

## **KNOWLEDGE TRANSFER – CRITICAL COMPONENTS IN OCCUPATIONAL HEALTH AND SAFETY – AN ESTONIAN APPROACH**

Marina Järvis and Piia Tint

Tallinn Technical University, Kopli 101, 11712 Tallinn, Estonia

E-mail: marina@staff.ttu.ee, tint@staff.ttu.ee

Defining and understanding the knowledge-sharing process facilitates the application of knowledge management to problems, systems, and situations in individual organizations and in the field of occupational health and safety in general. In this paper the process of knowledge transfer in occupational health and safety at the state level and the main barriers are described. The authors offer a possible tool for knowledge management – a Sectoral Profile on Occupational Health and Safety for knowledge creation and transfer and underscore the need to focus on the extent to which decision-makers and others receive and use such information and knowledge.

**KEYWORDS:** knowledge management, knowledge transfer, networking, training, Sectoral Profile, occupational health and safety

### **INTRODUCTION**

Occupational health and safety (OH&S) is one of the main concerns of today's business. Due to complexities of the products, process or equipments used to create the products or services, sudden accidents or accidental events could happen at any time. The impact of these disasters may be too much costly for the enterprises [1]. The requirements of effective management of OH&S often constitute a big challenge for many contemporary enterprises, which operate under conditions of increasing competitions of the global market and continuously rising requirements for products and services [2]. Information and knowledge are the central resources in the achievement of the goals of OH&S management. Active interest in OH&S requires that the workers and employers have the right information at the right time to make decision affecting health and safety. Knowledge and information is a precondition for action [3] and providing useful information to decision-makers (including employers, government officials, practitioners, unions, and workers) is essential in addressing OH&S issues. Well-informed decisions are needed at the political and administrative levels, as well as at the organizational level and in practical actions. The challenge is to provide OH&S information in such a form that each workplace can utilize it for its own purposes in a cost-effective manner [4]. Businesses of all sizes invest time and resources dealing with OH&S issues. Over time, corporations gain a significant amount of knowledge. Knowledge management (KM) has become an important process in knowledge intensive companies over the past few years [5]. It has been widely recognized that knowledge sharing is an effective approach to maintaining organizations' sustainable competitive advantages [6]. The knowledge of individuals, through the process of

knowledge sharing, could gradually accumulate and convert to the overall knowledge for an organization. The KM literature yields several articles that describe knowledge sharing as it occurs in sample organizations [7].

Much material, information and intellectual capacities on OH&S are dispersed among different ministries and government agencies, employers' and workers' organizations, universities, and other institutions. This information from OH&S authorities and national institutions is a valuable asset, and like any asset, it works best if it is well managed in order to develop of working conditions and promotion of workers' health accordingly.

Generally, KM research has focused on identifying, storing, and sharing the transaction-related knowledge and has described efforts within and between companies to consider knowledge as a manageable asset [2, 7–9]. Few systematic attempts have been made broadly outline the requirements and flow of information [9], but an analysis of the OH&S knowledge creation, transfer and utilization at the state level has not been prioritized. Defining and understanding the roles of knowledge cycle elements facilitate the application of KM to problems, systems, and situations in individual companies and in the field of OH&S in general. This paper is a first step in the process of applying KM principles to the field of OH&S in Estonia and it has four objectives:

- to discuss the importance of KM as an effective business practice and to assess how this practice is performed at the state level in the Estonian system of OH&S;
- to analyse the process of knowledge transfer at the state level, that need to be captured, refined and aggregated, and brought to the right places at the right time;
- to assess the possible knowledge transfer barriers;
- to discuss a possible tools of KM like network and a Sectoral Profile on Occupational Health and Safety for the evaluation of knowledge creation and transfer and underscore the need to focus on the extent to which decision-makers and others receive and use such knowledge. The principle of the Sectoral profile on OH&S in Estonian agriculture was used as an example in order to describe the knowledge transfer in the field of OH&S.

## **KNOWLEDGE MANAGEMENT IN OCCUPATIONAL HEALTH AND SAFETY**

Knowledge has been recognized as a new resource in gaining organizational competitiveness. A variety of definitions of KM exists. For Lomax [5] KM is “The process of capture, refinement, aggregation and sharing of data and information between employees, departments, subsidiaries and partner organizations to achieve a position of knowledge-base competitive advantage”. Sherehiy and Karwowski [2] also suggested, that the principles and tools of KM should be used to facilitate the management of the existing individual (personal) knowledge, structural knowledge (i.e. knowledge codified into manuals, reports, databases, and data warehouses), and organizational knowledge (activity of learning within the organization) in the fast domain of practical application [2, 10]. Knowledge management (KM) and knowledge management systems (KMS) have been positioned as strategies and

tools that enable organizations to create and transfer knowledge in order to sustain competitive advantage. While KM as a strategy gained legitimacy, KMS have struggled to show a causal relationship to knowledge creation and knowledge transfer. The Knowledge Management Systems process in the field of OH&S is shown in Figure 1. [11]

One possible definition of KM was proposed by Davenport and Prusak in 1998 [12]: “Knowledge management draws from existing resources that your organization may already have in place – good information systems management, organizational change management, and human resources management practices”. From the definition of KM it is clear that any advancement in this field need to adopt an integrated [12], interdisciplinary and strategic perspective. KMS are able to accumulate social capital and showing its effect on the creation and transfer of knowledge. A number of studies discuss the impact of so-called social capital on productivity, innovation and sustainability [13]. Social capital describes the ability of the organization, team, group, community or nation to work together. There are many characterizations of social capital. According to Robert Putnam [14] social capital has the following features: active participation in social networks, reciprocity, trust, and respect for social norms, communality, and initiative. The characterization of social capital, when applied to working life describes the situation that in Europe used to describe with the words: good job–good workplace.

KM in OH&S within the enterprises as well as at the state or regional level is needed so that: i) society’s scarce resources are not wasted by duplicating work; ii) OH&S information is easily available and accessible to all users of that information; and so that the information is kept as a structured entity instead of as fragmentary, unorganized bits of information [4]. In practice, KM combines various concepts from different disciplines,

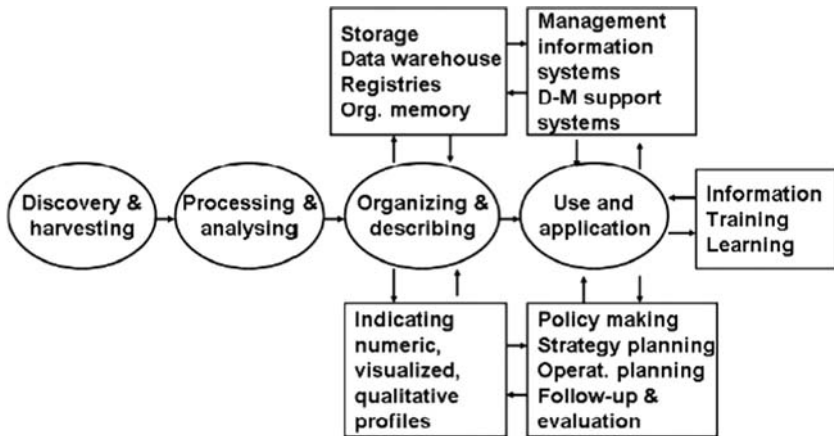


Figure 1. Knowledge management systems [11]

such as organizational theories, human resource management, artificial intelligence, ergonomics, and informational technologies [15]. The concept of KM can also be used to describe the collection of technique, methods, process, structure, and cultures developed to improve the creation, sharing and utilization of knowledge [2].

#### EXPLICIT AND TACIT KNOWLEDGE

Organizational KM in OH&S treats mixture of two kinds of knowledge: tacit knowledge and explicit knowledge. *Explicit knowledge*, sometimes referred to a codified knowledge, is objective knowledge that can be transmitted in formal, systematic language [4]. An example of explicit knowledge on OH&S consists of governmental and local regulations, standards, norms, and safety requirements, which are stored as written documents or procedures. According to Sherehiy and Karwowski [2], explicit knowledge in the area of OH&S and ergonomics are accident records, safety regulations, safety guidelines, theories and axioms, company records [2]. In the context of the management of OH&S, special attention should be given to tacit knowledge, because the research topics are often identified through direct human experience in the workplace, and the results of the research are often immediately applicable to the solution of a problem. When people solve complex problems in the field of OH&S, they bring knowledge and experience to the situation, and as they engage in problem solving they create, use, and share tacit knowledge. Zeleznikov [16] stated that *tacit knowledge* is highly personal, context specific as well as deeply rooted in an individual's actions and experience, which could be technical (i.e. know-how of an expert) or cognitive (i.e. based on values, beliefs and perceptions), and it hard to formalize, making it difficult to communicate or share with others. Examples of tacit knowledge are: safety engineer's experience, safety hazard recognition, perceptual and cognitive skills, physical experiences, rules of thumb and synthesis of facts [2]. In addition, in the context of OH&S management system, examples of tacit knowledge include individual knowledge of experienced worker and specialist as well as estimating and tendering skills acquired over time through hands-on experience, understanding the technological process, interaction with clients/ customers, awareness of occupational hazards and possible health effects, prevention measures, their responsibilities and right.

#### BACKGROUND AND PREVIOUS WORK

Despite the growing interest in KM studies, little research was carried out in the field of OH&S. Sherehiy and Karwowski [2] proposed model of KM for occupational safety, health, and ergonomics (OSHE). Schulte et al. [10] described the examples of current and effective KM practices within occupational hygiene in the USA. In 2006, Butler & Murphy [17] tried to exam the relationship between knowledge and work going forward. Schulte et al. [9] identified the special areas of dissemination of occupational and environmental safety and health information: the information needs of the changing workforce, new and young workers; small business [9]. Many researchers have described the process through which knowledge is created, developed, retained, and transferred in firms [18, 19], and the

role played by leadership [20–22] and decision-making styles in influencing these processes [23]. In most discussions of KM, the focus has been the organization as whole (e.g. Kotter & Heskett, 1992 [24]), organizational knowledge management [8] and on the right technology, proper organizational culture. There have been several systematic research studies in knowledge sharing within organizations and the 124 barriers from the KM literature were identified [7–8]. Such barriers concerned with source reliability, motivation to share, ability to learn and apply new knowledge and so on [6–8]. OH&S knowledge sharing is a field that has not received a great deal of researcher attention. In addition, the focus has not been on knowledge transfer at the state level and on knowledge transfer barriers. No research or other systematic studies have addressed knowledge transfer and possible barriers to knowledge sharing in the field of OH&S in Estonia. In order to understanding the success and failure of KM efforts in the field of OH&S, there is need to understand the process of knowledge creation, sharing and utilization at the state level. A profile on OH&S in Estonian agriculture was compiled with a rapid assessment approach and was used as an example of possible KM tool that helped to describe and explain the current situation in the field of OH&S, the process of knowledge cycle at the state level and to assess the possible barriers to knowledge transfer in Estonia.

## **SECTORAL PROFILE ON OCCUPATIONAL HEALTH AND SAFETY**

A Sectoral profile is valuable in its own right, being a contextual summary of issues of importance with specific focus. Profile (a situation summary) is a tool that is used for policy formulation and monitoring purposes, and for informing stakeholders about the state of affairs such as OH&S in Estonia. It is a document that also includes statistical indicators, which are interpreted and qualified in a profile, because it is more flexible and more informative than a collection of indicators. A profile is more than a set of indicators because it provides an understanding and context that cannot be communicated by numbers only. Profile and indicators of OH&S are used to describe state of affairs, provide early signals for problems in the work life, prioritizing activities, monitor trends, assess the effectiveness of programs, identify the information sources, as well as present a baseline against which progress is measured [25–28]. A profile aims at being understood also by decision-makers who deal with aspects of social dimensions other than OH&S, and who might see it useful to link elements of OH&S into their field of responsibility. The target groups of the profile are administrators, decision makers, politicians, labour inspectors, Trade Unions, employers' organizations, academic institutions, planners and managers, company management, OH&S specialists and OH&S expert institutions, local authorities and stakeholders [26, 29]. A Sectoral profile on OH&S in Estonian Agriculture was compiled under the umbrella of the Sub-network on OH&S in Agriculture as a part of the Estonian-Finnish Twinning Project on Occupational Health Services (2003–2004). The purpose of the Sectoral profile in OH&S in agriculture was to understand OH&S system in the local context and from the perspective of stakeholders, to increase the awareness about OH&S situation of national and local decision makers, companies, OH&S specialists, labour inspectors as well as stakeholders by promoting the compilation of profiles at national and sub-national level as well as to

provide a written summary that documents the state of affairs [26, 29]. In order to identify the information and knowledge sources, facilitate information sharing and dissemination, and raise awareness about OH&S in general, the Sectoral profile included headings as Overview of production; Labour Force demography; OHS legislation; OHS infrastructure and system; Information Strategy; Occupational hazards and risks; Occupational Health Services; Occupational and work-related diseases, work injuries; Sectoral OH&S Network in Agriculture; Inventory of educational and training materials (OH&S); Results from SWOT analysis by stakeholders; Main organizations involved in agriculture etc. Sectoral profile could be compiled by using several qualitative techniques such as desk-reviews of documents, conversations, group discussions, observations, walk-through assessments. On addition, the Sectoral profile can also be used, within reason, for making comparisons with other economic sectors within a country and between similar sectors in other countries [26, 28–29].

## **KNOWLEDGE TRANSFER IN OCCUPATIONAL HEALTH AND SAFETY**

Information and knowledge are critical components of OH&S decision-making, policy development, regulation, compliance, training, education, enforcement and risk management in general. In order for that knowledge to create value, it must be shared. The state may play an important role in process of knowledge generation and transfer, dissemination by establishing necessary legal infrastructure to support research development, network, and collaboration between authorities and enterprises [29]. Although knowledge sharing and knowledge transfer are often used interchangeably. *Knowledge sharing* refers to an exchange of knowledge between two individuals: one who communicates knowledge and one who assimilates it. Knowledge sharing focuses on human capital and the interaction of individuals. *Knowledge transfer* focuses on structural capital and the transformation of individual knowledge to group or organizational knowledge, which becomes built into processes, products, and services [8]. Knowledge transfer may occur between and among individuals, within and among teams, among organizational units, and among organizations. A major focus of knowledge transfer is on the individual who can explicate, encode, and communicate knowledge to other individuals, groups, and organizations. It is essential that enough information material on various risk and hazards of the work environment are available for the workplaces and workers. The dissemination of the OH&S information and transforming information into knowledge, i.e. into human knowledge capital, which can be used in many different ways to solve problems, to learn more in the field of OH&S, etc.

Many Estonian legislations (like Estonian Act on Occupational Health and Safety) and regulations contain stipulations about disseminating and applying information concerning OH&S. From a legislative perspective, improved dissemination of information and knowledge should encourage awareness, urge precaution, and lead to a reduction in occupational morbidity and mortality. In addition, to laws and regulations, voluntary consensus standards (e.g. OHSAS 18001) and corporate policies stipulates large role for

information dissemination and knowledge transfer. However, there is little known how employers, workers and OHS specialists receive, analyze and use this information. The analysis of the information needs should be based on a situation analysis and assessment of the status of the work life, occurrence and trends of OH&S problems, ongoing activities and operations, resource available, scientific and professional information available for experts, academia, social partners and enterprises [11]. According to Aaltonen [30], especially supportive safety information is needed in small companies because of the lack of safety knowledge. There is also need to define the target groups for OH&S information and knowledge because the contents of the information and knowledge need to be modified according to the needs of the information receivers. This requires an analysis on which are the groups of persons in need of information about OH&S, good solutions and practices at the workplace level. Knowledge, information and guidance materials are needed at every level of organization, but the type and content may be different. Small companies have different safety information and knowledge needs than large one.

There are some good and continuous channel for OH&S information and knowledge dissemination in Estonia: publication in journals, books, magazines, documents, brochures, CDs, lectures, posting on the web. According to Lagerlöf (2000) [31] research transfer is the process by which relevant research information is made available in a strategic manner for practice, planning and policy making. Technology transfer in OH&S is the application of new technologies or ideas to address OH&S problems [9]. Media is a very important factor when planning the information dissemination for the general public and for raising general awareness. One of the most effective factors is a regularly published newsletters and journals where OH&S issues are widely and extensively dealt with. The Estonian Newsletter on Occupational Health and Safety is the main channel for regular dissemination of information and knowledge Estonia [Figure 2]. In addition, the labour inspectors can disseminate regular information to the workers and employers during their visits to the workplaces.

The main ways of knowledge transfer in the field of OH&S are via communities of practice, the internet and training [10].

*Communities of practice/Networks:* People also share knowledge in different network: the organisation network, they belong to a team, a project, but they also form communities of practice (CoP) with people in other parts of the company or with experts outside the company. Knowledge sharing requires networks of specialists, but these are difficult to organise because of the increasing mobility and turnover the personnel and lack of time to share knowledge [5]. The field of OH&S could be considered as a CoP and it is important to know how knowledge, information, practice and values are shared, conserved, transformed within community.

The OH&S community of practice in Estonia is linked by Estonian Occupational Health Physician Association, non-governmental organizations, Occupational Health Services (OHS), consultants and researchers. In Estonia, the services provided by an OH physician, an OH nurse, a hygienist, a psychologist or a specialist in ergonomics are considered to be OHS. These service providers are all called 'occupational health specialists'. According to the Estonian legislation, only entrepreneurs or private medical companies

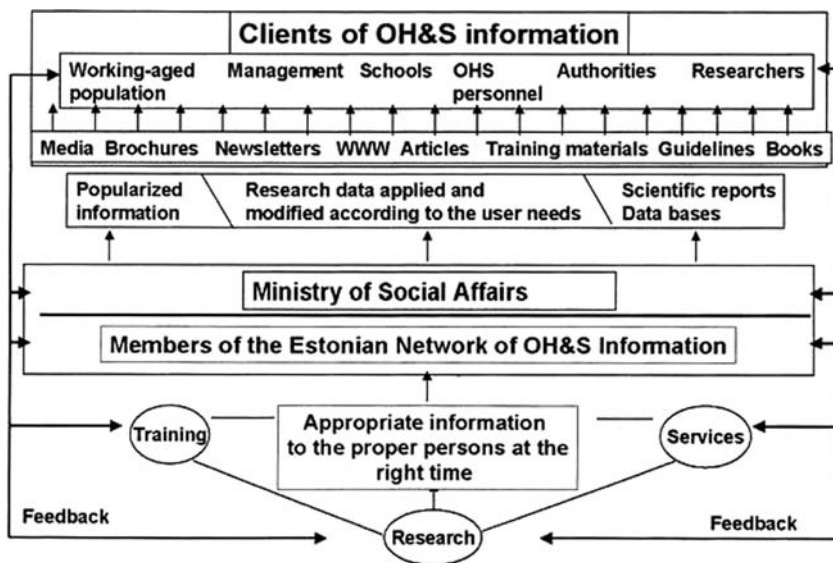


Figure 2. Process of information dissemination on OH&S in Estonia [11]

may provide the OHS. Another key function in this knowledge stewardship involves the accreditation of laboratories by the Estonian Accreditation Centre. According to data from Estonian Accreditation Centre, there are about 23 certificated laboratories in Estonia who may perform occupational hygiene measurements. Often the OH&S knowledge that a company applies to problems comes not from within, but from consultants retained for such purposes. In this case, the knowledge and expertise of the consultant is a marketable asset [29]. Utilization of consultants' services is one method of KM. Estonia has several national networks, for instance, the national Network on OH&S was built up during the Estonian-Finnish Twinning Project on Occupational Health executed in the years 2000–2002. The main functions of a networks include: sharing information and knowledge between organizations; increasing OH&S awareness in society; developing strategies, methods and instruments, and supporting training and education in OH&S [27–28].

*The internet* is becoming a primary source of OH&S information and knowledge. As Estonia has put a lot of emphasis on the development of Internet access, it can be expected that the workplaces use Internet actively. Therefore, training as well as information and knowledge transfer are performed via Internet. This electronic technology uses the Internet to train workers and employers as well as provide self-teaching courses and training modules. This is an additional challenge but there are already a lot of information available through Internet among the various organization involved in the National



Network on Occupational Health and Safety in Estonia. Information and knowledge dissemination on the Internet is generally considered to be passive, but list servers, video-conferencing, training, and other interactive formats are also available. Easy availability of and accessibility to well-managed information and knowledge can empower future workers and encourage life-long learning. Despite the potential of the Internet in Estonia, however, a systematic assessment has not been made to evaluate to how this technology is used in the field of OH&S and by whom. Comprehensive and multi-disciplinary approaches, including an understanding of the needs and behaviours of online information users, will be required to improve the health, safety, and competence of employees and managers.

*Training* and education are focused forms of dissemination of information and knowledge in the area of OH&S. A wide range of groups, including employers, labour unions, academia, private training companies, Estonian Accreditation Centre conduct training in the field of OH&S. Training and education are generally conceived in the OH&S field as worker and employer oriented or used OHS experts. The Estonian Act on Occupational Health and Safety and many other regulations contain requirements for worker training, which involves instruction in recognizing known hazards and using available methods of protection. Worker education in contrast prepares one to deal with potential hazards or unforeseen problems in order to find the possibility to eliminate the hazards at the workplaces. The training and education of OH&S experts is a part of graduate degree programs to obtain competency and certification in a particular field. The OH&S specialist and working environment specialists need a lot of information, part of which is transferred through training but another part by information and knowledge dissemination. Various channels are needed: informative web-pages that provide the information in an easy to access format, databases, textbooks, guidelines, etc.

## **KNOWLEDGE TRANSFER BARRIERS**

There are long-standing barriers to sharing knowledge in OH&S in Estonia. One of these is a lack of commitment of the government and social partners to be able to draw up policies and strategies for further development of Estonian OH&S system, by knowledge transfer. In addition, there is very little motivation from the legislation for employers to deal with OH&S issues [25, 32]. The compilation of the Sectoral profile on OH&S [26] defined, that the OH&S infrastructure in Estonia is still weak and that there is lack of the research activities in this the field [29]. The number and density of experts in the area of occupational psychology, toxicology, ergonomics and occupational hygiene in relation to the total workforce is still low and only a minority of employees has access to the OH&S specialist [25–26, 32]. One possible reason is that there is impossible to get degree education in some of these fields in Estonia and legislation reforms on OHS are needed [29, 32]. Barriers related to information and knowledge transfer via Internet include an information overload, shifting customer (people from many backgrounds) base for OH&S information. In addition, transferring knowledge and information via the web sometimes is not free. Knowledge and information on the web requires resources and effort, because the material

must be constantly maintained and updated. Another barrier to knowledge sharing and disseminating is the interdisciplinary nature of OH&S. Different OH&S specialists should be able to communicate across boundaries of component disciplines [10].

According to literature, the barriers to information and knowledge dissemination include constraints in the will to disseminate, inadequate resources, motivation to share, ability to learn and apply the new knowledge, and the lack of knowledge of what to disseminate or how to do it [9–10]. Often, OH&S information from state authorities may not get to small business employers because they are not the focus of the information as well as may not know how to reach the small business employers, and even if the employer is reached, the information may not be what is needed to make a decision. In the term of information seeking behaviours, the following categories of barriers have been defined: personal characteristics of the seeker; social and interpersonal characteristics; environmental or situational characteristics; are sources credibility [6, 9–10]. Next barrier is the increasingly global nature of knowledge creation, transfer and use. International standards development and the global harmonization of hazard classification and labelling systems are examples of initiatives to facilitate consistent and universal exchange of knowledge and information resources in occupational health and safety [10].

## **DISCUSSION AND CONCLUSIONS**

The process of OH&S knowledge transfer at the state level together with possible knowledge transfer barriers were identified from literature and results of the Sectoral profile on OH&S in Estonia. The authors used the principles of the Sectoral profile on OH&S in agriculture as an example. Sectoral profile on OH&S could be utilized by other sectors of the economy industries, not only in agriculture. It should be used as a possible tool for managing the safety knowledge, which provides situational understanding and clarity of the current OH&S system in the local context and from the perspective of stakeholders. The compilation of the Sectoral profiles on OH&S would strengthen the sectoral approach, information and knowledge dissemination and use. The target audience of the profile could be administrators, professionals, and others who deal with OH&S in the local context as well as specialists from other sectors who benefit from understanding the OH&S situation.

There is potential for organizations to learn, adopt and apply best practice, knowledge and information in the area of OH&S from other companies and various state authorities. Further research is needed in order to understand the factors involved in OH&S knowledge transfer and translated into practice, especially in focusing to knowledge management for young workers, non-Estonian speaking, for employers and employees in small business.

In order to overcome the knowledge transfer barriers, there is need to strengthening of national OH&S system in Estonia as well as awareness of the public through tripartite collaboration, and this includes legal provisions, enforcement, compliance and labour inspection capacity and capability, knowledge management strategy, information exchange, research and support services.

**REFERENCES**

1. Keles, R., 2006. E-safety for distributed occupational environments. Proceedings of 5<sup>th</sup> International Symposium on Intelligent Manufacturing Systems, May 29–31: 112–117.
2. Sherehiy, B., and Karwowski, W., 2006. Knowledge Management for Occupational Safety, Health, and Ergonomics. *Human Factors and Ergonomics in Manufacturing*, 16 (3), 309–319.
3. Takala J., 1998. Information: A precondition for action. In: Stellmann J., editor. *Encyclopedia of occupational health and safety*. Geneva, Switzerland: International Labour Organisation. P 22.2–22.4.
4. Lehtinen, S., Tammaru, E., Korpen, P., and Rünkla, E., 2004. **Information in occupational health and safety – brining about impact in practice in Estonia**. In *Occupational health services in Estonia. Estonian-Finnish Tinning Project on Occupational Health Services 2003–2004*. Finnish Institute of Occupational Health, Helsinki. ISBN: 951-802-616-5, 59–64.
5. Barnard, Y.F., 2005. Developing Industrial Knowledge management: Knowledge Sharing over Boundaries. In: *Proceedings of the International Conference on Advances in the Internet, Processing, systems, and Interdisciplinary research (IPSI-2005 France)*. Carassonne, France. IPSI Belgrade, Serbia, Serbia and Montenegro ([www.internet-conferences.net](http://www.internet-conferences.net)).
6. Kwok, S.H., and Gao, S., 2005/2006. Attitude towards knowledge sharing behaviour. *The Journal of Computer Information Systems*, 46, 2; 45–51.
7. Lindsey, K.L., 2006. Knowledge Sharing Barriers, in *Encyclopedia of Knowledge Management*. ISBN: 1-59140-573-4, 499–506.
8. Jacobson, C.M., 2006. Knowledge Sharing Between Individuals. In *Encyclopedia of Knowledge Management*. ISBN: 1-59140-573-4, 507–514.
9. Schulte, P.A., Okun, A., Stephensen, C.M., Colligan, M., Ahlers, H., Gjessing, C., Loos, G., Niemeier, R.W., and Sweeney, M.H., 2003. Information Dissemination and Use: Critical Components in Occupational Safety and Health. *American Journal of Industrial Medicine* 44:515–531.
10. Schulte, A., Lentz, T.J., Anderson, V.P., and Lamborg, A.D., 2004. Knowledge Management in Occupational Hygiene: The United States Example, *Annals of Occupational Hygiene*, 48(7):583–594.
11. Lehtinen, S., 2002. Mission of information dissemination. In *Information Dissemination Strategy on Occupational health and safety in Estonia*. ISBN 951-802-481-2.
12. Davenport, T.H., and Prusak, L., 1998. *Working knowledge: How organizations manage what they know*. Boston: Harvard Business School Press.
13. Rantanen, J., 2004. **Occupational health and safety as a resource for social development**. In *Occupational health services in Estonia. Estonian-Finnish Tinning Project on Occupational Health Services 2003–2004*. Finnish Institute of Occupational Health, Helsinki. ISBN: 951-802-616-5, 18–20.
14. Putnam, R.D. 1993. *Making Democracy Work*. Civic traditions in modern Italy, Princeton, NJ: Princeton University Press, 258+ xv pages.

15. Liebowitz, J., (Ed.) 1999. Knowledge management handbook. Boca raton, FL: CRC press.
16. Zelenkow, J., 2006. Legal Knowledge Management in Encyclopedia of Knowledge Management. ISBN: 1-59140-573-4, 578–582.
17. Butler, T., and Murphy, C., 2006. Work and Knowledge in Encyclopedia of Knowledge Management. ISBN: 1-59140-573-4, 884–889.
18. Argote, L., McEvily, B., and Reagans, R., 2005. Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management Science*, 49(4), 571–582.
19. Nonaka, I. and Takeuchi, H. (1995). The knowledge creating company. Oxford University Press.
20. Bryant, S.E., 2003. The role of transformational and transactional leadership in creating, sharing and exploiting organizational knowledge. *Journal of Leadership & Organizational Studies*, 9, 32–42.
21. Vera, D., and Crossan, M., 2004. Strategic leadership and organizational learning. *Academy of Management Review*, 29, 222–240.
22. Zyngier, S., 2006. Knowledge Management Governance, in Encyclopedia of Knowledge Management. ISBN: 1-59140-573-4, 373–379.
23. Cepeda-Cariñon, G., 2006, Competitive Advantage of Knowledge Management, In Encyclopedia of Knowledge Management. ISBN: 1-59140-573-4, 34–38.
24. Kotter, J.P. and Heskett, J.L., 1992. *Corporate culture and performance*. New York: Free Press.
25. Kempinen M., and Kurppa, K., 2004. Ülevaade Tööttervishoiust ja Tööohutusest Eesti Põllumajanduses. [Sectoral Profile on Occupational Health and Safety in Estonian Agriculture. English summary.] Estonian Occupational Health Centre, Tallinn, Estonia, ISBN: 9949-10-841-1, 112 p.
26. Kempinen, M., and Kurppa, K., 2004. Sectoral Profile on occupational health and safety in Estonian agriculture. Within the EST-FIN Twinning on Occupational Health Services. In Occupational health services in Estonia. Edit. Lehtinen, S. Finnish Institute of Occupational Health, Helsinki: 53–58. ISBN 951-802-616-5.
27. Kurppa, K., 2002. Building networks on occupational health and safety in Estonia. In The Finest bridge. Finnish-Estonian Collaboration in Occupational Health. Eds. Ylikoski M, Lehtinen S, Kaadu T, Rantanen J, Finnish Institute of Occupational Health, Helsinki, 76–82.
28. Kurppa, K., Tammaru, E., Kempinen, M., Rünkla, E., Sõrra, J., and Lehtinen, S., 2006. Sectoral Network on Occupational Health and Safety in Agriculture to Support Enterprises and Family Farms in Estonia. *Industrial Health*, 44, 3–5.
29. Jarvis, M., and Tint, P., 2007. Knowledge management in occupational health and safety: Estonia example. In Ergonomics in Contemporary Enterprise. Proceeding of the 11th International Conference on Human Aspects of Advanced manufacturing: Agility and Hybrid Automation. 4th Intern.Conf.ERGON-AXIA. Edit.by Pacholski & Trzezielinski. ISBN 978-09796435-0-7, 517–534.

30. Aaltonen, M., 1996. A Consequence and Cost Analysis of Occupational Accidents in the Furniture Industry. Finnish Institute of Occupational Health. ISBN 951-802-130-9, 13–35.
31. Lagerlöf, E., 2000. Research dissemination. *Arvete Och Hälsa* 16: 1–6.
32. Martimo, K-P., 2004. Strengthening of the service provision of occupational health in Estonia. In *Occupational health services in Estonia. Estonian-Finnish Tinning Project on Occupational Health Services 2003–2004*. Finnish Institute of Occupational Health, Helsinki. ISBN: 951-802-616-5, 26-32. ISBN 951-802-616-5.