managers for BP.

On the face of it, the lesson is that informal interaction between individuals can be more significant than formal systems for capturing knowledge, a finding that builds on the lessons of organizational learning. But although communities of practice overcome some of the limitations of IT-based knowledge management, they have also been criticized for failing to take sufficient account of the political, systemic, and structural aspects of organizations. In practice, communities can be even more coercive than formal organizations, and enormous pressure can be placed on individuals to conform to the group mindset. Such homogeneity can severely reduce the creativity and openness to ideas that are supposed to be the virtue of natural communities.

The foregoing underlines the need for exceptional managers to create contexts in which the social and technical dimensions of knowledge management can co-exist. It also bridges into the next section of this chapter, which focuses on the importance of greater integration between knowledge, learning systems, and structural changes in developing dynamic capabilities to underpin the organization's competitiveness.

4. Dynamic capabilities

In response to the ongoing challenge of sustaining competitiveness in unpredictable markets, the resource-based view (RBV) of the firm has highlighted the importance of routines, systems, and procedures that not only distinguish them from competitors, but which are also hard for competitors to imitate. By extension of that argument, as markets and technologies evolve, internal routines need to evolve with them; and it is the ability to change internal routines and procedures regularly which constitutes a dynamic capability. However, the term 'dynamic capabilities' has come to be used in different ways. For example, it is used with reference to the ability to change strategic capabilities, and also the ability to innovate and learn.

One reason for these differences is that the term has been adopted by researchers who use different methods to examine different phenomena. Evolutionary economists seek to understand the performance of organizations in terms of linear, cause-and-effect relationships, and therefore focus on organizational-level processes and routines that can be observed or identified across large samples of companies. One strand of this research examines how strategic routines can be established and modified to maintain competitive advantage within strategic alliances and through takeovers. Interest-

ingly, the research shows that past experience in managing alliances does not transfer well to new ones, unless the partners have worked together before. This suggests that the quality of relationships between partners affects their ability to adapt individual routines appropriately, and this can have a direct bearing on subsequent economic success.

But to understand how and why such relationships work, it is necessary to examine the inner workings of organizations, and this has led to a different research tradition based on detailed case studies, for example comparing highly innovative with less innovative firms. One researcher looks at the structuring of everyday work in product-development teams through shared responsibility, valuing knowledge and expertise, and encouraging people to search for, and exploit, the unexpected. The insights from such research highlight the importance of institutionalizing close links with customers, the need to create space and time within which innovation can flourish, the need to provide flexibility in organizational structure and roles, and the importance of nurturing attitudes that encourage teamwork and creativity.

A similar list of principles emerges from a case study of the innovative Danish hearing-aid firm, Oticon. The company had been a global leader in hearing aids until the late 1980s, when its market share fell from 14 per cent to 9 per cent in the space of eighteen months. This triggered a major restructuring, which involved abolishing departments, positions, titles, and job descriptions, and replacing the previous functional structure with a project-based organization. During the next few years, Oticon doubled its innovation rate, and forged ahead of rivals with a series of new products combining technical advances with new market appeal, for example using colours and designs aimed at hard-of-hearing children.

Oticon's innovation programme was supported by many measures, including a panel of 950 users with whom the R&D department maintained close links, the introduction of cross-functional project teams in charge of single development projects, and the establishment of a senior group with sufficient political clout to ensure that knowledge was shared between projects. As a result, the company was able simultaneously to create, absorb, and integrate knowledge - an attribute that is critical to dynamic capability in a business that relies on technical innovation.

Exceptional cases such as Oticon are usefully for flagging underlying principles, but, good practice is context-specific: what works in one context can't necessarily be transferred to another. Several unique organizational characteristics combine to create promising practices that support the ongoing renewal of organizations through their dynamic capabilities. Our own research concentrates on 'live' case studies of organizations in the process of transformation. Early findings already show great diversity within companies: some parts of the firm are highly dynamic, others much less so, meaning that it is unwise to generalize to whole companies. Also, there is an important time dimension, because the success of

companies and projects can vary greatly over time. This is shown by the examples below, which further add to our current understanding of the complexity of dynamic capabilities.

Ciba Speciality Chemicals, a global leader in industrial chemicals, like many multinationals has restructured around market segments instead of the previous product divisions. Over the years, it had built up a large body of proprietary technical know-how, which had been carefully guarded as the source of the company's competitive advantage. But a new strategic focus on customers has led Ciba radically to rethink the role of knowledge, which Ciba has now decided to sell to its erstwhile rivals in the form of consultancy services. Drawing on this expertise and its experience of supporting customer industries, Ciba has started to offer knowledge-based services to other chemical companies on a global basis. The creation of this new business, although relatively small in relation to the whole company, is significant because the establishment of new marketing routines and customer relationships demonstrates dynamic capability. It also highlights a trend, first identified by Gary Hamel and colleagues, of simultaneous collaboration and competition between modern firms.

Although conceived at a strategic level, the decision to develop the expert services business had major implications for the company's existing and competency base. Employees who had previously relied on technical and scientific innovation within their own communities of practice suddenly needed additional customer-relations skills, leading to a major training programme for existing staff, and changed recruitment criteria for new hires. The change was not universally welcomed: some scientists resented being obliged to move outside their natural competency, and other observers had wider misgivings about the principle of selling core expertise to competitors. Nevertheless, the initiative went ahead and is still evolving at the time of writing. Following the research model, the case demonstrates how a fresh strategic routine (switching selling products to selling services) has to interface with a range of new operational routines (organizational structure, training, recruitment). Change at both levels is necessary for dynamic capability. The integration strategic and operational practices is at the core of connecting knowledge and learning with action. Dynamic capability emerges from the connections created as learning redefines new practices and expands the current body of knowledge through new insights and modes of working, in a complex network of interacting players within and outside the organization. These networks provide a platform for rethinking core competencies and constantly updating them through an agile and flexible approach to managing. This point is in evidence in our second example, a much smaller company, which focuses on innovation driven by internal processes linking strategic and operational processes. Business Serve, founded in 1998, delivers Internet services to businesses-it is an ISP, optimizes web services,

and provides enhanced activity. It has prospered during the post-dotcom IT downturn, maintaining rapid growth and remaining substantially profitable. In 2003 the company developed a new product called Netsuite, combined its three core services into one package. The bundled product was conceived by middle managers and offered as a service to customers. But initial sales were disappointing, and managers worried whether they would make the sales target of twenty packages in the first month. Meanwhile, a manager dealing with existing accounts heard the product and realized that it exactly matched the needs of an existing customer. That afternoon he took orders for six packages. Quickly alerted, senior managers overhauled the initial strategy authorized sales to existing customers, selling 1.400 packages in months as a result. The unanticipated alteration naturally triggered cascade of further changes through the organization-to structure departmental boundaries, training and development programmes, ward systems, and recruitment, particularly in the area of web design. The initial sales plan was completely overturned as a new strategy emerged for selling the product.

The Business Serve case highlights some important aspects of dynamics capabilities-first, the need for flexible strategy to match fast-changing markets (i.e. strategic changes can be driven by operational concerns) secondly, a key principle, that employees can find opportunities in unexpected areas; and thirdly, the crucial role played by senior management appreciating and then legitimizing knowledge originating from an ployee who was effectively operating on the firm's periphery.

The lesson is that dynamic capabilities require and comprise flexibility at individual, collective, and organizational levels, and in the interface with the environment. Individual flexibility is helped by the development of learning capability such that a broad skill base is maintained. Moreover valuing and involving individuals in shaping strategic and operational practices is vital as a means of encouraging identities and careers which' do not depend on maintaining the status quo. Collective flexibility can supported by development processes that enable teams to form quickly and disband when no longer needed. Tolerating and even encouraging internal diversity is key, coupled with the proactive support of top management to drive and steer the collaborative activities and actively connect strategic and operational routines. Organizational flexibility can be supported by paring down structures and hierarchies, by generating processes and information systems that support flexibility elsewhere, and can themselves be reconfigured easily. Flexibility in relation to the environment demands close contact with customers and alliance partners, anticipating the moves of competitors.

Clearly, the idea of dynamic capabilities, as we have developed it builds on the insights of organizational learning and knowledge management. In particu-

lar, it draws on the need for systematic support for, integration of, learning, and the key role of senior managers. Over emphasizes the importance of the interaction between and within organizational structures, systems, and human behaviour. In our view, dynamic capability has considerable potential as an idea. On the other hand, its relative newness means that it is not well understood and still so far experimental in application.

5. Conclusion

Learning and knowledge are key underpinnings for the dynamics of organizational competitiveness, not just as organizational resources but also central practices and routines. As a means of connecting individual and organizational development, learning is a critical process for supporting flexibility and renewal, a bridge between operational and strategic priorities, present and future, known and unknown .

But, as we have seen from our examples, knowledge management and leering are not easy to manage, or at least not easy to manage in ways to produce lasting results. For example, it is clear that at Rover the 'learning organization' label was a misnomer, the changes being cosmetic rather than transformational and failing to include those with the formal power at the top of the organization.

The example underlines another important lesson: the social and politnature of learning and knowing. They are not tangible assets that can be measured and controlled. Instead, as intangible assets, the power of learning knowledge is based on the way they are employed in flexible but systematic ways to build formal and informal mechanisms for connecting internal and external environment. The alignment of individual and organizational goals in relation to development remains a key challenge.

Three key messages therefore are:

- ❑ For learning to make a serious contribution to corporate development, managers need to be sensitive to the politics that underpin learning and knowledge, mindful of both the positive and negative implications of politically driven learning agendas.
- ❑ Fostering learning and knowing from both external and internal sources, and providing consistency between operational and strategic practices, are critical. Formal and informal systems and structures must facilitate rather than hinder the flow of ideas and information.
- ❑ To support collective learning, managers need to pay special attention to legitimizing the ideas and experiences that come from the operational levels, which again requires an awareness of organizational power and politics. These ideas may be vital in gaining or maintaining . competitive edge.
- ❑ Learning from both successes and failures is essential. Success is oft seized on, and winning formulae regularly repeated. Failure is a better teacher, but since no one wants to be associ-

ated with it, its learn' potential is mostly lost-until it turns into catastrophe (Toft, Reynolds). A learn' culture needs to combine aggressive, and rigorous, search for n ideas with encouragement to learn from and make sense of fail. This is where the exceptional manager can really make a difference.

Literature:

- Argyris, C. (1991), *Teaching Smart People To Learn*, Harvard Business Review 69, 99-108.
- Brown, J.S. & Duguid, P. (1998), "Organizing Knowledge", *California Management Review* (40)3, 111.
- Caron, J.R., Jarvenpaa, S.L. & Stoddard, D.B. (1994), "Business reengineering at CIGNA corporation: experiences and lessons learned from the first five years", *MIS Quarterly* (18)3, 233-250.
- Carayanis, E. (1999), *Fostering Synergies between Information Technology and Managerial and Organizational Cognition: the Role of Knowledge Management*, *Technovation*, 19, 219-231
- Charles, D. & Daniele, C. (Eds.) (1999), "Knowledge Horizons: The Present and the Promise of Knowledge Management", Butterworth-Heinemann.
- Cypress, H.L. (1994), "Reengineering - MS/ OR imperative: make second generation of business process improvement mode work", *OR/MS Today* (21)1, 18-29.
- Davenport, T.H. (1993), "Process Innovation: Reengineering Work through Information Technology", Boston, MA: Harvard University Press.
- Davenport, T.H., Jarvenpaa, S.L. & Beers, M. C. (1996), "Improving Knowledge Work Processes", *Sloan Management Review* (37)4, 53-65.
- Davenport, T.H. & Prusak, L. (1998), *Working Knowledge: "How Organizations Manage what they Know"*, Boston, MA: Harvard Business School Press.
- Dixon, N.M. (2000), "Common Knowledge", Boston, MA: Harvard Business School Press.
- Drucker, P.F. (1995), "Managing in a Time of Great Change", New York, NY: Truman Talley.
- Earl, M. & Scott, I. (1998), "What on earth is a CKO?", Survey IBM. London Business School.
- Edvinsson, L. (1996), "Developing a model for managing intellectual capital", *European Management Journal*, Vol 14, N 4, August, 356-364.
- Gartner Group (1998), "Knowledge Management Scenario", conference presentation, Stamford, CN, presentation label SYM8Know-Man1098Kharris.
- Georgakopoulos, D., Hornick, M. & Sheth, A. (1995), "An Overview of Workflow Management: From Process Modeling to Workflow Automation Infrastructure", *Distributed and Parallel Databases* (3)2, 119-153.
- Hedlund, G. (1994), "A model of Knowledge Management and the N-Form Corporation", *Strategic Management Journal*, 73-90.
- Hammer, M. (1990), "Reengineering Work: Don't Automate, Obliterate", *Harvard Business Review*, pp. 104-112.
- Inkpen, A. & Dinur, A. (1999), "Knowledge Management Processes and International Joint Ventures", *Organization Science*, 9(4), 454-468.
- Leavitt, H.J. (1965), "Applying organizational change in industry: structural, technological and humanistic approaches", in: J. March (Ed.), *Handbook of Organizations* Chicago, IL: Rand Mc-Nally.
- Nissen, M.E. (1998), "Redesigning Reengineering through Measurement-Driven Inference", *MIS Quarterly* (22)4, 509-534.
- Nonaka, I. (1994), "A Dynamic Theory of Organizational Knowledge Creation", *Organization Science* (5)1, 14-37.
- O'Leary, D. E. (1998), "Enterprise Knowledge Management", *Computer* (31)3, pp. 54-61.
- Oxendine, E. & Nissen, M. E. (2001), "Knowledge Process and System Design for the Naval Battlegroup", *Journal of the KMCI* (1)3, 89-109.
- Snowden, D. (1998), "The ecology of a sustainable Knowledge Management Program". *Knowledge Management*, 1(6), 26-35.
- Teece, D.J. (1998), "Research Directions for Knowledge Management", *California Management Review* (40)3, 289-292.
- Von Krogh, G., Ichijo, K. & Nonaka, I. (2000), "Enabling Knowledge Creation: How to Unlock the Mystery of Tacit Knowledge and Release the Power of Innovation", New York, NY: Oxford University Press.
- Wiig, K. (2003), "Knowledge Management Foundations", Schema press – Knowledge Board 20-Nov.