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NARZĘDZIA PROGRAMOWE DLA PRACOWNIKÓW WIEDZY

[**słowa kluczowe:** zarządzanie wiedzą, pracownik wiedzy, zadania związane z wiedzą, zadania pracowników wiedzy, role pracowników wiedzy, narzędzia programowe, rozwiązania programowe]

Streszczenie

W artykule została uzasadniona ważność zarządzania wiedzą w dzisiejszej gospodarce. Głównymi podmiotami badań są pracownicy wiedzy i stosowane przez nich narzędzia programowe. Artykuł zawiera autorską wersję definicji zarządzania wiedzą oraz pracowników wiedzy. Analizowana jest współzależność działań pracowników wiedzy, ich ról i zadań. Artykuł rozważa istniejące narzędzia programowe z punktu widzenia ich stosowania przez pracowników wiedzy. Wyróżnione są najczęściej używane narzędzia programowe. W ostatniej części artykułu są przedstawione wnioski z prowadzonych badań, a również dalsze ich etapy.

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SOFTWARE SOLUTIONS FOR KNOWLEDGE WORKERS

[**keywords:** knowledge management, knowledge worker, knowledge actions, knowledge worker tasks, knowledge worker roles, software tools, software solutions]

Abstract

The importance of knowledge management in today's economy is justified in the paper. Knowledge workers and the software tools they apply are chosen as major subjects of the research. The paper contains the author's versions of the

definitions of knowledge management and knowledge worker. The correlation of knowledge actions, knowledge worker roles and tasks is analyzed. This paper considers the existing software tools from the point of view of their application by knowledge workers. The most frequently used software tools are distinguished. Conclusions on the research are drawn and further steps of the research are described in the final part of the paper.

Introduction

In the modern developing economics knowledge is being thought of as a valuable asset, which is owned by highly mobile employees, as well as embedded in high-technology products. Because of that, *knowledge management* (KM), believed to be the key ability for any organization at the modern market, is replacing more traditional factors. KM is a systematic approach, which is supposed to ensure the full utilization of the organization's knowledge base, together with the potential of individual skills, competencies, thoughts, innovations, and ideas to enhance the efficiency of organization's performance.

In the study of knowledge management phenomenon, it is necessary to consider two elements, which are vital for the KM process: the people, who create, utilize and distribute knowledge – *knowledge workers* (KW); and the *software tools* (*software solutions*), which assist knowledge workers and facilitate their activity.

That is why, this paper's major *objectives* are:

1. To define *the notions* “knowledge management” and “knowledge worker” – with the purpose to clarify the subjects of the research and to set the specific area of further research.
2. To determine *the tasks* performed by knowledge workers; formulate the *topology* of these tasks – with the objective to specify the demands of KW as for the software tools that assist them in the process of knowledge creation, distribution etc. The specified demands are to be further processed for realization of the third objective of the paper.
3. To reveal, whether there exist *proper software solutions* to meet demands of knowledge workers – in order to analyze advantages and disadvantages of the existing software solutions (SS) for KW, as well as to formulate recommendations on application of the most effective SS.

The results of the research in this paper will be presented as follows:

1. The first part presents definitions of the notions “knowledge management” and “knowledge worker”. Thus, it realizes the 1st objective of the paper. This part also contains description of knowledge workers’ roles and actions. Realization of the 2nd objective of the paper is achieved in this part – an aggregated topology of knowledge workers’ tasks is presented.
2. The second part contains analysis of software solutions applied by knowledge workers. These solutions are grouped in accordance with the knowledge workers’ tasks they help to realize.
3. In the final part conclusion on the research are drawn and some further steps of the author’s research are described.

Knowledge Workers in Knowledge Management

Initially knowledge management was defined as the process of applying a systematic approach to the capture, structuring, management, and dissemination of knowledge throughout an organization to work faster, reuse best practices, and reduce costly rework from project to project [22]. Presently literature brings many definitions of the KM phenomenon, which differ from each other in a larger or smaller degree.

On the basis of analysis of 50 definitions of KM [1, 2, 6, 7, 11, 15, 16, 24, 26, 27] the author has formed a cloud of words, which allows to highlight the words that appear in these definitions most frequently. Thus, the word cloud (fig. 1) contains key notions that are applied when defining KM.



Figure 1. Knowledge management word cloud [19]

the primary objective of their work – to create and distribute new knowledge. KWs are specialized in their profession, are well-informed, active and responsible, aware of their role and their self-worth. The mind of KWs is regarded as their primary work tool.

Thus, at this stage *the first objective of the paper* is reached – the notions of knowledge management and knowledge worker are defined. In order to realize the second objective – knowledge worker tasks determination, it is necessary to refer to the work of Reinhardt et al. [18]. In this work 10 *knowledge worker roles* are distinguished (tab. 1), and for each of the roles particular *actions* are matched. Table 2 presents the author’s vision of the correspondence between KW roles and the actions performed. This version allows to see the most “popular” knowledge actions – i.e. those, which are performed by the largest number of KW roles (“KA rating” in tab. 2). There is also a calculation of number of knowledge actions, conducted by each KW role (“Number of KA” in tab. 2) – it allows to define the most “responsible” KW roles, conducting the biggest number of knowledge actions. Thus, table 2 gives the picture of the activities, most frequently performed by knowledge workers – those that form the foundation of the knowledge management process.

Table 1. Roles of Knowledge Workers

Role	Description
Controller	Monitors the organizational performance based on raw information.
Helper	Transfers information to teach others, once he passed a problem.
Sharer	Disseminates information in a community.
Learner	Uses information and practices to improve personal skills and competence.
Linker	Associates and mashes up information from different sources to generate new information.
Networker	Creates personal or project related connections with people involved in the same kind of work, to share information and support each other.
Organizer	Is involved in personal or organizational planning of activities, e.g. to-do lists and scheduling.
Retriever	Searches and collects information on a given topic.
Solver	Finds or provides a way to deal with a problem.
Tracker	Monitors and reacts on personal and organizational actions that may become problems.

Table 2. Actions of Knowledge Workers

KW Roles	Knowledge Actions												Number of KA	
	Analysis	Dissemination	Information search	Networking	Monitoring	Information organization	Acquisition	Expert search	Learning	Service search	Authoring	Co-authoring		Feedback
Helper	+	+	+	+					+		+		+	7
Learner	+		+				+	+	+	+				6
Networker	+	+		+	+			+		+				6
Retriever	+		+		+	+	+	+						6
Solver	+	+	+				+		+	+				6
Linker	+	+	+	+		+								5
Controller	+	+			+	+								4
Organizer	+			+	+	+								4
Sharer		+		+							+	+		4
Tracker	+		+	+	+									4
<i>KA Rating</i>	9	6	6	6	5	4	3	3	3	3	2	1	1	

Therefore, it can be stated, that Analysis is the action, performed by 90% of KW roles, while Feedback and Co-authoring are peculiar only for 1% of the roles. At the same time, the highest number of knowledge actions is performed by the knowledge workers, who are Helpers, Learners, Networkers, Retrievers and Solvers – they conduct around 50% of all the actions.

On the basis of the ideas in [18], the author has also developed an aggregated *topology of knowledge worker tasks* (tab. 3), which correspond with the key words that define the phenomenon of KM (see fig. 1). Descriptions of each of the KW actions and roles [18] were analyzed and the key words they contain (see column “Key words” in Table 4) were matched with the definitions of the key KW tasks so that the grouping could be done correctly. In turn, the key KW tasks were selected from the analysis of knowledge management definitions, where identification, capturing, creation and distribution of knowledge were enumerated as the basic activities of the process.

Table 3. Topology of Knowledge Worker Tasks

KW key tasks	Knowledge actions	Key words	KW roles
Identification	Analysis Monitoring Expert search Service search Information search Feedback	Examining Thinking Keeping up-to date on selected topics Discussion with experts Retrieval of web services Search of information Assessment of information objects	Controller Organizer Tracker
Capturing	Information organization Acquisition Learning	Management of information collection Gathering of information Acquire new knowledge	Solver Learner Retriever
Creation	Authoring Co-authoring	Content creation (individual and collaborative)	Linker
Distribution	Dissemination Networking	Spreading information Interacting with other people and organizations o	Helper Sharer Networker

This is where realization of *the paper's second objective* can be seen – knowledge worker tasks are defined and structured.

To realize the last, *third objective of this paper*, – to reveal the existence of software solutions for the requirements of KW, it is necessary to proceed to the third part of the paper.

Software Solutions in Knowledge Management

Having conducted literature review on the tools that support the activity of knowledge workers [9, 10, 25], the author has selected a set of software solutions, which will be the subject to the following research. This set was divided into 8 major groups that were matched with the key tasks of knowledge workers (see. tab. 3).

Table 4 gives the picture of the software tools, which are applied in each of the KW tasks, and it shows, which ST are the most frequently used (“ST Rating” in tab. 4). At the same time, the column “Number of ST” (tab. 4) contains the numbers that show which group of KW tasks requires application of the biggest number of various software solutions.

The grouping, presented in the table, was done on the basis of the literature review of the existing research on the software solutions for knowledge management, as well as on the basis of results of questionnaire research, conducted within the academic staff of the University of Economics in Katowice.

In order to make the table more readable, the author replaces the names of software tools in table 4 by the acronyms (as follows):

1. *DB* – databases, data warehouses.
2. *SN* – social networks, e-mail, forums, black boards, news groups.
3. *DMS* – document management systems, content management systems.
4. *GS* – groupware systems, workflow systems, portal systems.
5. *ES* – expert systems, agent systems, data mining and text mining, business intelligence.
6. *PM* – process models creators.
7. *EL* – e-learning systems.
8. *MM* – mind mapping, concept mapping, white boards, decision trees creators.

Table 4. Software Tools for Knowledge Workers

KW tasks	Software tools (ST)								Number of ST
	DB	SN	DMS	GS	ES	PM	EL	MM	
Identification		+	+	+	+	+		+	6
Capturing	+		+		+	+	+		5
Creation	+	+	+						3
Distribution	+	+		+					3
ST Rating	3	3	3	2	2	2	1	1	

Drawing the conclusion about the data in the table, it can be claimed that 75% of knowledge workers' tasks are performed with the help of various knowledge integrating databases, communication tools (like social networks, e-mails etc.) and document management systems. At the same time, the task of Knowledge Identification requires 75% of the suggested ST, while the Knowledge Creation and Distribution apply only 37,5% of the software potential.

At this stage it can be stated that *the third objective of the paper* is realized – the existing software solutions, which can be applied for the requirements of knowledge workers, are revealed.

Conclusions

In contemporary economics knowledge management is believed to be the key factor that influences organization's performance and competitiveness of organizations. That is why a lot of research is conducted on the issues of efficient knowledge management and various tools that assist organizations in this process.

The research, conducted in this paper, is aimed at two elements, which form the foundation of the knowledge management process and are vital for it: knowledge workers and knowledge management software tools.

In this connection, the three major objectives are set and realized in this paper:

1. The notions of knowledge management and knowledge worker are formulated in order to clarify the main subjects of the research.
2. The tasks, performed by knowledge workers, are distinguished. Knowledge worker roles are grouped in accordance with the topology of these tasks. This was conducted with the objective to specify the demands of knowledge workers as for the software tools that assist them at all stages of knowledge management.
3. The existence of software solutions for knowledge workers was revealed and the most frequently used software tools were analyzed.

The author's further research will include the following steps:

1. To study the specific examples of software tools for each type of KW tasks. To analyze their functions, advantages, disadvantages and perspectives of application.
2. To formulate the set of criteria, which every particular software tool should meet in order to be efficiently applied in the KM process.
3. In accordance with the set of criteria, to conduct the analysis of the ST and select those, which are optimal to be applied in the process of KM.

The steps, described above, are supposed to be followed by creation of the set of recommendations on how the usage of particular software solutions can facilitate and enhance the process of managing knowledge in organizations.

References

1. Brooking, A. (1999); *Corporate memory: Strategies for knowledge management*. London: International Thomson Business Press.
2. Dalkir, K. *Introduction to Knowledge Management*. Mitpress.
https://mitpress.mit.edu/sites/default/files/titles/content/9780262015080_sch_0001.pdf (access date 30-01-2017).
3. Davenport, T. H. (2005); *Thinking for a Living. How to Get Better Performance and Results from Knowledge Workers*. Boston: Harvard Business School Press. https://www.researchgate.net/publication/248078273_Thinking_for_A_Living_How_to_Get_Better_Performance_and_Results_from_Knowledge_Workers (access date 21-05-2016).
4. Drucker, P. F. (1995); *Managing in a Time of Great Change*. New York: Truman Talley Books/Dutton.
5. Figurska, I. (2015); *Knowledge Workers Engagement in Work in Theory and Practice*. "Human Resources Management & Ergonomic", 2(9), pp.43-59. https://frcatel.fri.uni-za.sk/hrme/files/2015/2015_2_04.pdf (access date 17-06-2016)
6. Frost, A. (2010); *An Educational KM Site*. <http://www.knowledge-management-tools.net> (access date 27-01-2017).
7. Gotcha. *UC Berkeley's School of Information Management & Systems*. [Online]: http://web.archive.org/web/20070306094725/http://www2.sims.berkeley.edu/courses/is213/s99/Projects/P9/web_site/about_km.html (access date 01-02-2017)
8. Gurteen, D. (2006); *The Gurteen Perspective: Taking Responsibility*. "Inside Knowledge Magazine", 10(1). <http://www.ikmagazine.com/display.asp?articleid=ae03f1ca-f94b-4bd5-9be9-0cb68079cb6f> (access date 20-01-2011).
9. Hasan, H. M. and Pfaff, C. (2006); e Wiki: *a Tool to Support the Activities of the Knowledge Worker*. In H. M. Hasan, G. Whymark & J. Findlay (Eds.), *Transformational Tools for 21st Century Minds: 21C2006* (pp. 38-48). Sydney: Knowledge Creation Press. <http://ro.uow.edu.au/cgi/viewcontent.cgi?article=3301&context=commpapers> (access date 20-02-2017).
10. Kaiser, J.M., Conrad, J., Koehler, C., Wanke, W. and Weber, C. (2008); *Classification of Tools and Methods for Knowledge Management in Product Development*. Design Knowledge and Collaboration, International Design Conference. Pp. 809-816. https://www.designsociety.org/publication/26783/classification_of_tools_and_methods_for_knowledge_management_in_product_development (access date 24-02-2017).
11. Macintosh, A. *Knowledge Management*. Artificial Intelligence Applications Institute, School of Informatics – The University of Edinburgh. <http://www.aii.ed.ac.uk/~alm/kamlinks.html> (access date 01-02-2017).
12. Mikuła, B. (2006); *Knowledge Based Organizations* (in Polish). Kraków: Publishing House of Economic Academy in Kraków. 255 p. <http://www.e-mentor.edu.pl/artukul/index/numer/14/id/279> (access date 22-06-2016).
13. Morawski M. (2003); *Problematyka zarządzania pracownikami wiedzy*, „Przegląd Organizacji”, Vol. 1, pp. 17-20.
14. Morello, D. and Caldwell, F. (2001); *What Are Knowledge Workers? What Makes Them Thick?* Gartner Group Research. <http://www.marcusball.com/work/TechReference/What%20Are%20Knowledge%20Workers%20What%20Makes%20Them%20Tick.htm> (access date 22-06-2016).

15. *OECD Glossary of Statistical Terms*.
<http://stats.oecd.org/glossary/detail.asp?ID=6878> (access date 01-02-2017)
16. *Oxford Dictionary*.
https://en.oxforddictionaries.com/definition/us/knowledge_management (access date 02-02-2017).
17. Pyöriä, P. (2005); *The concept of knowledge work revisited*. "Journal of Knowledge Management", vol. 9, No. 3, pp. 116-127. <http://www.emeraldinsight.com/doi/pdfpl.us/10.1108/13673270510602818> (access date 16-06-2016).
18. Reinhardt, W., Schmidt, B., Sloep, P. and Drachsler, H. (2011); *Knowledge Worker Roles and Actions – Results of Two Empirical Studies*. "Knowledge Process Management", 18(3), pp. 150-174.
19. Rizun, M. (2017); *Maturity Models as the Element of Knowledge Management Development*. Materials of the 10th Conference of Young Scientists "Actual Issues Raised by Young Scientists" (in the process of edition).
20. Rizun, M. (2016); *Moodle Platform as a Knowledge Management System: Results of a Questionnaire Research*. Economic Studies, Scientific Journal of the University of economics in Katowice, Informatics and Econometrics, 296 (6), pp. 49-63.
21. Serrat, O. (2008); *Managing Knowledge Workers. Knowledge Solutions*. Asian Development Bank. <http://digitalcommons.ilr.cornell.edu/intl/146/> (access date 17-06-2016).
22. Sivasubramanian, S. (2016); *Process Model for Knowledge Management*. Language Technologies Institute, School of Computer Science, Carnegie Mellon University. [Online] <https://www.lti.cs.cmu.edu/work/technical-reports> (access 01-11-2016).
23. Skrzypek, E. (2009); *Creativity of Knowledge Workers and Their Impact on Innovativeness of Enterprises* (in Polish). <http://www.institut.info/Vkonf/site/32.pdf> (access date 17-06-2016).
24. Snowden, D. (2009); *Defining KM. Cognitive Edge*. <http://cognitive-edge.com/blog/defining-km/> (access date 28-01-2017).
25. Staniszkis, W. (2015); *Empowering the Knowledge Worker: End-User Software Engineering in Knowledge Management*. Springer International Publishing, Switzerland. Hammoudi, S. et al. (Eds.): ICEIS 2015, LNBIP 241, pp. 1–17. <http://www.rodan.pl/editor-cm-web-portlet/content/NjIzNQ==.pdf> (access date 21-02-2017).
26. *The Business Dictionary*.
<http://www.businessdictionary.com/definition/knowledge-management.html> (access date 29-01-2017).
27. Wiig, K. *Knowledge Management Glossary*. Knowledge Research Institute, Inc. http://www.krii.com/downloads/KM_glossary.pdf (access date 28-01-2017).