A Knowledge Management Literature Review based on Wiig´s Prognosis of 1997

Zuzana Crhová[1], Drahomíra Pavelková[1] and Jana Matošková[2]
[1]*Department of Finance and Accounting, Faculty of Management and Economics, Tomas Bata University in Zlín, Mostní 5139, Zlín, Czech Republic*
[2]*Department of Management and Marketing, Faculty of Management and Economics, Tomas Bata University in Zlín, Mostní 5139, Zlín, Czech Republic*

Keywords: Knowledge Management, Information Technology, Activities Supporting Knowledge Management, Knowledge Management Effectiveness.

Abstract: Knowledge is an important asset that can result in innovation and competitive advantage for companies. This paper provides a literature review based on perspectives proposed in a paper written by Karl M. Wiig almost two decades ago which forecasted development of Knowledge Management. The aim of this paper is to compare Wiig's predictions with the current state of Knowledge Management literature to see how true his forecasts turned out to be. Moreover, the current literature is reviewed in order to find out which subtopics of Knowledge Management should be key topics for future research.

1 INTRODUCTION

Knowledge Management is the creation, collection, organization and spreading of knowledge (Qureshi et al., 2006). In 1997, Karl M. Wiig wrote an article charting the development of Knowledge Management and forecasting its future. Since then, his article has been cited at least 138 times in the Web of Science database.

Wiig considered the future evolution of Knowledge Management (KM) from five perspectives: management practices, information technology, organizational efforts, development, supply, and adoption rate, and lastly the possible monitoring of KM effectiveness. Our idea was to compare Wiig´s forecast about the future development of KM with the current state of KM literature from the perspectives mentioned.

This was done by examining the current literature in the KM field. Each of the five perspectives proposed by Wiig is compared with contemporary KM literature. The result is that Wiig's prognostications were surprisingly accurate, as evidence of his proposed shifts in each of the perspectives was found in the current literature.

The second part of this paper provides a qualitative analysis of current literature to determine key subtopics for future research. It was found that knowledge use and knowledge sharing are the most popular topics in reviewed papers and, quite big groups of papers are focused on KM in health care, innovations and information technologies. From geographical point of view center of research on KM is mainly in European countries.

2 METHODOLOGY

The first part of this paper uses a literature review to compare the 1997 predictions of Karl M. Wiig about KM with present state of KM literature.

For the second part of the paper, we went through the newest papers on the Web of Science database – key word "knowledge management". Titles, abstracts, and key words of 150 papers from 2015 were analysed. Only papers relevant to KM topics were chosen and subtopics based on the KM practices proposed by Heisig (2009) – knowledge use, knowledge identification, knowledge creation, knowledge retrieving, knowledge sharing and knowledge storing - were used for analysis.

Crhová, Z., Pavelková, D. and Matošková, J..
A Knowledge Management Literature Review based on Wiig´s Prognosis of 1997.
In *Proceedings of the 7th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management (IC3K 2015) - Volume 3: KMIS*, pages 281-286
ISBN: 978-989-758-158-8

3 COMPARISON OF WIIG´S PROGNOSIS WITH CURRENT KNOWLEDGE MANAGEMENT LITERATURE

This chapter compares Wiig´s 1997 predictions about the future development of KM with current KM literature.

Each subchapter deals with one of five of Wiig's proposed perspectives. It starts with a short summary of Wiig´s predictions and then continues with a short review of current literature.

3.1 Management Practices Perspective

Wiig (1997) predicted that KM would not only be integrated as a part of the strategic management of companies but would be a part of everyday activities of each company. Knowledge and KM would be a key factor of competitiveness. Except for sharing explicit knowledge, activities supporting sharing of tacit knowledge would be incorporated into activities of companies.

Knowledge is a key asset of a company, especially in times of increasing competitiveness and globalization (Lee, Leong, Hew and Ooi, 2013; Ragab and Arisha, 2013). Companies can create a sustainable competitive advantage by using their knowledge (Calantone et al., 2002; Hung et al., 2010).

Many KM activities have been recognized. Currently, there is talk about usage, identification, creation, retrieving, sharing and storing of knowledge (Heisig, 2009). Sharing knowledge can create new knowledge which could be beneficial to an organization (Minbaeva et al., 2014). Except for the sharing of explicit knowledge, methods of sharing of tacit knowledge have evolved. Mentoring, story-telling or communities of practices are methods that spread tacit knowledge.

3.2 Information Technology Perspective

According to Wiig (1997), information technology should play a key role in KM. According to Alavi and Ledner (2001), information technology (IT) can support knowledge sharing in companies. Electronic databases are also used for the storing of company knowledge (Wong, Tan, Lee and Wong, 2015). The need to use information systems is highlighted in large companies where the systems are often too bureaucratic (Sparrow, 2001).

Qureshi et al. (2006) call the information systems which focus on creation, collection, organization and dissemination of knowledge within an organization as KM systems.

Tseng (2008) documents that IT is helpful in supporting the implementation of KM systems, but it is not able to help the sharing of tacit knowledge.

Yuan et al. (2013) focus on different generations of information systems used in organizations. Information systems have to fulfil three main requirements of KM: awareness of expertise distribution, motivation for sharing, and network ties. The authors conclude that social networks can be helpful for searching and sharing knowledge within a company. But the choice to use one or another type of information or communication technology is biased towards the functional background of the worker.

Casimir et al. (2012) suggest that companies should use IT to create online communities of practices that can help reduce the time it takes workers to find necessary information and knowledge, to enable access to a wide range of knowledge and to utilize it within the organization.

3.3 Organizational Efforts Perspective

Wiig (1997) states that Companies should know how to manage knowledge and how it can help to improve organizational success. Activities supporting KM are part of daily activities and can help to make these activities easier.

In the area of activities supporting KM, there is a strong connection between KM and certain practices of Human Resource Management (Matošková, 2011; Afiouni, 2007; Gloet, 2006). Activities like recruitment, job organization, occasions for formal or informal knowledge sharing, an open organizational structure, targeted work with older employees, or an elaborate system of rewards can help to improve KM in companies (Matošková, 2011).

Yahya and Goh (2002) state that companies should start with new employee training. This training focuses on improving creativity, team building or strengthening of position, all of which should lead to better knowledge creation, documentation and sharing.

Then, the environment-supporting knowledge sharing has to occur. Casimir et al. (2012) present the necessity of creating a system enabling knowledge sharing, social networks, an organizational structure supporting communication flows, or interdisciplinary interactions.

When company management is planning a system of rewards for knowledge sharing, it has to keep in mind that this system should appreciate taking risk, creative problem solving or knowledge sharing among employees instead of a system based on competitiveness between employees (Yahya and Goh, 2002).

3.4 Development, Supply, and Adoption Rate Perspective

Wiig (1997) predicted that developers will provide many operational models, methods and technologies supporting KM practices.

In accordance with Wiig´s prediction, many such developers can be found. For example, The KM World magazine prepares a list of 100 companies that matter the most in KM every year. These companies provide tools or services to help other companies deal with KM. Companies like APOC (which deals with KM business research and searches for KM best practices), Microsoft (software solutions), Bamboo Solutions (share points), Calabrio (contact centres for faster decision-making), and PeopleFluent (social networking software) can be found in this list (*KM World*, 2015).

3.5 Possible Monitoring of Knowledge Management Effectiveness

Wiig (1997) proposed that some system of accounting allowing a description of the state of the enterprise´s knowledge assets will be introduced. The contribution of knowledge assets to company performance should be substantial.

Stewart (2001) claims that measurements of KM initiatives have to be in relation with corporate strategy and financial performance. He suggests four steps to designing a working system of intellectual capital management. Each step is connected with employing the right measures. Firstly, the role of company knowledge has to be identified. Secondly, knowledge revenues have to be matched with knowledge assets. The third step includes developing KM strategies and planning investments aimed at increasing the value of the knowledge assets. Lastly, the productivity of the knowledge assets and the knowledge of the staff have to be increased. (Stewart, 2001)

Based on a literature review, Ragab and Arisha (2013) divided the methods of measuring knowledge into four groups. Financial measures are based on using data from financial statements (e.g., Human Capital Value Added or Revenues per Employee). Questionnaires are used to construct non-financial measures (e.g., an Employee Satisfaction Index or Training Return on Investments). Measures of intellectual capital try to evaluate the value of intellectual capital present in a company (e.g., Scandia Navigator). Performance metrics measure the impact of knowledge when it is applied (e.g., Balanced Scorecard). (Ragab and Arisha, 2013, Marr, 2012)

Wong et al., (2015) then identified another six categories of KM performance measurement approaches. These are traditional, advanced, deterministic, stochastic, general result oriented, and specific result oriented measures.

4 SUBTOPICS OF KNOWLEDGE MANAGEMENT RESEARCH IN 2015

The 150 latest papers on the Web of Science database containing the key word "knowledge management" were analysed so as to ascertain the current main research areas. A quantitative analysis included an analysis of the titles, abstracts and key words of these papers. Then, 96 relevant papers were chosen and an analysis of the subtopic was performed.

Table 1: Subtopics of KM based on a Literature Review of Articles Published in 2015 (source: own analysis).

Subtopic	Research problem of the paper
Knowledge use	Decision-making, risk reduction, quality systems, talent management, importance of information, innovation, R&D productivity, KM performance measurement
Knowledge identification	Documentation structure, measure of individual knowledge, intellectual capital disclosure, knowledge audit
Knowledge creation	SECI model, knowledge creation in R&D, knowledge creation in nursing education, generation of knowledge, knowledge combination mechanism
Knowledge retrieving	Knowledge seeking patterns, extracting knowledge from web sources, access to strategic information
Knowledge sharing	IT technologies, knowledge transfer in health care, e-learning, language clustering, factors for knowledge transfer, support of knowledge sharing
Knowledge storing	KM domains, IT technologies, corporate memory, medical record system

Figure 1: Map of Concentration of Knowledge Management Research in 2015 (source: own analysis).

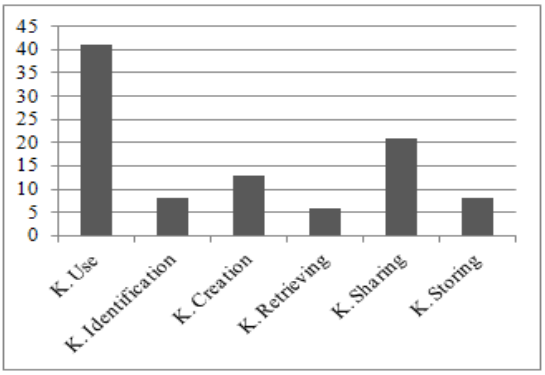

Figure 2: Number of Papers in each of the Subtopics of KM (source: own analysis).

In this way, the main research subtopics of 2015 were identified. These subtopics are based on the KM practices proposed by Heisig (2009) – knowledge use, knowledge identification, knowledge creation, knowledge retrieving, knowledge sharing and knowledge storing. The identified subtopics together with corresponding research problems stated in the papers are listed in Table 1.

The results show that knowledge use is the category with the highest representation in the sample. This subtopic includes a wide range of research problems like personal knowledge measurement, KM performance measurement, decision making or innovations.

Knowledge sharing is also quite a large group of papers, which is important especially in European countries like Finland, Germany, Scotland, Austria, followed by the United States and Taiwan. These papers deal with topics of language clustering, social media for knowledge exchange, and effects of supporting knowledge sharing.

The number of papers in each category of subtopics is show in the figure below (Figure 1). Across the identified subtopics, there are three research problems which should be highlighted.

A research area common across the identified groups of subtopics is the area of health care (12 papers). Researchers worldwide are interested in how to share knowledge in hospitals and also how to use information technology and databases for learning and improving decision making.

Researchers in Taiwan, China, the United States, Spain, and the United Kingdom are interested in innovations (10 papers). The papers connected with innovations are focused on innovation ability, the relationship between learning and innovations, the relationship between human resources, KM practices and the innovation performance of R&D productivity.

Information technology is a group of papers focused on using social technologies, organizational memory, e-learning, information systems, and documentation structure. These topic are popular in European countries like the United Kingdom, Denmark, France, and Belgium, as well as in Brazil and India (8 papers).

4.1 Geographical Concentration of Knowledge Management Research

Figure 2 depicts the geographic concentration of KM research in 2015.

To prepare this figure we used the authors' affiliations. Each bubble in the figure contains the number of papers produced in a certain country, either as the only authors or co-authors in cooperation with researchers from abroad. If the paper was prepared together with foreign researchers, then we entered also the link between these countries.

The results show that the center of research on KM in 2015 was Europe, where 68 papers were written. The main concentrations of KM research in 2015 were found in England and Spain (12 papers in England and 11 papers in Spain). In England, the research is focused, among other things, on health care, and in Spain on innovations.

A strong focus on KM research could be found also at U.S. universities where the researchers are focused on health care topics or KM activities like knowledge creation, use and sharing.

5 CONCLUSIONS

KM is still an important area of research worldwide. An often cited paper by Karl M. Wiig was published in 1997. This paper described the evolution of KM and also the proposed future development of this area in the next two decades. The aim of this paper was to compare Wiig´s prognosis with the current state of literature in KM and find out if these predictions were accurate.

Results of the short literature review provided proof that Wiig was remarkably correct about the future of KM. All five perspectives proposed by him 18 years ago are supported by some evidence in current literature. In the Management Practices Perspective, KM became a key competitive factor, and many activities of KM were implemented. From the Information Technology Perspective, IT can enable the storing and sharing of knowledge in a company. There is also evidence that organizational effort in the area of Human Resources Management can support KM activities in a company. At present, many companies act as a developers or suppliers of technologies or services that assist in KM. Lastly, researchers are also focused on methods and metrics enabling the measurement of KM effectiveness. Some of Wiig's predictions relate to using KM practices, supporting practices or IT to support KM activities in companies. These predictions are thoroughly verified by the literature review.

The second part of the paper contained a quantitative analysis of KM literature in 2015 with the aim to identify which subtopics of KM will be the main focus of future researchers. Based on the analysis, it was concluded that biggest group of papers was focused on knowledge use subtopic that contains research problems like KM performance measurement or innovations. Across all identified groups of subtopics three groups of research problems were identified. These are KM in health care, innovations and IT. KM literature should be focused on knowledge sharing and decision making in the health care branch and also KM performance measurement. This research was limited by the number of papers analysed and also by the focus on papers from just 2015. With such a limited analysis, it is hard to make definite conclusions about the future focus of KM research. Therefore, this is a work in progress. More extended research of KM literature with the same methodology will be conducted in the future to derive more concrete results.

ACKNOWLEDGEMENTS

The authors are thankful to the Internal Grant Agency of Faculty of Management and Economics, TBU in Zlín, project No. IGA/FaME/2015/040, "The Proposal of System of Targeted Support of Knowledge Sharing and its Impact on Financial Performance of Organizations."

REFERENCES

Afiouni, F., 2007. Human Resource Management and Knowledge Management: A road Map toward Improving Organizational Performance. *Journal of American Academy of Business*, 11(2): 107 – 136.

Alavi, M., Ledner, D. E., 2001. Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundantions and Research Issues. *MIS Quarterly,* 25(1): 107 - 136.

Calantone, R. J., Cavusgil, T. S., Zhao, Y., 2012. Learning Orientation, Firm Innovation Capability, and Firm Performance. *Industrial Marketing Management*, 31: 515 – 524.

Casimir, G., Lee, K., Loon, M., 2012. Knowledge Sharing: Influences of Trust, Commitment and Cost. *Journal of Knowledge Management*, 16(5): 740 – 753.

Gholami, H. M. et *al*., 2013. Investigating the Influence of Knowledge Management Practices on Organizational

Performance: An Empirical Study. *Acta Polytechnica Hungarica,* 10(2): 205-216.

Gloet, M., 2006. Knowledge Management and the Links to HRM: Developing Leadership and Management Capabilities to Support Sustainability. *Management Research News*, 29(7): 402 – 413.

Heisig, P., 2009. Harmonisation of Knowledge Management – Comparing 160 KM Frameworks around the Globe. *Journal of Knowledge Management*, 13(4): 4 – 31.

Hung, R. Yang, B., Lien, B. Y. H., McLean, G. N., Kuo, Y. M., 2010. Dynamic Capability: Impact of Process Alignment and Organizational Learning Culture on Performance. *Journal of World Business*, 45(3): 285 – 294.

KM World, 2015. 100 Companies that Matter in Knowledge Management. Retrieved August 27, 2015 from http://www.kmworld.com/Articles/Editorial/Features/KMWorld-100-COMPANIES-That-Matter-in-Knowledge-Management-102189.aspx.

Lee, V. H., Leong, L. Y., Hew, T. S., Ooi, K. B., 2013. Knowledge Management: A Key Determinant in Advancing Technological Innovation? *Journal of Knowledge Management*, 17(6): 848 – 872.

Lin, H. F., 2014. A Multi-Stage Analysis of Antecedents and Consequences of Knowledge Management Evolution. Journal of Knowledge Management, 18(1): 52 – 74.

Marr, B., 2012. *Key performance indicators: the 75 measures every manager needs to know*, Pearson. Harlow, 1st ed.

Matošková, J., 2011. How to Support Knowledge Management through Human Resource Management Activities. *The International Journal of Knowledge, Culture and Change Management*, 11.

Molochodnik, M., Shakina, E., Bykova, A., 2012. Intellectual Capital Transformation Evaluation Model. *Journal of Intellectual Capital*, 13(4): 444 – 461.

Minbaeva, D. B., Pedersen, T., Bjormnab, I., Fey, C. F., 2014. A Retrospective on: MNC Knowledge Transfer, Subsidiary Absorptive Capacity, and HRM. *Journal of International Business Studies*, 45(1): 52 – 62.

Qureshi, S., Briggs, R. O., Hlupic, V., 2006. Value Creation from Intellectual Capital: Convergence of Knowledge Management and Collaboration in the Intellectual Bandwidth Model. *Group Decision and Negotiation*, 15(3): 197 – 220.

Ragab, M., Arisha, A., 2013. Knowledge Management and Measurement: A Critical Review. *Journal of Knowledge Management*, 17(6): 873 – 901.

Sparrow, J., 2001. Knowledge Management in Small Firms. Knowledge and Process Management, 8(1): 3 – 16.

Stewart, T. A., 2001. *The wealth of knowledge: intellectual capital and the twenty-first-century organization*, Currency. New York, 1st ed.

Tseng, S. M., 2008. The Effects of Information Technology on Knowledge Management Systems. *Expert Systems with Applications*, 35: 150 – 160.

Yahya, S., Goh, W. K., 2002. Managing Human Resources toward Achieving Knowledge Management. *Journal of Knowledge Management*, 6(5): 457 – 465.

Wang, Z., Wang, N., Liang, H., 2014. Knowledge Sharing, Intellectual Capital and Firm Performance. *Management Decision*, 52(2): 230 - 258.

Wiig, K. M., 1997. Knowledge Management: Where Did It Come from and Where Will It Go? *Expert Systems with Applications*, 13(1): 1 – 14.

Wong, K. Y., Tan, L. P., Lee, Ch. S., Wong, W. P., 2015. Knowledge Management Performance Measurement: Measures, Approaches, Trends and Future Direction. *Information Development*, 31(3): 239 – 257.